FIRE ALARM SYSTEM

Volume IV

Operations & Maintenance Manual

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EST3 BASE PLATFORM

Operations & Maintenance Manual
December 2015

EST
Life Safety & Communications

EST3 Base Platform

With Signature Series Fire Alarm

Overview

EST3 is a modular control platform uniquely designed to meet the needs of applications ranging from standalone single panel fire alarm systems to multi-panel networks with unified fire alarm, security, and Mass Notification functions. Each function uses many of the same components, simplifying system layouts.

Virtually all EST3 operating features are software-controlled. A powerful System Definition Utility program helps define system operations in a fraction of the time required by previous methods. This gives EST3 great site flexibility and ensures operational changes and upgrades will be possible years after the initial installation.

EST3 is uniquely designed to meet the life safety needs of any size facility. The function of each panel can be customized by using an extensive selection of plug and play local rail modules.

With support for 64 nodes of up to 2,500 devices each, this network's multi-priority peer-to-peer token ring protocol delivers a fast alarm response time across any size network. Add to that the ability to network panels with fiber or copper connections with an overall length of 160000 ft - that's 30 miles - and you've got virtually unlimited networking options.

The EST3 is modularly listed under the following standards: UL 864 categories: UOJZ, UOXX, UUKL and SYZV, UL 294 category ALVY, UL 609 category AOTX, UL 636 category ANET, UL 1076 category APOU, UL 365 category APAW, UL 1610 category AMCX, UL 1635 category AMCX, UL2572 Mass Notification.
Also listed to ULC-S527, ULC-S303, and ULC/ORD-C1076.

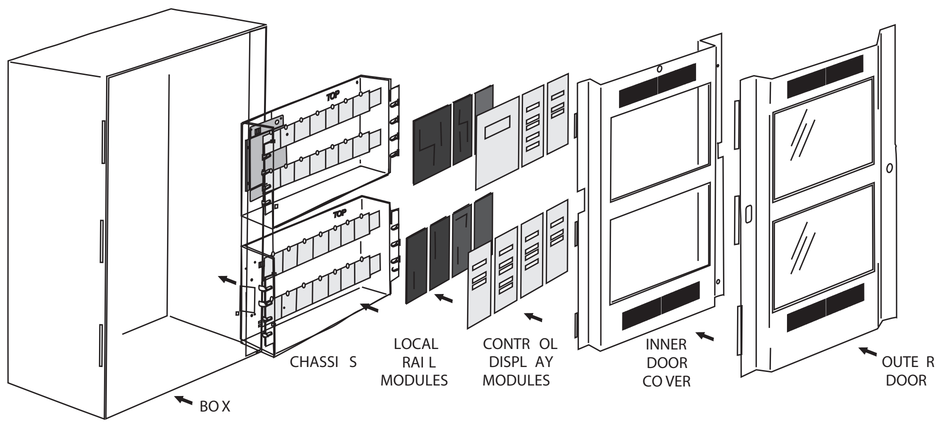
Standard Features

- Listed for Mass Notification/Emergency Communication, Fire, Security, and Emergency Voice Alarm
- 168-character LCD
- Exceptional alarm response times
- Network supports copper, multi-mode fiber, single-mode fiber, or a combination of all three
- Total network wiring over 160,000 feet
- Eight channels of multiplexed digital audio on a single pair of wires or fiber filiment
- Zoned, distributed and banked audio amplifier options
- Local, Proprietary, and Central Station system operations
- In retrofit applications, existing wiring may be used if code compliant
- Supports Edwards Signature Series detectors and modules
- Designed in accordance with ISO-9000 quality standards
- UL864 Ninth Edition Listed
- UL2572 Listed for Mass Notification
- Optional earthquake hardening: OSHPD seismic pre-approval for component Importance Factor 1.5

Outstanding Features

EST3 system components are arranged in layers, starting with the backbox and finishing with inner and outer doors. Cabinets are available with room for up to 20 modules and system batteries up to 65 AH. A single 24-volt battery can act as the secondary power supply for all four internal power supplies. Once the backbox is installed, up to four power supplies can be installed in the chassis assembly. The power supplies use a unique paralleling arrangement that ensures the optimum use of each supply. Each supply has the capacity to deliver up to 7 amps at 24 Vdc (28 amps total).

The function of each life safety network panel is determined by the Local Rail Modules (LRMs) plugged into the panel's chassis. An extensive variety of modules are available, including central processing units, input/output circuit modules, communication modules, security modules, and audio amplifier modules.



The top layer of the LRMs is referred to as the user interface layer. This layer is made up of the Main Display Interface module and a system of generic control/display modules. Any control/display module can mount on any LRM. This maximizes flexibility of design for custom systems. The inner and outer doors finish and secure the enclosure.

A single panel can support up to 2,500 addressable points, provide 28 amps @ 24 Vdc and still have room for future expansion. If a single panel is not large enough or you need to distribute functionality throughout the project, then you can network up to 64 panels together!

Networking/Communications

The EST3 Life Safety Network uses a multi-priority peer-to-peer token ring protocol. The protocol gives EST3 the exceptionally fast alarm response time of less than three seconds across the network, virtually independent of the total number of nodes. The EST3 token ring network configuration also affords long distances between panels. The distance between any three panels on #18 AWG (1.0 mm²) is 5,000 ft (1,523m) for both network control and digital audio signals. Supporting a maximum of 64 panels on a network, the total network length can be in excess of 160000 ft (48768m). Network and audio communication are via RS-485 serial ports. Each two-wire circuit supports Class A (Style 7) or Class B (Style 4) wiring configurations. Fiber optic media is also available.

As an indication of the high level of system integration, off-premise communications is handled by the Modcom modem communicator module. This module provides the Digital Alarm Communicator Transmitter (DACT) function, sending system status signals for up to 255 accounts to up to 80 different central monitoring stations and/or commercial paging carriers.

Digital Audio

EST3 digitized audio can deliver up to eight audio messages *simultaneously* over a single pair of wires! This is plenty of capacity for both live and pre-recorded messages. EST3 easlly supports the needs of mass notification messaging, and fire alarm messaging by providing the ability to bring not only pre-recorded messages but also live voice messaging supporting not only evacuation announcments but the messaging needed to support the risks that may require shelter-in-place and relocation messaging.

All audio messages and live pages originate at the Audio Source Unit (ASU) that can store up to 100 minutes pre-recorded audio messages as .wav files. These messages can be automatically directed to various areas in a facility under program control. On the receiving end, zoned amplifiers installed in remote fire alarm cabinets receive and decode the digital messages. The messages are then amplified and sent out to the speakers.

The availability of eight different channels opens a number of new *simultaneous* notification possibilities:

1) Live voice page for MNEC or fire-related instructions;
2) Emergency floor evacuation/notification message;
3) Alert message on floors above and below the emergency;
4) Stairwell evacuation reinforcement message;
5) Elevator cab information messages;
6) Lobby message instructing occupants to exit the building;
7) Concourse instructions to occupants not to enter the lobby;
8) Other instructions to areas not directly affected by the emergency.

Any combination of the eight audio channels can be automatically directed to any or all areas of the building, with total manual override as required. Eight channel capability assures that one message is never interrupted in order to process another, a common fault with two-channel systems. This eliminates any chance of confusing the occupants with conflicting messages.

Survivability is also an integral part of EST3's digitized audio system. Default audio messages are continuously transmitted to all network amplifiers by the ASU. These messages provide audio supervision for the digital audio chain, and act as a default signal if the network data circuit fails or should message control information fail to reach the ASU. If the audio data circuit fails, each amplifier generates a 1KHz temporal (3-3-3) tone that is transmitted during an alarm. In the event of an amplifier failure, a backup audio amplifier is automatically substituted for the failed amplifier in the cabinet, restoring audio capability. In the unlikely event of multiple amplifier failures, the backup amp replaces the amplifier actively processing the highest priority message in the cabinet. When messages are no longer directed to a failed amplifier such as when a high priority page message ends, the backup amp is dynamically reassigned to the next highest priority failed amplifier actively processing messages

The Firefighters Telephone Control unit (FTCU) provides two-way communications between remotely located phones and the fire command center. The alphanumeric display makes operation intuitive, and a single switch permits the phone signals to be used to issue pages in the facility.

Digitized audio increases notification messaging flexibility, reduces wiring and installation costs, provides enhanced supervision and survivability, and is easy to use.

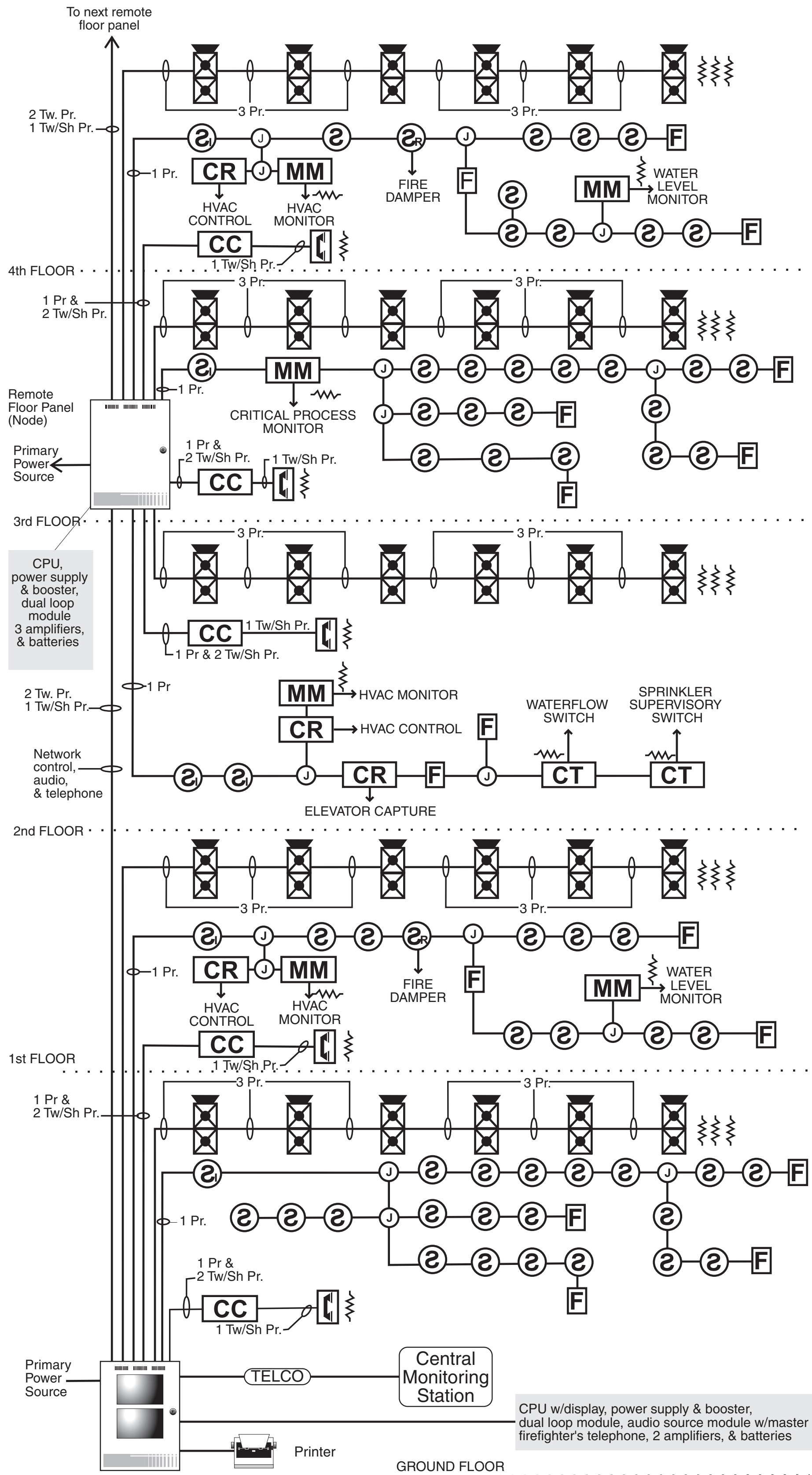
Enhanced Reliability & Survivability

The EST3 uses distributed technology, designed to survive expected and unexpected events including earthquakes. Simple-to-install kits provide internal hardening that meets ;requirements defined by *Uniform Building Code* (UBC 1997); *International Building Code* (IBC 2006); and, *Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems* (AC-156). Seismic component importance factor of 1.5 can be met by adding appropriate anchorage for local conditions. There is no need for special installation methods for EST3 field devices including signals and detection devises. By following standard mounting methods, along with any local requirements, seismic Importance Factor 1.5 may be gained in order to further enhance system survivability.

On the initiating side, intelligent Signature Series detectors can make alarm decisions on their own, and do not involve other system components in this important decision-making process. Sensor-based technology must communicate data to a remotely located common panel where alarm decisions are made. Failure of this centralized processor can cripple sensor-based systems. With EST3, a panel CPU failure does not disable a panel's ability to provide protection. In the event of a CPU failure, the intelligent device controllers can still receive alarms and distribute the alarm information to all other modules in the panel. Modules in the panel are capable of responding with a programmed standalone alarm response.

When a network is wired in a Class B configuration, a single break or short on the wiring isolates the system into two groups of panels. Each group continues to function as a peer-to-peer network, working with their combined databases. When wired using a Class A configuration, a single break or short on the network wiring causes the system to isolate the fault, and network communication continues uninterrupted – without any loss of

Typical Wiring



Contact us...

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EST is an EDWARDS brand.

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Web: www.chubbedwards.com

function. Should multiple wiring faults occur, the network re-configures into many sub-networks and continues to respond to alarm events from every panel that can transmit and receive network messages. Survivability is maximized as responses originating and executed by a single panel are always carried out because a copy of the system database is stored in the panel's memory.

Scheduled maintenance improves system availability, and EST3 is designed to make system maintenance easy. System components are designed to assist in routine and time-consuming service functions.

- EST3 service groups are defined by location, not by system wiring. There is no need to disable an entire floor to test a single device.
- According to their UL listings, Signature Series detectors do not require routine sensitivity testing – a real timesaver.
- Comprehensive internal and external monitoring quickly identifies most problems to a component level, including ground faults that can be identified down to the module.
- Parts are easy to replace. Modules plug in and use automatic addressing and plug-in field wiring. No DIP switches are used.
- Firmware in system modules and Signature devices is easily upgraded as new advances in detection and control technology are made available.
- Advanced system diagnostics are provided in the EST3 System Definition Utility.

User Friendly

A comprehensive survey of users resulted in system features and controls that are easy to use.

The main display interface shows the operator the first and most recent system events – without ever touching a single control! All system events are sent to one of four message queues. Alarm messages are never intermixed with trouble or supervisory signals, eliminating confusion. For more information the *Details* switch provides additional information about the highlighted device. The operator can easily review supervisory, trouble, and monitor messages by simply selecting the appropriate message queue. After a few minutes of inactivity, the system automatically returns to displaying the first and most recent events.

Optional manual control switches and display modules can be arranged on the system operator layer to suit the application. These modules can be used to provide additional HVAC controls, manual selection of audio circuits, or other required manual control functions.

The digital audio system uses only five basic controls to direct all paging messages.

- ALL CALL directs page messages to all zones in the facility.
- Page to EVACUATION automatically directs page messages to the fire area.
- Page to ALERT automatically directs page messages to the areas receiving the alert message.
- All Call Minus automatically directs page messages to the areas NOT receiving the evacuation or alert messages.
- Page by Phone selects the firefighters' telephone system as the source for paging.

The Firefighters' Telephone Control Unit (FTCU) uses an alphanumeric display to indicate the source of incoming calls. Operators simply scroll through the list and hit the "Connect" button when the desired call is highlighted. There is no need to look through rows of lamps and switches to determine the source of calls. Up to five remote locations can be in simultaneous two-way communications with the FTCU.

System Configuration

The powerful EST3 System Definition Utility (SDU) helps define flexible system operations in a fraction of the time required by other systems. Based on an object-oriented system of rules, virtually all EST3 operating features are software-controlled. This gives the designer great flexibility in integrating mass notification, fire, and security functions into a single seamless design.

A report generator provides a complete library of system reports that are invaluable for troubleshooting, including a printout of Signature device connections as the devices are actually wired.

Use of software-based components permits the SDU to add new features to the system. Even the Signature Series devices are capable of upgrading firmware as new detection algorithms become available.

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EST3
Installation and Service Manual

P/N 270380 • REV 12.0 • ISS 26APR12

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TRADEMARKS	

Content

Important information

Limitation of liability

This product has been designed to meet the requirements of NFPA Standard 72; Underwriters Laboratories, Inc., Standard 864; and Underwriters Laboratories of Canada, Inc., Standard ULC S527. Installation in accordance with this manual, applicable codes, and the instructions of the Authority Having Jurisdiction is mandatory. UTC Fire & Security shall not under any circumstances be liable for any incidental or consequential damages arising from loss of property or other damages or losses owing to the failure of UTC Fire & Security products beyond the cost of repair or replacement of any defective products. UTC Fire & Security reserves the right to make product improvements and change product specifications at any time.

While every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents, UTC Fire & Security assumes no responsibility for errors or omissions.

FCC warning

This equipment can generate and radiate radio frequency energy. If this equipment is not installed in accordance with this manual, it may cause interference to radio communications. This equipment has been tested and found to comply within the limits for Class A computing devices pursuant to Subpart B of Part 15 of the FCC Rules. These rules are designed to provide reasonable protection against such interference when this equipment is operated in a commercial environment. Operation of this equipment is likely to cause interference, in which case the user at his own expense, will be required to take whatever measures may be required to correct the interference.

Industry Canada information

Note: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. Industry Canada does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate

Note: The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop that is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirements that the sum of the Load Numbers of all the devices does not exceed 100.

UL 864 programming requirements

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, AND OTHER INVOLVED PARTIES

This product incorporates field-programmable software. In order for this product to comply with the requirements in the *Standard for Control Units and Accessories for Fire Alarm Systems* (UL 864) certain programming features or options must be limited to specific values or not used at all as indicated below.

Programmable feature or option	Permitted in UL 864? (Y/N)	Possible settings	Settings permitted in UL 864
Telephone line supervision	Y	No Yes	Yes
Second telephone line	Y	No Yes	No [1] Yes
Trouble Resound	Y	00:00:00 to 99:59:59	00:00:00 [2] to 24:00:00
AC Power Delay	Y	Disabled 01:00 to 45:00	01:00 to 03:00
Event message routing	Y	All Cabinets No Cabinets User defined routes (1 to 15)	All Cabinets No Cabinets [3] User defined routes (1 to 15) [4]
Event message display filtering: Alarm, Supervisory, and Trouble options	Y	Enabled Disabled	Enabled Disabled [5]
Delays (programmed in rules)	Y	0 to 240 seconds	0 to 240 seconds [6]
CMS event reporting priority (programmed in rules)	Y	1 to 255	1 to 255 [7]
CMS activate and restore messages (programmed in rules)	Y	Send on activation Send on restoration	Activation and restoration triggers must match the message type
AND Group member device types, Activation event: Q1 - Alarm	Y	GENALARM SMOKE SMOKEVFY HEAT PULL STAGEONE STAGETWO WATERFLOW	GENALARM SMOKE SMOKEVFY [9] HEAT PULL STAGEONE [9] STAGETWO [9] WATERFLOW
AND group device activation count	Y	1 to 255	1 to 255 [10]

Programmable feature or option	Permitted in UL 864? (Y/N)	Possible settings	Settings permitted in UL 864
SIGA-IO(-MIO) modules: Personality codes 35 and 36	N	N/A	N/A
CO Supervisory	N	Latching / nonlatching	N/A
CO Monitor	N	Latching / nonlatching	N/A
Matrix groups: Device activation count	Y	3 to 10	3 to 10 [10]

[1] Allowed only when the supervising station supervises the telephone line and annunciates fault conditions within 200 seconds.

[2] Allowed only on control panels that transmit trouble event signals off premises.

[3] Allowed only with monitor device types and switches.

[4] Allowed only if user route includes the control panel.

[5] Allowed only on nonrequired remote annunciators.

[6] Allowed only when setting does not prevent the activation or transmission of alarm or supervisory signals within 10 seconds or trouble signals within 200 seconds.

[7] When priorities are used, alarm events must have a higher priority than supervisory and trouble events.

[8] Not allowed in Zone groups that are used to initiate the release of extinguishing agent or water.

[9] Not allowed in AND groups that are used to initiate the release of extinguishing agent or water.

[10] A minimum device activation count of 2 is required if the group is used to initiate the release of extinguishing agent or water.

About this manual

This manual provides information on how to properly install, wire, and maintain the EST3 integrated system and related components. This manual applies to the following EST3 models:

- EST3
- EST3R
- EST3-230
- EST3R-230

Model number JB-TBZL-EST3, used to describe the EST3 life safety system in the Chinese marketplace, carries the same UL listings and approvals as EST3 when installed and configured using the subcomponents and methodologies described in this manual.

Organization

Chapter 1: System overview: a descriptive overview of the components and subsystems that comprise an EST3 system.

Chapter 2: Security applications: covers security applications. This chapter contains block diagrams that show the components required to create specific security systems.

Chapter 3: Access control applications: covers access control applications. Like Chapter 2, this chapter contains block diagrams and descriptions of specific access control systems.

Chapter 4: Centralized audio applications: describes the equipment and configuration required to create centralized audio for a site.

Chapter 5: Installation: installation information for system components and applications that supplement the instructions provided on individual component installation sheets.

Chapter 6: Power-up and testing: information and procedures necessary to perform initial system power-up and acceptance testing.

Chapter 7: Preventive maintenance: lists the required scheduled maintenance items and procedures.

Chapter 8: Service and troubleshooting: a comprehensive set of procedures and tables to aid certified technical personnel in servicing and troubleshooting the system.

Appendices A, B, and C provide supplementary information about system addressing, calculations, and compatibility.

Safety information

Important safety admonishments are used throughout this manual to warn of possible hazards to persons or equipment.

WARNING: Warnings are used to indicate the presence of a hazard which will or may cause personal injury or death, or loss of service if safety instructions are not followed or if the hazard is not avoided.

Caution: Cautions are used to indicate the presence of a hazard which will or may cause damage to the equipment if safety instructions are not followed or if the hazard is not avoided.

The EST3 library

EST3 documents

A library of documents and multimedia presentations supports the EST3 life safety system. A brief description of each is provided below.

EST3 Installation and Service Manual (P/N 270380): Gives complete information on how to install and service the EST3 hardware. The manual also includes installation information on selected Signature Series components.

SDU Online Help (P/N 180653): Provides full online support for configuring and programming a system using the System Definition Utility program.

EST3 System Operation Manual (P/N 270382): Provides detailed information on how to operate the system and system components.

EST3 Smoke Management Application Manual (P/N 270913): Provides information for designing, programming, and testing an EST3 smoke control system.

EST3 ULI ULC Compatibility Lists (P/N 3100427): Lists the appliances, devices, and accessories that are compatible with EST3.

Other documents

In addition to documents in the EST3 library, you may find the following documents useful.

Signature Series Detector Application Bulletin (P/N 270145): Provides additional applications information on the Signature series smoke and heat detector applications.

Signature Series Component Installation Manual (P/N 270497): Contains detailed mounting and wiring information for all Signature series devices.

Speaker Application Guide (P/N 85000-0033): Provides information on the placement and layout of speakers for fire alarm signaling and emergency voice communications.

Strobe Applications Guide (P/N 85000-0049): Provides information on the placement and layout of strobes for fire alarm signaling.

Related documentation

National Fire Protection Association
1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101

NFPA 70 National Electric Code

NFPA 72 National Fire Alarm and Signaling Code

NFPA 11 Low-Expansion Foam Systems

NFPA 11A Medium- and High-Expansion Foam Systems

NFPA 12 Carbon Dioxide Extinguishing Systems

NFPA 13 Sprinkler Systems

NFPA 15 Water Spray Fixed Systems for Fire Protection

NFPA 16 Deluge Foam-Water Sprinkler and Foam-Water Spray Systems

NFPA 17 Dry Chemical Extinguishing Systems

Underwriters Laboratories, Inc.
333 Pfingsten Road
Northbrook, IL 60062-2096

UL 38 Manually Actuated Signaling Boxes

UL 217 Single and Multiple Station Smoke Alarms

UL 228 Door Closers/Holders for Fire Protective Signaling Systems

UL 268 Smoke Detectors for Fire Alarm Signaling Systems

UL 268A Smoke Detectors for Duct Applications

UL 294 Access Control System Units

UL 346 Waterflow Indicators for Fire Protective Signaling Systems

UL 365 Police Station Connected Burglar Alarm Units and Systems

UL 464 Audible Signaling Appliances

UL 521 Heat Detectors for Fire Protective Signaling Systems

UL 609 Local Burglar Alarm Units and Systems

UL 636 Holdup Alarm Units and Systems

UL 681 Installation and Classification of Burglar and Holdup Alarm Systems

UL 827 Central-Station Alarm Services

UL 864 Standard for Control Units and Accessories for Fire Alarm Systems

UL 1076 Proprietary Buglar Alarm Units and Systems

UL 1481 Power Supplies for Fire Protective Signaling Systems

UL 1610 Central-Station Burglar-Alarm Units

UL 1635 Digital Alarm Communicator System Units

UL 1638 Visual Signaling Appliances

UL 1971 Standard for Signaling Devices for the Hearing Impaired

UL 2075 Gas and Vapor Detectors and Sensors

Underwriters Laboratories of Canada
7 Crouse Road
Scarborough, ON
Canada M1R 3A9

CSA C22.1 Canadian Electrical Code Part 1

ULC S527 Standard for Control Units for Fire Alarm Systems

ULC S524 Standard for the Installation of Fire Alarm Systems

ULC S536 Standard for the Inspection and Testing of Fire Alarm Systems

ULC S537 Standard for the Verification of Fire Alarm Systems

ULC ORD–C693–1994 Central Station Fire Protective Signaling Systems and Services

CAN/ULC-S301 Standard for Central and Monitoring Station Burglar Alarm Systems

CAN/ULC-S302 Standard for Installation and Classification of Burglar Alarm Systems for Financial and Commercial Premises, Safes, and Vaults

CAN/ULC-S303 Standard for Local Burglar Alarm Units and Systems

PLUS: Requirements of state and local building codes and the local authority having jurisdiction.

Chapter 1

System overview

Summary

This chapter provides a descriptive overview of the components and subsystems that comprise a system.

Content

System description

EST3 is designed using modular hardware and software components to facilitate rapid configuration, installation, and testing. Most network components are provided as local rail modules (LRMs) that plug into the rail chassis assemblies. Rail chassis assemblies are available to meet most any application.

Rail modules are used for data processing, intrapanel communication of command/control data, response data, audio signal processing, and power distribution. Each rail module provides an interface to support a control/display module that can be mounted on the front of the module. Most field wiring is terminated using removable terminal strips for easy installation and servicing of modules.

Cabinets are available in a variety of sizes. The smallest (3-CAB5), in addition to the central processor module and primary power supply module, supports two rail modules and three control/display modules. The largest, the 3-CAB21 supports as many as 18 rail modules and 19 control/display modules.

An EST3 cabinet can be configured as a stand-alone system or as part of a network which supports up to 64 cabinets on a peer-to-peer Class A or B token ring network. Below is a partial list of local rail modules that can be incorporated into a system:

- Central Processor module (CPU). One is required for each panel. Several models of CPU are available. See the current compatibility lists for details.
- Primary Power Supply module (3 PPS/M, 3 BPS/M, or 3 BBC/M). One power supply module is required for each panel.
- Main LCD Display module (LCD). One LCD is required to provide a point of control for the entire network. Additional displays can be added to any CPU module for additional points of control or annunciation. Several LCD models are available. See the current compatibility lists for details.

Additional control/display modules as required by the application:

- 3-BPS/M Booster Power Supply module
- 3-MODCOM Modem Communicator module
- 3-SAC Security Access Control module
- 3-SSDC(1) Signature Driver Controller module
- 3-AADC(1) Analog Addressable Driver Controller module
- 3-IDC8/4 Initiating Device Circuit module
- 3-OPS Off-Premises Signaling module
- 3-ZAxx Zoned Amplifier modules

The audio and firefighter phone functions use a different hardware format, providing operator controls and storage for the microphone and telephone handset in a chassis configuration.

System features

Each cabinet in the system provides local control, display, power supply, and communication functions. Each cabinet has the following capacities:

- 10 addressable device circuits (Signature and addressable analog combined)
- 120 traditional input / output zones
- 4 Class B (2 Class A) security / access control communication (SAC) busses
- 10 modem / dialer cards, each with two telephone lines
- 2 RS-232 external peripheral device ports
- 456 LED annunciation points
- 342 input switches

In addition, the EST3 system has these global features:

- Firefighter telephone
- Custom programmability and user-friendly front panel
- Class B (Style B), initiating device circuits (IDC)
- Event reporting by alarm, trouble, supervisory, or monitor mode and message display routing
- Dead front construction
- Supports networking — up to 64 nodes may be connected in a regenerative Class A or Class B token ring
- Fast response time, less than three seconds from initial alarm to device activation on a fully loaded system over the network
- Flash memory on controller modules to facilitate quick firmware upgrades
- Supports 255 security partitions
- Multiplexed eight-channel digital audio system
- Transient protected field wiring
- Class B (Style Y) or Class A notification appliance circuits
- Ground fault detection by panel, Signature data circuit, and Signature modules
- Switch mode power supply

- Copper or fiber network and audio communications
- Application and firmware downloading over the network or from a single point
- Network-wide control routing
- Form C alarm, supervisory, and trouble relay contacts

Refer to the release notes for the latest information regarding specifications and capabilities.

Minimum system requirements

NFPA 72 system classification	Required control equipment
Protected Premises (Local)	Cabinet with a CPU (Central Processor module), one LCD (Main LCD Display module) one 3-PPS/M Primary Power Supply and Monitor, appropriate batteries, plus appropriate initiating device circuits and notification appliance circuits
Auxiliary —or— Remote Station —or— Proprietary Protected Premises	Add a 3-OPS Off Premises Signal module or a correctly configured and programmed 3-MODCOM Modem Communicator module to the protected premises system

System construction

The EST3 system is assembled in layers as shown in Figure 1-1. The cabinet (1) houses all the system components. A variety of cabinets are available for as few as 5 and as many as 21 modules. A 3-RCC14 cabinet is illustrated in Figure 1-1.

Mounted directly to the cabinets are the rail chassis assemblies (2), of which there are three types: rail, audio, and audio with telephone. The most common chassis is the rail chassis, which provides mounting and electrical connections for the local rail modules (LRMs) (4). Mounted on the rear of the chassis are the cabinet power supplies (3).

The local rail modules (4) are the specialized cards that provide an interface between the CPU and the field wiring. The front of any rail module can support a control/display module (5), providing customized operator controls and annunciators.

Completing the EST3 “CAB” series cabinet assembly are the inner (6) and outer (7) doors. The “RCC” cabinets use a single outer door.

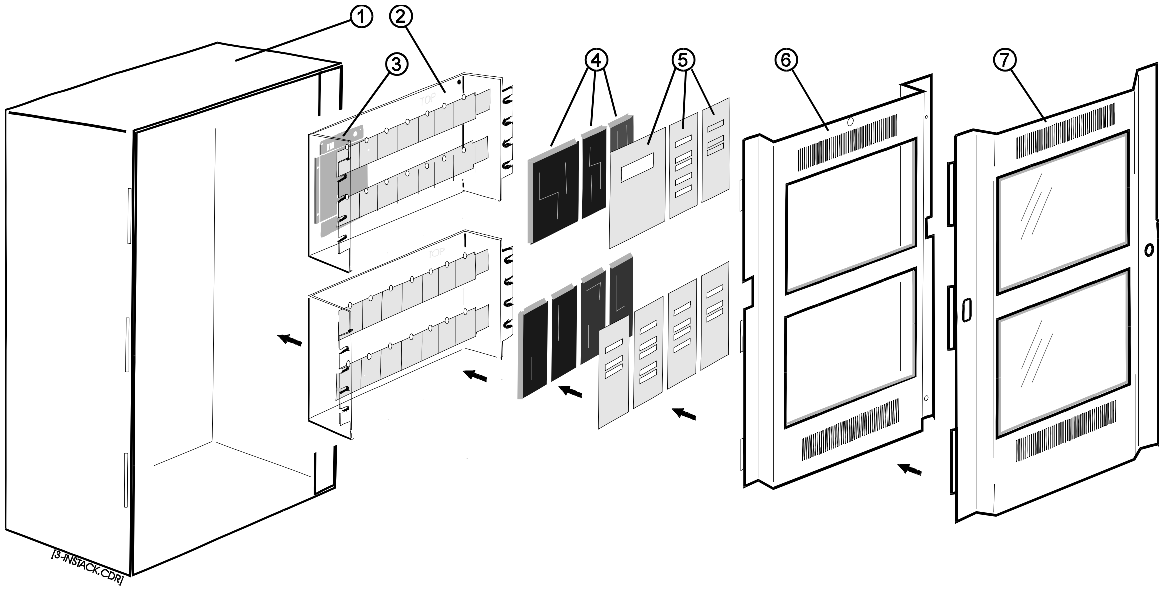


Figure 1-1: Exploded CAB series cabinet equipment installation

Audio subsystem description

The audio subsystem consists of a variety of signal sources, integral amplifiers, and sophisticated control software. The 3-ASU Audio Source Unit is available with the optional 3-FTCU Firefighter Telephone Control Unit as the model 3-ASU/FT. The ASU/FT is the only audio equipment required at the fire command control center. Zoned audio amplifiers are distributed throughout the system and provide the de-multiplexing, switching, amplification and circuit supervision.

Network audio riser wiring

A digital network audio riser consisting of a single pair (Class B) or two pairs (Class A) of wires connect all amplifiers together. Since the digital signals are multiplexed, any of 8 independent audio sources can be directed to any amplifier connected to the network. All command and control signals for the audio system are distributed over the network data riser.

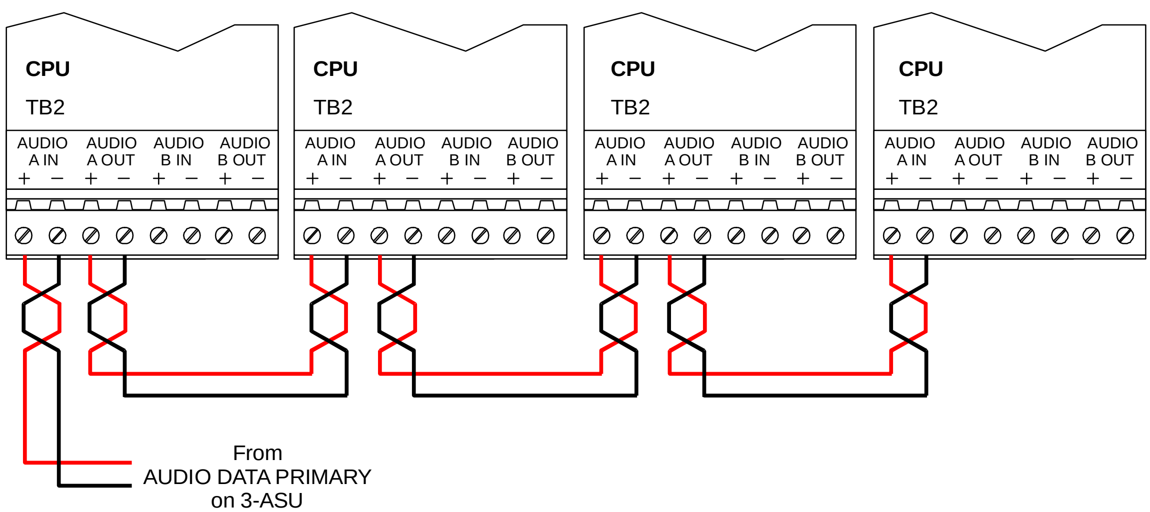


Figure 1-2: Class B network audio riser wiring

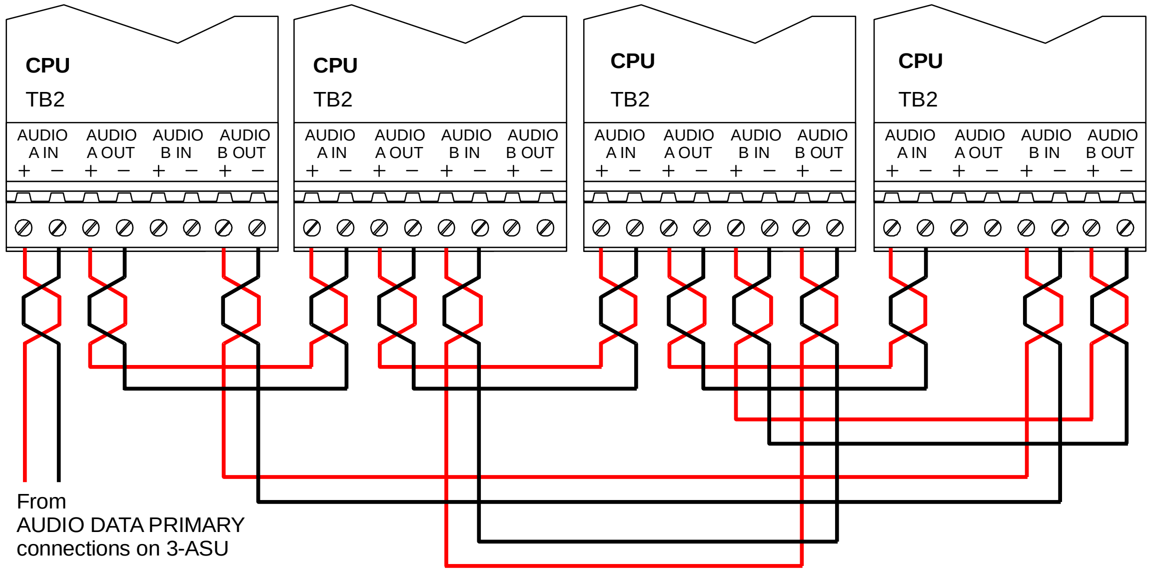


Figure 1-3: Class A network audio riser wiring

Amplifiers

Amplifiers are designed to feed a single audio zone and provide an integral 24 Vdc visual notification appliance circuit. Amplifier modules are available in 20-, 40-, and 95-watt versions, with each amplifier providing a single supervised Class B or A audio output circuit. The amplifier is configurable for either 25 Vrms or 70 Vrms output. An independent supervised Class B or Class A, 24 Vdc, 3.5 Amp notification appliance circuit (NAC) is also provided on the 20- and 40-watt amplifiers to drive notification appliances. In addition, automatic backup amplifiers can be added on a switched common backup configuration.

Each audio power amplifier has an integral demultiplexer, making the 8 audio channels available to the amplifier's input, as directed by the system programming. Each amplifier also contains circuitry that handles routine signal processing functions such as channel priority.

The amplifier's output is a dedicated, supervised, 25-, 70-Vrms speaker circuit, which covers one audio zone in the protected facility. Figure 1-4 is an example of an enclosure with four zone amplifiers and a backup amplifier. In response to an alarm, selected audio amplifiers have been connected to the required audio channels. Note that three different audio signals are being broadcast simultaneously.

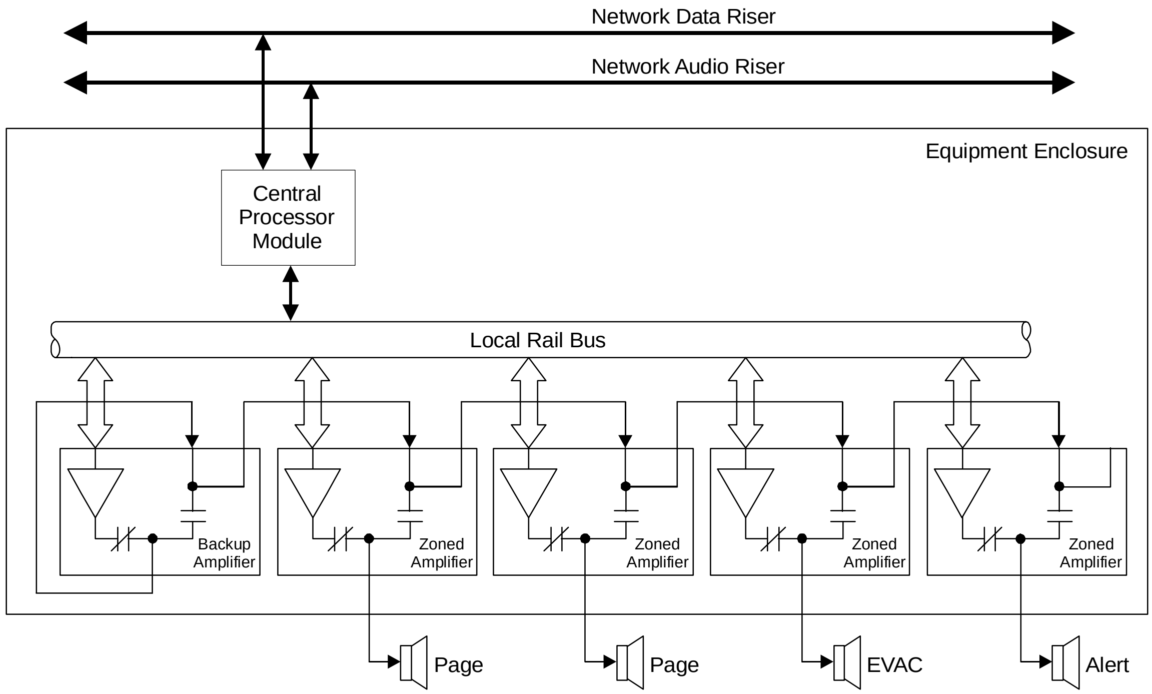


Figure 1-4: Normal amplifier operation

Possible fault condition	Amplifier operation
Amplifier loses communication with Central Processor module	If the panel is configured for stand-alone operation, the amplifier automatically switches to the EVAC channel and outputs its 1 kHz temporal tone when the panel detects an alarm. If the panel is not configured for stand-alone operation, the amplifier will not output any signal.
Panel loses communication with network data riser	Amplifier switches to the EVAC channel only in response to the local panel's programming uses the default EVAC message.
Panel loses communication with network audio riser	Amplifier switches to the EVAC channel in response to the system programming. For EVAC the amplifier uses its 1 kHz temporal tone. For Alert the amplifier uses its 1 kHz 20 bps tone.

Backup amplifiers

In the event of an amplifier failure (not a field wiring problem), the backup amplifier automatically replaces the failed amplifier, as shown in Figure 1-5.

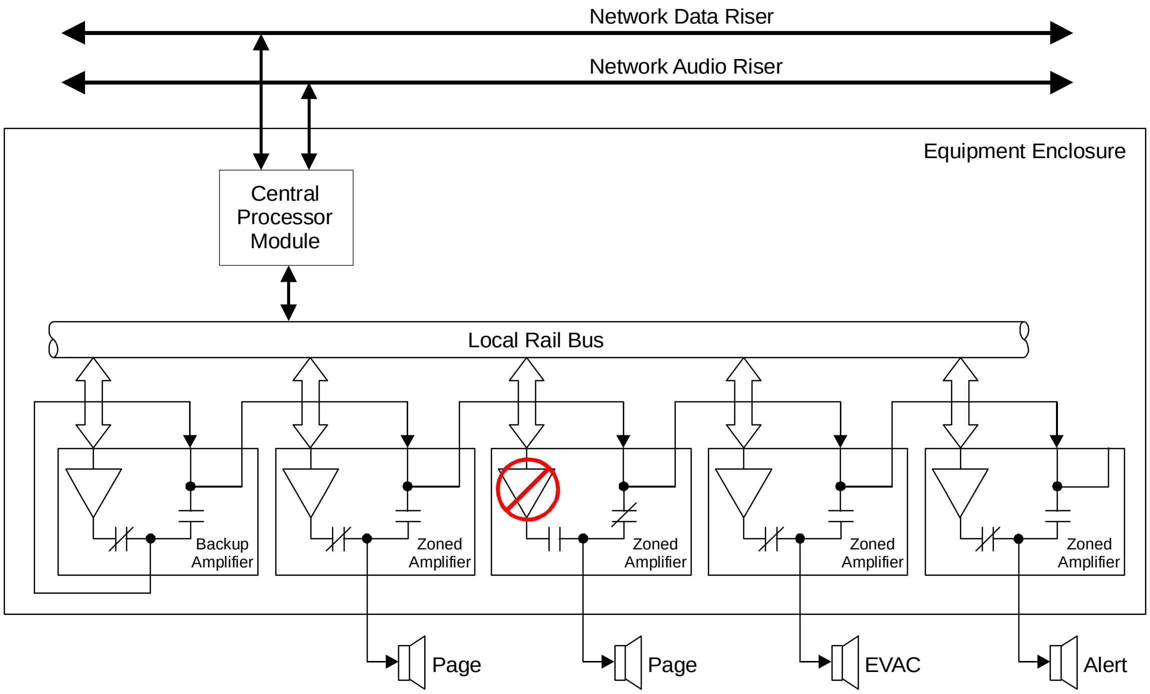


Figure 1-5: Single amplifier failure

Note: The backup amplifier will back up a failed amplifier if it was being used for Page, EVAC, or Alert. It will not back up an amplifier being used on an Auxiliary or General channel.

The amplifier failure caused the backup amplifier to automatically connect to the same audio source as the failed amplifier. The output of the backup amplifier replaced the output of the failed amplifier.

Note: The backup amplifier will not replace an amplifier that has detected a field wiring problem to prevent the amplifier from driving into a shorted circuit.

3-ASU Audio Source Unit

The 3-ASU is the source of the network audio riser. Available audio sources are local and remote voice PAGE functions and the firefighter telephone PAGE function. An integral tone generator database is provided for the EVAC, ALERT and other functions. Alternately, the 3-ASU's integral digital voice message playback unit can simultaneously provide up to 8 different prerecorded audio messages that may be assigned to any channel.

The multiplexer within the 3-ASU converts and compresses the real-time audio signal and converts it to a digital format. The output of the digital message playback unit and the integral tone generator database is already in the digital format. The 8 signal sources in digital format are then combined together as selected by the system designer using a multiplexer. This makes up the network audio riser signal.

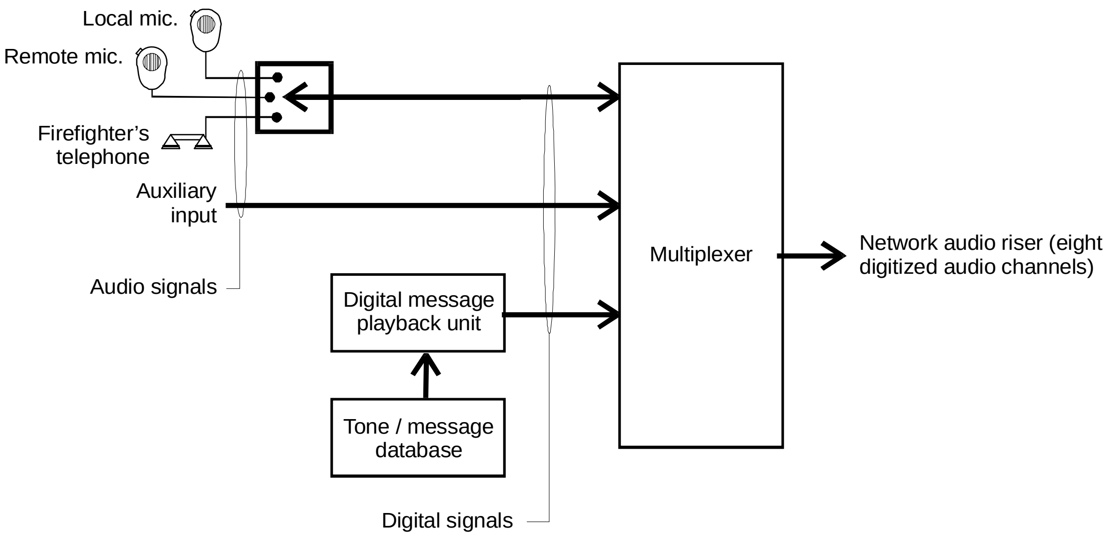


Figure 1-6: ASU Signal Flow

The amplifiers at the remote-panels extract the audio signals from the network riser, amplify it and send it to the speakers.

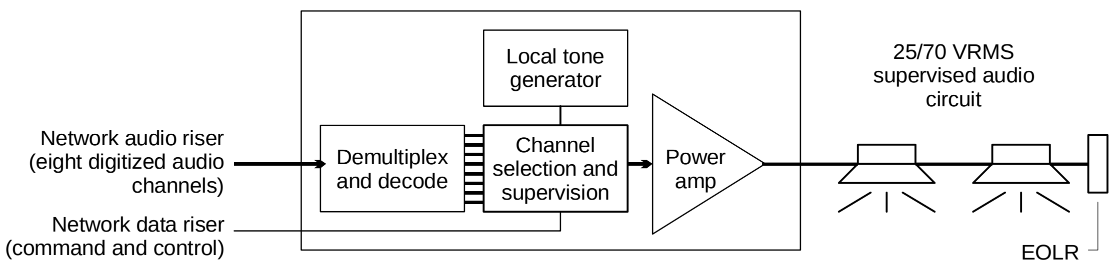


Figure 1-7: Amplifier Signal Flow

Audio signal priority

During system configuration, each of the eight available audio channels is assigned one of the five available attributes listed in Table 1-1. The Page, and Auxiliary attributes may only be assigned to a single channel. The General attribute may be assigned to up to four channels.

Table 1-1: Network audio channel parameters

Channel attribute	Priority
PAGE	1
EVAC	2
ALERT	3
AUXILIARY	4

Table 1-1: Network audio channel parameters

Channel attribute	Priority
GENERAL	5

Each channel attribute has a priority level associated with it. When more than one channel is commanded to source a given amplifier, the amplifier will connect to the source having the highest priority. The Page channel will only go active when the microphone push-to-talk switch is pressed.

Special audio source unit page modes

The front panel of the ASU offers four special page mode switches:

- All Call
- EVAC
- Alert
- All Call Minus

These switches provide instantaneous switching of the page signal to the most frequently contacted areas of the building. The special page modes do *not* require any source switching by the zoned audio amplifiers. When a special page mode switch is activated, the signal content of the eight outgoing audio channels is modified. Figure 1-8 illustrates this principle.

In the *normal page mode*, the eight audio signal sources are each connected to a separate audio channel, as represented by a ■ at the intersection of the signal source and the audio channel, shown at the lower left of Figure 1-8. Each audio channel is represented as a vertical line in this figure. The eight audio channels are actually multiplexed together and distributed over a common pair of wires called the network audio riser. The figure shows the system in the normal page mode, with the zoned audio amplifiers processing EVAC signals on the 1st and 3rd levels, a page signal on the 2nd level, and the alert signal on the 4th level.

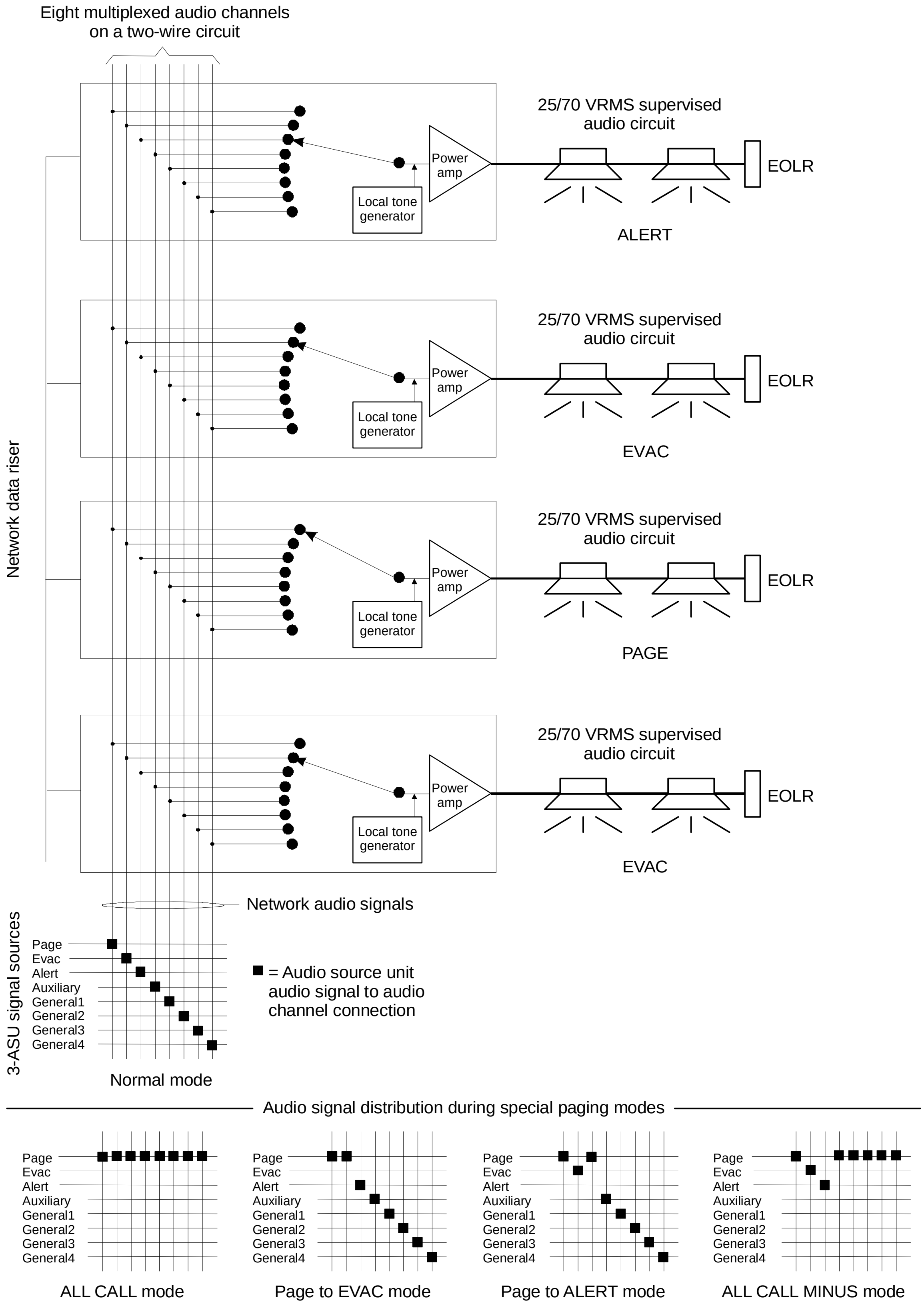


Figure 1-8: Audio Source Unit Special Page Mode Signal Flow

The *All Call* mode is used to send a page to the entire facility. When the All Call switch is activated, the Audio Source Unit is put into the all call mode. In this mode, the zoned audio amplifiers do not all transfer to the page channel. Rather, the Audio Source Unit redirects the page signal source to all the audio channels. Figure 1-8 shows the all call page source to audio channel connections in the lower left corner. Note that all channels receive the same signal. Any amplifier on the system, regardless of the audio channel selected, will receive the page. Any amplifiers that were previously idle will power up and receive the page.

The *Page to EVAC* mode is used to send a page to the areas automatically receiving the evacuation signal. Activating the EVAC switch causes the Audio Source Unit to enter the page to EVAC mode. In this mode, the zoned audio amplifiers connected to the EVAC channel do not transfer to the page channel. Rather, the Audio Source Unit redirects the page signal source to the EVAC channel. Figure 1-8 shows the page to EVAC mode page source to EVAC channel connections. The page and EVAC audio channels both receive the page signal. Any amplifier connected to either the page or EVAC audio channels will receive the page. The alert, auxiliary and general channels are connected to their respective signal sources, as in the normal mode.

The *Page to Alert* mode is used to send a page to the areas automatically receiving the alert signal. Activating the Alert switch causes the Audio Source Unit to enter the page to alert mode. In this mode, the zoned audio amplifiers connected to the alert channel do not transfer to the page channel. Rather, the Audio Source Unit redirects the page signal source to the alert channel. Figure 1-8 shows the page to alert mode page source to alert channel connections. The page and alert audio channels both receive the page signal. Any amplifier connected to either the page or alert audio channels will receive the page. Any amplifiers that were previously idle will power up and receive the page. The EVAC, auxiliary and general channels are connected to their respective signal sources, as in the normal mode.

The *All Call Minus* mode is used to send a page to all areas NOT automatically receiving the EVAC or alert signals. In high rise applications, all call minus is an effective way to quickly select stairwells. Activating the All Call Minus switch causes the Audio Source Unit to enter the all call minus mode. In this mode, the zoned audio amplifiers connected to the auxiliary and general channels do not transfer to the page channel. Rather, the Audio Source Unit redirects the page signal source to the auxiliary and four general channels. Figure 1-8 shows the all call minus mode page source to auxiliary and general channel connections. The page, auxiliary and four general audio channels all receive the page signal. Any amplifier connected to the page, auxiliary or general audio channels will receive the page. The EVAC and alert channels are connected to their respective signal sources, as in the normal mode.

Automatic messaging

One of the features of the 3-ASU Audio Source Unit is the method used to monitor the integrity of the digital audio system. When an audio messaging system is configured, default audio messages are recorded for the Evacuation and Alert channels. The text of default messages should be generic in nature, and should not include location-specific instructions. When the system is in the normal condition, the 3-ASU continuously transmits default messages over the network audio riser. The zone amplifiers use the default messages to verify their operational integrity, as well as the integrity of the riser wiring.

When an alarm is detected, the evacuation and alert message channels are selected by the amplifiers in the appropriate areas in the facility, as directed by the system rules. If a specific evacuation message has been programmed to play in response to the alarm, it is sent out over the evacuation channel. Location specific evacuation messages contain information and instructions that should only be used for a specific alarm location. Should a second alarm from another location be received, the evacuation message playing as a result of the first alarm may not be appropriate for the second alarm.

Note: In the event of conflicting messaging instructions caused by multiple alarm events, the system will play the default evacuation message, whenever two or more different messages are requested at the same time on the evacuation channel.

Automatic message processing is illustrated in Figure 1-9. By reverting back to the generic default evacuation message in multiple alarm location scenarios, no one can be misdirected by the wrong message. Default messages also play during alarms when no location specific message has been requested.

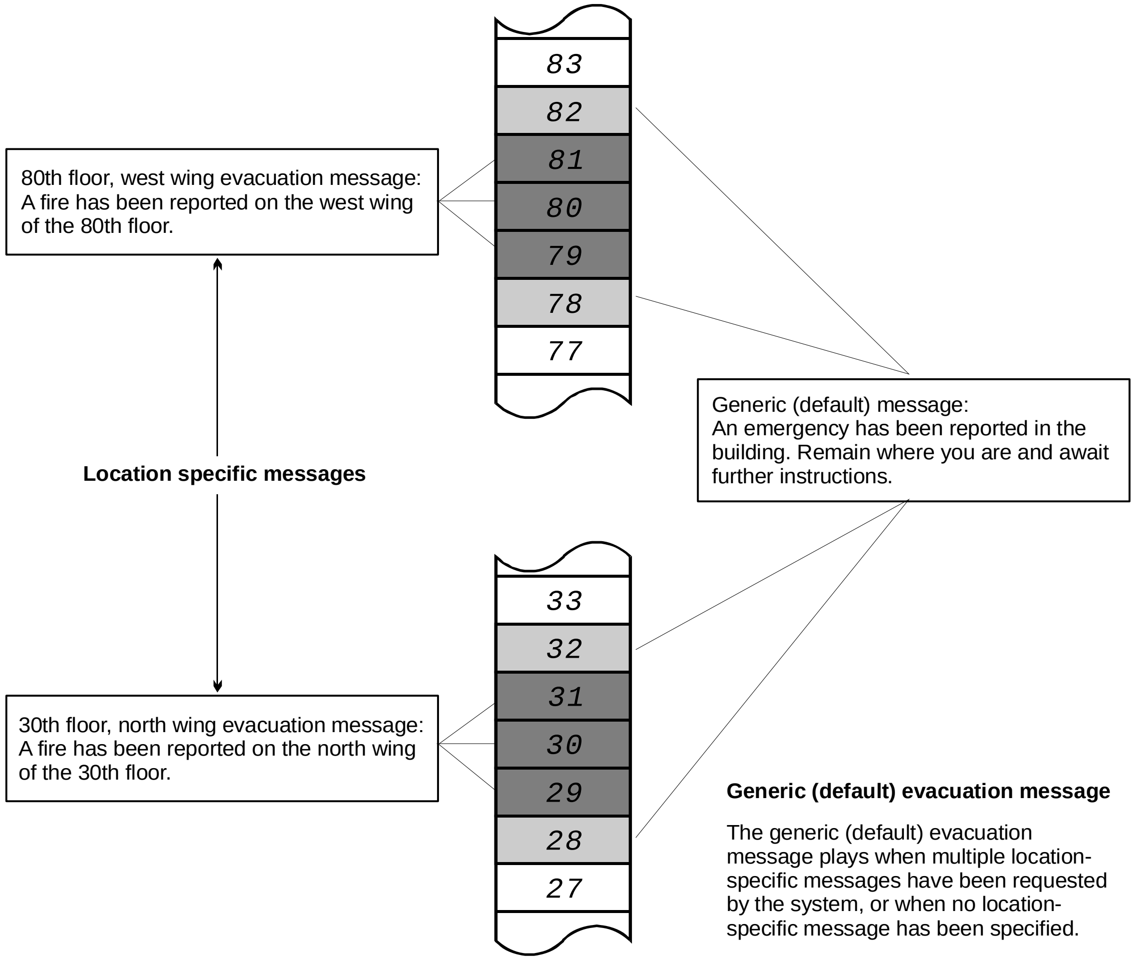


Figure 1-9: Automatic Message Processing

Firefighter phone

The 3-FTCU contains a master telephone handset that provides an analog telephone riser for totally independent 2-way communications between the fire command station and Firefighter telephone stations / jack telephones installed at strategic locations throughout the protected facility.

Taking a telephone off-hook or plugging into a telephone jack generates a visual and audible incoming call signal at the fire command station. The individual originating the call hears a tone until the handset is connected to the system. The fire command station operator manually connects the incoming phone call to the phone riser to complete the call. Up to five remote telephones may be connected to the riser simultaneously. The fire command center operator can also use the telephone circuit as a page source, permitting paging via the telephone system.

Digital network subsystem

Network data riser wiring

The network data riser provides the communication path between each CPU module (3-CPUx or 3-ANNCPUx) installed in the system. Each CPU module has two bi-directional RS-485 ports (Network A and Network B) that are used to connect the network data riser wiring. Network B is isolated from ground and Network A is not.

The correct method for running the network data riser is to connect the isolated Network B port on one CPU module to the non-isolated Network A port on another. Any remote CPU modules connected to a local CPU module's Network B port is considered to be *downstream* from the local CPU module. Any remote CPU modules connected to a local CPU module's Network A port is considered *upstream* from the local CPU module.

Additionally, *next* and *previous* refer to the order in which remote CPU modules are electrically connected to a local CPU module. *Previous* refers to the remote CPU module whose isolated Network B port connects to the local CPU module's non-isolated Network A port. *Next* refers to the remote CPU module whose non-isolated Network A port connects to the local CPU module's isolated Network B port.

Note: Since the data traveling the network data riser is bi-directional, *out* and *in* references are used to direct wire connections.

Class B network data risers

In a Class B network, a break or short in the network data riser wiring divides the network into separate independent networks. Panels on the same side of the line fault will communicate with each other but not with panels across the line fault. Figure 1-10 shows the wiring for a Class B network.

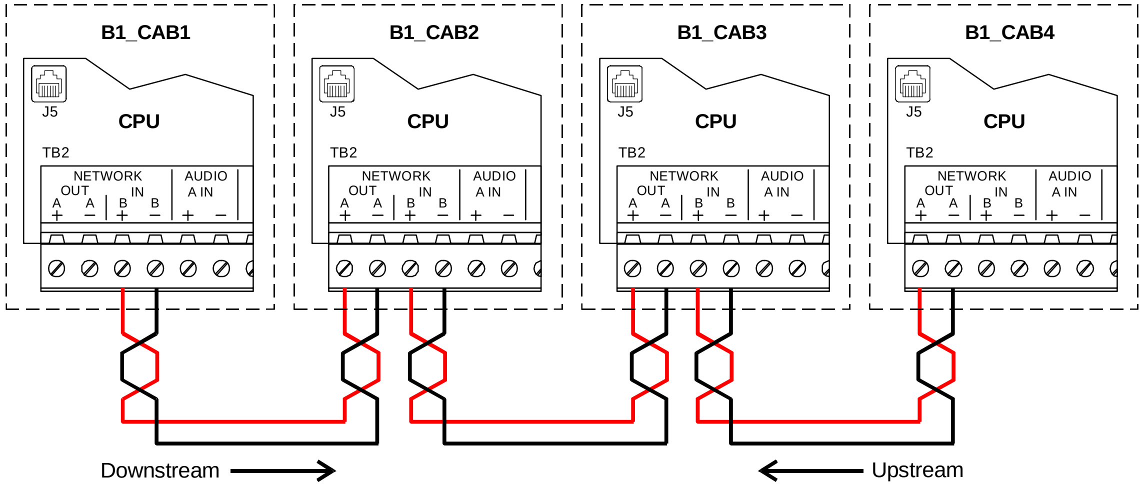


Figure 1-10: Class B network data riser wiring using copper wire

Note: As a matter of convention, a Class B network data riser should start at the CPU module that does not have wires connected to its Network A port.

When wiring a Class B network, give careful consideration as to the location of the service panel. The service panel provides a single point from which you can download files to all other panels on the network. For this function to work properly you must use the panel at the start of the network data riser as the service panel. See "Downloading data files" for more information.

Class A network data risers

In a Class A network, a single break or short in the network data riser wiring does not interrupt communications between panels. Figure 1-11 shows the wiring for a Class A network.

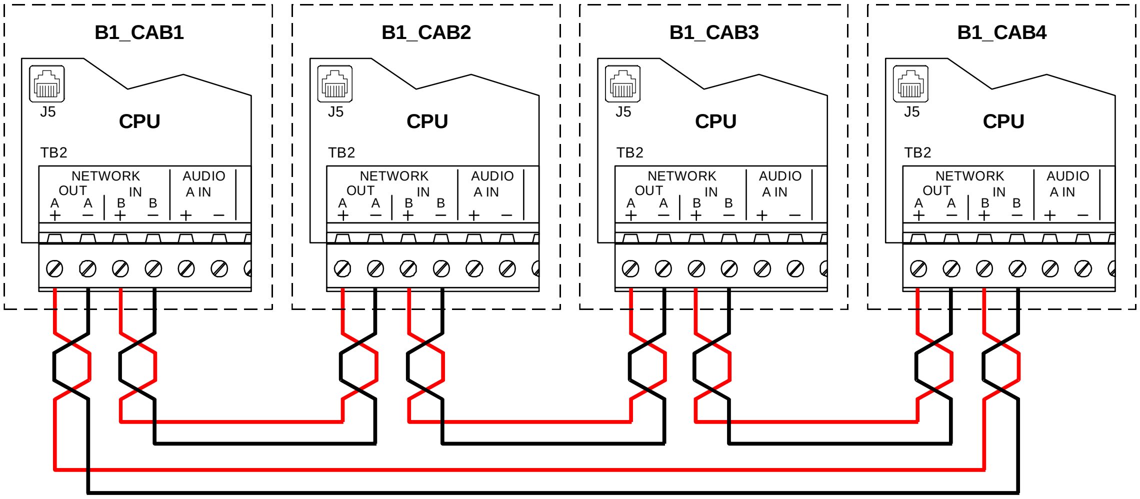


Figure 1-11: Typical Class A network data riser wiring using copper wire

Download connections

Each programmable rail module has a modular phone jack to use for downloading data directly from the SDU computer. The modular phone jack on any CPU module can also be used to download data to other programmable rail modules in the same panel over the rail bus, or to other panels over the network data riser.

In addition to the modular phone jack, the CPU module has two serial communication ports that can be used to download data, provided both of these conditions are met:

- A 3-RS232 option card is installed
- The serial port used to download data is not configured for gateway or coder applications

Tip: To download data over the network without having to reconfigure the system, temporarily install a 3-RS232 option card on any CPU module in the system and connect the SDU computer to serial port 1.

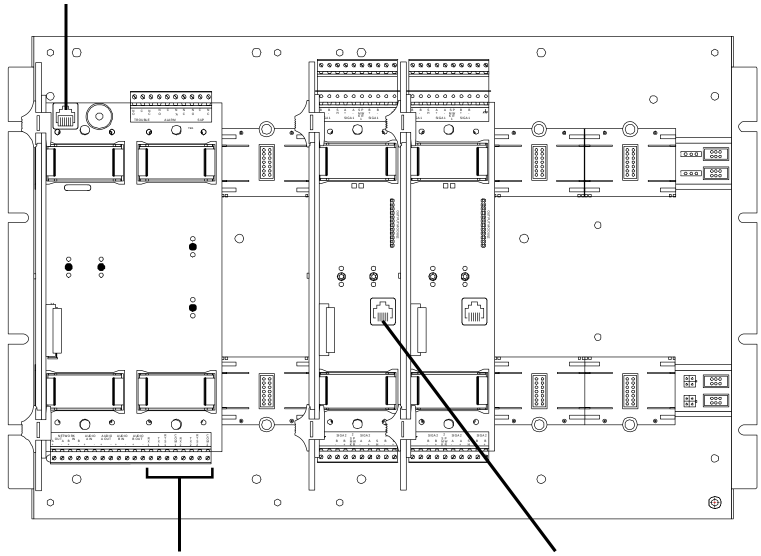


Figure 1-12: Potential connection points for downloading data

Downloading database files over the network

A CPU module's Network A port and its modular phone jack share an interrupt with the module's microprocessor. As such, the microprocessor disables the Network A port whenever you connect the SDU computer to the modular phone jack. Consequently, download options differ for Class A and Class B networks.

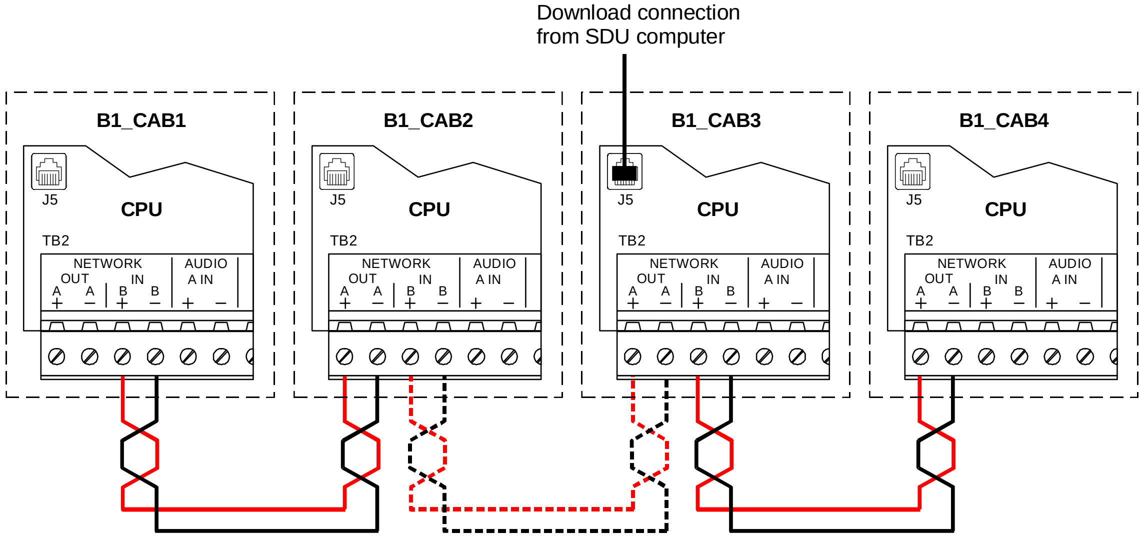


Figure 1-13: Impact of disabling Network A terminal connection on Class B networks during a download

Figure 1-13 shows how connecting the SDU computer to the modular phone jack affects downloading data over a Class B network. Connecting the SDU computer to the modular phone jack on the CPU module installed in panel B1_CAB3, disables that CPU module's Network A port. Downloading data to panels B1_CAB2 and B1_CAB1 from panel B1_CAB3 is no longer possible but downloading to B1_CAB4 still is.

Since the microprocessor disables only the Network A port, the CPU module that doesn't have a Network A port connection should be used as the service panel. It is the only panel that is capable of downloading to every panel on the network using the modular phone jack.

Note: Connecting the SDU computer to an optional serial communications port does not affect the Network A port. If a 3-RS232 option card is connected to the CPU, you can download data to any panel on a Class B network regardless of where the panel physically connects to the network data riser.

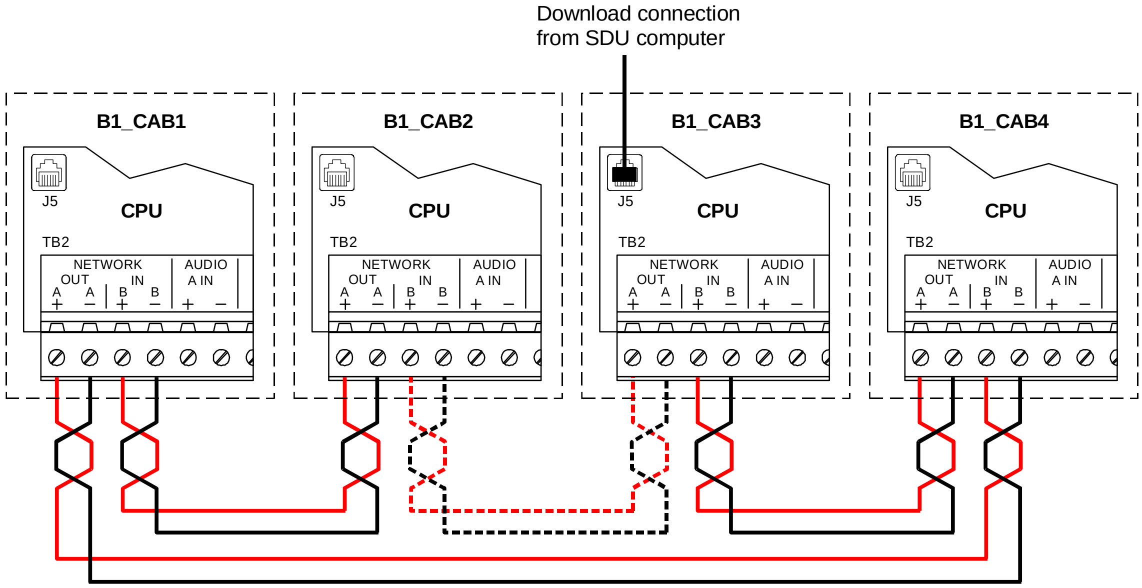


Figure 1-14: Impact of disabling Network A terminal connection on Class A networks during a download

On Class A networks however, see Figure 1-14, disabling the Network A port on panel B1_CAB3 does not prevent the other panels from receiving data through B1_CAB3's Network B port. Connecting the SDU computer to the modular phone jack does cause the panel to report a Network Class A Failure trouble. When the network data riser is configured for Class B, connecting to the panel modular phone jack causes the local CPU module to report a communications fault with every panel upstream of the local CPU module.

Tip: To download data to every panel across the Class B network data riser, connect to the first connection on the network data riser as the download panel — the panel with no connections on its Network A terminals.)

Foreign language support

Printer use with foreign languages

When supporting a single-byte character set language, your printer must be able to support the appropriate DOS code page. To support a double-byte character set language, your printer must be able to support the appropriate Windows code page. The required code pages are listed below.

Remember that not all Windows characters are available on DOS printers, so some characters are not supported on these printers.

Language	Code page
Chinese simplified	Windows Page Code 936 (GB)
Chinese traditional	Windows Code Page 950 (Big 5)
Korean	Windows Code Page 949 (Extended Wansung)
Hebrew	DOS Code Page 862
Turkish	DOS Code Page 857
Dutch, French, Italian, Portuguese, Spanish, English	DOS Code Page 850
Polish, Slovak	DOS Code Page 852
Russian	DOS Code Page 866

Bilingual language support

EST3 display modules (all LCD models and the KPDISP) feature bilingual operation. For two languages to be supported simultaneously, they must appear on the same code page. Refer to the table below to determine the system bilingual capabilities. Bilingual operation is not supported for Chinese and Korean.

Windows code page	Languages supported
1250 (Eastern Europe)	English, Polish Slovak
1251 (Cyrillic)	English, Russian
1252 (Western Europe)	Dutch, English, French, Italian, Portuguese, Spanish
1254 (Turkish)	English, Turkish
1255 (Hebrew)	English, Hebrew

Example: Bilingual operation between Polish and Slovak is supported (code page 1250). Bilingual operation between Polish and Russian is not supported, as no code page has both.

Display device language support

LCD language support

Language	Marketplace US	European	Asian	Canadian	Mideast
Chinese, traditional (Taiwan)			X		
Chinese, simplified (PRC)			X		
Dutch		X			
English (UK)		X			
English (US)	X	X	X[1]	X	X
French Canadian	X			X	
Hebrew	X			X	X
Italian	X	X		X	
Korean, Extended Wansung			X		
Polish		X			
Portuguese (Brazil)	X			X	
Russian	X	X		X	
Slovak		X			
Spanish (South America)	X			X	
Turkish	X			X	

[1] For testing and support purposes only

3-FTCU language support

Language	Marketplace: US	European	Asian	Canadian	Mideast
Chinese, traditional (Taiwan)			[1]		
Chinese, simplified (PRC)			[1]		
Dutch		X			
English (UK)		X			
English (US)	X	X	X	X	X
French Canadian	X			X	
Hebrew	X			[1]	[1]
Italian	X	X		X	
Korean, Extended Wansung			[1]		
Portuguese (Brazil)	X			X	
Spanish (South America)	X			X	
Turkish	[1]			[1]	
Russian	[1]	[1]		[1]	
Polish		[1]			
Slovak		[1]			

[1] Only Western European character set is supported

KPDISP language support

Language	Marketplace				
	US	**European**	**Asian**	**Canadian**	**Mideast**
Chinese, traditional (Taiwan)					
Chinese, simplified (PRC)					
Dutch		X			
English (UK)		X			
English (US)	X	X		X	X
French Canadian	X			X	
Hebrew	X			X	X
Italian	X	X		X	
Korean, Extended Wansung					
Polish		X			
Portuguese (Brazil)	X			X	
Russian	X	X		X	
Slovak		X			
Spanish (South America)	X			X	
Turkish	X	X		X	

Signature series devices

The Signature series family consists of intelligent smoke and heat detectors, carbon monoxide (CO) sensor detectors, bases, input/output modules, and ancillary devices. The EST3 network supports Signature series devices using several models of the Signature Driver Controller module. Up to 125 detectors and 125 modules can be connected to the Signature Data Circuit on these modules.

The Signature series smoke, heat and CO sensor detectors contain their own microprocessors. This allows the devices to make alarm decisions based on the information gathered by the sensing elements incorporated in the device. Signature series detectors can be installed in any of four detector bases:

- The Standard Base provides wiring terminals for connection to a remote LED.
- The Relay Base provides a detector activated, pilot-duty dry contact relay used to control external appliances.
- The Sounder Base incorporates a sounder horn that can be controlled by the detector, by a special Signature module, by the control panel, or by programmed rules. The CO compatible sounder base is specifically designed for use with CO sensors and requires a temporal pattern generator (TCDR) to add the audible output function to any Signature Series detector. This CO sounder base is not compatible with a coded system.
- The Isolator Base protects the Signature Data Circuit from wiring shorts.

Signature modules interface and support the operation of initiating devices, conventional 2-wire smoke and heat detectors, manual pull-stations, strobes, bells, etc. The actual functions of each Signature module is determined by a personality code downloaded to the module through the System Definition Utility (SDU) program.

Signature series manual pull-stations (1-stage and 2-stage) feature an integral Signature module that monitors the station. One-stage stations are monitored by a single input module that sends an alarm signal to the loop controller when the station is activated. Two-stage stations are monitored by a dual input module which sends two independent alarm events to the control panel; one when the pull-switch is activated, and the second when the key switch is activated.

Alarm sensitivity setting

Alarm sensitivity refers to the primary threshold (expressed in percent smoke obscuration) at which the smoke detector will go into alarm. The alarm sensitivity setting for smoke detectors can be set to one of five sensitivity levels. When smoke detectors having both ionization and photoelectric elements are used, the sensitivity setting applies to both elements. Reduced sensitivity settings are used to reduce the occurrence of nuisance alarms. The alarm sensitivity setting may be individually set for each detector using the SDU program.

Alternate alarm sensitivity setting

Alternate alarm sensitivity refers to the secondary threshold (expressed in percent smoke obscuration) at which the smoke detector goes into alarm. The alternate alarm sensitivity setting for smoke detectors can be set to one of the same five sensitivity levels as the primary alarm. When smoke detectors having both ionization and photoelectric elements are used, the sensitivity setting applies to both elements. This feature permits increasing or reducing an individual detector’s sensitivity at various times of the day, dependent upon, environmental conditions, occupancy, manufacturing processes, etc. Increased sensitivity is typically used when a facility is unoccupied. Reduced sensitivity is typically used to reduce the occurrence of nuisance alarms when occupancy or environmental conditions may create prealarm conditions. An alternate alarm sensitivity setting for each detector can be set using the SDU program.

Alarm verification

Upon receipt of the initial alarm signal from a verified detector, the EST3 panel issues a detector reset command. After a programmable reset/retard period, if the detector continues to generate an alarm during the fixed confirmation period, the alarm is considered valid and processed by the EST3 control panel. Alarm verification reduces the occurrence of nuisance alarms, as it provides a time frame in which the cause of the alarm can be investigated to determine whether an actual alarm condition exists. The alarm verification period can be increased or decreased through the SDU program, as limited by the listing agencies.

Alternate alarm verification

The alternate alarm verification feature operates the same way the alarm verification feature operates using a second, alternate, programmed reset/retard period.

Prealarm setting

Signature smoke detectors can be configured to enter a prealarm state, which generates a monitor event message. Detectors configured for prealarm have a prealarm pseudo point for which rules can be written.

During configuration, you specify a percentage of the alarm sensitivity setting that will generate a prealarm event.

Alternate prealarm setting

The alternate prealarm setting is similar to the prealarm setting, but it represents a percentage of the alternate alarm sensitivity that will generate a prealarm event.

Network applications

This section deals with the initial layout of the network cabinets as well as application configurations for the basic network modules.

Network layout

The first task for the system designer is locating the equipment cabinets throughout the project. The objective when locating cabinets is to maximize the per cabinet coverage of the facility while minimizing hardware cost. The following general information should be used as a guide to designing the system.

The per cabinet coverage is, in some part, based upon the type of project being designed. In a high rise building installation that requires an audio emergency voice communication system, the problem becomes how many floors can be served by a single cabinet. In a campus style installation, there may be one or more cabinets per building, depending on building size.

Cabinet coverage

The following factors govern how much area a single cabinet can cover:

Cabinet capacity: Depending on the installed equipment, the largest backbox available can have 21 module spaces and 3 chassis spaces. Is this enough cabinet capacity to house the equipment required to cover the proposed area?

Available current per cabinet: Does the proposed number of large current components (audio amplifiers and 24 Vdc notification appliance circuits), in addition to the required module currents, exceed the available 28 amps per cabinet or 60-Ah battery capacity?

Notification Appliance Circuit voltage drop: Does the distance from the cabinet to the last strobe, horn, speaker, etc. exceed the acceptable limits?

User interface requirements: Depending on the installed equipment, the largest backbox available can have 19 module displays installed. Will this provide enough capacity for the required control/display module functions?

Distance between cabinets: Does the wiring length between any three cabinets exceed 5,000 ft. (1,524 m)?

System capacity of 64 cabinets per network: Does the proposed system require more than 64 cabinets?

Cost of installation labor and materials: Is it cheaper to install a smaller cabinet and service the floor above and below the floor of installation, or install a larger cabinet with more equipment, and wire two floors above and two floors below the cabinet floor?

Feature/function domain

The EST3 life safety system utilizes peer-to-peer networking technology. No single cabinet is in control of the network. Peer-to-peer networking permits multiple control locations within a single network. The feature/function domain is defined as the group of cabinets that are affected when the feature or function is activated. A network cabinet may be a part of one or more groups. Multiple control locations are permitted for any group.

Three types of domains are available.

Local: The feature/function affects only the cabinet on which the LCD module is installed.

Group: The feature/function affects a predefined group of cabinets on the network.

Global: The feature/function affects all the cabinets on the network.

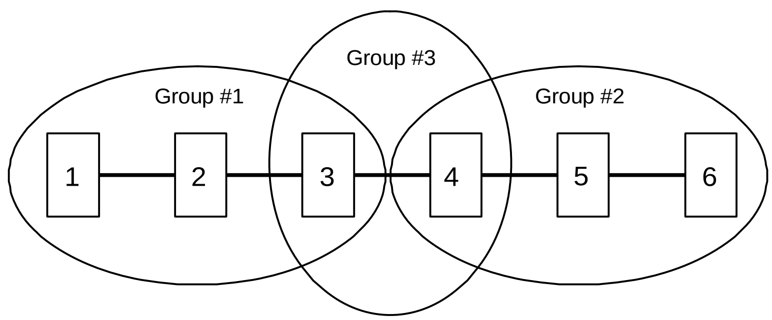


Figure 1-15: Sample domain consisting of three groups

Using the System Definition Utility (SDU), you can configure the system so that information from any cabinet can be selectively sent to any combination of other cabinets on the network.

Each cabinet may selectively transmit the following information to other cabinets on the network:

- Reset commands
- Alarm Silence commands
- Trouble Silence commands
- Drill commands
- Acknowledge commands

A cabinet can also be configured to receive state changes (Alarm, Supervisory, Trouble, Monitor, firefighter telephone incoming calls), logicals, events, audio controls, and so forth, from a select group of cabinets.

Feature/function domains are associated with the cabinet providing the operator controls. In Figure 1-15, the feature/function domain for Cabinet 1, which has the operator controls for the first subnet, is groups 1 and 3. The feature/function domain for Cabinet 6, which has the operator controls for the second subnet is groups 2 and 3.

Two subnetworks, with operator controls at cabinets 1 and 6.
Cabinets 3 and 4 are common to both subnetworks.

	Sending cabinet	Commands					
		Cabinet state	Reset	Alarm silence	Trouble silence	Drill	Acknowledge
Group 1	Cabinet 1	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4, 5, 6	1, 2, 3, 4
	Cabinet 2	1, 2, 3, 4	N/A	N/A	N/A	N/A	N/A
Group 3	Cabinet 3	1, 2, 3, 4, 5, 6	N/A	N/A	N/A	N/A	N/A
	Cabinet 4	1, 2, 3, 4, 5, 6	N/A	N/A	N/A	N/A	N/A
Group 2	Cabinet 5	3, 4, 5, 6	N/A	N/A	N/A	N/A	N/A
	Cabinet 6	3, 4, 5, 6	3, 4, 5, 6	3, 4, 5, 6	3, 4, 5, 6	1, 2, 3, 4, 5, 6	3, 4, 5, 6

Legend
1 through 6 = Cabinets that receive commands from the sending cabinet
N/A = Not applicable

Figure 1-16: Routed network commands for the domain illustrated in Figure 1-15

In Figure 1-16, the Cabinet 1 entry under the Cabinet State column indicates that Cabinet 1 should receive from cabinets 1, 2, 3, and 4 all information about changes of state. Because Cabinet 1 is the location of the operator controls it should send information about reset, alarm silence, trouble silence, drill, and acknowledgments to all the cabinets in the domain, which are cabinets 1, 2, 3, and 4. In this example, the drill command is common to both systems. Note, that the drill command is also sent to cabinets 5 and 6 by Cabinet 1.

The Cabinet 2 entry under the Cabinet State column indicates that Cabinet 2 receives its change of state information from cabinets 1, 2, 3, and 4. Because there are no operator controls located at cabinet 2, there is no need to send reset, alarm silence, trouble silence, drill, and acknowledgment information to other cabinets. As an alternative, the table could show these commands sent to other cabinets, because they can never be issued due to the lack of an LCD module in the cabinet.

Cabinets 3 and 4 receive their change of state information from all cabinets on the network, as indicated in the cabinet state column. This is necessary as cabinets 3 and 4 are part of both domains. Again, there is no need to send reset, alarm silence, trouble silence, drill, and acknowledgment information to other cabinets from cabinets 3 and 4.

The Cabinet 5 entry under the Cabinet State column indicates that Cabinet 5 receives its change of state information from cabinets 3, 4, 5, and 6.

Cabinet 6 information indicates that Cabinet 6 should receive from cabinets 3, 4, 5, and 6 all information about changes of state. Because cabinet 6 is the location of the operator controls it should send information about reset, alarm silence, trouble silence, drill, and acknowledgments to cabinets 3, 4, 5, and 6, (all the cabinets in the domain.) In this example, the drill command is common to both systems. Note, that the drill command is also sent to cabinets 1 and 2 by Cabinet 6.

Audio applications

Amplifier selection

The EST3 system provides amplifiers with 20-, 40-, and 95-watt output ratings to meet any project requirement. Selection of the proper amplifiers requires an understanding of the amplifier characteristics and application related information that follows.

Audio zoning

The output of each amplifier usually covers a single audio zone, typically a floor of a high rise building. Using the appropriate Signature modules, the amplifier’s output can be divided into several zones. The output circuit can be configured for either Class A or Class B wiring.

Output wattage

The output rating of an amplifier is determined by the speaker load it is required to drive, and any expansion or safety factor required. The speaker load is determined by adding up the value of all the wattage taps selected on each speaker connected to the amplifier. For a conservative approach, use the highest wattage tap available on each speaker. This insures there is enough head room to adjust speaker taps to compensate for any installation variables such as sound absorbing furniture, etc.

Output voltage

Zoned amplifiers are available with either a 25 Vrms or 70 Vrms output. The 25 Vrms output amplifiers are primarily used in retrofit applications that previously had 25 Vrms speakers installed. 70 Vrms output amplifiers are recommended for new installations. The output circuits of a 70 Vrms amplifier can be run eight-times farther than a 25 Vrms amplifier, given the same load.

Note: If all the system wiring is required to be power limited, you may use any 20-, 40-, or 95-watt amplifier with either a 25 Vrms or 70 Vrms output.

Wiring considerations

Refer to Appendix B of this manual for wire distance calculations and other wiring considerations.

Backup amplifiers

Each cabinet can contain 1 zoned amplifier module to use to back up the remaining primary zoned amplifier modules installed in the same cabinet with the following restrictions:

- All the amplifiers must have the same output voltage rating.
- If the cabinet contains older amplifier modules (15- and 30-watt) and newer amplifier modules (20- and 40-watt), the amplifier used to back up the primary amplifier modules must be of the older type.

Note: In cases where older and newer zoned amplifiers exist in the same cabinet, the older modules should be replaced with newer modules for optimum results.

- The backup amplifier must have an output wattage rating equal to or greater than the largest primary amplifier it is backing up. If not, the output capacity of the speaker circuit is diminished proportionately.
- The wire used to wire the backup amplifier to the other amplifiers must be the same size or greater than that used to wire the speaker circuit.

Cabinet space

The 20- and 40-watt amplifiers each require one space on the rail assembly. The 95-watt amplifier requires two rail spaces.

The number of zoned amplifier modules that can be installed in a single cabinet is limited by the number of available rail spaces, the number of power supplies installed in the cabinet, and battery limits, if any.

Audio channels

The EST3 audio system provides eight (8) simultaneous channels for distribution of audio signals. The functions of four of these channels are fixed by the system. These four channels are referred to by their functions: *Page*, *EVAC*, *Alert*, and *Auxiliary Input* channels. The four remaining channels are referred to as general channels 1 to 4.

Under manual or automatic network control, each amplifier’s input can be connected to either the Alert channel, the Evacuation (EVAC) channel, the Page channel, the Auxiliary Input channel, or one of four (4) general input channels. Should conflicting commands be issued to a single amplifier, the amplifier responds to the channel with the highest priority. The eight channels are prioritized as follows, with the Page channel having the highest priority

Page channel

Paging is a manual function. An operator is required to select a destination for the page, and then make an announcement. The Page channel is never automatically selected by the EST3 system.

The page channel always carries a live page signal, regardless of its source. There are three sources which can supply the paging signal: 1) the local 3-ASU microphone, 2) the remote microphone, and the 3) the firefighter telephone system. These sources are automatically prioritized as shown in Table 1-2.

Table 1-2: Page priorities

Priority	Page signal source
1 (highest)	Local microphone
2	Firefighter phone
3 (lowest)	Remote microphone

The page command is a non-latching function. When the page command ends, amplifiers automatically switch back to the source channel that was active (if any) prior to the page command.

Five types of page commands are available on the network. The first four page commands are available simply by pressing a single switch on the front of the 3-ASU. These are the paging functions most commonly used in an emergency situation.

1. The All Call command temporarily transfers all amplifiers to the Page channel while the page is active. All Call distributes the page signal to every amplifier in the system.
2. The Page to EVAC command temporarily transfers the Page signal to all amplifiers actively connected to the EVAC channel. All “EVAC” amplifiers then receive and distribute the Page signal.
3. The Page to Alert command temporarily transfers the Page signal to all amplifiers actively connected to the Alert channel. All Alert amplifiers then receive and distribute the page signal.
4. The All Call Minus command temporarily transfers the page signal to all amplifiers except those connected to the EVAC and Alert channels.
5. A Selective Page temporarily transfers the selected amplifiers to the Page channel while the page is activate, distributing the page signal only to selected audio zones

(amplifiers). Audio zones are selected manually by the operator using the LED/Switch displays.

An example of how the page commands work is illustrated in Figure 1-17. This figure shows a nine story high rise building, with a fire on the 6th floor. The fire plan requires the evacuation signal to be sounded on the fire floor, floor above the fire, and floor below the fire. The alert signal is required to sounded in all other areas of the building except the stairwells. The first column (Fire Alarm) shows the automatic responses on the affected floors according to the fire plan.

Floor	Fire Alarm	ASU page commands				
		Page to Evac	Page to Alert	All Call Minus	All Call	Zoned Paging
Stairwells				*Page*	*Page*	
9th floor	Alert	Alert	*Page*	Alert	*Page*	Alert
8th floor	Alert	Alert	*Page*	Alert	*Page*	Alert
7th floor	Evac	*Page*	Evac	Evac	*Page*	Evac
6th floor	Evac	*Page*	Evac	Evac	*Page*	*Page*
5th floor	Evac	*Page*	Evac	Evac	*Page*	Evac
4th floor	Alert	Alert	*Page*	Alert	*Page*	Alert
3rd floor	Alert	Alert	*Page*	Alert	*Page*	Alert
2nd floor	Alert	Alert	*Page*	Alert	*Page*	Alert
1st floor	Alert	Alert	*Page*	Alert	*Page*	Alert

Legend
- Fire floor
- Floor above or floor below fire

Figure 1-17: ASU Page Command Example

The Page to EVAC command replaces the EVAC signal with the Page signal, as shown in the figure's second column.

The third column shows the Page to Alert command response, all the Alert signals have been replaced by the Page signal.

The All Call Minus command directs the Page to the areas which are not receiving the EVAC or Alert signals, i.e. the stairwells. In the fourth column of Figure 1-17, the stairwells receive the Page signal when the All Call Minus command is used and do not automatically receive either the EVAC or Alert signals.

The All Call command directs the page signal to all areas of the building, as illustrated in the last column of Figure 1-17.

Any combination of floors and stairwells could be selected to receive the page by manually selecting the audio zones on the audio zone select control/display module. Notice that at no time does any area receiving a signal have its signal interrupted by any page command function.

Evacuation (EVAC) channel

The EVAC channel always carries a signal designed to notify the occupants they must leave the facility. The evacuation signal may take the form of a textual message, a variety of audio tones, or an audio tone modulated by the standard 3-3-3 evacuation pattern, or any combination of these signals.

The EVAC channel is preprogrammed, and activated by the system in response to an alarm. The EVAC signal is automatically sent to the areas that are in danger and require immediate evacuation.

The EVAC channel has priority over all channels signals except for the Page channel. The alarm silence function automatically silences the EVAC channel when an operator presses the Alarm Silence switch.

Alert channel

The Alert channel always carries a signal designed to notify the occupants that an emergency situation exists in the facility. Occupants hearing the alert signal are not in immediate danger, but should prepare to evacuate. In some installations, the alert signal advises occupants that persons evacuating the danger area will be entering the area for safety.

The Alert channel is preprogrammed, and activated by the system in response to an alarm. The Alert signal is automatically sent to areas that are not in immediate danger and do not require immediate evacuation.

The Alert channel has priority over all other channels except the Page and EVAC channels. The alarm silence function automatically silences the Alert channel when an operator presses the Alarm Silence switch.

General channel

The General channel is used to distribute special purpose signals to special areas in the facility. Typically these areas include elevator cabs, stairwells, and areas in less peril than those areas receiving the Alert signal.

The general channel signals can be preprogrammed in response to an alarm, or they may be manually activated.

General channels have a lower priority than the Alert channel. The alarm silence function does not automatically silence the Alert channel unless programmed to do so.

Manual audio zone selection

If manual audio zone selection is required on the system, the appropriate control/display modules must be mounted on modules in the same cabinet as the Audio Source Unit. Typical configurations of control/display modules is shown in Figure 1-18. Exact operation of each display is dependent on system programming. Typical operation is described below.

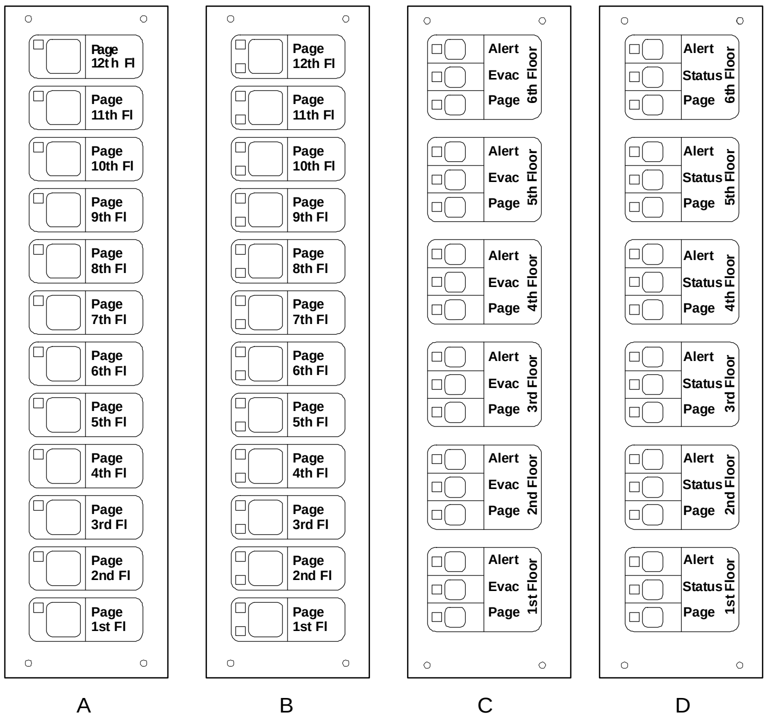


Figure 1-18: Audio zone selection displays

Display A is a model 3-12SG. Each floor switch provides audio zone selection for the Page signal, and the integral green LED indicates the audio zone is selected.

Display B is a model 3-12GY. Each floor switch provides Page audio zone selection. The green LED to the upper left of the switch indicates the audio zone is selected. The yellow LED to the lower left of the switch indicates audio circuit trouble.

Displays C and D are model 3-6/3Sxxx. The display C configuration permits manual selection of the Alert, EVAC, and Page signals by floor. This configuration is well suited for systems which do not sound signals through the entire facility during an alarm. Responsible authorities can then manually add EVAC and Alert signals to other floors of the facility. Display configuration D is used in facilities which sound the Alert signal in all areas not receiving the EVAC signal. This eliminates the need to switch the Alert signal. The middle switch is not used, the middle LED indicates amplifier status.

Messages

General

While there is no standardization on message content, messages must tell the occupant what is happening, why it is happening, and what actions they should take.

As a rule, each message should be repeated three times. If there is more than one language spoken in the area, the messages should be provided in each language.

A male voice has been demonstrated to be more authoritative than a female voice, and should be used where urgency is required. A female voice has been shown to initially gain the public's attention quicker than a male voice.

Alarm message format

The basic alarm message format consists of an alarm tone followed by an evacuation message repeated three times. The suggested alarm tone can take the form of a 1000 Hz tone modulated by the standard 3-3-3 evacuation pattern, a slow whoop, an electronic bell, a constant tone, or a constant tone modulated at a 120 pulse per minute rate. Please refer to the Authority Having Jurisdiction for specific requirements.

Typical Alarm Message text:

> Female Voice: "May I have your attention please. May I have your attention Please." Male Voice: "There has been a fire reported in the building." "Proceed to the nearest stairwell and exit the building." "Do not use the elevators." "Repeat, do not use the elevators."

Note: The EST3 amplifiers operate in a stand-alone mode should they lose communication with the Audio Source Unit. The alarm tone used in the alarm message should be the same tone used by the amplifier for stand alone alarm signaling.

Alert message format

The basic alert message consists of an alert tone followed by an advisory message. The suggested alert tone should be easily differentiated from the alarm tone and can take the form of a constant tone, or a constant tone modulated at a 20 pulse per minute rate. Please refer to the Authority Having Jurisdiction for specific requirements.

Typical Alert message text:

> Female Voice: “May I have your attention please. May I have your attention Please.” Male Voice: “There has been an emergency reported in the building.” “Your area is in no immediate danger.” “People from other areas of the building may be entering your area.” “Be prepared to leave the building if you hear the evacuation signal.” “Repeat, you are in no immediate danger.”

Informative messages

Informative messages are those special purpose signals to areas of the facility which may have special concerns during an emergency situation. Typically these areas include elevator cabs, stairwells, and areas in less peril than those areas receiving the Alert signal. Some sample informative messages appear below.

Elevator message text:

> Female Voice: “May I have your attention please. May I have your attention Please.” Male Voice: “There has been an emergency reported in the building.” “The building manager has directed the elevators to the lobby.” “Please exit the building when you reach the lobby.”

Stairwell message text:

> Female Voice: “Please continue down the stairs to your assigned re-entry floor or the lobby.” “Do not attempt to use the elevators.”

Do Not Enter message text:

> Male Voice: Do not enter this area.” “This is not an exit.” “An emergency has been reported in this section of the building.” “Please exit the building using a marked fire exit.”

Message and tone storage

The prerecorded messages and tone sequences are stored in a digital format in the 3-ASU Audio Source Unit internal memory. When the message and tone library exceeds two minutes in total length, a 3-ASUMX/32 Expansion Memory card must be installed in the 3-ASU. The 3-ASUXM/32 provides additional storage space for up to 32 minutes of messages.

Messages and tone sequences are created and downloaded directly into the Audio Source Unit using the SDU and a computer equipped with a compatible sound card.

Firefighter phone system

Five phone off-hook limit

The circuitry on the 3-FTCU Firefighter Telephone Control Unit can support up to five telephones off-hook in addition to the master handset at the 3-FTCU at any one time. The flexibility of the EST3 system permits any number of phones to be wired on a single phone circuit, as long as they are not all used simultaneously. There are a number of different designs which can be used to insure that no more than five phones are active at any one time.

One phone per circuit

The advantages of installing a single firefighter phone station or jack on a SIGA-CC1 Signature module (personality code 6) are numerous. The system provides complete control and annunciation phone/circuit. Installing a single phone on a circuit permits the operator to immediately identify the exact location of the calling party. Because the 3-FTCU will only permit five circuits to be connected simultaneously, the maximum number of off-hook handsets can never be exceeded. Should a branch telephone circuit be damaged during a fire, the fault will not affect other phone circuits. When there is only one phone per circuit, troubleshooting of faults is simplified.

The largest disadvantage of installing one phone per branch telephone circuit is cost. Each phone location requires a separate SIGA-CC1 module.

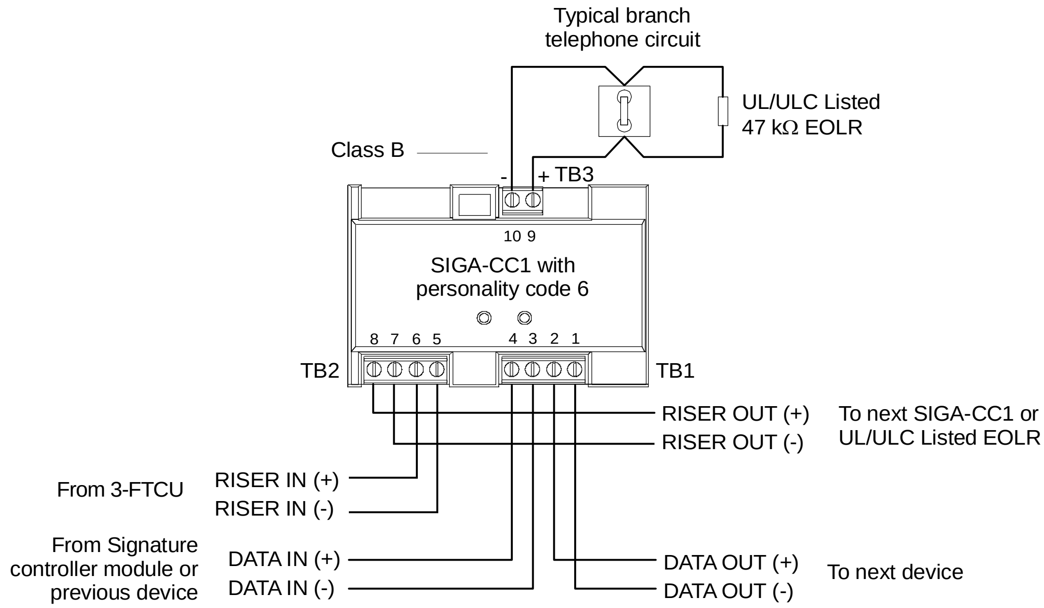


Figure 1-19: SIGA-CC1 with one phone installed

Five phones per circuit

Installing up to five phones per branch circuit is a realistic compromise between installing a single phone per circuit and more than five phones per circuit. In the rare instance that all five phones are off-hook and a need to communicate with a sixth remote phone arises, the 3-FTCU operator can temporarily disconnect the entire branch circuit. Then the second branch circuit can be connected to complete the conversation.

The advantages of installing up to five telephone stations or jacks on a SIGA-CC1 Signature module (personality code 6) are: a reasonable balance between cost and performance; and the system maintains the high quality voice circuit at all times because the maximum number of off-hook handsets can never be exceeded.

The main disadvantage of installing up to five phones per branch telephone circuit is that a circuit failure can render the entire branch circuit useless. Additionally, the location of the incoming caller is not precisely known, and troubleshooting is more difficult.

Limited number of portable telephone handsets

Another method of limiting the number of off-hook phones to five limits the number of available portable phones available to the fire department to five. The biggest advantage of this method is low cost, as multiple remote telephone jacks can be installed on a single branch circuit.

The main disadvantage of this method are: that five phones may not be adequate to properly cover the facility; a circuit failure can render many of the phone jacks useless; the location of the incoming caller is not precisely known; and troubleshooting is more difficult.

Chapter 2

Security applications

Summary

EST3 has powerful and flexible security capabilities. This chapter introduces you to the equipment required for security systems.

This chapter also illustrates and describes several security applications. Each application is presented as a separate topic that includes a block diagram and description. These give you an overview of the application, and show the components required and their interconnection.

Refer to the *EST3 Installation Sheets* for specific component settings and terminal connections.

Content

Security equipment

Introduction

The equipment required for a general security system is shown in Figure 2-1. We'll discuss each item shown in the drawing, plus the *other factors* called out on the drawing.

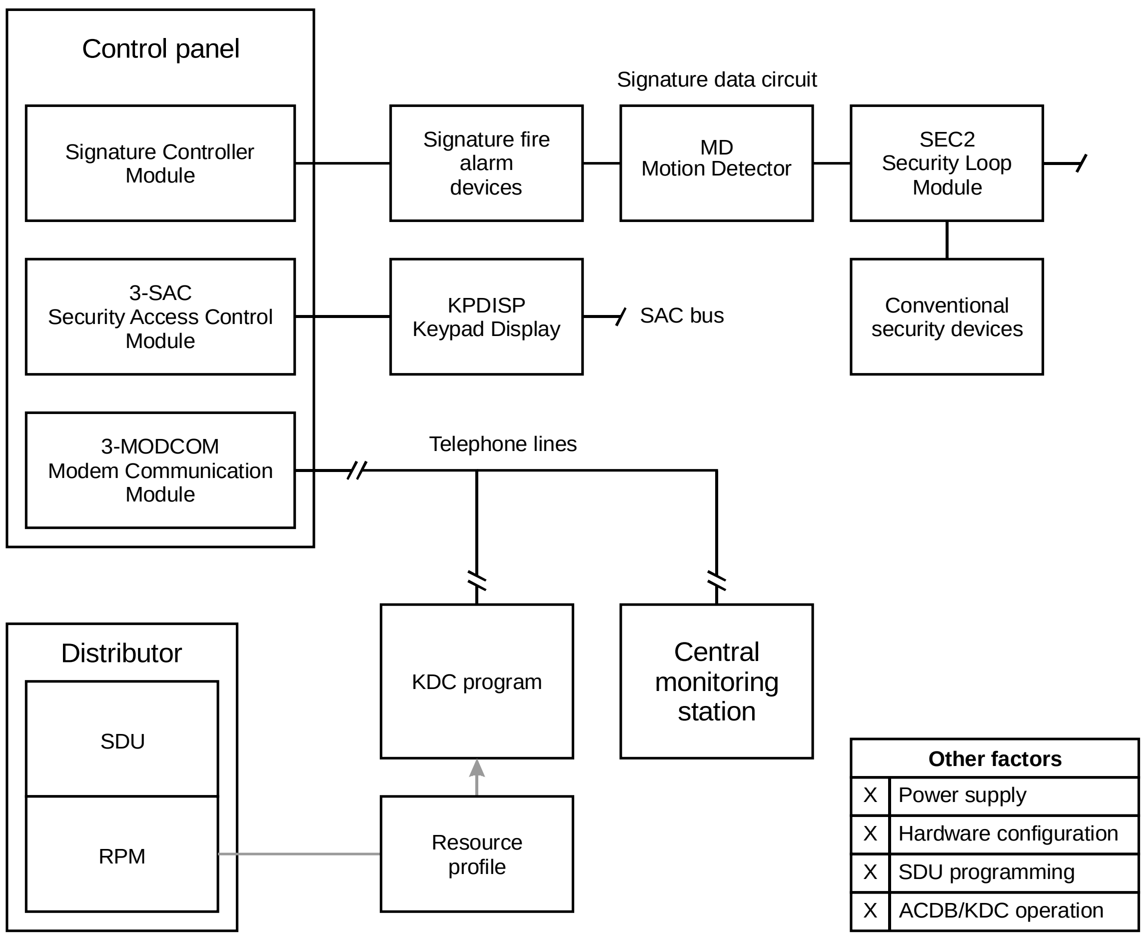


Figure 2-1: Equipment required for a basic security system

Equipment

The equipment used in security applications includes:

- Control panel
- Signature Controller module
- SIGA-MD Motion Detector module
- SIGA-SEC2 Security Loop module
- 3-SAC Security Access module
- SAC bus

- KPDISP Keypad Display
- 3-MODCOM Modem Communication module
- RPM Resource Profile Manager tool
- KDC Keypad Display Configuration program

Control panel

It is a UL listing requirement that all cabinets in a system that includes security functions must have a tamper switch. The control panel must include a 3-TAMP, 3-TAMP5, or 3-TAMPRCC Cabinet Tamper Switch.

Signature Controller module

The Signature data circuit plays a dual role in integrated systems. First, it supports devices and modules belonging to the fire alarm system. Second, it supports security devices that are part of the security system.

Figure 2-1 shows a Signature Controller module with a Class B Signature data circuit. Shown on this circuit are Signature fire alarm devices, plus two security devices, the SIGA-MD and the SIGA-SEC2.

Several Signature Controller models are available, and can be used with integrated systems.

Note: Security devices can also be installed on the SAC bus via CRCs, or on an analog device loop.

SIGA-MD Motion Detector module

The SIGA-MD is a passive infrared motion detector that connects to the Signature loop. The detector has alarm and tamper output monitoring capability. A contact closure causes an alarm but does not latch at the module.

The SIGA-MD provides six separate curtain coverage patterns with a 34-foot range. The detector can be mounted in flat corners or on walls up to a height of ten feet.

SIGA-SEC2 Security Loop module

The SIGA-SEC2 Security Loop Module is an intelligent analog addressable device that connects one or two security loops to a Signature data circuit. In Figure 2-1 this is indicated by the conventional security devices connected to the SIGA-SEC2.

The operation of the SIGA-SEC2 is determined by its device type and personality code. These are assigned during system design and configuration.

3-SAC Security Access Control module

The 3-SAC Security Access Control rail module controls a high-speed RS-485 circuit called the Security Access Control (SAC) bus. The SAC bus supports fire, security, and access control devices.

The 3-SAC handles message traffic for these devices, interfacing them with the CPU as required. Events are passed from the devices to the 3-SAC module, then to the CPU for alarm processing.

The 3-SAC has two sets of circuit terminals, and is capable of Class A or Class B configuration. Each Class B circuit can include 31 devices, for a total of 62 devices per module. Class A circuits can include 30 devices total. In the figure, we show a Class B bus with a KPDISP Keypad Display control and display module.

SAC bus

Since our security and access control devices require 24 Vdc, we suggest that you always use a four-wire cable (two twisted-pairs) for the SAC bus and a 24 Vdc power supply.

For the data wires we suggest unshielded, twisted pair, with greater than 6 twists per foot, in 14 to 22 AWG (1.50 to 0.25 sq mm).

For the power wires, we recommend 14 or 16 AWG.

KPDISP Keypad Display

Tip: To improve system performance in systems with a high number of partitions or cardholders, limit the volume of network messages. To do this, create partition routing groups so that only essential messages are sent to each KPDISP. In practice, limit the average number of partitions in a partition routing group to 10 or less.

The KPDISP Keypad Display is a control and display module for security and fire alarm systems. The KPDISP has an LCD display and a telephone-style keypad. It operates on the 24 Vdc power supplied with the SAC bus.

The KPDISP is completely menu-driven. It lets the system user:

- Arm and disarm partitions
- Review off-normal points
- Bypass or disable points
- Execute fire alarm panel commands

Each KPDISP stores its portion of the security database.

You can create a security system that is operated via the LCD module alone, or in combination with any Control/LED display module. See the topic “Secure access.”

3-MODCOM Modem Communicator module

The 3-MODCOM Modem Communicator module has both modem and dialer functions. It can transmit and receive information.

The 3-MODCOM can transmit alarm, supervisory, or trouble messages to a remote central monitoring station using one or two telephone lines. A variation of the module (3-MODCOMP) can transmit pager messages to a paging company using the TAP protocol. The 3-MODCOMP remote paging feature is supplemental and is not supervised.

The module can also receive information sent over telephone lines by the Keypad Display Configuration program.

RPM Resource Profile Manager tool

The Resource Profile Manager (RPM) tool is part of the SDU. It uses the project database to let you create a separate resource profile for each company that will be using the security system.

The resource profile defines the security system for the KDC program. It includes such information as:

- The KPDISPs in the system
- The routing required to access each KPDISP for downloads
- Which KPDISPs can execute fire alarm system commands

The resource profile is imported into the KDC program during installation.

KDC Keypad Display Configuration program

The Keypad Display Configuration (KDC) program lets the system user define and maintain a database of information about KPDISPs, users, and access levels. This is part of the overall security database.

The KDC program runs on the user’s PC. Additions or updates to the security database can be transmitted to the KPDISP units in two ways.

The first method is via modem and dial-up telephone line to the3-MODCOM. The information is then routed to the CPU, through the correct 3-SACs, and finally to the affected KPDISP units.

The second method is by connecting the user’s PC directly to the CPU using an RS-232 cable. The connection is made between the PC’s COM1 port and any of the RS-232 terminals on the CPU. As in the first method, after reaching the CPU additions and changes are routed through the correct 3-SACs to the affected KPDISPs.

Note: Fire and security functionality cannot be programmed into a control panel from a remote location. You must perform all panel programming on site. Changes to the security database have no impact on the parameters or operations of listed fire system equipment.

When the site includes an access control system, the Access Control Database (ACDB) program is used in place of the KDC. The ACDB includes the required KDC functionality.

Other factors

Next, we'll cover the additional factors listed on the drawing:

- Power supply
- Hardware configuration
- SDU programming
- ACDB/KDC operation

These factors are called out on each application diagram given in this chapter.

Power supply

The KPDISP is designed to operate on 24 Vdc. For this reason, we recommend that you include power from the panel with the SAC bus cable. You can use the panel 3-PPS/M, 3-BPS/M, or 3-BBC/M power supplies.

Note that additional power supplies must be listed for the application.

Hardware configuration

The KPDISP does not have any switch or jumper settings. All configuration is done with the SDU program.

SDU programming

While the KDC program controls a small portion of the security database, all other definition, configuration, and programming for the security system happens in the SDU.

The SIGA-MD and SIGA-SEC2 are both treated as modules on the Signature data circuit. You configure each security module using the SDU.

The SDU controls the general configuration of the 3-SAC modules, plus the configuration of all CRC or KPDISP devices on the SAC busses.

KPDISP modules can be configured to execute a specific, predefined command list when a specific security or access control event occurs. You write the command lists in the SDU, and assign them to KPDISP events when you configure the KPDISP module.

Partitions are fundamental groups used with security systems. A partition is a group of devices intended to provide security for a given area of the site. Partitions can be armed and disarmed separately.

All partitions are created and defined in the SDU, and each CRC, CRC input circuit, KPDISP, SIGA-SEC2 circuit, and SIGA-MD circuit can be assigned to a partition. Partitions also play a role in KPDISP message routing.

For the 3-MODCOM module, the SDU determines the dialer and modem parameters, defines the receivers and accounts, and assigns each account to the correct receiver.

Finally, the SDU includes the RPM tool, described earlier in this topic.

ACDB/KDC operation

The Keypad Display Configuration (KDC) program runs on the end-user’s PC. It lets him create and maintain a database of information about KPDISPs, users, and access levels. This is part of the overall security database.

During setup of the program, the user imports the resource profile created by the RPM during system programming.

Once installed, the user can create and revise his KDC database. Changes and additions are transmitted via modem to the 3-MODCOM or via direct RS-232 connection to the CPU. The data is then routed to the correct 3-SAC and KPDISP units.

Security applications

The remaining topics in this chapter cover specific security applications. Each topic gives you an overview of the application, and shows you the components required and their interconnection.

Each topic has a block diagram and general description of the application. Other factors (as called out on the drawings) are discussed under separate headings in each topic.

Certificate installations

Description of the applications

An installation company can be listed to install burglar alarm systems that are covered by UL under its Follow-Up Service. The listed company issues a certificate of the appropriate class, grade, and type.

This topic does not detail the steps required for certificate installations. You must follow UL 681 to determine the exact requirements for a given installation. Here, we simply list special EST3 equipment that can be used in the following applications:

- Central Station Alarm Certificate
- Police Station Connect Certificate
- Local Mercantile Alarm Certificate

Refer to Appendix C, "Listing requirements" for additional information.

Special equipment

Certificate installations require the use of specialized attack and tamper equipment. Here are brief descriptions of the special parts. The diagrams for each application show which parts are required.

ATCK Attack Kit: a replacement cover kit for the 3-RCC7 cabinet. The kit provides a two-minute attack delay time. It includes a red, overlapping box cover for the cabinet. The cover attaches to the backbox sides using sheet metal screws and four locks. The kit also includes special knockout plugs that secure the unused knockout holes.

3-TAMPRCC Cabinet Tamper Switch: a switch that detects removal of the cover.

Central station alarm certificate (UL Applications Only)

Figure 2-2 shows the equipment that can be used as part of a Central Station Alarm Certificate installation. Note that this is the same equipment used for a Police Station Connect Certificate installation.

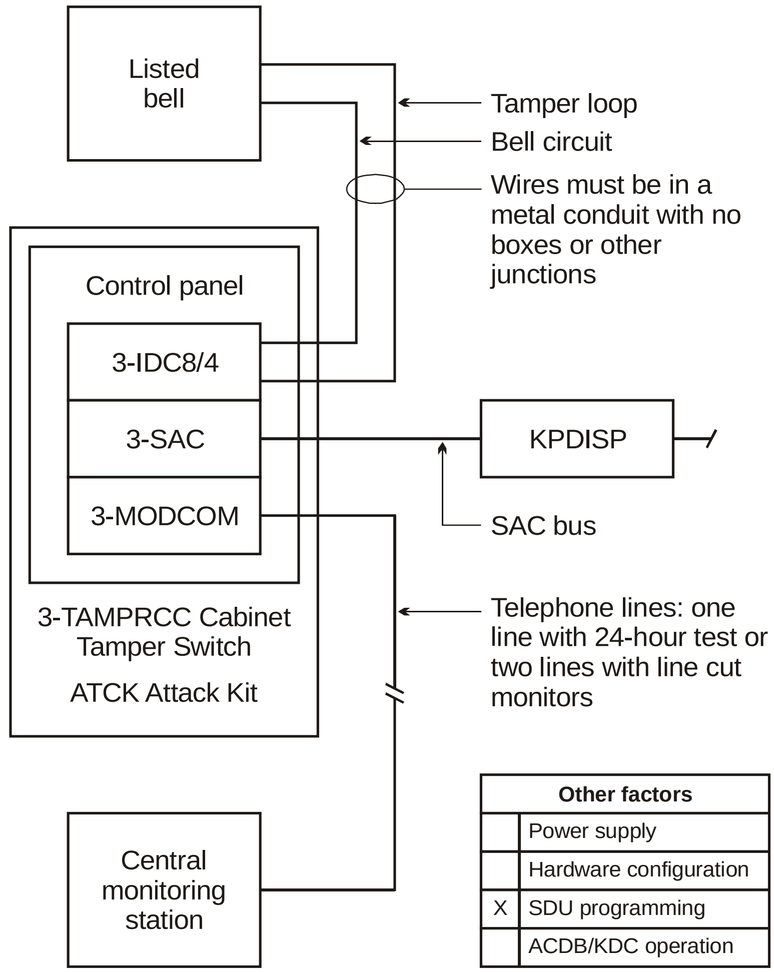


Figure 2-2: Components used with a central station certificate application

For this certificate, the control panel cabinet must be fitted with an ATCK Attack Kit and a 3-TAMPRCC Cabinet Tamper Switch. In addition, a listed local bell is required.

The bell must be positioned where it can be heard from every arming station in the system. You can use multiple bells if required.

The bell requires a tamper detection loop. Both the bell circuit and the tamper detection loop can be supported by a 3-IDC8/4 module.

A single phone line that is tested at least once in every 24-hour period can be used. Alternately, two lines with line cut monitoring can be used in place of a line with 24-hour testing.

If the central monitoring station (CMS) does not have testing services, the SDU can program the system to issue tests on a fixed or relative basis to meet this requirement.

The CMS must have a maximum response time of 30 minutes.

When this application includes partitions, the partition that contains the EST3 panel equipped with the 3-MODCOM and local bell must be armed 24 hours a day, and have limited, high-level access.

Police station connect certificate

The equipment, installation requirements, and application restrictions for a Police Station Connect Certificate installation are the same as for a Central Station Alarm Certificate installation, as described above.

Central station alarm certificate (UL Applications Only)

Figure 2-3 shows the equipment that can be used as part of a Central Station Alarm Certificate installation.

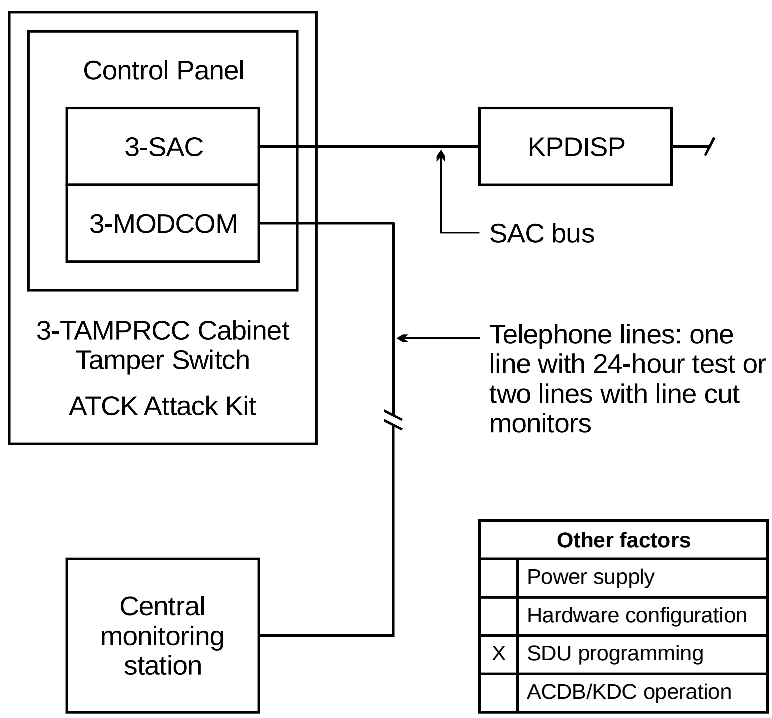


Figure 2-3: Central station certificate

This certificate requires that the control panel be fitted with an ATCK Attack Kit and a 3-TAMPRCC Cabinet Tamper Switch. No local bell is required.

A single phone line that is tested at least once in every 24-hour period can be used. Alternately, two lines with line cut monitoring can be used in place of a line with 24-hour testing.

When this application includes partitions, the partition that contains the EST3 panel equipped with the 3-MODCOM must be armed 24 hours a day, and have limited, high-level access.

In mercantile burglar alarm systems, you can locate an alarm sounding device outside the protected area, provided the sounding device is located inside the building, is rated for outside service, and you transmit alarm conditions to one of the following:

- The dispatch location of the law enforcement agency having jurisdiction over the protected property
- A central station or residential monitoring station complying with the Standard for Central Station Alarm Services, UL 827

You can also locate an alarm sounding device within the area of greatest protection, or outside the area of greatest protection within an area protected by an alarm system that shares a common control unit with the alarm system installed in the area of greatest protection, provided the sounding device is rated for inside service and you transmit alarm conditions to one of the following:

- The dispatch location of the law enforcement agency having jurisdiction over the protected property
- A central station or residential monitoring station complying with the Standard for Central Station Alarm Services, UL 827

In either case above, mount alarm sounding devices located inside building at least 10 feet (3.05 m) above the floor or at the surface of the ceiling. When there is fixed construction within the area that could provide access for an intruder, mount the alarm sounding device at least 4 feet (1.2 m) away from the edges of the fixed construction along the surface of the ceiling or at least 10 feet (3.05 m) above it so as to minimize access by an intruder.

Local mercantile alarm certificate

Figure 2-4 shows the equipment that can be used as part of a Local Mercantile Alarm Certificate installation. The control panel cabinet must be fitted with an ATCK Attack Kit and a 3-TAMPRCC Cabinet Tamper Switch. A listed local bell is also required.

The bell requires a tamper detection loop. Both the bell circuit and the tamper detection loop can be supported by a 3-IDC8/4 module.

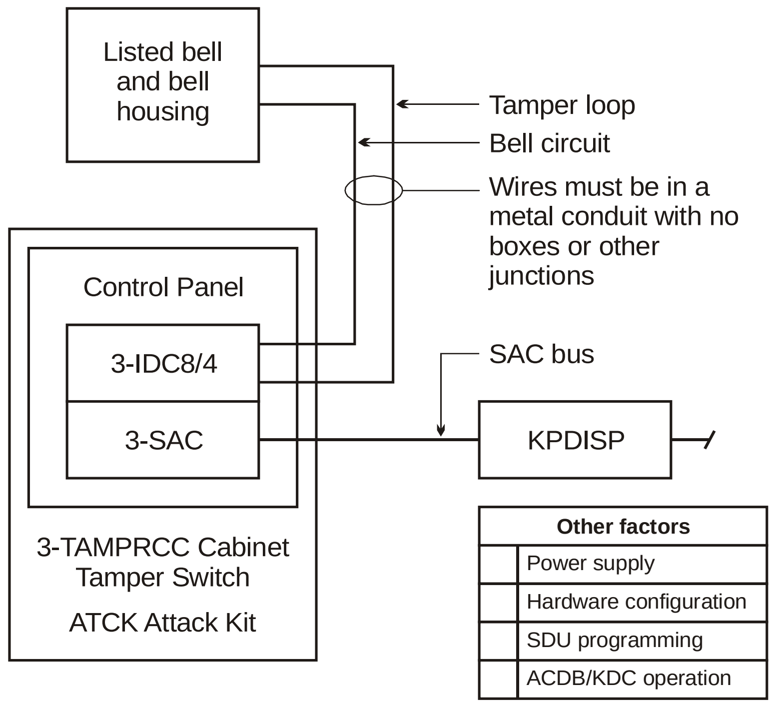


Figure 2-4: Local certificate

The bell must be positioned where it can be heard from every arming station in the system. You can use multiple bells if required.

In mercantile alarm systems that do not provide a remote alarm transmission connection, you must mount the alarm housing on the outside of the building in a location that is accessible, is not more than four stories above street level, and is visible from the public street or highway.

You may locate the alarm housing as high as the seventh floor, provided you do one of the following:

- Mount a second alarm sounding device and housing intended for outside service adjacent to the premises or area of the building in which the alarm system is installed
- Mount a second alarm sounding device and housing intended for inside service within the premises

Multiple 3-MODCOM modules

You can install more than one 3-MODCOM Modem Communicator module in a system. Two or more 3-MODCOM modules can be installed in the same cabinet. Two or more cabinets can contain 3-MODCOM modules.

There are several reasons for using multiple 3-MODCOMs:

- Redundant communication to a CMS
- Backup of critical communication links
- Dedicated security transmission hardware

In a redundant communication system both 3-MODCOMs are programmed to transmit the same message to different receivers at the CMS or at different CMS installations.

One 3-MODCOM can be programmed to back up another. This guarantees CMS communication (or TAP paging) should one panel in the system become disabled.

In a multiple tenant application, there may be a high volume of ACDB/KDC program traffic. You can design such systems with a second 3-MODCOM, dedicating the first module to ACDB/KDC traffic, and the second module to CMS transmissions. This prevents contention for communication channels.

Overall limits for the number of 3-MODCOM modules are:

- 10 modules per node
- 10 modules total per network

Multiple site security and access

Description of the application

Figure 2-5 shows how a company with multiple sites can centralize security and access control functions for all sites. This means an employee only needs to carry a single access card to gain appropriate access to any company site.

The figure shows a company with three plants, designated sites A, B, and C. Site C is chosen as the company headquarters for security and access control purposes.

Each site is a separate SDU project. At each site, the Resource Profile Manager (RPM) tool is used to create a profile for that site. This includes site C, the headquarters plant.

All the profiles are sent to the security office at site C for import into the Keypad Display Configuration (KDC) or Access Control Database (ACDB) program. This means that the programs will present all resources at all sites in a single hierarchy, as shown by the tree diagram.

The security personnel at site C can create global access groups. This means that they can assign an employee the correct security and access privileges for all sites from one central location. The employee can carry a single access card that will grant him the correct security and access privileges at each site.

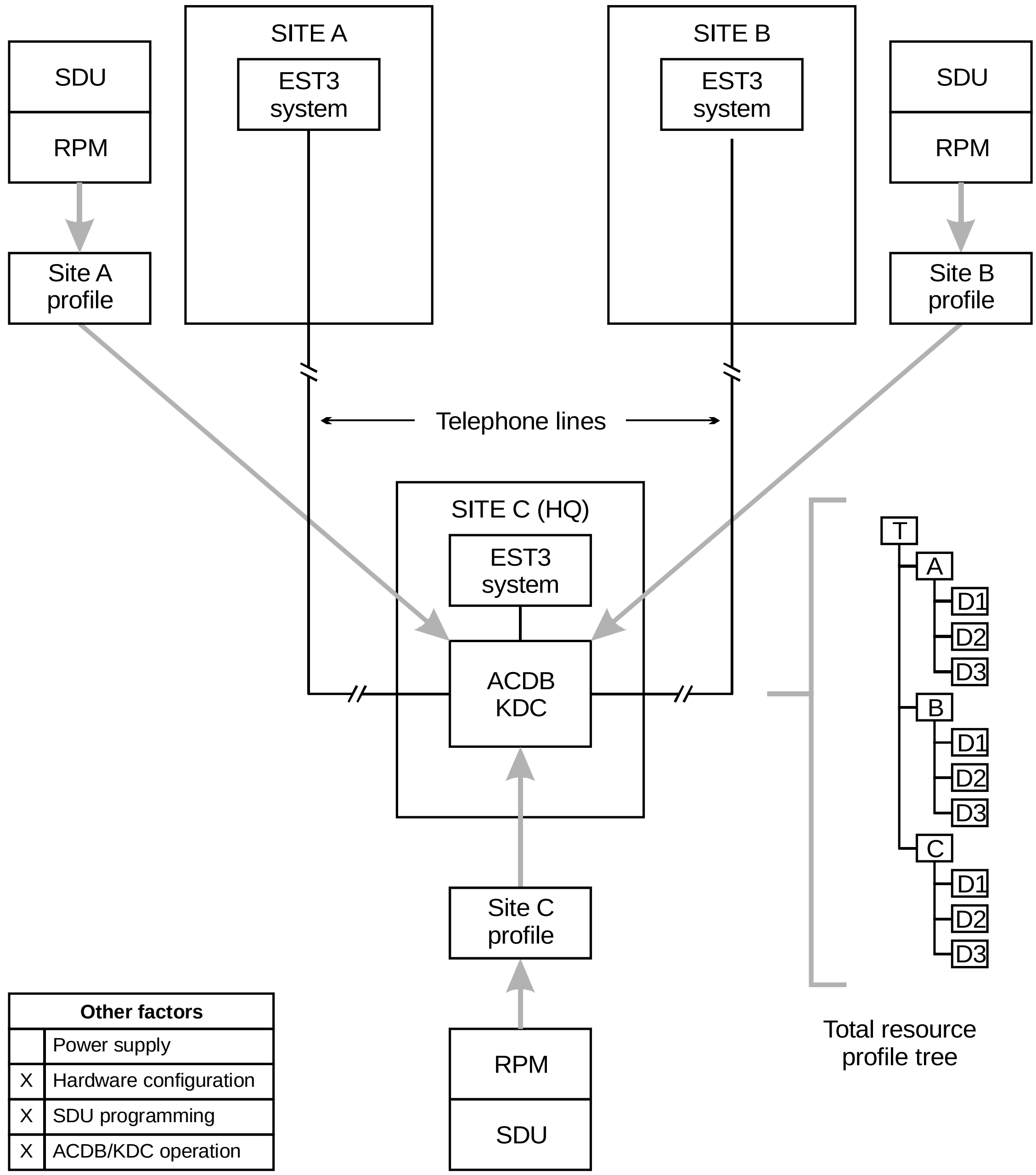


Figure 2-5: Multiple site security and access control system

Hardware configuration

Each site must have an EST3 system. In each EST3 system, at least one panel must include a 3-MODCOM module to support modem communication between headquarters and sites A and B.

The KDC and ACDB programs can communicate with the EST3 system either by modem, or by direct connection to an RS-232 port on the CPU module.

Each system includes 3-SAC modules as required to support the security and access control systems implemented.

Rules covering installation and classification (of extent) of alarm equipment at individual locations are published in the *Standard for Installation and Classification of Burglar and Holdup Alarm Systems* UL681.

SDU programming

No special project programming is required to enable multiple site security and access control systems. When running the RPM tool, each site receives 100% of the resources for that site.

Note that all profiles must be sent to the site C headquarters when the project is finished.

ACDB/KDC operation

At the headquarters site, all three profiles are imported into the ACDB/KDC program. The result is a global tree of resources that includes each KPDISP and CRC device in each site.

Importing all the profiles into one ACDB/KDC program creates the global database.

When additions or changes to the KPDISP database are made, headquarters can transmit the changes to the affected sites.

Multiple tenant security

Description of the application

Figure 2-6 illustrates a simple strip mall security application. The mall consists of three identical stores and an electrical room.

The control panel supports a SIGA data circuit and a SAC bus. The panel also supports modem communications via telephone lines.

The SIGA circuit has pull stations and smoke detectors. In addition, the SIGA circuit has two security devices, the motion detector and the SIGA-SEC2 security loop module. The SIGA-SEC2 connects a conventional door contact to the SIGA circuit.

The SAC bus is used exclusively for the KPDISP devices.

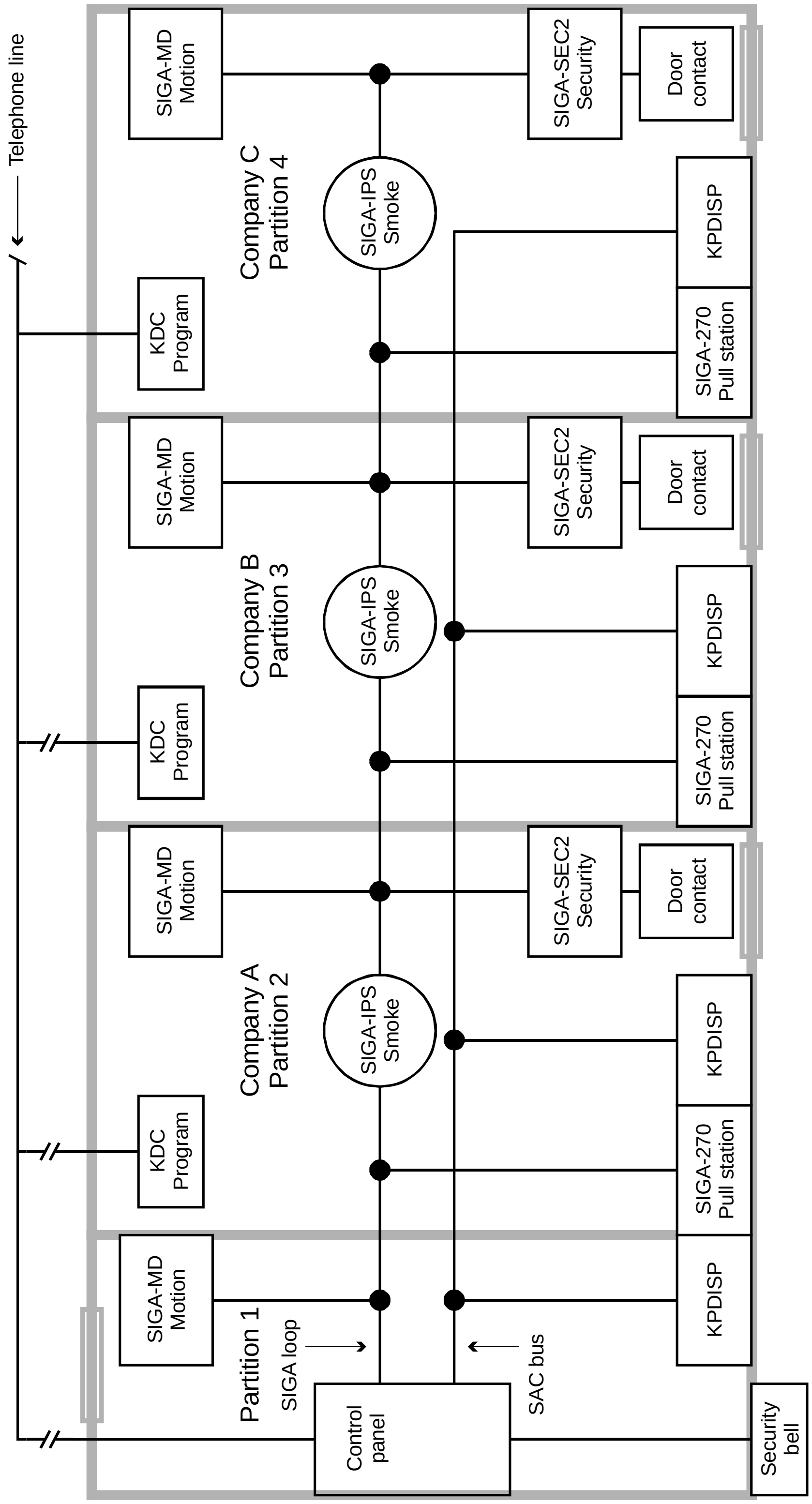
Each company owner has a Keypad Display Configuration (KDC) program. The program runs on a computer equipped with a modem, and uses the modem and a dial-up telephone line to communicate with the control panel.

Each company owner can use the KDC to download changes to that company's portion of the security database. The changes are routed through the panel to the appropriate KPDISP unit.

Note: Fire and security functionality cannot be programmed into a control panel from a remote location. You must perform all panel programming on site. Changes to the security database have no impact on the parameters or operations of listed fire system equipment.

The control panel can be configured to provide telephone connection to a central monitoring station (CMS). Each tenant company can have a separate account at the same CMS, or can use the services of a separate CMS.

Refer to Appendix C, "Listing requirements" for additional information.



Other factors	
Power supply	
Hardware configuration	X
SDU programming	X
ACDB/KDC operation	X

NOTE: Star taps are shown to simplify this diagram, but are not recommended for Signature data circuits. Create two T-taps in the same junction box if required.

Figure 2-6: Multiple tenant security in a strip mall

Hardware configuration

The control panel contains the following rail modules:

- Signature Controller module
- 3-SAC Security Access Control module
- 3-MODCOM Modem Communicator module

The Signature Controller module supports the SIGA loop.

The 3-SAC module supports the SAC bus. Power for the KPDISP can be taken from the 3-PPS/M and routed with the data lines in a cable composed of two twisted-pair wires.

The 3-MODCOM module supports modem communication between the control panel and the KDC programs via telephone lines.

In the Class B configuration illustrated, an appropriate RS-485 line terminating resistor is required in the KPDISP located in partition 4.

The electrical room, partition 1, must be armed 24 hours a day, and have limited, high-level access.

SDU programming

When programming the system for this application, you define the required partitions and assign the correct partition number to each security device.

Part of the programming effort includes using the Resource Profile Manager (RPM) tool to create resource profiles for the site owner and for each company owner.

Since none of the devices are shared, each company should receive 100% of the resources of their KPDISP. A small percentage may be set aside for use of the site owner, depending on the owner’s policy.

Programming for the 3-MODCOM module determines the dialer and modem parameters, defines the receivers and accounts, and assigns each account to the correct receiver.

Finally, when running the RPM tool, you specify which, if any, of the KPDISP modules can execute fire system commands. Typically, this privilege is reserved for the site owner or site security staff.

Refer to the *SDU Online Help* for more information.

KDC operation

Each company owner must import the resource profile output from the RPM. After importing this resource data, each company owner can create his portion of the security database, according to the instructions included with the KDC program.

Changes to the tenant portion of the security database can be made at any time, and from any location.

Note: Fire and security functionality cannot be programmed into a control panel from a remote location. You must perform all panel programming on site. Changes to the security database have no impact on the parameters or operations of listed fire system equipment.

Secure access

Description of the application

Secure access is a simplified type of security application. Typical secure access applications are operated from a secured control panel, and use partitions with no entry or exit delay timers.

Secure access applications often use the control panel LCD module (or dedicated Control/LED display modules) to control the security partitions. Partitions can be armed or disarmed using any of the following:

- LCD menus
- EST3 Control/LED modules
- FireWorks interface
- ENVOY annunciators
- KPDISP

A secure access system can be implemented using either Signature or Analog Addressable security devices. Signature devices are less prone to false alarms, and are more resistant to tampering, since they cannot be swapped with deliberately compromised devices.

SDU programming

When you create a secure access application, use the SDU to create partitions as required. When configuring the partitions, set the Entry Delay Timer and Exit Delay Timer values to zero. When configuring SIGA-SEC2 and SIGA-MD devices, set the Delay to None.

You can use LCD menu commands to arm and disarm the partitions. To do so, you must check the Enable LCD Security Control Functions check box. This is located on the Options tab of the Cabinet Configuration dialog box. Checking this box causes the Security menu to appear in the Command Menus list.

You can use any suitable Control/LED module to arm and disarm partitions. Configure the switches as momentary contact switches, and use them to activate command lists. Program the command lists to perform the desired arm and disarm actions and control the LEDs.

Refer to the *SDU Online Help* for more information on rule programming for secure access applications.

Chapter 3

Access control applications

Summary

EST3 supports rugged and adaptable access control systems. This chapter introduces you to the equipment required for access control applications.

This chapter also illustrates and describes several access control applications. Each application is presented as a separate topic that includes a block diagram and description. These give you an overview of the application, and show the components required and their interconnection.

Refer to the *EST3 Installation Sheets* for specific component settings and terminal connections.

Security applications make use of the CRC Card Reader Controller. Refer to the *CRC and CRCXM—Card Reader Controller Installation Sheet* for specific installation information on this module.

Content

Access control equipment

Introduction

The equipment required for a basic networked access control system is shown in Figure 3-1. We'll discuss each item shown in the figure, plus the *other factors* called out on the drawing.

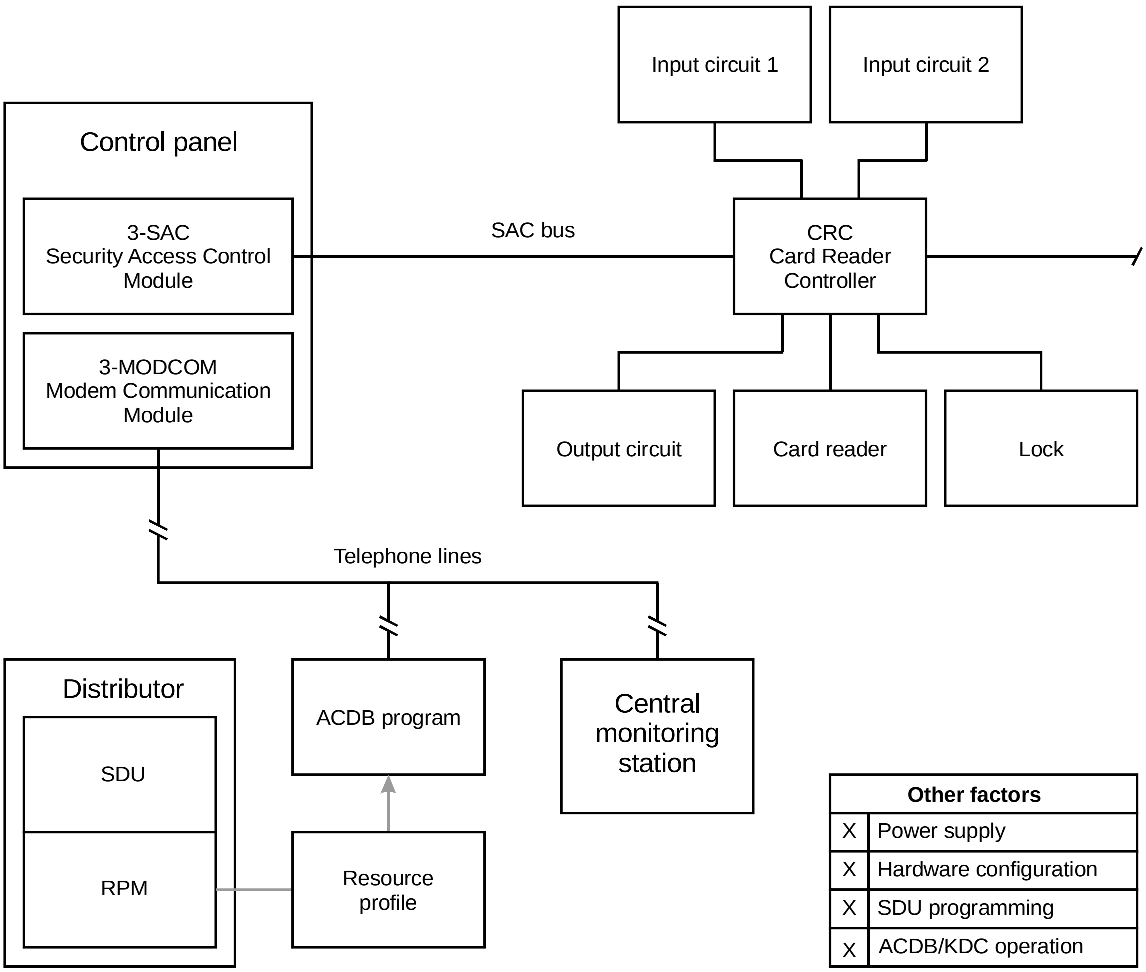


Figure 3-1: Equipment required for a basic access control system

Equipment

Here is a list of the equipment used in a basic networked access control system:

- 3-SAC Security Access Control module
- 3-MODCOM Modem Communication module
- SAC bus
- CRC Card Reader Controller

- Input circuit 1
- Input circuit 2
- Output circuit
- Card reader
- Lock
- RPM Resource Profile Manager tool
- ACDB Access Control Database program

3-SAC Security Access Control module

The 3-SAC Security Access Control rail module controls a high-speed RS-485 circuit called the Security Access Control (SAC) bus. The SAC bus supports fire, security, and access control devices.

The 3-SAC handles message traffic for these devices, interfacing them with the CPU as required. Events are passed from the devices to the 3-SAC module, then to the CPU for alarm processing.

The 3-SAC has two sets of circuit terminals, and is capable of Class A or Class B configuration. Each Class B circuit can include 31 devices, for a total of 62 devices per module. Class A circuits can include 30 devices total. In Figure 3-1, we show a Class B bus with a CRC Card Reader Controller module.

3-MODCOM Modem Communicator module

The 3-MODCOM Modem Communicator module has both modem and dialer functions. It can transmit and receive information.

The 3-MODCOM can transmit alarm, supervisory, or trouble messages to a remote central monitoring station using one or two telephone lines. A variation of the module (3-MODCOMP) can transmit pager messages to a paging company using the TAP protocol.

The module can also receive information sent over telephone lines by the Access Control Database (ACDB) program.

SAC bus

Since our security and access control devices require 24 Vdc, we suggest that you always use a four-wire cable for the SAC bus and a 24 Vdc power supply.

For the data wires, use unshielded, twisted pair, with greater than 6 twists per foot, in 14 to 22 AWG (1.50 to 0.25 sq mm). For the power wires, use 14 or 16 AWG.

You can use a four-conductor cable with an overall jacket containing solid 2-19 AWG and 2-16 AWG for the SAC bus.

The maximum run from a CRC to the 3-SAC is 4,000 ft (1,220 m) at 25 pF/ft. The maximum total capacitance of the run is 0.1 μF, and the maximum total resistance is 52 Ω.

CRC Card Reader Controller

The Card Reader Controller (CRC) module performs all access decision processing. Each CRC stores a database and is capable of granting or denying entry without external communication. If entry is granted, the CRC applies or removes power to the strike or maglock to unlock the door. The CRC is also capable of unlocking a door by activating a manual push button.

Each CRC stores an access database of users and events for the door it controls. The CRCXM model features enhanced storage capacity. (Refer to the product installation sheets for quantities.)

Each CRC has terminals that support:

- Two card readers, typically one inside and one outside the door
- One lock device, either strike or maglock type
- Two input circuits for devices such as request to exit detectors, door contacts, or motion detectors
- One output circuit with N.O and N.C. contacts for auxiliary devices, such as door openers

With the addition of an internal battery, the CRC can continue processing access events even if there is a loss of communication or power.

CRC options

CRCSND CRC Sounder

The CRC Sounder is a small horn that mounts inside the card reader controller module. The sounder operates if an emergency exit door is opened without an exit request and can also indicate that a door has been left open.

The CRC Sounder can be programmed, using rules written in the SDU. Further, the ACDB program can control several operating parameters of the sounder.

CRCRL CRC Accessory Relay

The CRCRL is an accessory relay for the CRC (or CRCXM) Card Reader Controller. Use the CRCRL in conjunction with an external power supply to control a lock which requires voltage or current outside the CRC's operating range.

The CRCRL can be mounted inside the CRC housing when connected to power-limited wiring. The unit includes a hook-and-loop patch which can be attached to the CRC battery strap.

When nonpower-limited wiring is used, the CRCRL must be mounted in a junction box.

The CRCRL is listed as an Access Control Accessory and Control Unit Accessory.

Battery

Each CRC has space for an internal, 1.2 Ah, sealed lead-acid battery. The battery supplies power to the CRC and its peripherals, and provides local standby power.

The CRC battery provides 30 minutes of standby power for access control functions and up to 4 hours for security functions. The battery cannot be used for fire applications.

CRCXF CRC Transformer

The CRCXF CRC Transformer is a 16.5 Vac transformer that can power the CRC or CRCXM. It provides local power for applications requiring additional power at door lock. The CRC has AC load terminals for easy connection to transformer.

Be sure to check the CRC installation sheet for a list of applications that prohibit the use of the CRCXF.

Input circuits 1 and 2

Each CRC supports two input circuits for such devices as:

- Door contacts
- Motion detectors
- Request to exit (REX) switches
- Security devices

A door contact device monitors the door position (open or closed) for various applications.

A motion detector detects a person’s approach and can be used to unlock the door.

A request to exit (REX) push button (or bar) can be used to manually unlock the door.

Security devices, such as glass-break detectors can be associated with the door to enhance its security, or to monitor a nearby window.

Output circuit

Each CRC supports one output circuit in the form of N.O. and N.C. dry contact connections. The output circuit can be used for such devices as:

- Automatic door openers
- Door holder control

Card reader

By *card reader*, we mean any of the different types of credential reader supported by the CRC. A card reader scans a card to determine the card number and passes the card number to the CRC.

A card reader is a self-contained module capable of reading one type of access card and transmitting the card's code to a card reader controller.

All the required electronics are assembled in the card reader housing. The card reader connects directly to the CRC, which processes the card code and grants or denies access.

Each CRC can support several card readers. Typically, a CRC will control an entry and exit card reader for the doorway. It can also support multiple readers for such applications as two-person rule or anti-passback.

Note that the CRC supports any type of reader that uses the industry standard Wiegand output format. These include:

- Proximity
- Wiegand pin
- Magnetic stripe
- Bar code
- Keypad
- Smart card
- Biometric

For simplicity, we present all the applications in this chapter as operating with proximity readers, but other reader types can be used.

Some applications work best with card readers that support dual LED control. The CRC uses two LEDs, or two LED states, to indicate that further actions are required after the initial badging operation, before access is granted. These applications are:

- Two-person rule
- Visitor and escort
- PIN schedule

Some card readers are also equipped with a keypad. The keypad allows for entry of a PIN number in addition to the card code.

The CRC can accommodate any PIN number of 1-4 digits along with the associated card code. The need to enter a PIN is controlled by two factors: whether or not the CRC is armed, and whether or not the access schedule calls for use of a PIN.

Lock

The CRC supports any type of door locking or releasing device. Common lock devices are strikes and maglocks. A strike *opens* the door when power is supplied, while a maglock *secures* the door while power is supplied.

RPM Resource Profile Manager tool

The Resource Profile Manager (RPM) tool is part of the SDU. It uses the project database to let you create a separate resource profile for each company that will be using the access control system.

The resource profile defines the access control system for the ACDB program. It includes detailed information about each CRC used by a given company. For example:

- Communication method
- Primary or secondary control
- Number of cardholders
- Number of schedules
- Number of holidays
- Number of access levels
- Command lists used

ACDB Access Control Database program

The Access Control Database (ACDB) program lets you define and maintain a database of information about CRCs, cardholders, and access levels.

The ACDB program runs on the your PC. Additions or updates to the access control database can be transmitted to the CRC units in two ways.

The first method is via modem and dial-up telephone line to the 3-MODCOM. The information is then routed to the CPU, through the correct 3-SACs, and finally to the CRC units.

The second method is by connecting your PC directly to the CPU using an RS-232 cable. The connection is made between the PC’s COM1 port and any of the RS-232 terminals on the CPU. As in the first method, after reaching the CPU additions and changes are routed through the correct 3-SACs to the CRCs.

Note: Changes to the access control database have no impact on the parameters or operations of listed fire system equipment.

Other factors

Next, we'll cover the additional factors listed on the drawing:

- Power supply
- Hardware configuration
- SDU programming
- ACDB/KDC operation

These factors are called out on each application diagram given in this chapter.

Power supply

The CRC is designed to operate on 24 Vdc. For this reason, we recommend that you include power from the panel with the SAC bus cable. You can use the panel 3-PPS/M or 3-BPS/M power supplies.

When using CRCXF CRC Transformer you must provide a circuit common path between all devices, using the –24 Vdc terminals.

If you use an additional power supply other than the CRCXF, that power supply must be listed for fire alarm applications, must have ground fault detection disabled, and must have a circuit ground (circuit common) that is isolated from earth ground.

Hardware configuration

The CRC has two jumpers that configure the power source and usage for the module. See the CRC installation sheet for details on the jumper settings.

No other configuration settings are made at the device itself. All other configuration is done via SDU or ACDB programming.

The SDU determines site-level configuration and parameters. The ACDB program controls end-user settings.

SDU programming

While the ACDB program defines the access control database, all other definition, configuration, and programming for the access control system happens in the SDU.

The SDU controls the general configuration of the 3-SAC modules, plus the configuration of all CRC devices on the SAC busses.

CRC modules can be configured to execute a specific, predefined command list when a specific access control event occurs. You write the command lists in the SDU, and assign them to CRC events when you configure the CRC module.

Partitions are fundamental groups used with access control systems. To use such access control features as two man rule, muster, or anti-passback, CRCs must belong to the same partition. All partitions are created and defined in the SDU, and each CRC can be assigned to a partition.

For the 3-MODCOM module, the SDU determines the dialer and modem parameters, defines the receivers and accounts, and assigns each account to the correct receiver. These settings control CMS reporting and ACDB download operation.

Finally, the SDU includes the RPM tool, described earlier in this topic.

ACDB operation

The ACDB program lets you create and revise your access control database. Parameters stored in the database identify cardholders, schedules, and holidays, and assign access privileges.

The SDU includes a tool called the Resource Profile Manager (RPM). The RPM lets you create a resource profile for each company using the system for access control purposes. During setup of the ACDB program, you import the resource profile created by the RPM. This defines the system devices for the ACDB program.

The ACDB runs on your computer. You can connect the computer to the access control system in two ways:

- From an RS-232 port on the computer to an RS-232 port on the CPU
- From the computer modem to a 3-MODCOM via telephone lines

The end result is that the ACDB database can be downloaded from your computer to the system. Each CRC stores that portion of the database pertinent to its operation.

Locally defined unlock and open timers

Using the ACDB program, you can control how much time a cardholder has to enter or exit after badging in or pressing a request-to-exit button (REX). The CRC controls both the unlock time and door open time. Both can be set in the ACDB program.

Unlock timers control the number of seconds that the door stays unlocked after a cardholder badges in. When the unlock timer expires, the door locks. The ACDB has four unlock timers:

- Standard unlock
- Handicap unlock

- Manual unlock
- Minimum unlock

The CRC relay can be used to control a door opener. Door open timers control the number of seconds that the relay remains active. The ACDB has two door open timers:

- Manual open time
- Relay open time

Access control applications

The remaining topics in this chapter discuss specific access control applications. Each topic gives you an overview of the application, showing the components required and their interconnection.

Each topic includes a block diagram and general description of the application. Other factors (as called out on the drawings) are discussed under separate headings in the topic.

Anti-passback

Description of the application

Anti-passback is a feature of the access control system that prevents successive use of one card to pass through any door in the same direction. Anti-passback prevents a card from being passed back to another person for the purpose of gaining unauthorized access.

The CRC supports three forms of anti-passback:

- Strict
- Logged
- Timed

Strict anti-passback is the most restrictive form of anti-passback. It requires all personnel to badge in and out, denying them access to an area when they fail to do so.

Logged anti-passback is less restrictive than strict anti-passback. It still requires personnel to badge in and out but does not deny access when anti-passback rules are violated. Rather, such access is logged as an access granted anti-passback event. With logged anti-passback, security staff can work to correct violations, but personnel are not locked out.

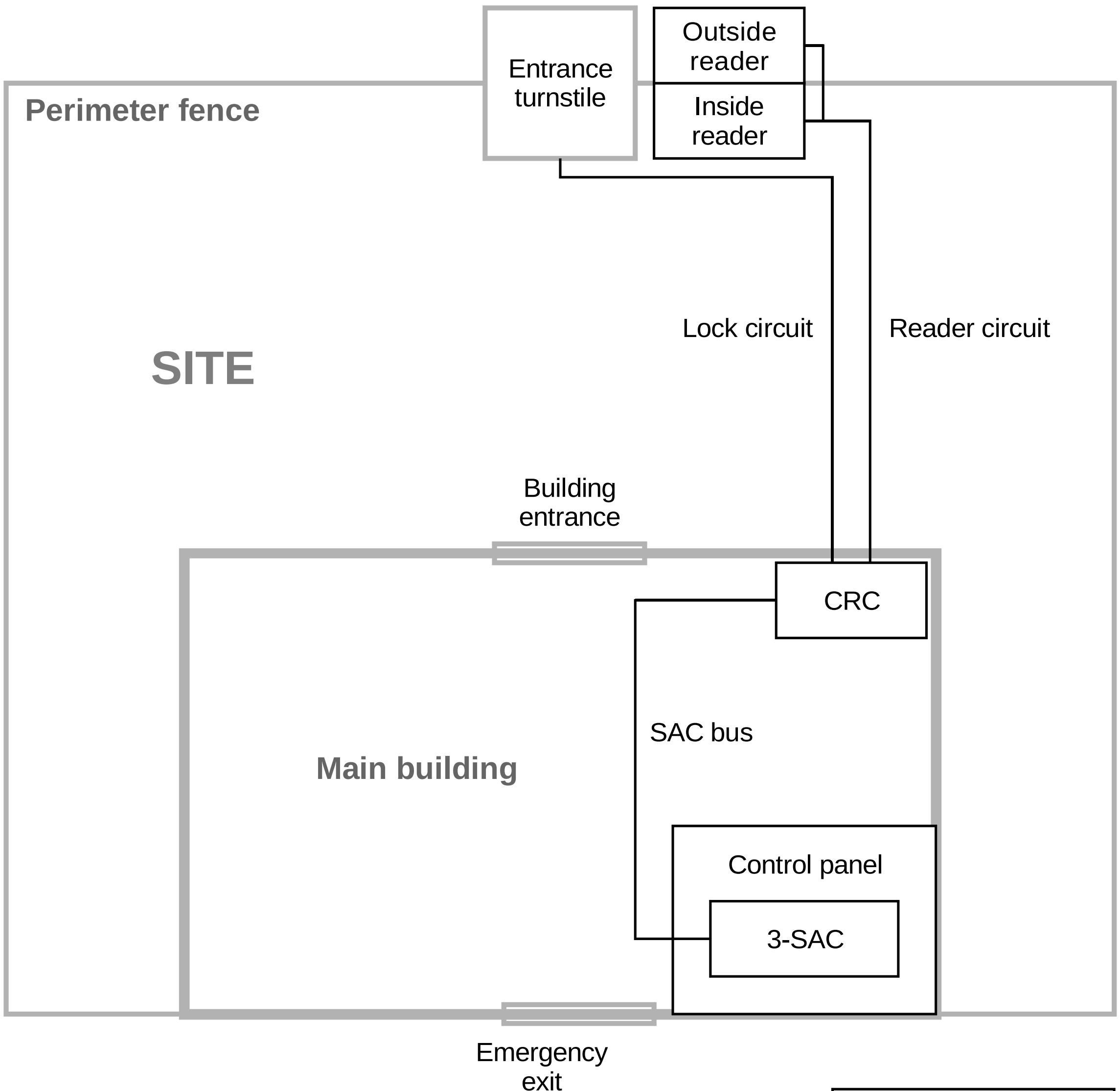
Timed anti-passback prevents reuse of a card for a specific period, but does not require personnel to badge out. A timed anti-passback system automatically badges a cardholder out of the controlled partition after a specified time period, allowing the card to be used again.

Note: Timed anti-passback cannot be used with a muster application, since the system automatically logs cardholders out of the partition, defeating muster accounting.

To implement anti-passback, a separate CRC is required at each doorway in the controlled partition. Each doorway requires an outside card reader. Strict and logged anti-passback applications also require an inside reader at every doorway. Timed anti-passback does not require the use of an inside card reader.

A typical anti-passback application is shown in Figure 3-2, below.

The figure shows a building with a perimeter fence. It would be easy for an employee to pass his access card to an unauthorized individual through the fence, thereby allowing access. Configuring the access control system for anti-passback operation can help prevent this from happening.



	Other factors
	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 3-2: Anti-passback

Hardware configuration

The control panel must contain a 3-SAC Security Access Control module. The 3-SAC module supports the SAC bus. Power for the CRC can be taken from the 3-PPS/M and routed with the data lines in a cable composed of two twisted-pair wires (the SAC bus).

SDU programming

If the CRC is to be used for anti-passback this must be configured using the SDU. The CRC configuration dialogs let you select the type of anti-passback you want to use:

- None
- Logged
- Timed
- Strict

You can also assign a predefined command list to various access granted or access denied events, including the anti-passback events:

- Access granted anti-passback
- Access denied anti-passback

The CPU runs the command list you specify when either of these events occurs.

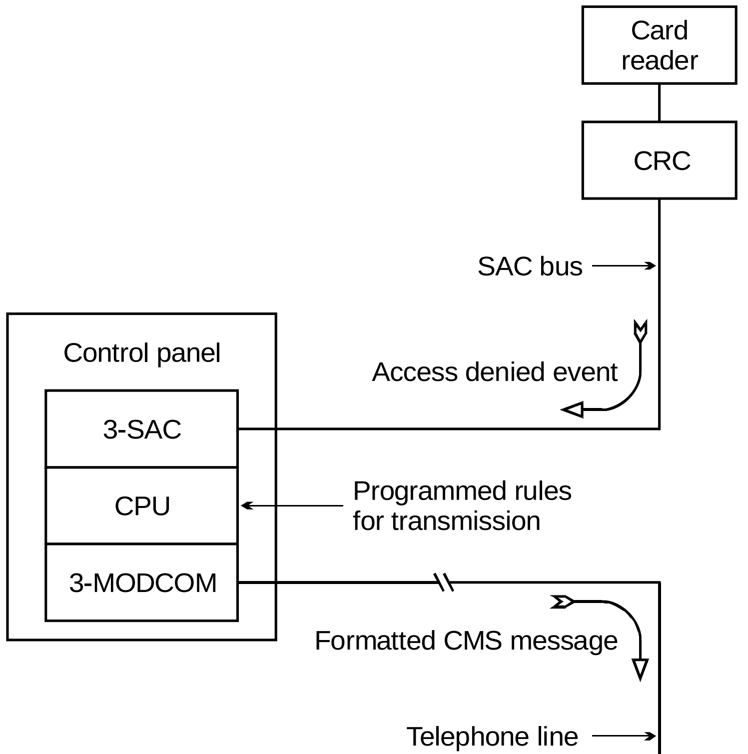
ACDB programming

With timed anti-passback, the cardholder is automatically marked out after a specified period of time. This period is defined by the ACDB. The period can be set from 0 through 255 minutes (4 hours and 15 minutes).

Central monitoring station

Description of the application

An access control system can transmit different kinds of event information to a central monitoring station (CMS). The basics for such a system are shown in Figure 3-3.



	Other factors
	Power supply
	Hardware configuration
X	SDU programming
	ACDB/KDC operation

Figure 3-3: Access control reporting to a central monitoring station

When a reportable access event occurs, the event message travels from the CRC to the 3-SAC. The 3-SAC passes the message to the CPU which executes a predefined command list. The command list specifies the details of the message that is sent to the 3-MODCOM for transmission to the CMS.

SDU programming

Reporting access control events to a CMS depends entirely on programming and the creation of command lists. In essence, you must assign a command list to each CRC event you want to report. The command list contains the details of the message to be transmitted.

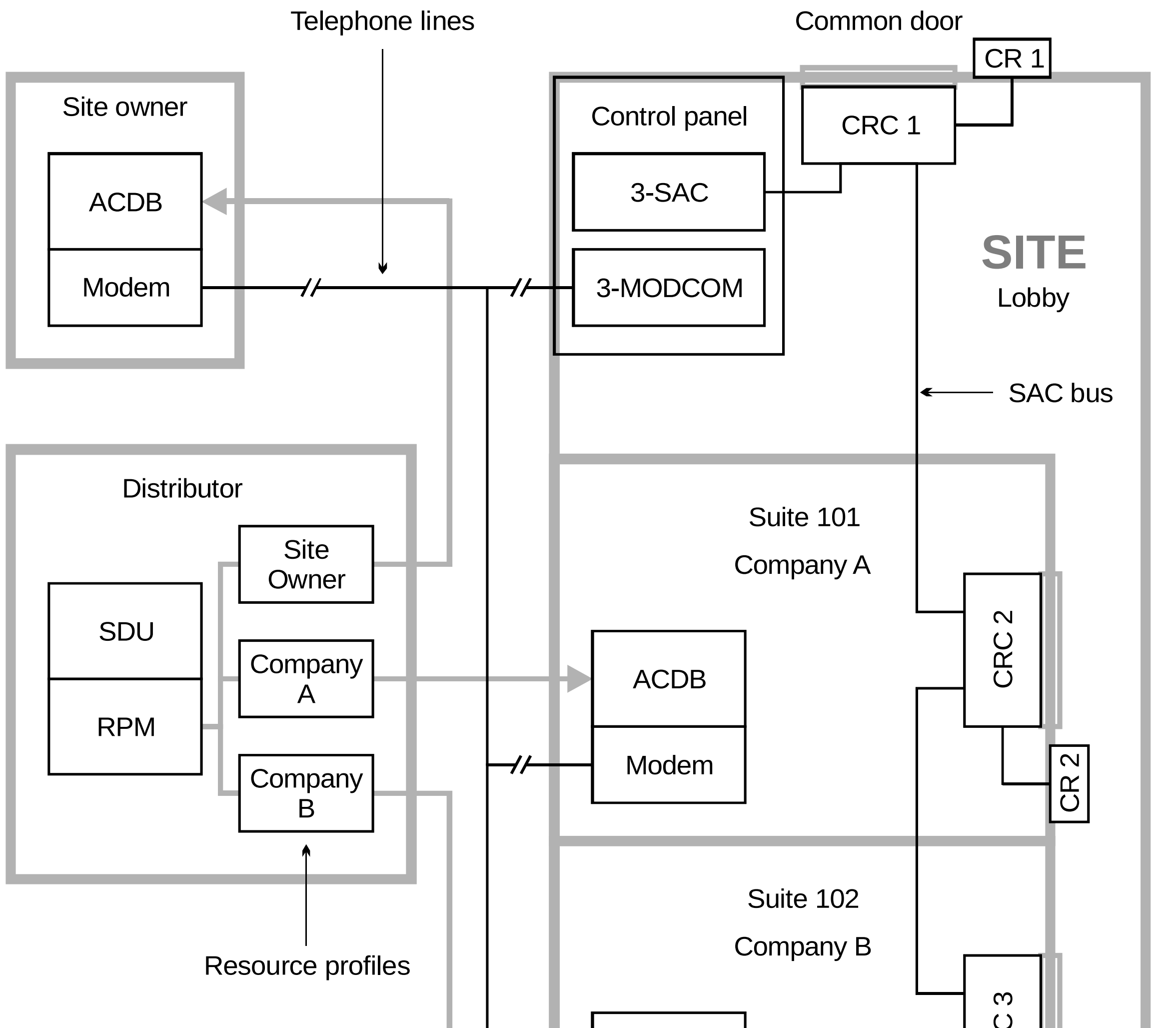
The following CRC events can be assigned command events:

- Access granted
- Access granted irregular
- Access granted anti-passback
- Access granted muster
- Access denied unknown
- Access denied reader disabled
- Access denied access level not active
- Access denied outside schedule 1
- Access denied outside schedule 2
- Access denied partition armed
- Access denied PIN not entered
- Access denied PIN not valid
- Access denied two-person timeout
- Access denied anti-passback
- Access denied escort

Common door access

Description of the application

A site that makes use of a common door is shown in Figure 3-4. Here, the door is the main entrance of an office building, and leads into a common lobby area. Within the building, two companies rent offices, each with controlled access doors.



	Other factors
	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 3-4: Common door in a lobby area

Hardware configuration

The site has an EST3 control panel that includes a 3-SAC and a 3-MODCOM module. The 3-SAC supports the SAC bus. The 3-MODCOM module supports modem communication with the control panel over telephone lines.

SDU programming

As the distributor, you use the SDU to program the control panel for this application. Part of the programming job is to use the Resource Profile Manager (RPM) to create resource profiles for the site owner and for each tenant company.

Resource profiles are imported into the Access Control Database (ACDB) program. They determine which devices the user can see and program. Resource profiles also establish transmission routes that permit modem communication with the EST3 panel.

When a device is shared, the RPM lets you specify how much of the device is allocated to each company. You can allocate resources either by percentages or by actual numbers.

It's a good idea to hold some allocation in reserve, giving each company only what it needs. It is much easier to allocate additional resources as needed than to reclaim resources that are already allocated.

In our example, the resource profile for company A would contain CRC 1 (the lobby door) and CRC 2 (the suite 101 door). For Company A, you might choose to allocate 80% of CRC 2, and 20% of CRC 1.

Similarly, the resource profile for company B would allocate 80% of CRC 3 and another 20% of CRC 1.

The site owner will need access to the CRC2 and CRC3 doors for cleaning or inspection purposes. The site owner resource profile could allocate 20% of CRC 1, 10 % of CRC 2, and 10% of CRC 3.

This leaves 40% of CRC 1 unallocated, and 10% of CRC 2 and CRC 3 unallocated. The unallocated resources are reserved for future expansion or changes.

ACDB operation

The site owner, the owner of company A, and the owner of company B, can all use telephone lines to communicate with the control panel via the 3-MODCOM module. They can download additions and changes to the CRCs, and upload usage data for various ACDB reports.

Delayed egress

Description of the application

Delayed egress doors help to control shoplifting at retail sites. A delayed egress door has card readers and a request to exit (REX) switch. Employees can badge in and out as they would at any other door. In an emergency, customers must press the REX switch to unlock the door.

When the REX switch is activated, the CRC sounds the CRCSND horn and sends a security alarm event to the panel. It does not unlock the door immediately, thus allowing site staff time to investigate.

The CRC waits for a specific interval of time before unlocking the door. The typical delay time is 15 seconds; however, you may be able to use a delay of up to 30 seconds with the approval of the AHJ. The horn continues to sound for a specific period of time, or until the CRC is reset.

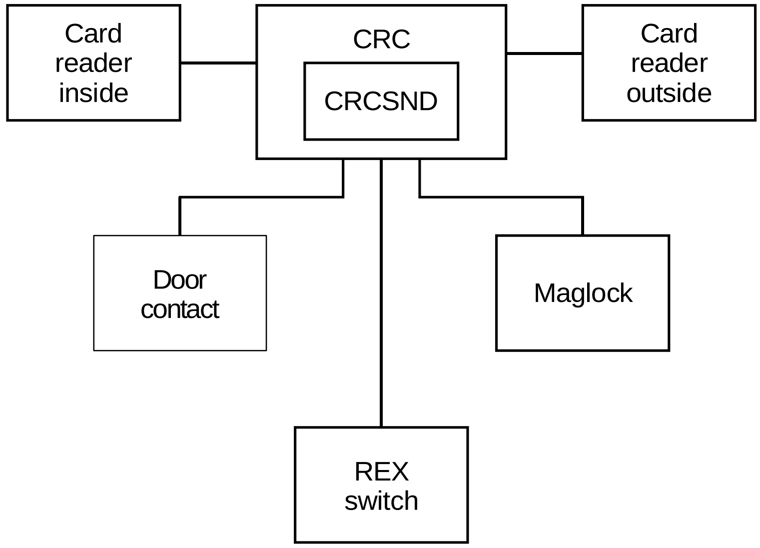
After the delay time passes, the CRC unlocks the door, and latches it in the unlocked state. The CRC must be reset in order to relock the door and silence the horn. To reset the CRC, site staff must use a valid badge at the card reader.

The CRC also activates the CRCSND horn if the door is opened without badging. For example, if the door is forced open from the outside, the CRCSND activates, even though the REX switch has not been pressed.

Many codes require that delayed egress doors unlock during a fire alarm, or when the panel is in trouble. This requirement allows occupants to evacuate the site immediately when a fire is detected, or when the panel loses its ability to detect a fire or sound the alarm.

Figure 3-5 shows a delayed egress door with inside and outside card readers and a request to exit switch. The CRC uses a door contact switch to determine the position of the door, and a maglock to lock the door. The door contact switch and REX switch are connected to the input loops of the CRC.

Note: Refer to NFPA 101 and the local AHJ to determine the requirements for delayed egress applications.



Other factors	
	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 3-5: Delayed egress doorway

Hardware configuration

A maglock is most commonly used for delayed egress applications, but you can use any locking device that has no manual override. For example, a strike with no knob could be used.

The door contact is used to detect unauthorized opening of the door. The CRC activates the CRCSND and reports a security alarm event when the door is opened without badging or use of the REX.

The door contact signal is also required to relock the door when the CRC is reset. The lock cannot be reset until the door is closed.

SDU programming

Most codes require you to program rules that unlock the door when the panel goes into alarm or when the panel goes into trouble.

When configuring the CRC, set the Delayed Egress Time field to the value (in seconds) you want to use. Define the input loops as follows.

For the door contact input loop:

- Device Type = Security P Monitor
- Input Circuit Partition = as determined by project
- Max Delta Count = as determined by project
- Delays = None
- Application = Emergency Exit Door Contact
- Personality = Basic

For the request to exit switch:

- Device Type = Monitor
- Input Circuit Partition = None
- Max Delta Count = not applicable
- Delays = None
- Application = Request to Exit with Delayed Egress
- Personality = N.O. with Trouble

ACDB operation

When an employee badges in or out at the door, the CRC bypasses the door contact for a specified period of time. This is called the Bypass Time, and is specified in the ACDB.

The duration of the CRCSND horn is also specified in the ACDB, as the Emergency Exit Sounder Time. This can be set to any value between 0 and 255 seconds.

Setting the value to 0 seconds effectively inhibits the CRCSND. Setting the value to 255 seconds programs the CRC to operate the CRCSND until the CRC is manually reset by badging at the CRC card reader.

Elevator control

Description of the application

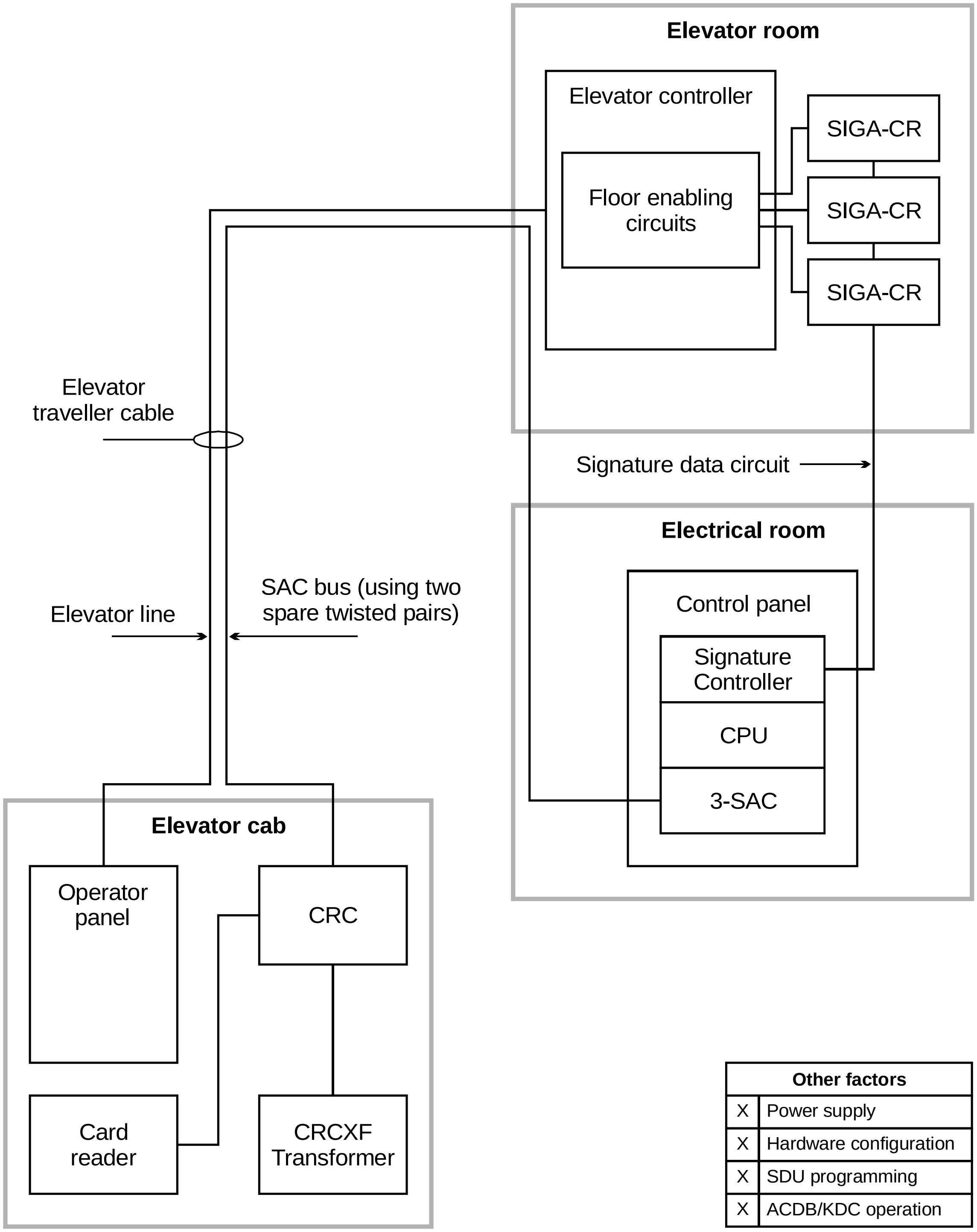
An access control system can determine which floors are available to a given cardholder. This application is shown in Figure 3-6.

A CRC and independent power source are installed in the elevator cab. When a cardholder presents his card it is processed by the CRC. If valid, the CRC sends an access granted event and a command list request to the CPU via the 3-SAC.

The command list operates the Signature relay modules attached to the Signature Controller module. The relays are connected to the elevator controller, and turn on or off access to the correct floors, according to the cardholder's access level privileges.

The command list includes timing, so the cardholder has a limited window of opportunity during which he can press the desired floor button. After the time has lapsed, he must present his card again.

Note: This application must be used only for floor access, and *not* for elevator control.



Other factors	
X	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 3-6: Access control and elevators

Power supply

The figure shows an independent power source for the CRC. This is suggested due to the length of cable from the cab to the electrical room.

Two pairs of wires are used to connect the CRC to the control panel. The SAC bus requires one pair for data communication. One wire of the second pair is required to maintain a common ground between the control panel and the CRC. For details, refer to the topic "Power from an AC source," later in this chapter.

If you use an additional power supply other than the CRCXF, that power supply must be listed for fire alarm applications, must have ground fault detection disabled, and must have a circuit ground (circuit common) that is isolated from earth ground.

Hardware configuration

In this application, none of the CRC input circuits or relay contacts are used. The CRC simply reads the card and passes the command list request to the 3-SAC and CPU for processing.

Since the CRC lock and input circuits are not used, you must provide dummy loads to maintain correct supervision currents. See the installation sheet for the correct load values.

SDU programming

The SDU programmer must create a command list for each combination of floors desired.

ACDB operation

The site security officer determines which floors should be accessible for an access level, and assigns the correct command list to the access granted event for that level. The site security officer also determines which cardholders belong to each access level.

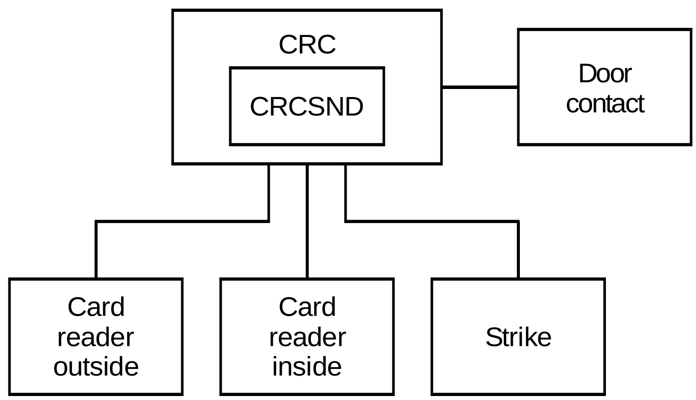
Emergency exit door

Description of the application

An *emergency exit door* is a door that is unlocked from the inside either by badging out or by opening the door.

If the door is opened without badging out, it causes an immediate alarm. Badging out bypasses the door for a specific period of time, so no alarm event occurs.

A typical CRC application for emergency exit door is shown in Figure 3-7 below.



	Other factors
	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 3-7: Emergency exit door

Note: Refer to NFPA 101 and the local AHJ to determine the requirements for emergency exit applications.

Hardware configuration

A CRC used for an emergency exit door requires the following additional hardware:

- CRCSND CRC Sounder
- Door contact

The CRCSND is installed inside the CRC. The sounder provides a local sound alarm. Opening the door without badging out activates the CRCSND.

The door contact is connected to the CRC via the input circuit.

SDU programming

In the SDU, you'll need to define the input circuit for the door contact as follows:

- Device type: Security P Monitor
- Delays: None
- Application: Door Contact
- Personality: Basic

ACDB operation

Two time periods are defined in the ACDB: Emergency Exit Sounder Time, and Bypass Time.

Emergency Exit Sounder Time is the number of seconds (0 through 255) the CRC Sounder sounds when an emergency exit door is opened without badging out.

When set to zero, the sounder is disabled. When set to 255, the sounder sounds until manually reset. The sounder is reset when a cardholder badges in at the door.

In all cases badging in on the affected CRC can silence the sounder.

Bypass Time is the number of seconds (0 through 255) that the door is bypassed after a cardholder badges out.

Handicap access door

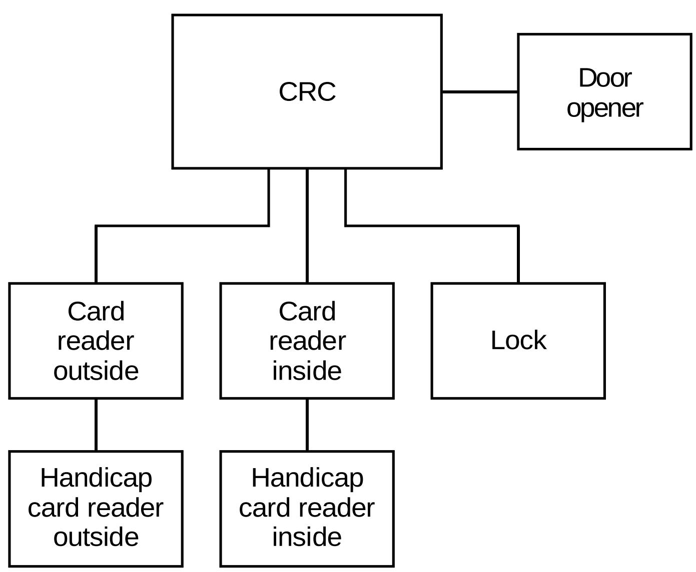
Description of application

A *handicap access door* is a door that helps a handicapped person enter and exit a door by allowing extra access time and providing an automatic door opener. See Figure 3-8, below.

The door can function for both normal access and handicap access. A person without handicap privileges would operate the door just as any other door.

When a person with handicap privileges badges in, the CRC recognizes that the person has handicap privileges and provides two extra benefits. The first is giving the handicap person extra time to enter or exit the doorway before relocking the door. The second is an automatic door opener.

A second card reader can be installed in parallel to the entry or exit card reader to make it easier for a handicapped person to reach. The second card reader should be placed at a lower level and farther away from the door. The distance from the door should allow the automatic door to open fully without a person needing to move backwards.



Other factors	
	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 3-8: Handicap access door

Note: Refer to the appropriate ADA codes and the local AHJ to determine the requirements for handicap access door applications.

Hardware configuration

A CRC used for a handicap access door may require the following additional hardware:

- Automatic door opener
- Additional card readers

The automatic door opener is installed directly to the access door. The CRC controls the opening of the door with its internal relay.

Caution: The CRC relay is for low-voltage only. Do not exceed the relay limits stated on the installation sheet.

The additional card readers are wired to the standard card readers in parallel.

SDU programming

In the SDU, you’ll need to define the CRC relay device type as Access Door Control. This will activate the door opener for the time specified by the ACDB.

ACDB operation

The relay open time needs to be defined in the ACDB. This is the number of seconds (0 through 255) that the CRC will activate the relay that automatically opens the door. The default is 30 seconds.

The handicap unlock time also needs to be defined in the ACDB. This is the number of seconds (0 through 255) that the lock will stay unlocked. The default is 20 seconds The door will relock when the unlock time has expired and the door has closed.

Both of these times can be set to allow a longer access time for a handicapped person.

Maglock peripherals

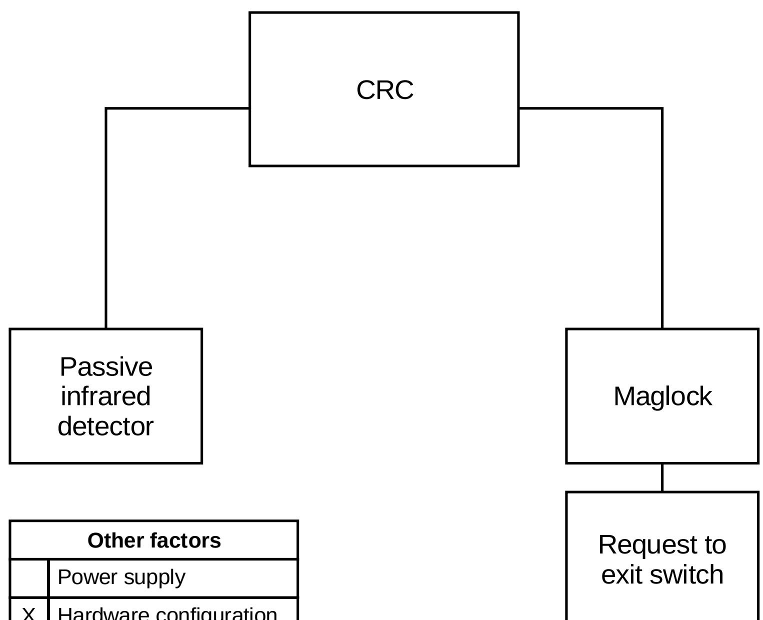
Description of the application

Maglocks require *maglock peripherals* due to NFPA codes. In general, these devices are intended to ensure that an egress door secured with a maglock can always be opened in an emergency.

Figure 3-9 shows the CRC using a maglock and required peripherals.

Maglock application requires a passive infrared motion detector (PIR) to be mounted above the door. Also required is a request to exit (REX) switch to be mounted within five feet of the door and 40 to 48 inches above the ground. The PIR is connected on the input circuit of the CRC. The REX is connected directly to the maglock so that when activated it unlocks the door independently of the CRC.

The CRC is designed so that on detection of a fault on the input circuit of the PIR, the door will unlock. The PIR detects an approaching body and unlocks the door. Similarly, the REX switch unlocks the door when it is pressed. The REX switch must unlock the door for a minimum of 30 seconds.



Other factors	
	Power supply
X	Hardware configuration
X	SDU programming
	ACDB/KDC operation

Figure 3-9: Maglock and peripherals

Hardware configuration

The maglock peripherals consist of the following:

- Passive infrared motion detector (PIR)
- Request to exit (REX) switch

The PIR is connected via the CRC input circuit. The REX is connected directly to the maglock instead of the CRC input circuit to meet NFPA requirements.

SDU programming

When programming the system for this application you'll need to configure the CRC, defining the device type. You'll also need to define the input circuits. For this application define the input circuit for the PIR as follows:

- Device type = Security interior
- Application = Request to exit motion detector.

Multiple card readers

Description of the application

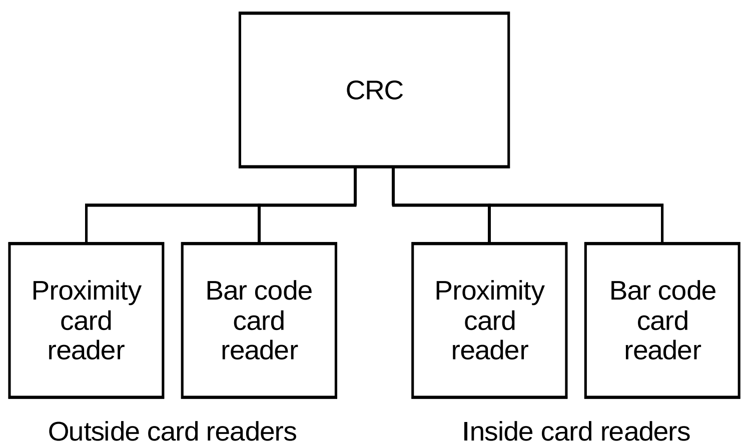
Several access control applications require the use of multiple card readers. For example:

- Visitor and escort readers
- High and low position readers

The CRC lets you use multiple card readers of the same technology or of mixed technologies. It can support up to four card readers, provided that the total current draw of the readers does not exceed the limits specified on the CRC installation sheet.

A visitor and escort application using multiple card readers is shown in Figure 3-10, below. In this application, both the escort and visitor must badge in to gain access.

The escort has a permanent, plastic card, and uses the proximity card reader. The visitor is issued an inexpensive paper bar code card, and uses the bar code reader.



Other factors	
	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 3-10: Multiple card readers

Card reader

This application works best with card readers that support dual LED control. The CRC uses the second LED (or LED state) to signal the visitor that the escort must badge in before access is granted.

Hardware configuration

The proximity card reader and barcode card reader are connected to the same terminals of the CRC.

SDU programming

When an escorted visitor tries to enter a controlled area without an employee, the CRC generates an access denied escort event. You can select a predefined command list that the CPU executes in response to this event.

ACDB operation

Like employees, visitors must be assigned an access level using the ACDB. The site security officer can elect to assign the same access level to all visitor cards, or assign different access levels to ranges of visitor cards.

Muster

Description of the application

The *muster* application can be used to determine who has exited the building in the event of an evacuation.

During normal operations, staff badge in and out using the inside and outside readers. Note that muster reporting will only work if all employees badge in and out.

During an evacuation, everyone exits the building immediately and goes to one of the predetermined muster stations. At the muster station personnel badge in using a reader that is attached to a CRC designated as a muster station.

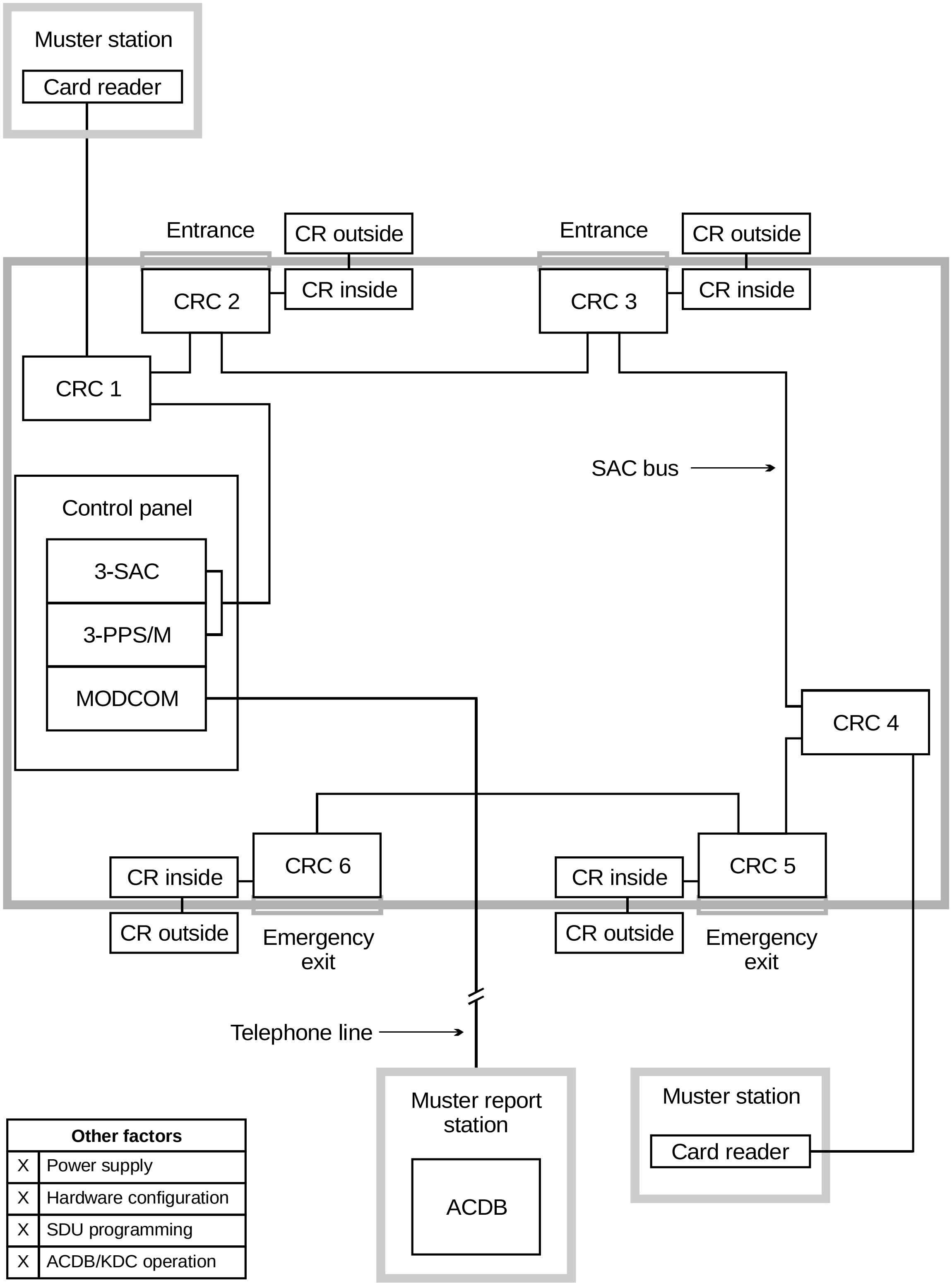
After everyone has badged in at the muster station security staff use the ACDB program to create a muster report. The report lists staff who badged into the building but did not badge out at a muster station.

Figure 3-11 shows a typical muster application. CRCs 2, 3, 5, and 6 are normal access control CRCs. CRCs 1 and 4 are muster station CRCs.

The ACDB computer must be located in a safe area so security staff can create the muster report after the evacuation. This computer can connect to the access control system either via telephone lines and a 3-MODCOM, or by direct connection to the EST3 control panel.

Note: Links between the ACDB computer and the control panel should be tested regularly to ensure correct operation.

Staff must be made aware of the importance of badging in and out at all times. Failure to do so can result in a false muster report, indicating that someone is still in the building. This in turn can result in rescue personnel risking danger to search for someone who is not actually in the building.



Other factors	
X	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 3-11: Muster application

Hardware configuration

The control panel must contain the following rail modules:

- 3-SAC Security Access Control module
- 3-PPS/M Primary Power Supply module
- 3-MODCOM Modem Communication module
  —or—
  3-RS232 Card option installed in the CPU

The 3-SAC module supports the SAC bus. Power for the CRC is normally taken from the 3-PPS/M and is routed with the data lines in a cable composed of two twisted-pair wires.

The 3-MODCOM module supports modem communication between the control panel and the ACDB program via telephone lines. Alternately, the 3-RS232 Card supports RS-232 communications on a cable connected directly to the CPU.

All CRCs controlled by a muster station must be on the same 3-SAC card as the muster station. Badging out at a muster station badges the person out of all partitions for that 3-SAC card. Therefore, a single muster station can serve multiple partitions, provided that they are on the same 3-SAC card.

The system must have at least one muster CRC per 3-SAC module. The system cannot exchange muster information between 3-SAC modules, so each must be handled separately for muster purposes.

A CRC used for a muster station requires the specified dummy load on the lock terminals to maintain supervision. (Refer to the CRC installation sheet for correct resistor values.)

The card reader used for the muster station must be wired as an outside reader.

SDU programming

Each CRC used in a muster application requires specific configuration settings. These are made in the SDU program, on the CRC Configuration tab.

If the CRC is used in a partition that has muster control, check the Muster Support box.

For the CRC designated as the muster station, check the Muster Station box, but leave the Muster Support box clear.

In the SDU, you can also assign a predefined command list to the Access Granted Muster event.

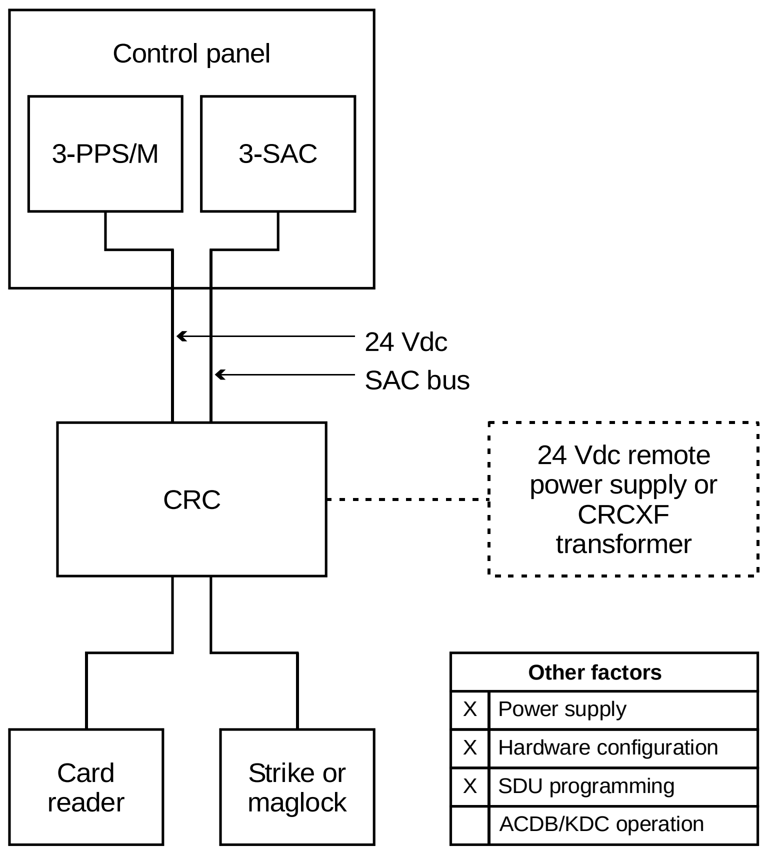
Power for continuous locks

Description of the application

By *continuous locks*, we mean locks that operate, on average, more than 30 seconds in every minute. Normally, power for the lock is taken from the CRC battery. However, for continuous locks there is not enough recharge time for the CRC battery to keep up with the drain. Consequently, the CRC must be configured so that an external power supply operates the lock.

The CRC can be powered by the 3-PPS/M, by a CRCXF (CRC Transformer), or by a remote 24 Vdc power supply. Any of these supplies is suitable for powering continuous locks. (See the topics "Power from an AC source" and "Power from a remote source" for more information about these options.)

A typical application using continuous locks is shown in Figure 3-12, below.



Other factors	
X	Power supply
X	Hardware configuration
X	SDU programming
	ACDB/KDC operation

Figure 3-12: CRC controlling a continuous lock

The figure shows the power coming from the 3-PPS/M in the control panel. This power supply could be used to operate the lock, but use of a CRCXF or remote 24 Vdc supply is recommended to minimize the load on the panel power supply.

During open schedules, or when an authorized card is read at a card reader, the CRC provides power from the 3-PPS/M to the door strike to unlock the door. For maglocks, the CRC provides power from the 3-PPS/M (or CRCXF or 24 Vdc power supply) to activate the lock during closed schedules, or between authorized card accesses.

Power supply

Use power and load calculations to determine the need for remote power supplies or transformers. Refer to *the CRC Technical Reference Manual* for calculation guidelines.

Jumper settings determine the power source and usage for the CRC. Refer to the installation sheet for correct jumper settings. Configure the input power as DC when using power from the control panel or a remote supply. Configure input power as AC when using a transformer.

For this application, configure the output power as continuous.

Hardware configuration

The control panel must contain the following rail modules:

- 3-SAC Security Access Control module
- 3-PPS/M Primary Power Supply module

The 3-SAC module supports the SAC bus. Power for the CRC is taken from the 3-PPS/M and is routed with the data lines in a cable composed of two twisted-pair wires.

SDU programming

When configuring the system for this application, you’ll need to configure the CRC and define the appropriate lock type in the SDU. For this application the Lock Type can be either Strike or Maglock as required to match the lock actually used.

Power for intermittent locks

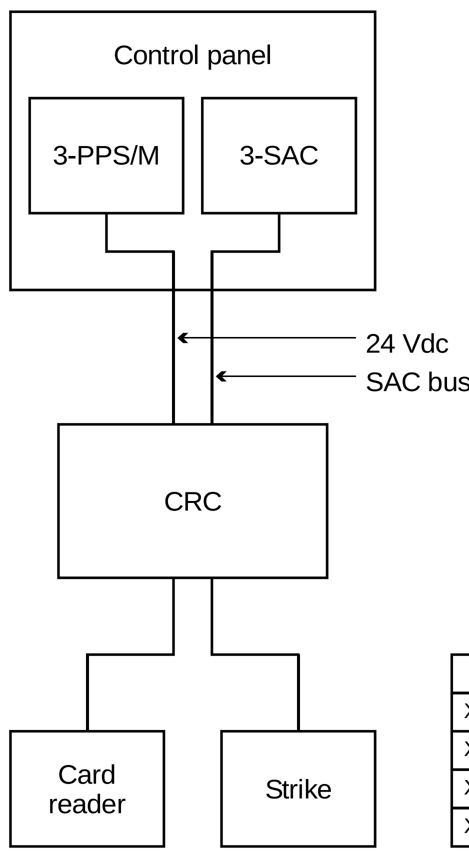
Description of the application

By *intermittent locks*, we mean locks that operate, on average, less than 30 seconds in every minute. In these applications, the CRC battery can provide the power needed to operate the lock.

The CRC can be powered by the 3-PPS/M. It uses this power source to charge an internal 1.2 Ah sealed lead acid battery. The battery then provides the power needed to operate the door lock.

Because the battery powers the door strike, this configuration cannot be used for maglocks or strikes that are active more than 30 seconds in a minute. In these conditions the battery would not have enough time to charge and keep up with the drain. For heavy or continuous duty applications, refer to the topic *Power for continuous locks* presented in this chapter.

A typical application using CRC battery power is shown in Figure 3-13, below.



Other factors	
X	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC operation

Figure 3-13: CRC controlling an intermittent strike

The figure shows the charging power coming from the 3-PPS/M in the control panel. The access control system requires a 24 Vdc power supply to power the CRC and to charge its battery. The 3-SAC connects to the CRC through the SAC bus.

When an authorized card is read at a card reader, the CRC provides power from its internal battery to the door strike and unlocks the door.

Power supply

Jumper settings determine the power source and usage for the CRC. Refer to the installation sheet for correct jumper settings. Configure the input power as DC. Configure the output power as intermittent.

Hardware configuration

The control panel must contain the following rail modules:

- 3-SAC Security Access Control module
- 3-PPS/M Primary Power Supply module

The 3-SAC module supports the SAC bus. Power for the CRC is taken from the 3-PPS/M and is routed with the data lines in a cable composed of two twisted-pair wires.

SDU programming

When configuring the system for this application, you’ll need to configure the CRC and define the appropriate lock type in the SDU. For this application set the Lock Type to Strike.

ACDB operation

Note that a CRC configured and programmed for intermittent lock use cannot support an open schedule (a period when the lock is kept open). Such a schedule would quickly drain the CRC battery and the lock would close.

You should document the CRC configuration and include this in your project plans. Make a copy of this documentation available to the site security staff who will use the ADCB to create and assign schedules.

Power from an AC source

Description of the application

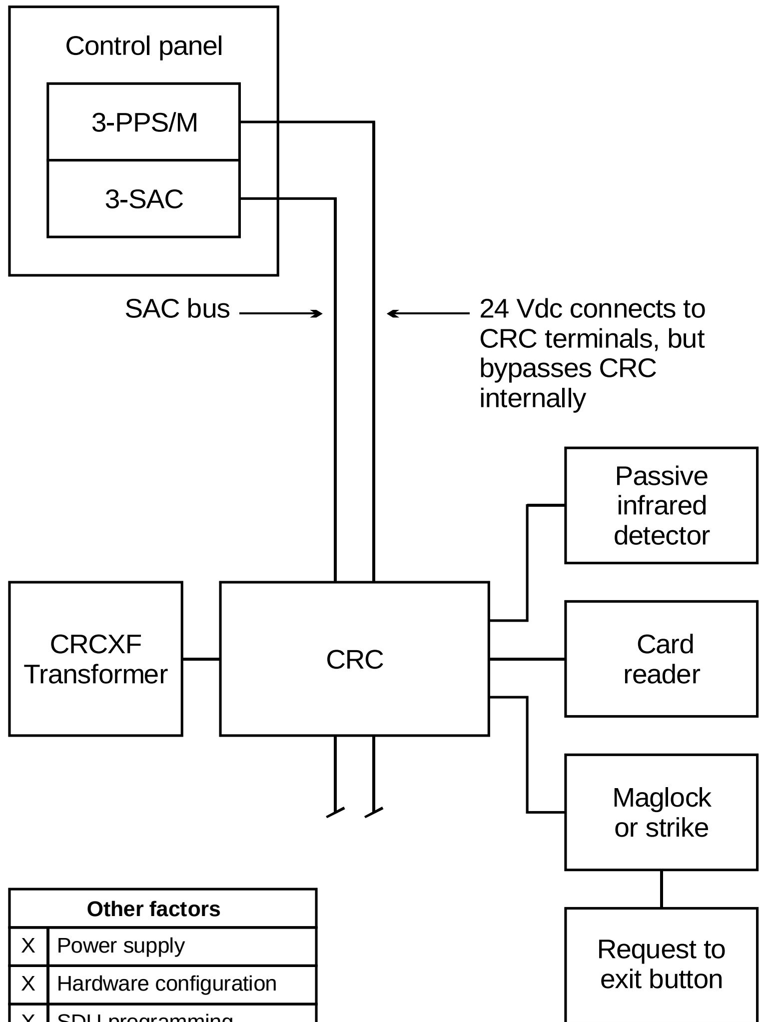
By AC *power*, we mean that the CRC provides the power to operate the electric door strike or maglock by using a 16.5 Vac transformer (model CRCXF). This supply can provide continuous power to the door strike or maglock, and also power the CRC.

Using an AC source:

- Limits power drawn from the control panel
- Supports continuous duty locks
- Supports schedules with unlock periods

Note: Be sure to check the installation sheet for the *CRC and CRCXM—Card Reader Controller Installation Sheet* (P/N 387625) for a list of applications that prohibit the use of the CRCXF.

A typical CRC using AC power is shown in Figure 3-14.



	Other factors
X	Power supply
X	Hardware configuration
X	SDU programming
	ACDB/KDC operation

Figure 3-14: CRC using AC power

The figure above shows the CRC power coming from the 16.5 Vac transformer. The 3-PPS/M power supply coming from the control panel simply passes through the CRC. The 3-SAC connects to the CRC through the SAC bus.

This wiring is shown in Figure 3-15.

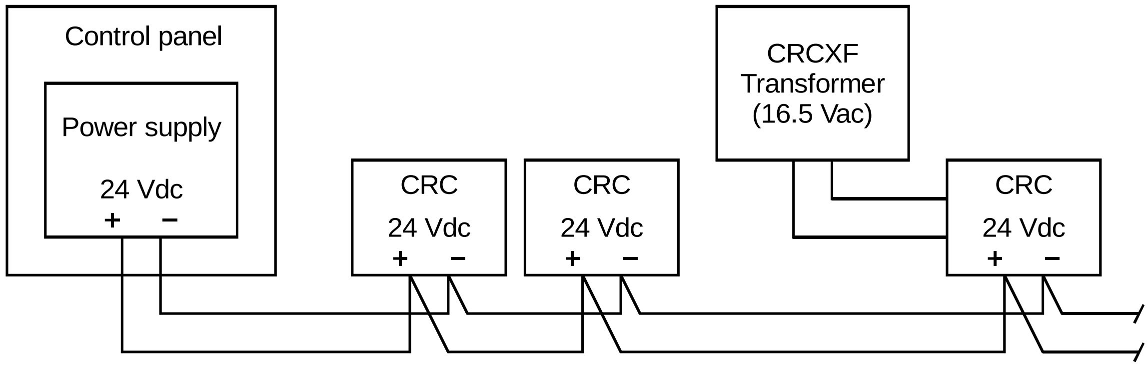


Figure 3-15: Wiring details for transformer supply

Power supply

Jumper settings determine the power source and usage for the CRC. Configure the input power as AC. Configure the output power as continuous.

If you use an additional power supply other than the CRCXF, that power supply must be listed for fire alarm applications, must have ground fault detection disabled, and must have a circuit ground (circuit common) that is isolated from earth ground.

Hardware configuration

The control panel must contain the following rail modules:

- 3-SAC Security Access Control module
- 3-PPS/M Primary Power Supply module

The 3-SAC module supports the SAC bus. Power for the CRC is normally taken from the 3-PPS/M and is routed with the data lines in a cable composed of two twisted-pair wires. In this case the power from the 3-PPS/M is connected to the CRC terminals, but internally bypassed.

The 16.5 Vac transformer should be plugged into a continuously energized AC socket, not one controlled by a switch.

SDU programming

When programming the system for this application, you’ll need to configure the CRC and define the appropriate lock type in the SDU. This can be either a strike or maglock.

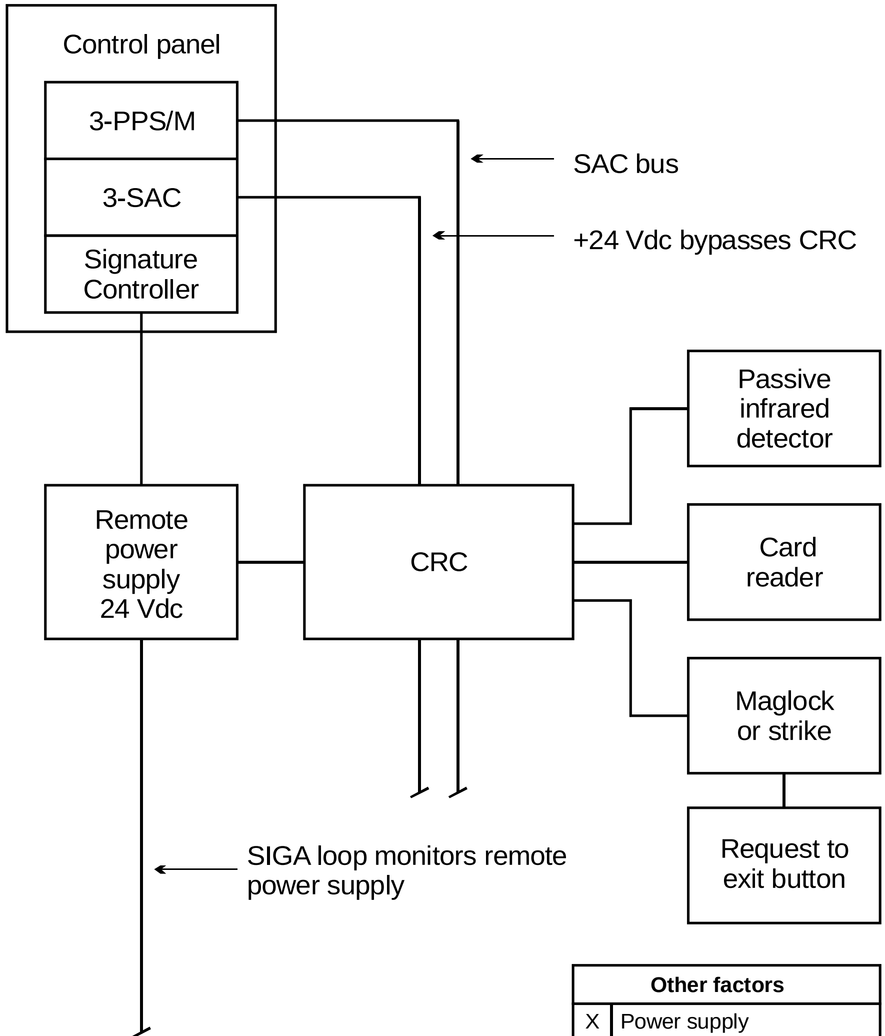
Power from a remote source

Description of the application

By *remote power*, we mean that the CRC provides the power to operate the electronic door strike or maglock by using a remote DC power supply. This additional power can provide continuous power to the door strike or maglock.

A typical CRC using remote power is shown in Figure 3-16. The additional power is needed because the CRC battery cannot keep up with the power needs of maglocks or strikes with an active duty cycle greater than 30 seconds in a minute. In these conditions the battery does not have enough time to charge and keep up with the drain.

The figure shows power coming from the additional remote power supply to power the CRC and maglock. The supply is supervised by the Signature data circuit derived from the 3-SSDC(1) module. The 3-SAC connects to the CRC through the SAC bus.



Other factors	
X	Power supply
X	Hardware configuration
X	SDU programming
	ACDB/KDC operation

Figure 3-16: CRC using remote power

The negative side of the 3-PPS/M power supply coming from the control panel connects to the CRC (and to all other CRCs). The positive side is broken and the remote power supply picks up the load. This wiring is shown in Figure 3-17.

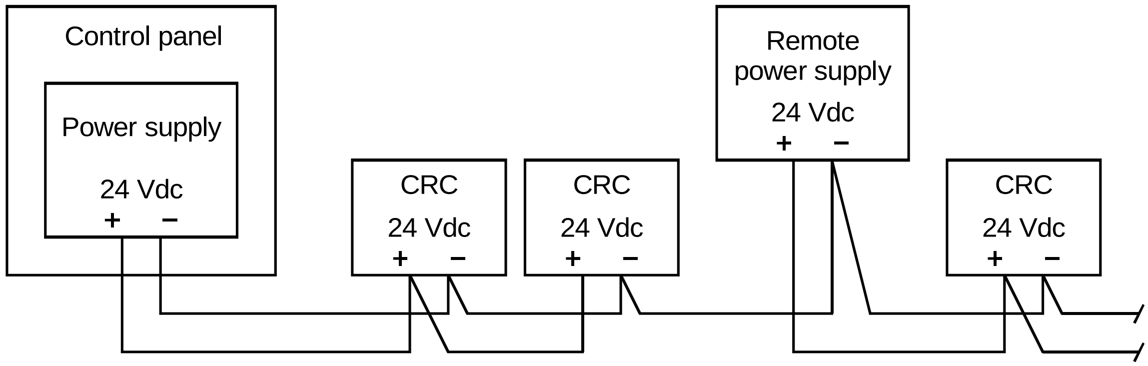


Figure 3-17: Wiring for remote power supply

Power supply

Jumper settings determine the power source and usage for the CRC. Configure the input power as DC. Configure the output power as continuous.

Note that additional power supplies must be listed for fire alarm applications, must have ground fault detection disabled, and must have a circuit ground that is isolated from earth ground.

Hardware configuration

The control panel must contain the following rail modules:

- 3-SSDC(1) Single Signature Controller module
- 3-SAC Security Access Control module
- 3-PPS/M Primary Power Supply module

The 3-SSDC(1) module supports the SIGA loop, which supervises the remote power supply

The 3-SAC module supports the SAC bus. Power for the CRC is normally taken from the 3-PPS/M and is routed with the data lines in a cable composed of two twisted-pair wires. In this case the power from the 3-PPS/M is simply passed through the CRC.

The remote power supply is supervised by the 3-SSDC(1) module via the Signature loop. The remote power supply must share a common ground with the 3-PPS/M.

SDU programming

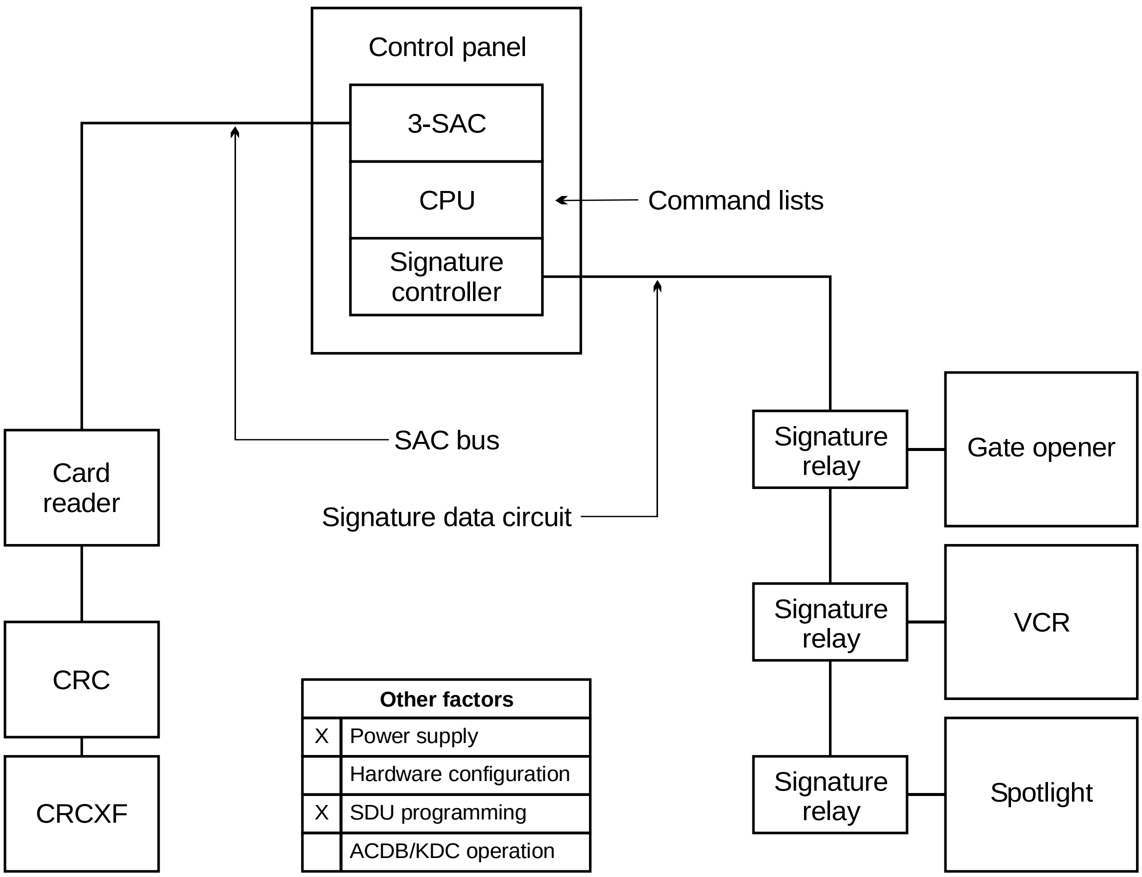
When programming the system for this application, you’ll need to configure the CRC and define the appropriate lock type in the SDU. This can be either a strike or maglock.

Remote controls

Description of the application

In any access control system, a card reader and CRC can be used to operate devices that are completely remote from the CRC. In such cases the CRC simply creates an access event and passes it to the 3-SAC for processing by the CPU. Any device that can be controlled by an EST3 panel can be operated in response to an access event.

As a typical example, Figure 3-18 shows how the entrance devices to a secured parking area could be operated from a remote card reader. Note that any type of CRC input device could be used in place of a card reader.



Other factors	
X	Power supply
	Hardware configuration
X	SDU programming
	ACDB/KDC operation

Figure 3-18: Remote control of a parking garage entrance

When the cardholder badges in, the access event is sent from the CRC to the 3-SAC and then to the CPU. At the CPU, the access event activates a predefined command list.

The command list operates the Signature relays on the Signature data circuit supported by the Signature controller module. These relays activate the gate opener, a spotlight, and a VCR image recording system.

An inside card reader and could be used to control exits from the area, but it would be more appropriate to use a motion detector, since egress from the area is not controlled.

Power supply

A CRCXF—CRC Transformer power supply is shown, assuming that the CRC is be located at some distance from the electrical room and control panel.

If you use an additional power supply other than the CRCXF, that power supply must be listed for fire alarm applications, must have ground fault detection disabled, and must have a circuit ground (circuit common) that is isolated from earth ground.

SDU programming

The SDU programmer must create a command list that specifies activation of the correct relays and devices, the delays required, and the deactivation of the devices.

Since there is no restoration phase of access events, the command list should include commands that turn off the devices.

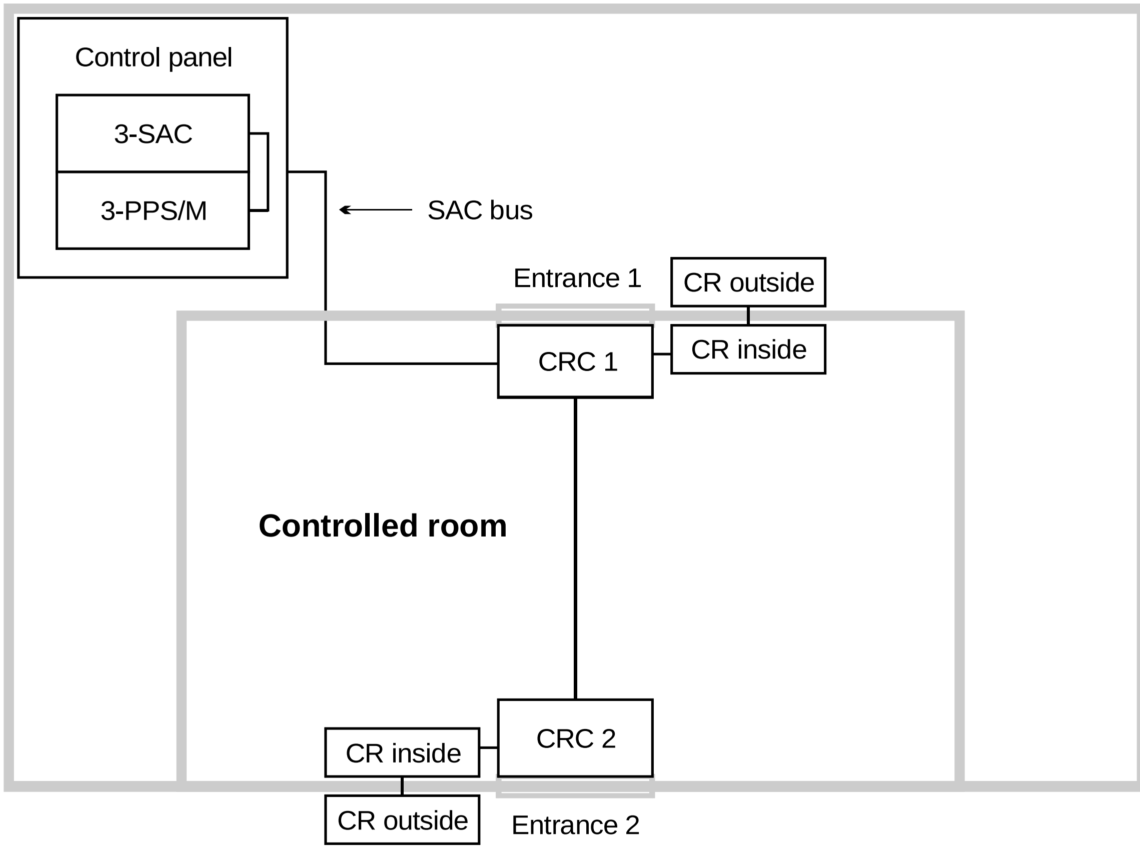
Two-person rule

Description of the application

A *two-person rule* ensures that no staff member can be in a controlled area alone. A CRC operating under two-person rule prevents the entrance of a single person into the controlled area. When two people are present in the area, one cannot exit without the other.

The controlled area can have a single entrance or multiple entrances. The network coordinates user information between the CRCs that serve a common area.

A typical two-person rule application is shown in Figure 3-19, below.



Other factors	
X	Power supply
X	Hardware configuration
X	SDU programming
X	ACDB/KDC programming

Figure 3-19: Two-person rule

Card reader

This application works best with card readers that support dual LED control. The CRC uses the second LED (or LED state) to signal the cardholder that a second person must badge in or out of the controlled area.

Hardware configuration

The control panel must contain the following rail modules:

- 3-SAC Security Access Control module
- 3-PPS/M Primary Power Supply module

The 3-SAC module supports the SAC bus. Power for the CRC is normally taken from the 3-PPS/M and is routed with the data lines in a cable composed of two twisted-pair wires.

SDU programming

If the CRC is to be used for two-person rule it must be configured in the SDU. On the CRC Configuration tab, the 2 Person Rule box must be checked.

You can also assign a predefined command list to the Access Denied 2 Person Timeout event. This setting is found on the CRC Command Lists tab.

Chapter 4

Centralized audio applications

Summary

EST3 supports centralized audio. This chapter introduces you to the equipment required, and discusses special installation and backup considerations for centralized audio applications.

Refer to the manual entitled *EST3 Installation Sheets* for specific component settings and terminal connections.

Content

Equipment required

The EST3 system requires one 3-ZA20 amplifier for each audio channel to be operated *simultaneously*. The output of each amplifier is reduced from 25 Vrms to the appropriate input level (1 Vrms) using the 3-ATPINT interface, and then fed into the input of the banked amplifiers.

The wiring between the output of each 3-ZA20 and its associated amplifier bank input should be twisted, shielded pair, and can be configured for Class A or Class B integrity monitoring.

The output of the banked amplifiers (the audio riser) is directed to the appropriate areas using Signature Series modules. The SIGA-CC1 module, Figure 4-16, is used for single channel systems and the SIGA-CC2 module, Figure 4-17, is used for two channel systems.

EST3 audio system programming requires that the Signature modules controlling the audio signals be programmed in addition to the programming required for the 3-ZAxx amplifier(s) supplying the audio signal.

Note: Remember to follow power-limited or nonpower-limited wiring practices as determined by the amplifier providing the audio signal.

ATPC Amplifier Terminal Panel Cabinet

Overview

The Amplifier Terminal Panel (ATP), the 3-ATPINT Interface, RKU series enclosures, and Dukane 125 W or 250 W audio power amplifiers are the basic components of the Amplifier Terminal Panel Cabinet (ATPC). Appropriately sized standby batteries, and in some situations an external battery charger, round out the equipment required in the ATPC. The ATPC can be located up to 3,000 ft (914 m) from the 3-ZAxx amplifiers supplying the audio signals.

Equipment racks

RKU-Series Equipment Racks are designed to support standard 19 in (48.26 cm) wide rack-mount components. These UL listed enclosures are constructed of 16 gauge steel, and finished in either white or black enamel.

Interior-facing louvers on the two side panels and the back door provide ventilation for installed equipment, while maintaining a flush outside surface for side-by-side stacking of multiple racks. Six conduit knockouts for 1/2 in or 3/4 in conduit are available on the top end panel (three on top, three on the flange), and six on the bottom end panel (three on the bottom and three on the flange). Three 2.875 in (7.3 cm) diameter cable access holes are located on the bottom end panel for routing wiring to cabinet components. The equipment mounting rails on the front of the rack are recessed 0.625 in (1.59 cm).

The louvered back door attaches to the cabinet with spring hinges allowing easy field access and door removal. A key lock is provided on the door for added security. Multiple racks can be installed side by side where additional cabinet capacity is required.

The RKU series of 19 in (48.3 cm) equipment racks is used to house the banked amplifiers and associated equipment. Five sizes of racks are available to meet all requirements. These are listed in Table 4, below.

Table 4-1: RKU enclosure specifications

Model	Width	Height	Depth	Rack Space
RKU-36(B)	22.31 in (56.7 cm)	41.06 in (104.3 cm)	18.50 in (47.0 cm)	36.75 in (93.3 cm)
RKU-42(B)	22.31 in (56.7 cm)	46.31in (117.6 cm)	18.50 in (47.0 cm)	42.00 in (106.7 cm)
RKU-61(B)	22.31 in (56.7 cm)	65.56 in (166.5 cm)	18.50 in (47.0 cm)	61.25 In (155.6 cm)
RKU-70(B)	22.31 in (56.7 cm)	74.31in (188.7 cm)	18.50 in (47.0 cm)	70.00 in (177.8 cm)
RKU-77(B)	22.31 in (56.7 cm)	81.31 in (206.5 cm)	18.50 in (47.0 cm)	77.00 in (195.6 cm)

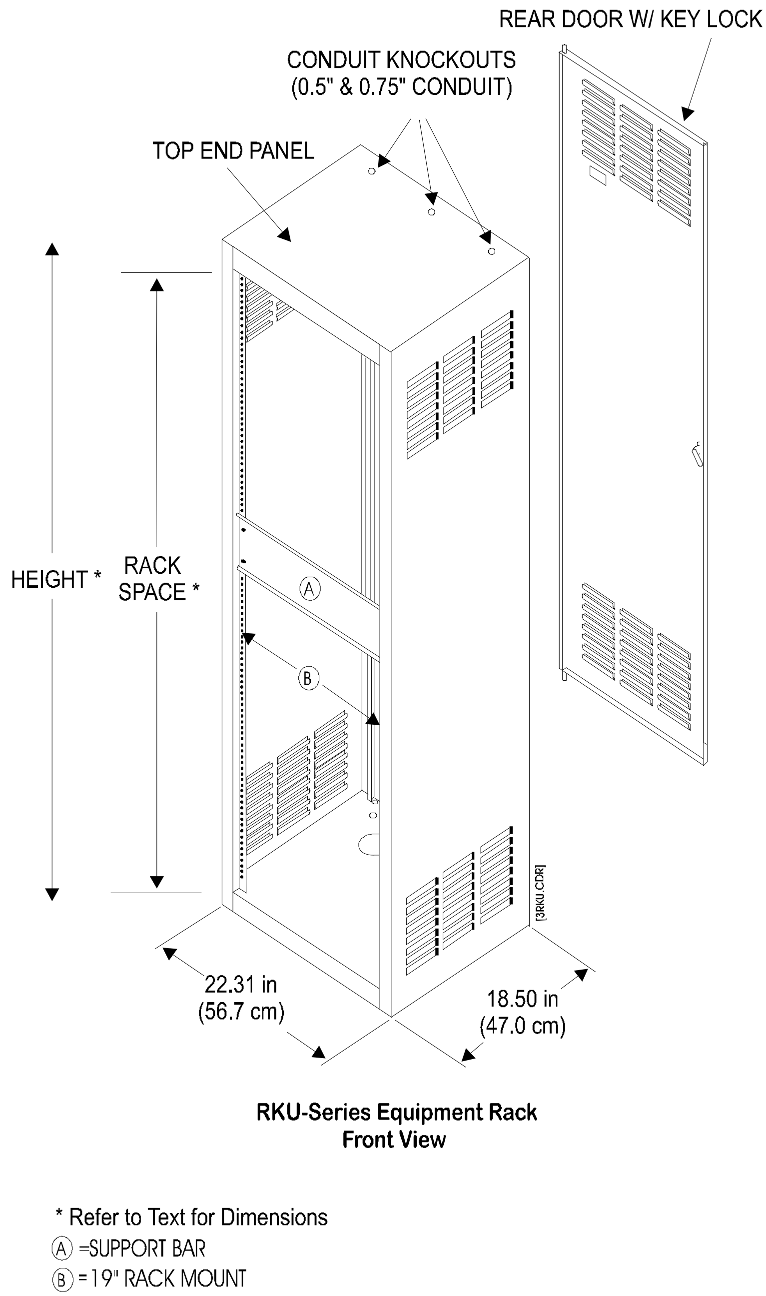


Figure 4-1: RKU Equipment Rack

ATP Amplifier Terminal Panel

A 3-ATPINT Interface must be installed on the ATP when used with the EST3 system.

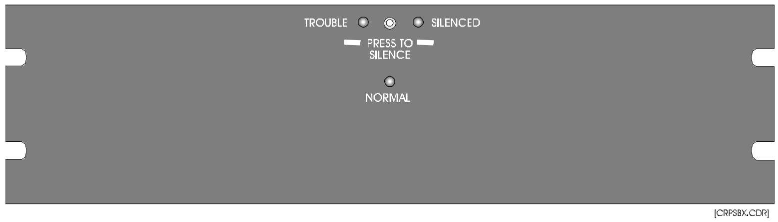


Figure 4-2: 3-ATP, front view

The Amplifier Terminal Panel, is a 5-1/4 inches (13.34 cm) high x 19 inches (48.3 cm) wide unit that senses loss of AC power or brownout conditions affecting the amplifiers. It also provides battery backup to the amplifiers if the audio system is active when the power failure or brownout occurs. The ATP must have a 3-ATPINT interface Card installed in order to work with the EST3 system.

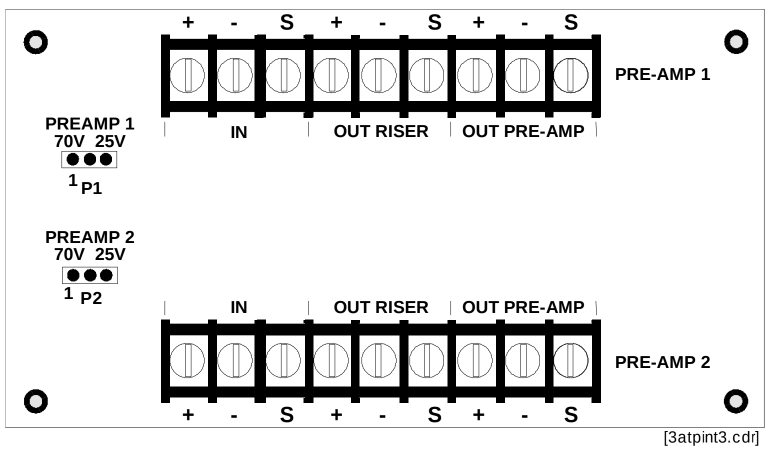


Figure 4-3: 3-ATPINT Interface Card

The ATP with 3-ATPINT installed, is mounted in an RKU rack and provides termination for the power amplifier's audio power and control signals. The panel has an integral battery charger capable of charging a maximum of 40 Ah sealed, lead-acid batteries. The charger is fully supervised and provides a silenceable trouble buzzer and trouble contacts. One ATP is required for every two amplifiers.

When a brownout condition is sensed at the ATP, the trouble contacts and AC fail contacts are closed, and an EST3 supervisory zone reports the condition to the EST3 system. The EST3 system is designed to provide +24 Vdc to the ATP's audio activity input via control relay, enabling backup power only when *both* primary power to the amplifiers has failed *and* the EST3 audio is active during an alarm condition.

Battery backup

When multiple ATPs share a common battery, an external battery charger must be used.

To charge the batteries, you will use either the ATP's integral battery charger or an external LaMarche model A33-10-24 battery charger.

The internal battery charger is capable of charging 40 Ah batteries.

Caution: Do *not* connect the battery chargers of multiple ATPs in parallel to increase charger current.

When multiple ATPs share a common battery, or when the amplifier backup is to be supplied from a single battery source, a LaMarche model A33-10-24 external battery charger must be used. The Amplifier Terminal Panel switches battery power to the amplifiers.

When calculating the battery size required to support the amplifiers, the alarm current must be known. Each 250 W amplifier connected to the system draws 20 amperes at 24 Vdc at full load; 125 W amplifiers draw 10 amperes at 24 Vdc at full load.

The amplifiers draw no current in the standby mode. NFPA 72 specifies that designing the system to provide 15 minutes of the evacuation alarm at full load is the equivalent of 2 hours of emergency operation. The local authority having jurisdiction or local codes can modify the amount of time for which standby power must be provided.

Audio amplifiers

Two Dukane amplifiers are available. Model 1B3125 is rated at 125 watts output. Model 1B3250 is rated at 250 watts output. Both amplifiers operate from 120 Vac, 50/60 Hz, as well as 24 Vdc battery backup. The amplifiers are mounted in an Amplifier Terminal Panel Cabinet.

Note: The Model 1B3250 amplifier should be loaded to no more than 72% of rated capacity. The amp is derated by 28% to allow for continuous operation and line loss averages.

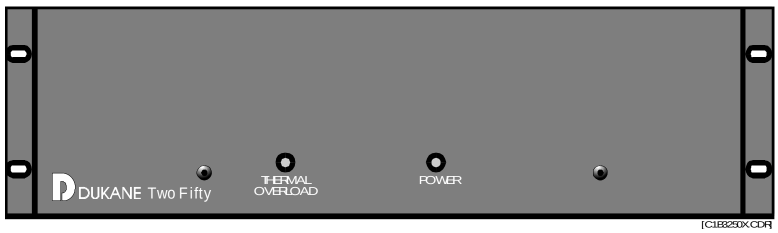


Figure 4-4: Dukane 250-watt Amplifier, Front View

Table 4-2: 1B3125 Amplifier specifications

Rated output power	125 W
Max. signal input	1 Vrms
Input impedance	75 kΩ
Output voltage	25 or 70 Vrms
Primary power	120 Vac, 60 Hz
Battery power	24 Vdc
AC power consumption standby full load	 27 W 360 W
DC power consumption standby full load	 0 W (when using the ATP) 11.5 A
Dimensions (HWD)	5.25 x 19.0 x 6.625 in (13.3 x 48.3 x 16.8 cm)
Weight	22.5 lb (10.1 kg)

Table 4-3: 1B3–250 Amplifier specifications

Rated output power	250 W (180 W max. loaded)
Max. signal input	1 Vrms
Input impedance	75 kΩ

Table 4-3: 1B3–250 Amplifier specifications

Output voltage	25 or 70 Vrms
Primary power	120 Vac, 60 Hz
Battery power	24 Vdc
AC power consumption standby full load	 48 W 700 W
DC power consumption standby full load	 0 W (when using the ATP) 20 A
Dimensions (H×W×D)	8.5 × 19 × 15 in (21.6 × 48.3 × 38.1 cm)
Weight	55 lb (24.9 kg)

URSM Universal Riser Supervisory Module

The Universal Riser Supervisory Module (URSM) provides open and short circuit, and amplifier supervision of two risers, audio (25 or 70 Vrms), and/or firefighter telephone riser. A form C dry relay contact is provided for each riser circuit’s trouble annunciation. Ground fault detection is also provided for the risers using a GFD Ground Fault Detector.

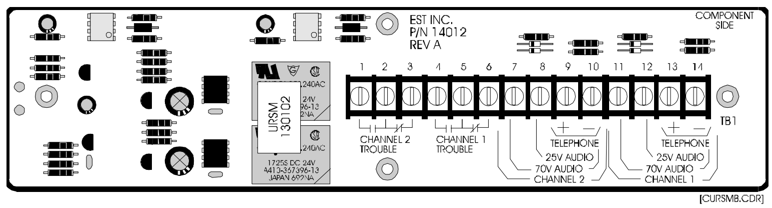


Figure 4-5: URSM

Application

The URSM is required on 70 Vrms audio system risers, and 25 Vrms audio systems. The URSM should be located in an equipment cabinet convenient to the end of the risers, which has 24 Vdc power available. URSM trouble contacts should be monitored with a SIGA-CT2 module to signal riser trouble information back to the network.

The URSM riser inputs should be connected to a GFD, which provides ground fault monitoring. The GFD should be monitored with a SIGA-CT1 module to signal riser ground fault conditions back to the network. The GFD and SIGA-CT1 must be installed in the same enclosure and should be located adjacent to the fire alarm control panel.

Table 4-4: URSM specifications

Voltage	24 Vdc
Standby Current	40 mA
Trouble Contact Rating	30 Vdc @ 2A
Trouble Detection Levels 25 Vrms audio 70 Vrms audio Firefighter’s phone	 10 Vrms 23 Vrms 2.7 Vrms

Installation

The URSM requires one-half of a standard mounting footprint and should be installed where the power pigtails can reach the power supply.

The GFD and CT1 must be installed in the same enclosure, located adjacent to the fire alarm control panel. Jumper JP1 on the GFD should be set to the 2-3 position.

Terminal connections

Refer to Figure 4-6.

Black pigtail = (-)24 Vdc power in

Red pigtail = (+)24 Vdc power in

TB1–1 to 3 = Channel 2, trouble relay contacts

TB1–4 to 6 = Channel 1, trouble relay contacts

TB1–7 = Channel 2, 70 Vrms audio riser input

TB1–8 = Channel 2, 25 Vrms audio riser input

TB1–9 = Firefighter’s Telephone riser input, Ch 2

TB1–10 = Channel 2, Riser input, common

TB1–11 = Channel 1, 70 Vrms audio riser input

TB1–12 = Channel 1, 25 Vrms audio riser input

TB1–13 = Firefighter’s Telephone riser input, Ch 1

TB1–14 = Channel 1, Riser input, common

Operation

The trouble relay will activate 45–60 seconds after a circuit short, circuit open, or amplifier failure is detected.

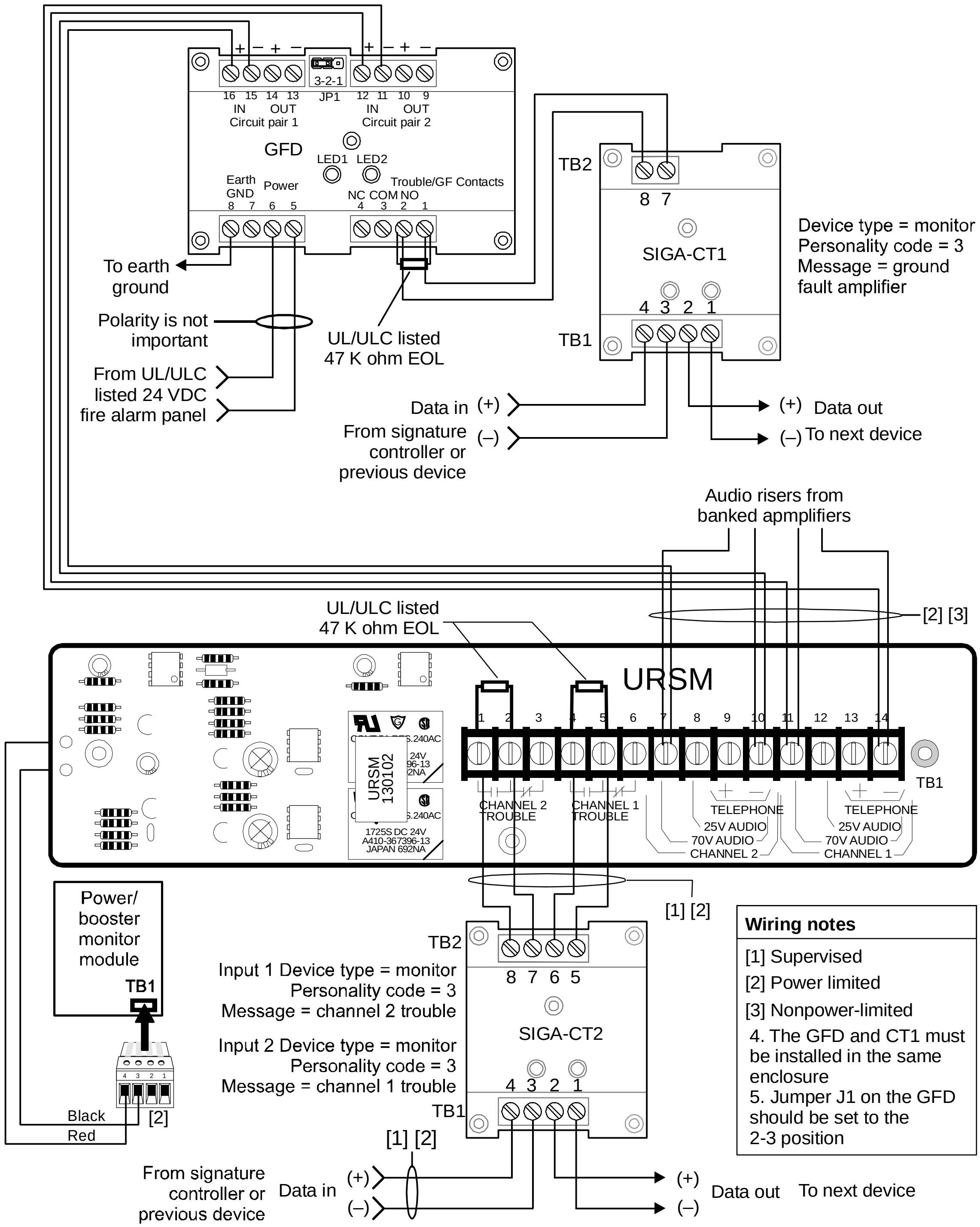


Figure 4-6: URSM wiring

ATP and 3-ATPINT installation

ATP installation

Refer to Figure 4-7.

To install the ATP:

1. Remove the cover plate from the left side of the ATP. The cover plate is held in place by four screws.
2. Install four short spacers [5] in the flanges of the card cage, and secure with nuts [6].
3. Mount the 3-ATPINT board [4] on the four short spacers [5] and secure with four long spacers [3].
4. Install the new cover plate [2] on the long spacers with the screws [1] provided.

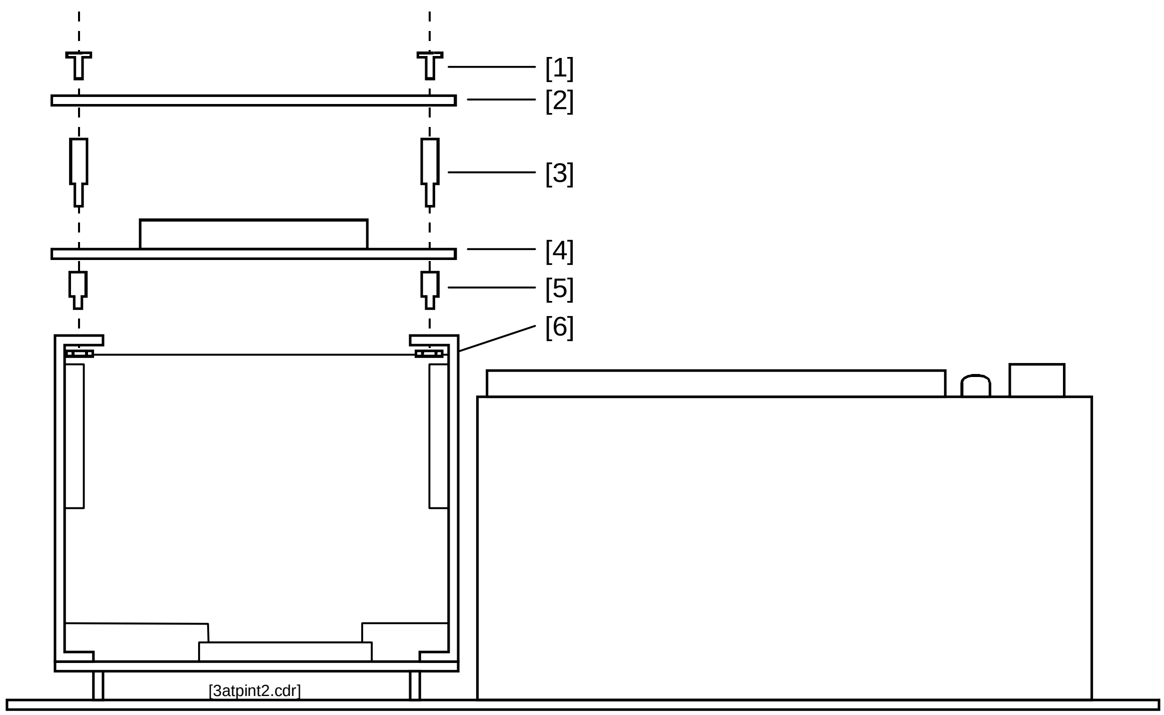


Figure 4-7: 3-ATPINT installation, bottom view

ATP wiring

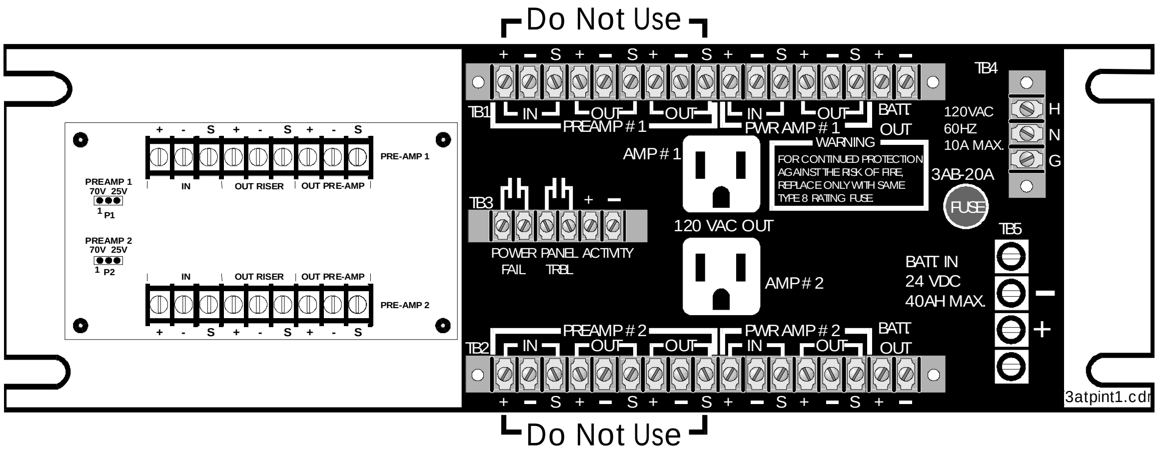


Figure 4-8: ATP with 3-ATPINT installed, rear view

ATP terminal connections

AMP POWER 1 = Type NEMA 5–15p receptacle to plug in one amplifier. Output is rated at 120 Vac, 5 A max.

AMP POWER 2 = Type NEMA 5–15p receptacle to plug in one amplifier. Output is rated at 120Vac 5 A max.

BATT IN - These terminals are for connection of gel cell batteries. When the internal battery charger is enabled (J3 on the APSB terminal board installed) a maximum of 40 Ah of gel cell batteries can be charged.

POWER FAIL - Normally open that activates when primary power to the amplifiers is either lost or in brownout condition. This contact is to be supervised by Signature series input module configured as a supervisory input.

PANEL TROUBLE - Normally open relay contacts that close when any of the following power problems are sensed:

- Loss of 24 Vdc power
- Failure of the battery charger circuit (if enabled)
- Any blown fuse or circuit breaker
- Ground fault, if enabled

ACTIVITY = 24 Vdc should be provided to these terminals through SIGA-CR contacts when either an alarm is present in the system or when the system user activates the paging system. When this input is active and the amplifier is in power fail, power relay contacts will transfer and provide battery power to the terminals marked BATT OUT. Each battery output terminal is capable of providing 20 A of battery current.

In addition to the terminals listed above, two groups of terminals are provided for connection of audio signals, one for each channel

WARNING: Do not use the preamp in and out terminals on the main body of the ATP if the 3-ATPINT Interface is installed. Route *all* preamp wiring to the 3-ATPINT.

The following terminals are provided on the ATP for audio channel 1 and channel 2.

PREAMP IN = Not used. Refer to 3-ATPINT terminal connections.

PREAMP OUT = Not used. Refer to 3-ATPINT terminal connections.

PREAMP OUT = Not used. Refer to 3-ATPINT terminal connections.

AMP IN = From the 70 V or the 25 V output of the power amplifier.

AMP OUT = to be connected to the Signature Series control modules and terminated with a URSM Universal Riser Supervisory Module. The URSM must be monitored by a Signature Series input module configured as a supervisory circuit. Each riser cannot supply a load greater than 180 W.

ATP jumper settings

Refer to Figure 4-9.

Table 4-5: 3-ATP Jumper Settings

Function	Jumper Setting
Ground fault detection	J1 = enable
No ground fault detection	J1 = disable
Internal battery charger operable	J2 = in
Internal battery charger disabled	J3 = in

3-ATPINT terminal connections

Refer to Figure 4-9.

IN RISER = To audio source amplifier 25 or 70 Vrms output, or previous 3-ATPINT riser output.

OUT RISER = 25 or 70 Vrms output to next 3-ATPINT IN RISER or EOL resistor.

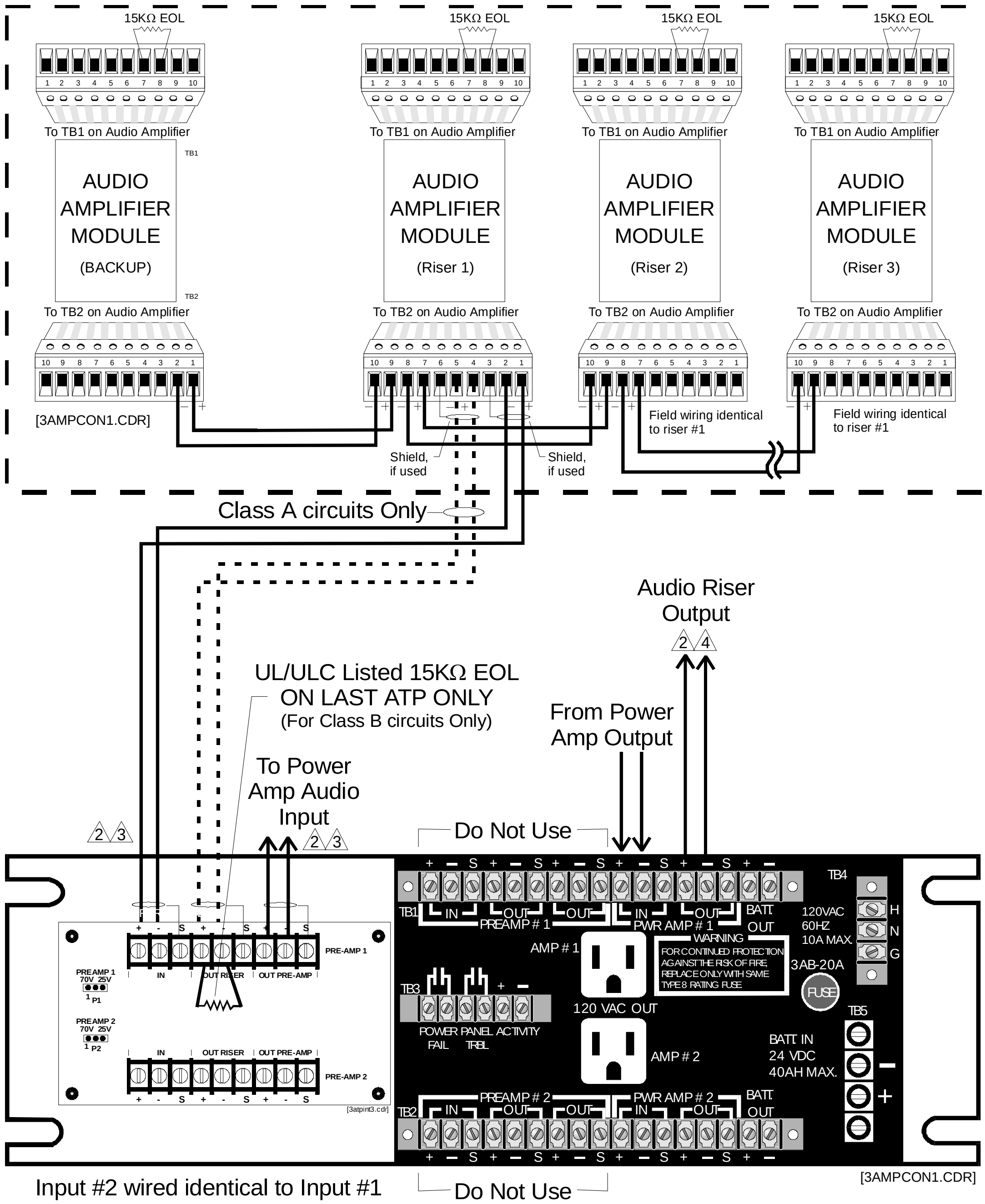
OUT PRE-AMP = Low level audio to audio power amplifier input.

3-ATPINT jumper settings

Refer to Figure 4-9.

Table 4-6: 3-ATPINT jumper settings

Input / Voltage	Jumper setting
Pre-Amp #1, 70 Vrms	P1 = 1/2
Pre-Amp #1, 25 Vrms	P1 = 2/3
Pre-Amp #2, 70 Vrms	P2 = 1/2
Pre-Amp #2, 25 Vrms	P1 = 2/3



JUMPER SETTINGS

P1 = 1/2, Pre-Amp #1 Input 70 V_{RMS}
P1 = 2/3, Pre-Amp #1 Input 25 V_{RMS}
P2 = 1/2, Pre-Amp #2 Input 70 V_{RMS}
P2 = 2/3, Pre-Amp #2 Input 25 V_{RMS}

Wiring Notes

1. Circuit polarity shown in supervisory condition.
2. Supervised circuit.
3. Power limited circuit.
4. Non-Power limited circuit.
5. Back up amplifier size must equal the wattage of the largest amplifier to be backed up.
6. Set J1 & J2 to match source amplifier output voltage.
7. Additional ATPs may be connected to the same audio source by connecting the ATP pre-amp output to the pre-amp input of the next ATP.

Figure 4-9: ATP with 3-ATPINT wiring

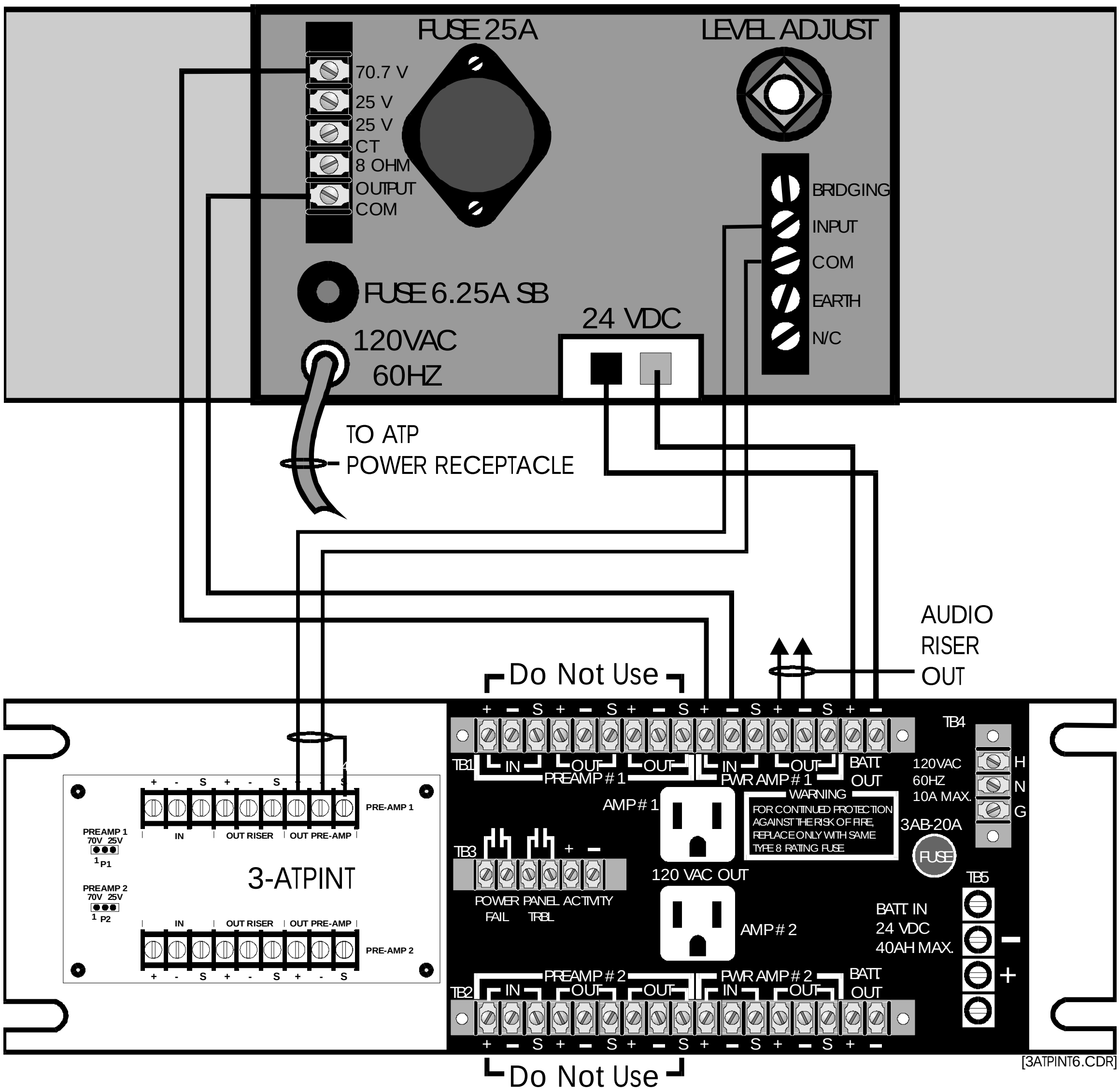


Figure 4-10: Wiring from Dukane amplifier to ATP

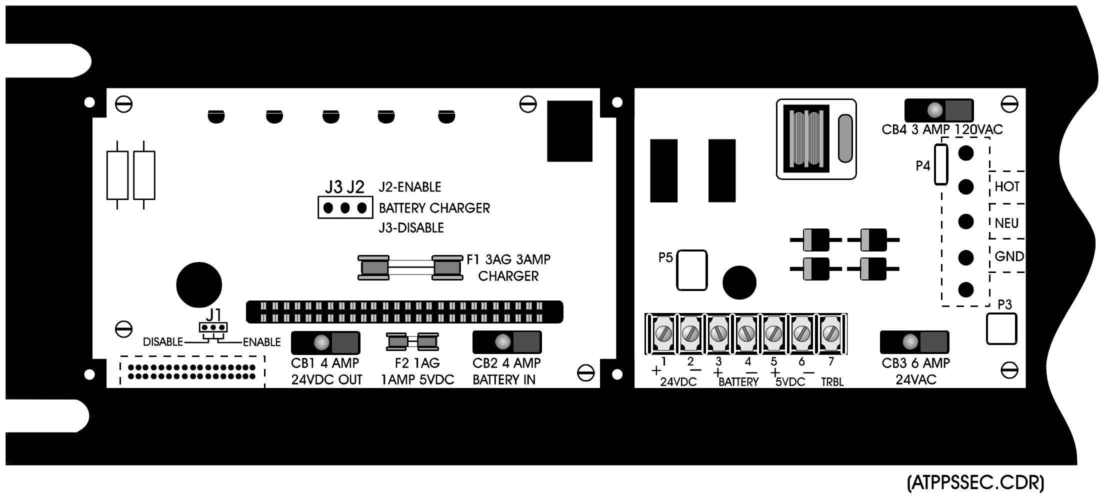


Figure 4-11: Power supply terminal card, with 3-ATPINT, cover removed

The output of the amplifier must be set for the proper value by adjusting the INPUT LEVEL adjustment on the back of the amplifier. With a 1,000 Hz tone generated by the 3-ACPor 3-ZA20, the amplifier must be adjusted for 70 Vrms output using the appropriate RMS voltmeter.

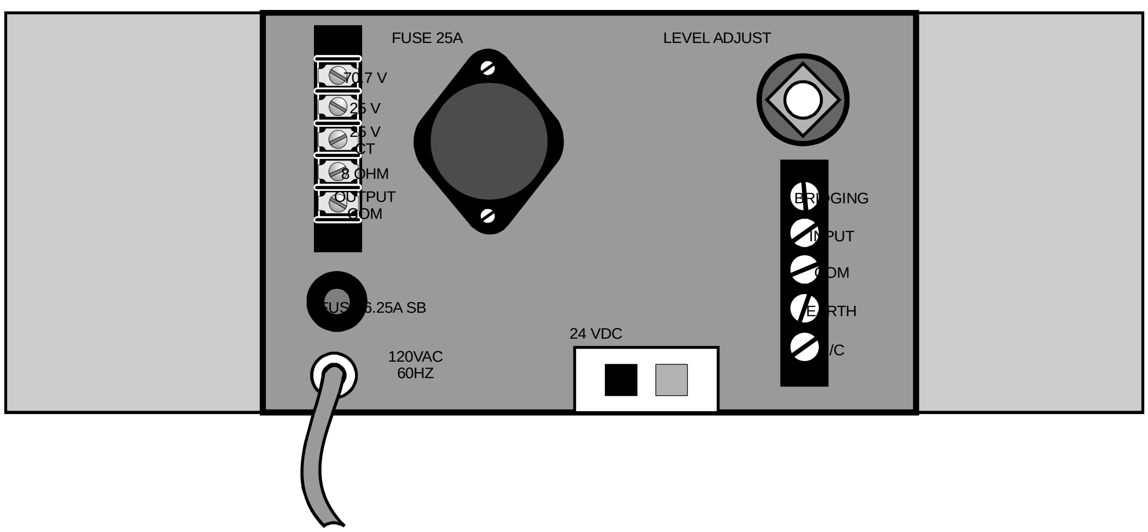


Figure 4-12: Dukane amplifier, rear view

ATP external battery charger

When multiple ATPs are connected to a common battery set, disable the ATP internal battery charger, by installing J3 and removing J2 on the APSB terminal board. This is located in the ATP. (see Figure 4-11). Use a La Marche model A33-10-24 external battery charger, which can charge up to 160-Ah batteries, as shown in Figure 4-13.

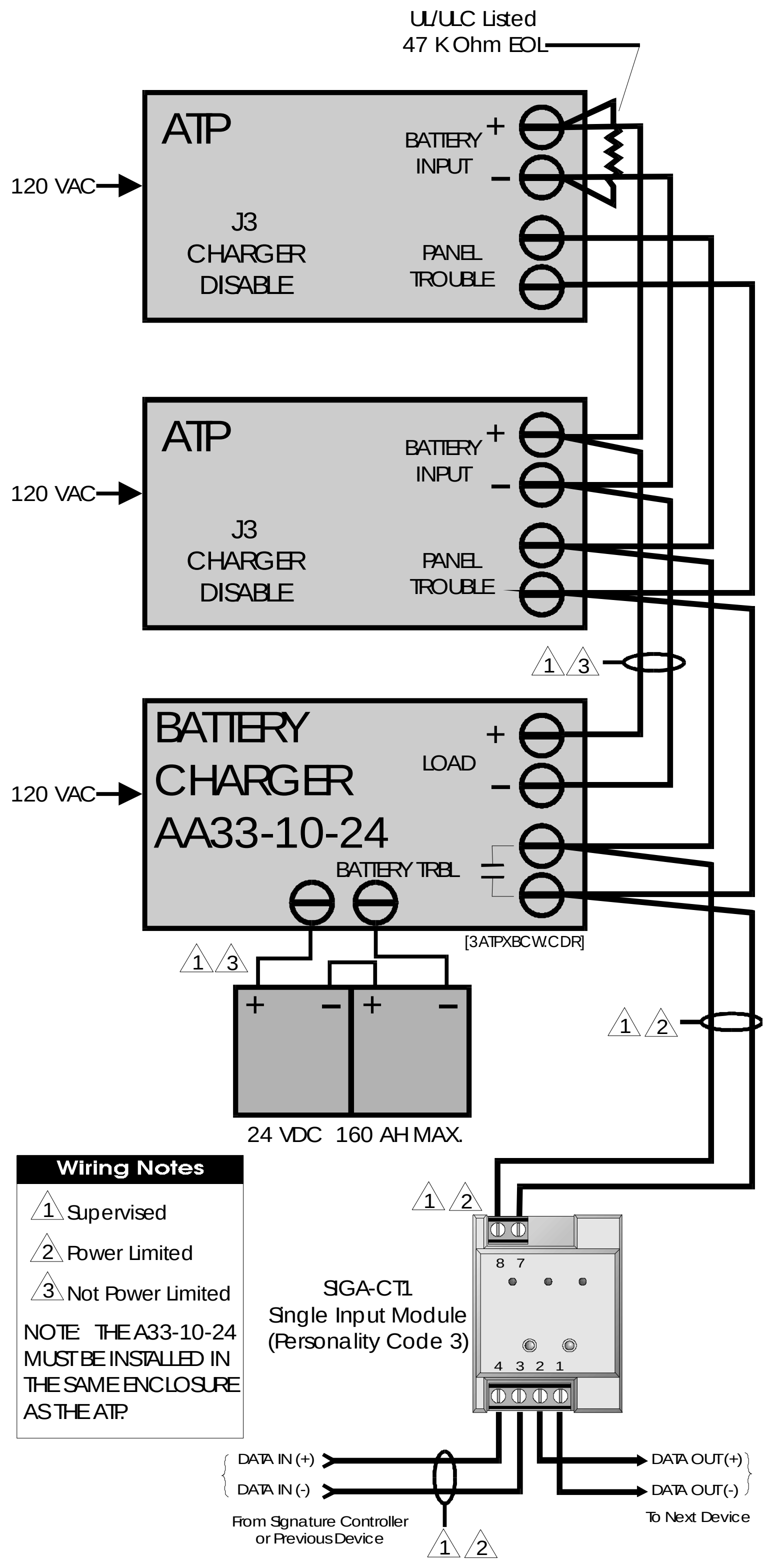


Figure 4-13: ATP external battery charger wiring

Amplifier backup

Various methods are available to provide a spare amplifier in the event that a primary amplifier fails. Depending upon the local Authority Having Jurisdiction, a single backup amplifier can be required for each primary amplifier or a single backup per bank of amplifiers.

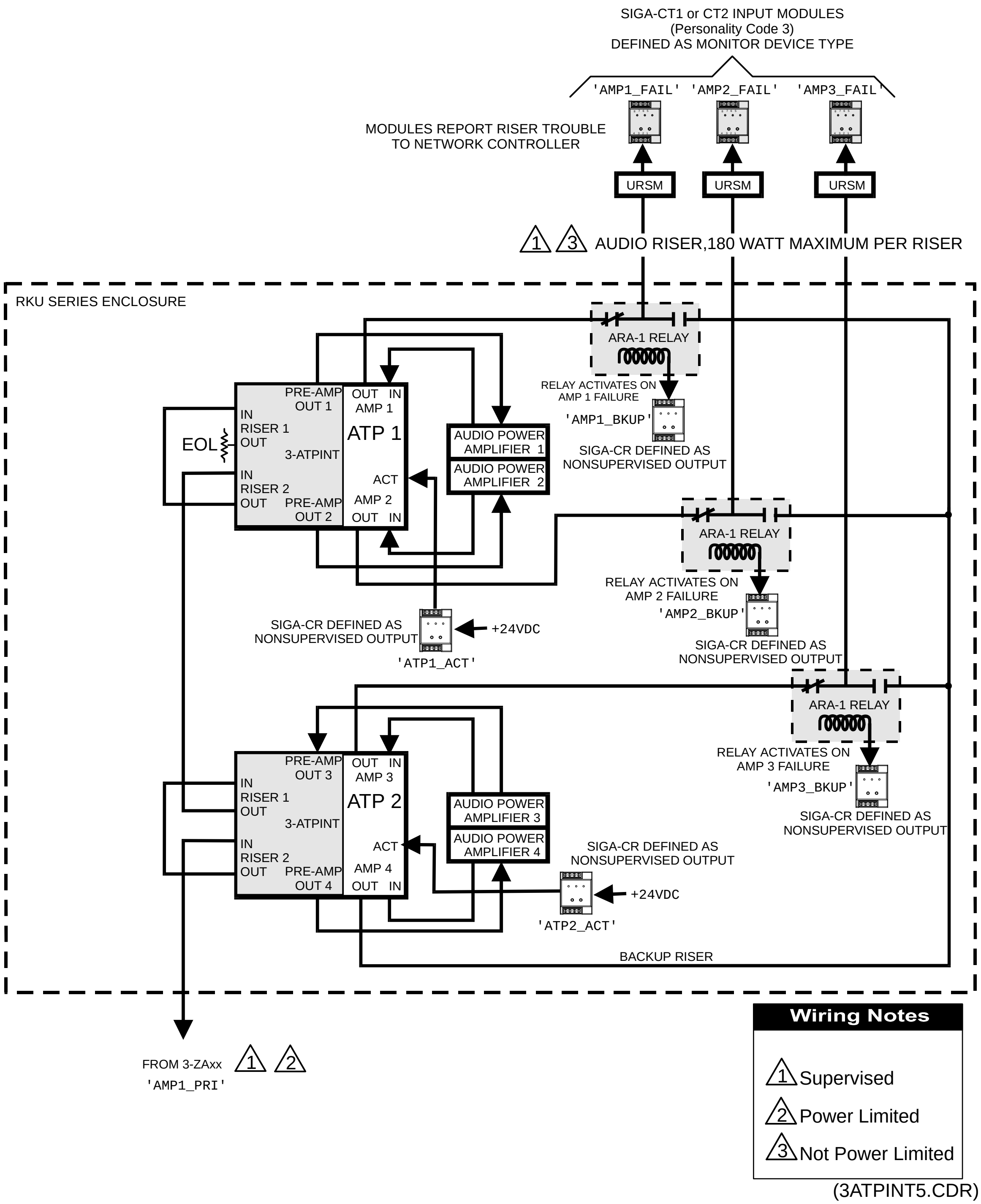


Figure 4-14: Amplifier bank with spare amplifier

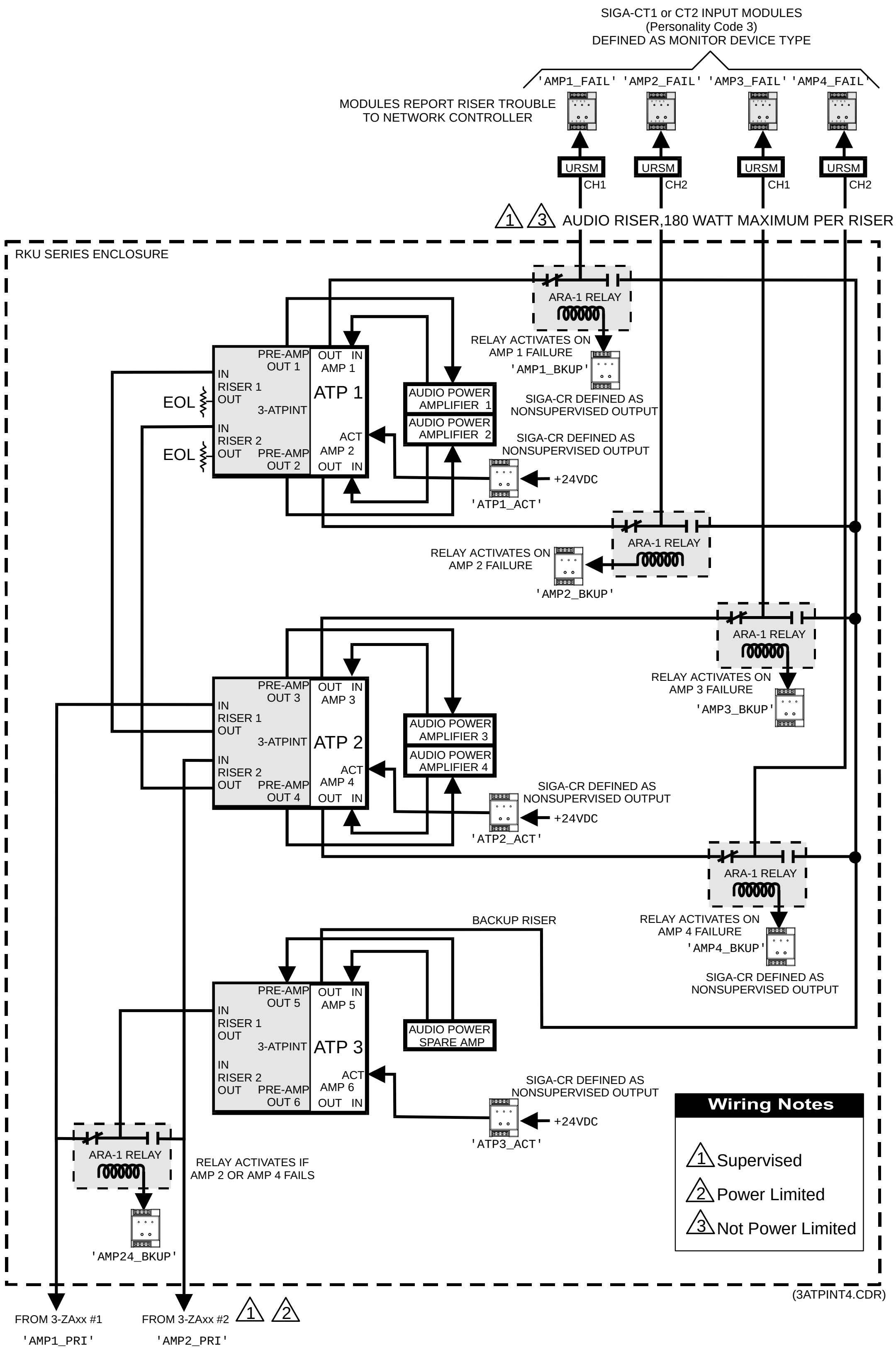


Figure 4-15: One spare amplifier in dual channel system

Branch speaker wiring

Signature modules are used to connect individual floor branch speaker circuits to the main riser. Single channel branch speaker circuits can be wired as Class A (Style Z) using the SIGA-UM module. Class B (Style Y) circuit configuration can be accomplished using either the SIGA-UM or SIGA-CC2 modules. The branch speaker circuits of two channels can be wired as Class B (Style Y) circuits using the SIGA-CC2 module.

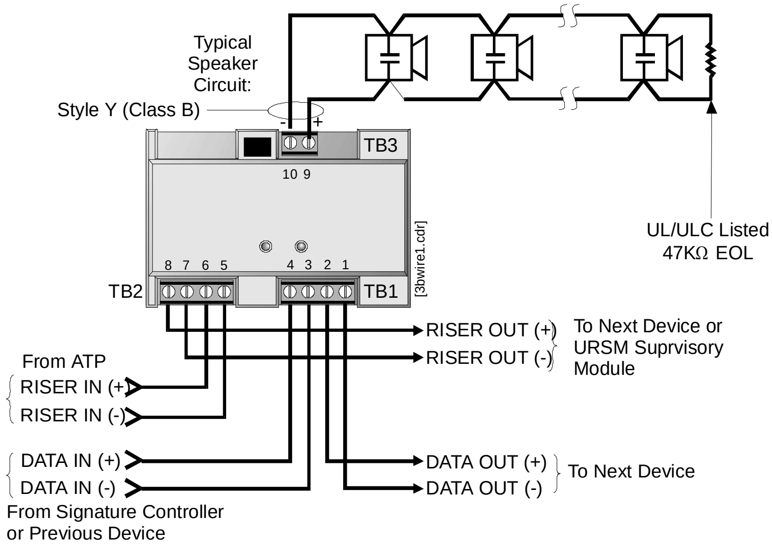


Figure 4-16: Single channel Class B wiring, SIGA-CC1 Module

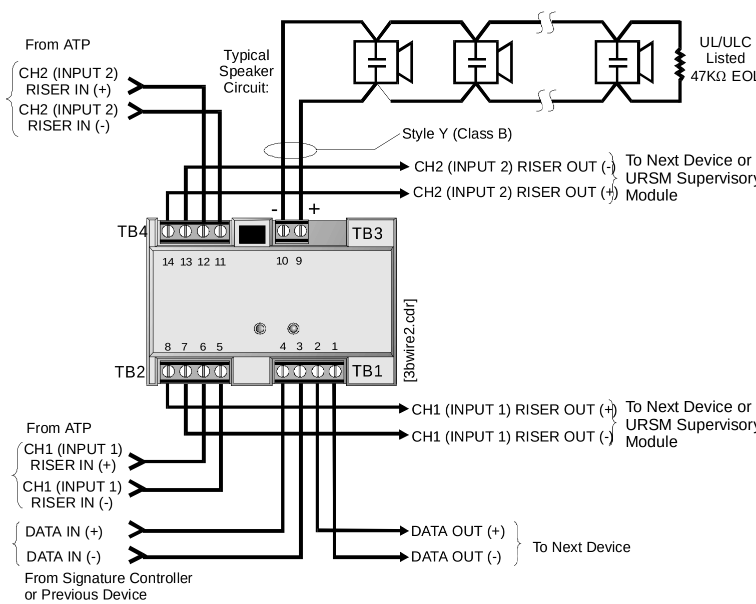


Figure 4-17: Two channel Class B wiring, SIGA-CC2 Module

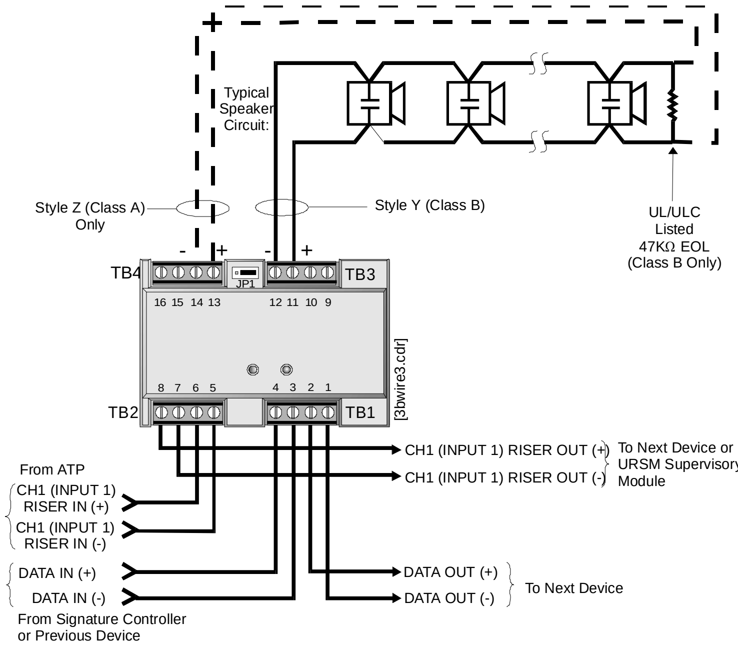


Figure 4-18: Single channel Class A wiring, SIGA-UM Module

Troubleshooting

The ATP senses loss of AC power or brownout conditions affecting the amplifiers. It also provides battery backup to the amplifiers if the audio system is active when the power failure or brownout occurs. The ATP must have a 3-ATPINT interface Card installed in order to work with the EST3 system.

The ATP enters a trouble state if any of the following events occur:

- ATP brownout or loss of AC power
- Low battery charge or missing battery (with J2 enabled)
- Ground fault (if ground fault detection J1 is enabled)
- Fuse failure

Chapter 5

Installation

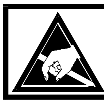
Summary

This chapter provides installation information for system components and applications that supplements the instructions provided on individual component installation sheets.

Content

Installation overview

Electrostatic discharge precaution



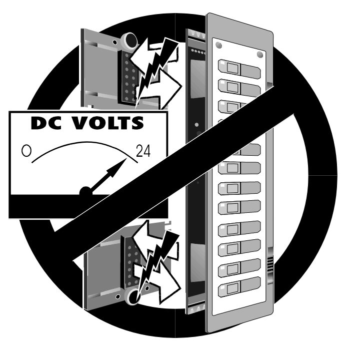
Observe static sensitive material handling practices.

The components used in this system are sensitive to electrostatic discharge (ESD). When handling electronic assemblies, you must take precautions to avoid the build up of static charges on your body and on the equipment.

- Do not open the anti-static packaging until you are ready to install the electronics.
- Wear a grounded wrist strap to bleed off any static charge which may have built up on your body.

Energized system precaution

Caution: Never install or remove a module or cabinet component with power applied to the cabinet.



Circuit compatibility

The following circuit compatibility matrix indicates which circuit types may occupy the same conduit or be bundled together, where permitted by code.

CIRCUIT COMPATIBILITY MATRIX

KEY

1 No restriction
2 Twisted
3 Twisted/Shielded

Power Limited Circuit

⊘ Do Not Mix

1\2 — Top notes refers to this circuit. Bottom notes refers to this circuit.

Circuits permitted by manufacturer to occupy the same conduit. Check local codes for additional restrictions.

	24 VDC-power limited	Network Audio-digitized	Network Com (RS-485)	25 V_{RMS} Audio-power limited	25 V_{RMS} Audio-not power limited	70 V_{RMS} Audio-power limited	70 V_{RMS} Audio-not power limited	Signature Data Circuit	Addressable Analog "ZAS" Circuit	Traditional 2-Wire IDC	RS-232 Peripheral Data Circuit	Telephone	AC Mains - non power limited	Fiber Optic Cable	Circuit Wiring Specifications
24 VDC-power limited	1\1	1\2	1\2	1\1	⊘	1\2	⊘	1\1	1\2	1\1	1\2	1\3	⊘	1\1	Size conductors per acceptable voltage drop.
Network Audio-digitized	2\1	2\2	2\2	2\2	⊘	2\2	⊘	2\1	2\2	2\1	2\2	2\3	⊘	2\1	Max. Ckt. Res = 70Ω. NO T-Taps Max. Ckt. Capacitance = 0.07µF.
Network Com (RS-485)	2\1	2\2	2\2	2\2	⊘	2\2	⊘	2\1	2\2	2\1	2\2	2\3	⊘	2\1	Max. Ckt. Res = 90Ω. NO T-Taps Max. Ckt. Capacitance = 0.3µF.
25 V_{RMS} Audio-power limited	1\1	2\2	2\2	2\2	⊘	2\2	⊘	2\1	2\2	2\1	2\2	3\3	⊘	2\1	Size conductors per acceptable voltage drop.
25 V_{RMS} Audio-not power limited	⊘	⊘	⊘	⊘	2\2	⊘	2\2	⊘	⊘	⊘	⊘	⊘	⊘	1\1	Size conductors per acceptable voltage drop.
70 V_{RMS} Audio-power limited	1\1	2\2	2\2	2\2	⊘	2\2	⊘	2\1	2\2	2\1	2\2	3\3	⊘	1\1	Size conductors per acceptable voltage drop.
70 V_{RMS} Audio - not power limited	⊘	⊘	⊘	⊘	2\2	⊘	2\2	⊘	⊘	⊘	⊘	⊘	⊘	1\1	Size conductors per acceptable voltage drop.
Signature Data Circuit	1\1	1\2	1\2	1\2	⊘	1\2	⊘	1\1	1\2	1\1	1\2	1\3	⊘	1\1	Max. Ckt. Res = 76Ω. Max. Ckt. Capacitance = 0.5µF.
Addressable Analog "ZAS" Circuit	2\1	2\2	2\2	2\2	⊘	2\2	⊘	2\1	2\2	2\1	2\2	2\3	⊘	2\1	Max. Ckt. Res = 36 w/RZB; 50Ω w/o RZB. Max. Ckt. Capacitance = 0.2µF.
Traditional 2-Wire IDC	1\1	1\2	1\2	1\2	⊘	1\2	⊘	1\1	1\2	1\1	1\2	1\3	⊘	1\1	Max. Ckt. Res = 50Ω.
RS-232 Peripheral Data Circuit	2\1	2\2	2\2	2\2	⊘	2\2	⊘	2\1	2\2	2\1	2\2	2\3	⊘	2\1	Max. length 50 Ft. (15.2 M) without modem.
Telephone	3\1	3\2	3\2	3\3	⊘	3\3	⊘	3\1	3\2	3\1	3\2	3\3	⊘	3\1	#18 AWG Twisted/Shielded. 4,000 Ft. (1,220 M) Max
AC Mains - not power limited	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	1\1	⊘	230V, 20A Max.
Fiber Optic Cable	1\1	1\2	1\2	1\2	1\2	1\2	1\2	1\1	1\2	1\1	1\2	1\3	⊘	1\1	Jacket material must be rated for application.

WMATRIX2.CDR

Recommended cable manufacturers

Atlas Wire and Cable Corp.
133 S. Van Norman Road
Montebello, CA 90640
(213) 723-2401

West Penn Wire Corp.
2833 West Chestnut Street
P.O. Box 762
Washington, PA 15301
(412) 222-7060

Belden Wire and Cable Corp.
P.O. Box 1980
Richmond, IN 47375
(317) 983-5200

BSCC
233 Florence Street
Leominster, MA 01453
Telephone: (508) 537-9138
Fax: (508) 537-8392

Remee Products, Inc.
186 North Main Street
Florida, NY 10921

Table 5-1: Recommended cable manufacturer's part numbers

		#14 (1.50 mm^2) Twisted Pair		#16 (1.00 mm^2) Twisted Pair		#18 (0.75 mm^2) Twisted Pair	
MFG	**Type**	**Unshielded**	**Shielded**	**Unshielded**	**Shielded**	**Unshielded**	**Shielded**
ATLAS	FPL	218-14-1-1TP	218-14-1-1STP	218-16-1-1STP	218-16-1-1STP	218-18-1-1TP	218-18-1-1STP
	FPLP	__	1762-14-1-2J	1761-16-1-2J	1762-16-1-2J	1761-18-1-2J	1762-18-1-2J
BELDEN	FPL	9580	9581	9572	9575	9571	9574
	FPLP	__	83752	__	__	__	__
BSCC	FPL	__	231402	__	241602	__	241802
	FPLP	341402	__	341602	351602	341802	351802
REMEE	FPLP	NY514UH	NY514SH	NY516UH	NY516SH	NY518UH	NY518SH
WEST PENN	FPL	994	995	990	991	D9780	D975
	FPLP	60993	60992	60991	60990	60980	60975

UL 864 NAC signal synchronization

Requirements

Table 5-2 lists the installation requirements for systems that must meet UL 864 NAC signal synchronization requirements.

Table 5-2: Installation requirements for UL 864 signal synchronization

Circuit	Installation requirements
3-ASU audio riser	The 3-ASU audio subsystem uses a single signal source, so audible NACs on the 3-ASU network audio riser are synchronized network-wide.
3-AADC(1)	Signals are synchronized for a NAC when you use a riser selection module, a Genesis Signal Master synchronization module, and Genesis or Enhanced Integrity notification appliances. Separate NACs on the loop are not synchronized. Configure the audible notification appliances for temporal or steady output as desired.
3-IDC8/4	Signals are synchronized for a NAC when you use a Genesis Signal Master synchronization module and Genesis or Enhanced Integrity notification appliances. Separate NACs on the module are not synchronized. To silence audible appliances separately, use two NAC channels from the 3-IDC8/4 to provide separate audible and visible power to the NAC. In this configuration, the signal silence function operates as defined in your project. See Figure 5-1 for typical wiring. Configure the audible notification appliances for temporal or steady output as desired.
3-SSDC(1)	Signals are synchronized for all NACs on the Signature data circuit when you use SIGA-CC1S or SIGA-MCC1S modules and Genesis or Enhanced Integrity notification appliances. See Figure 5-3. The system does not synchronize Signature data circuits on separate 3-SSDC(1) modules in one panel or between panels. Signals are synchronized for a NAC on the Signature data circuit when you use SIGA-CC1 and SIGA-MCC1 addressable NAC modules, a Genesis Signal Master synchronization module, and Genesis or Enhanced Integrity notification appliances. [1] Separate NACs on the Signature data circuit are not synchronized. See Figure 5-4. Configure the audible notification appliances for temporal or steady output as desired.
3-SDDC(1)	Synchronization is not supported between two daughter cards on the same 3-SDDC(1) module. NACs on the individual daughter cards are synchronized as described above for the 3-SSDC(1).

Table 5-2: Installation requirements for UL 864 signal synchronization

Circuit	Installation requirements
SIGA-CC1, SIGA-MCC1, SIGA-CC1S, and SIGA-MCC1S	Signature CC1 modules do not generate temporal signals, they simply turn the NAC circuit on or off. You must configure the notification appliances for temporal or steady output as desired.
G1M and G1M-RM	The G1M and G1M-RM Genesis Signal Master modules can be used to synchronize NACs consisting of Genesis appliances. They can also be used to synchronize mixed NACs consisting of Genesis and Enhanced Integrity appliances, but the first appliance must be a Genesis device, and the Genesis Signal Master module must be mounted on this device. G1M and G1M-RM Genesis Signal Master modules cannot be used to synchronize NACs consisting of Enhanced Integrity appliances.

[1] You can also use SIGA-UM and SIGA-MAB modules configured as Class B addressable NAC modules (personality code 16.)

2. If notification appliances are used on the data line for more than one zone, each zone must have isolation so that a break, ground, or wire-to-wire fault shall not affect more than one zone.
3. If the riser is used for more than one notification zone, install in accordance with the survivability from attack by fire requirements in NFPA 72 *National Fire Alarm Code.*

Typical circuits

The circuit diagrams that follow use the term *zone* to indicate *notification zones* as defined in UL 864.

“Notification zone: An area covered by notification appliances that are activated simultaneously.”

Figure 5-1 shows a typical application of the 3-IDC8/4 module to support two notification zones. In this example, power is being supplied from the EST3 rail, and the jumpers (JP1 through JP4) are set accordingly.

It is also possible to create a similar application that uses external power, supplied to NAC 1/2 IN and NAC 5/6 IN. Refer to the 3-IDC8/4 installation sheet for wiring details and the required jumper settings.

In Figure 5-1, both zones are configured with separate NAC circuits for audible and visible appliances. NAC 1 and NAC 5 are programmed as visible device types, and NAC 2 and NAC 6 as audible device types. This means that the signal silence function can be configured to silence only the horns.

Separating the visible and audible devices is optional and may not be required for your project. Refer to the Genesis Signal Master installation sheet for additional configurations and wiring details.

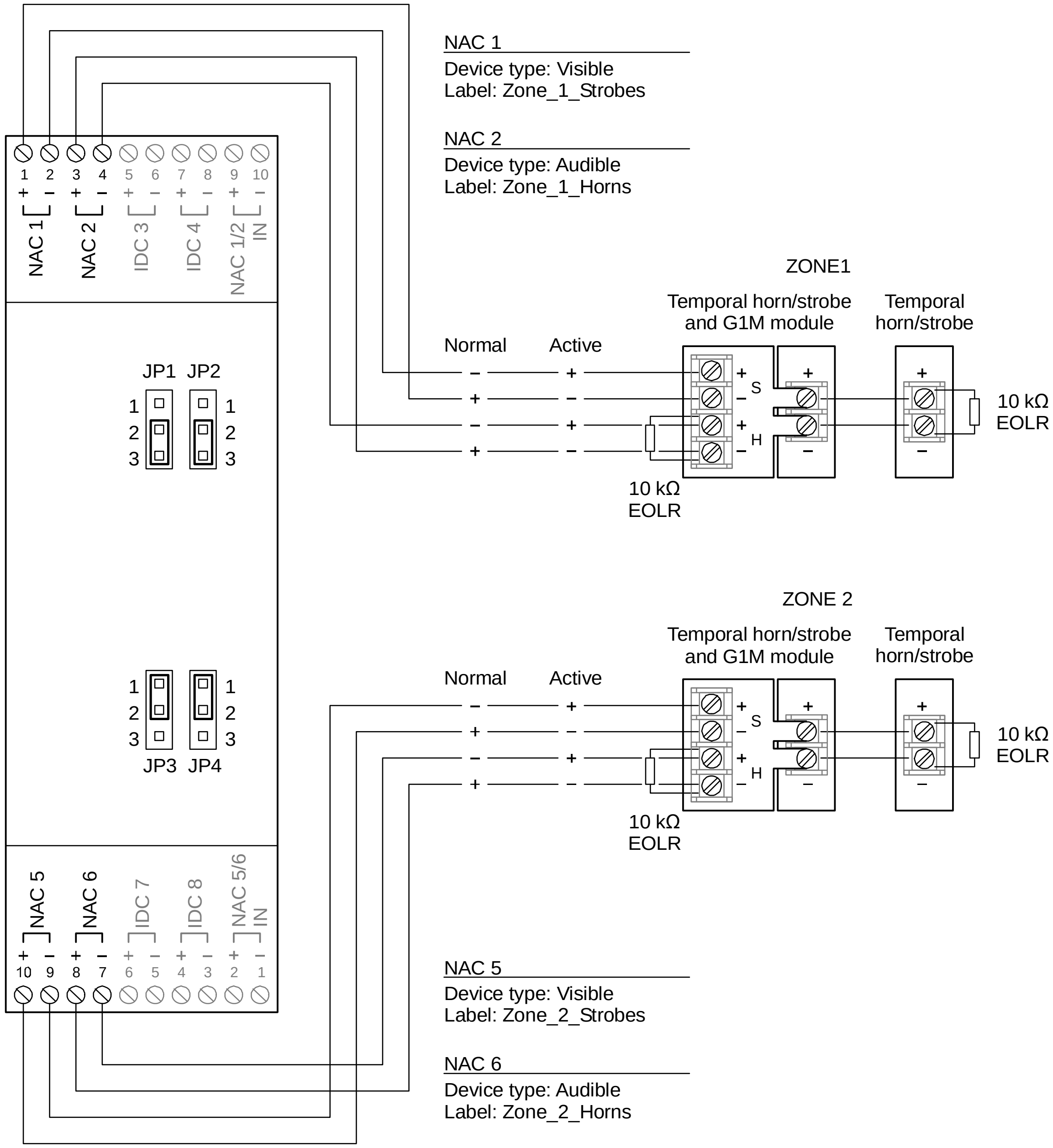


Figure 5-1: Typical 3-IDC8/4 card NAC wiring

Figure 5-2 shows a Signature circuit, wired as Class A, and using isolation modules or bases for each IDC and NAC.

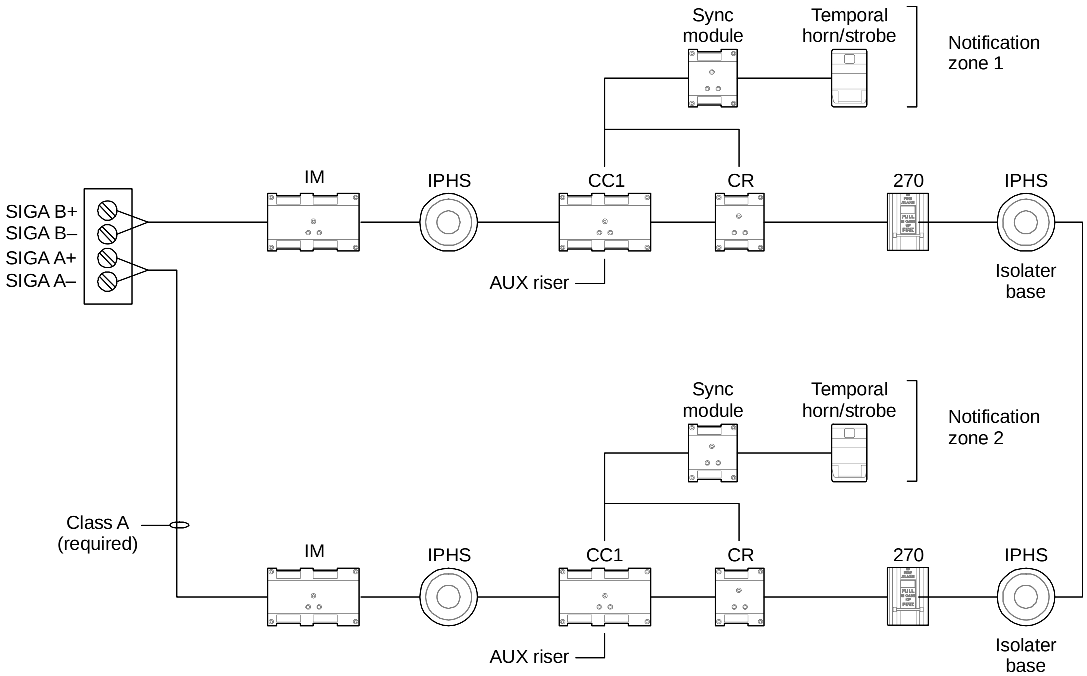


Figure 5-2: Signature wiring for notification circuit signal synchronization

Figure 5-3 Shows two NACs on a Signature data circuit. Each NAC is controlled by a SIGA-CC1S module, one for audible appliances, and one for visible appliances.

As in Figure 5-1, this configuration allows the audible appliances to be silenced independently of the visible appliances. This operation is optional, and may or may not be required for your project.

The SIGA-CC1S modules provide signal synchronization for both NACs.

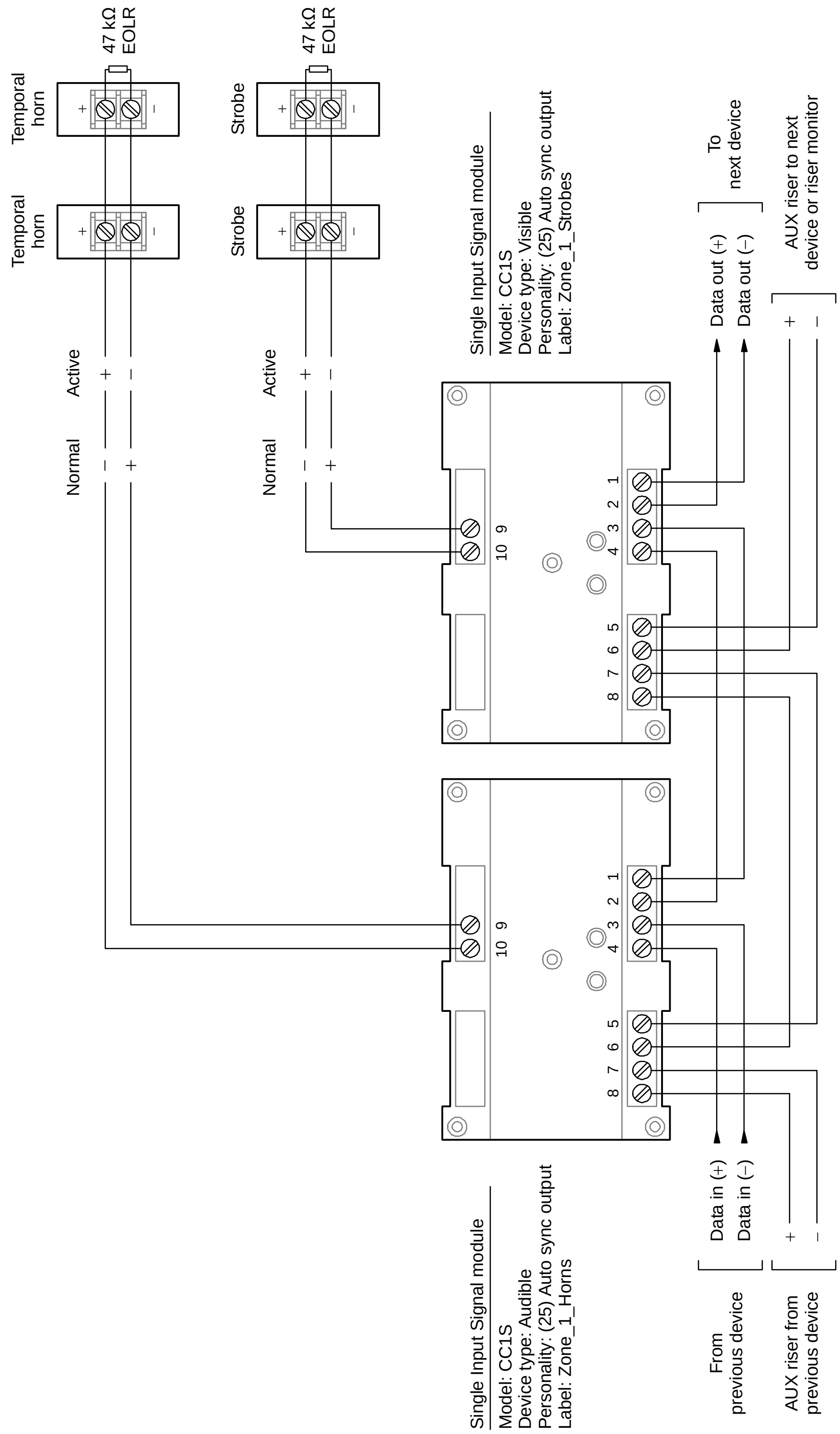


Figure 5-3: Typical SIGA-CC1S NAC wiring

Figure 5-4 shows a single SIGA-CC1 switching an NAC on or off. The G1M module provides signal synchronization for the temporal horn/strobe appliances.

As in earlier examples, this circuit allows for independent silencing of the audible appliances. This operation is provided by the SIGA-CR module, which opens or closes the circuit between S+ and H+ on the G1M module. In this case, however, you must program the operation of the SIGA-CR. The project settings for signal silence operation will not determine the operation of the audible appliances in this NAC.

Note also, that this application could be implemented with a SIGA-CC1S module. The SIGA-CC1S provides signal synchronization compatible with the operation of the G1M module.

The advantage to using a SIGA-CC1S module is that the NAC would then be synchronized with other NACs on the Signature data circuit.

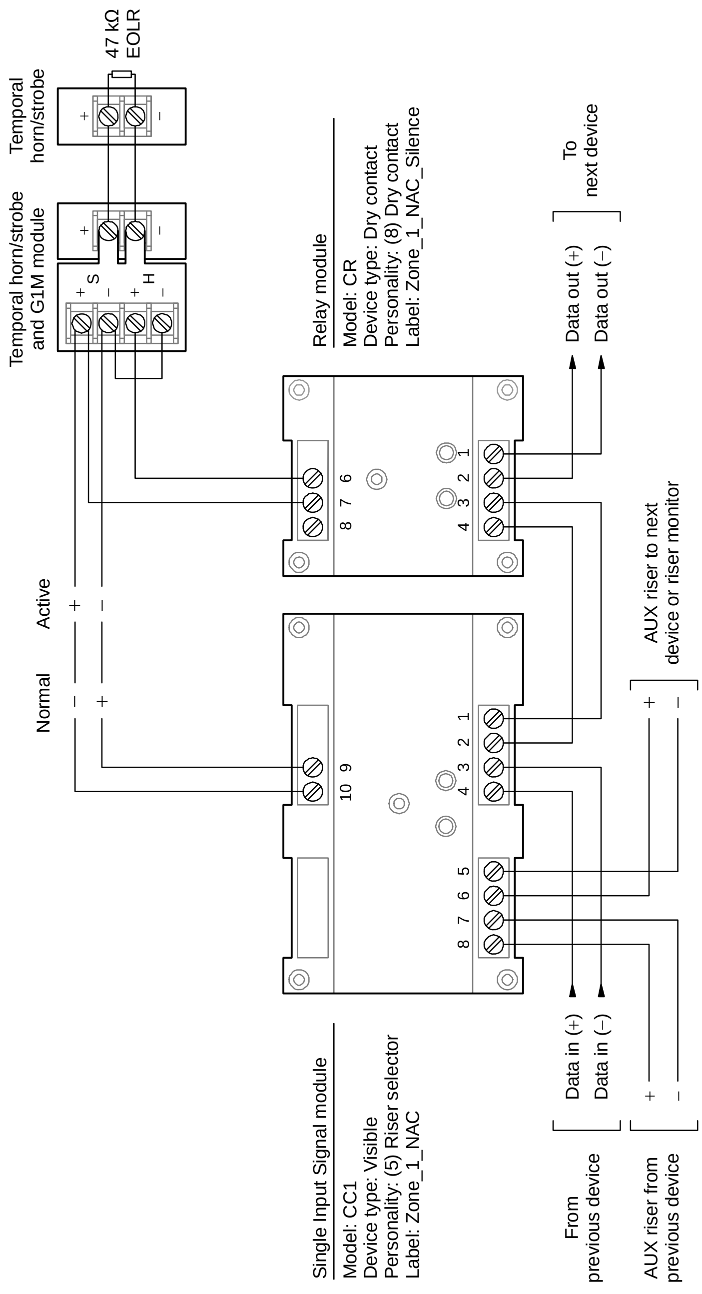


Figure 5-4: Typical SIGA-CC1 NAC wiring

Figure 5-5 shows an auxiliary/booster power supply being used to power the NAC, to provide synchronization, and to provide horn silence capability. Because the auxiliary/booster supply has the ability to silence the horn circuit, this application can be created using only the Signature loop wiring.

The SIGA-CT1 module monitors the power supply for AC failure. The SIGA-CR module signals the power supply to turn the horns on or off. The SIGA-CC1 module signals the power supply when the system goes into alarm, turning the NAC on.

Note that the power supply can only synchronize the notification appliances to which it is connected. If you need to synchronize several similar NACs on the same Signature loop, you can use a SIGA-CC1S module in place of the SIGA-CC1.

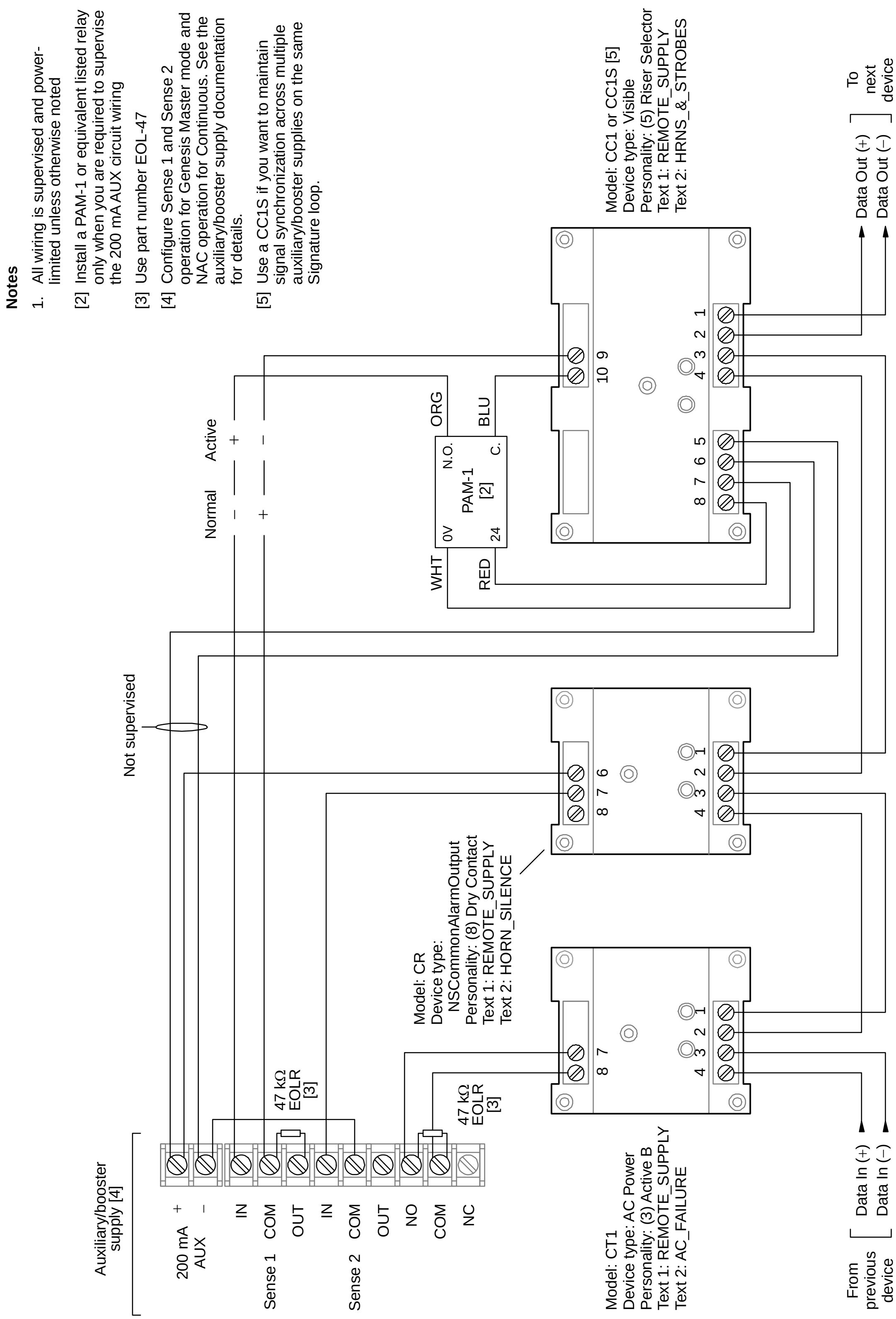


Figure 5-5: Using an auxiliary/booster supply to provide horn silence capability with two wires

Creating an initial startup version of the project database

Creating an initial startup version of the project database is useful for:

- Assigning panel addresses when you bring up a system for the first time
- Verifying the correct installation of the rail modules and control/display modules
- Adjusting the gain on the 3-ASU and amplifier modules installed in a cabinet

Follow these suggestions when creating an initial startup version of the project database:

Only include the hardware configuration for each cabinet in the system. Do not include any device loops in the database. These should be installed after verifying the cabinet configuration. It is also not necessary to configure any rail modules.

The easiest way to create an initial startup version of the project database is to save the project under a different name using the Save As command. Save the project as a different version after you have defined the cabinet chassis configuration and added all the rail modules for all the cabinets in the system. Using this method eliminates doubling your workload by having to edit two databases as you add cabinets to the system.

If the cabinet contains amplifiers and a 3-ASU, include the following features in the initial startup version of the project database:

- Program a control/display module toggle switch to send a 0.7 Vrms, 1 kHz tone to the amplifiers. Label the switch 1KHZ_TONE and add the following rule to the rules file:

  ```
  [AMPLIFIER_SETUP]
  SW '1KHZ_TONE':
     AMPON '*' TO 'Ch_Gen*',
     MSGON '1KHZ_TONE' TO 'Ch_Gen*';
  ```

- Record a message in the 3-ASU database labeled 1KHZ_TONE. Import the *Steady tone at 1kHz.wav* file from the EST3 Fire Alarm Support Tools CD-ROM into this record.

Note: For firmware versions earlier than 1.5, copy the *Steady tone at 1kHz.wav* file from the \Library\Sounds\FCCA directory on the EST3 Fire Alarm Support Tools CD-ROM to a directory on your hard drive that doesn’t contain any other files. You can import the file from this directory.

If a CDR-3 Zone Coder is installed and connected to the AUX input on a 3-ASU, include the following features in the initial startup version of the project database:

- Program a control/display module toggle switch that is to turn on the amplifiers and select the Auxiliary channel. Label the switch AUX_INPUT_ADJUST and add the following rule to the rules file:

  ```
  [3-ASU_AUX_INPUT_SETUP]
  SW 'AUX_INPUT_ADJ':
     AMPON '*' TO 'Ch_Aux*';
  ```

System installation sequence

Follow these general instructions when installing a panel as part of an EST3 system. Refer to the installation sheets that came with the product for specific instructions. The *EST3 Installation Sheets* book contains copies of the installation sheets.

1. Install the equipment enclosure backbox at the required location and pull all the required conductors through the conduit into the backbox.
2. Verify the field wiring. Refer to Table 5-3.
3. Install the chassis assemblies that go into the panel.
4. Install the primary and booster power supplies.
5. Install all rail modules and control / display modules in their required locations.
6. Apply power to the panel. Refer to the topic “Cabinet power-up procedure” in Chapter 6.
7. Download an initial startup version of the CPU database, and clear panel troubles. See the topic “Creating an initial startup version of the project database,” later in this chapter.
8. Connect field wiring and clear any field wiring problems.
9. Download the final applications program. Refer to Chapter 6, “Power-up and testing.”
10. Disconnect the SDU from the panel.
11. Verify proper operation. Refer to the topic “Detector, input module, and output module testing” in Chapter 6.
12. Fill out a Certificate of Completion for the system. Example forms are included in Chapter 5.

Preliminary field wiring testing

We recommend that you test all circuits before they are connected to the control equipment. Table 5-3 indicates the recommended tests and acceptable test results.

Note: Individual devices are not checked as part of these tests. All equipment installed on field circuits must be individually tested to ensure proper operation when the system running.

Table 5-3: Field wiring tests

Circuit type	Test
DC notification appliance circuit	1. Measure the resistance between conductors. The circuit resistance should be infinite if no devices are installed on the circuit. The circuit resistance should be approximately 15 kΩ when the polarized notification appliances and the end-of-line resistor are correctly installed. 2. Reverse the meter leads. The circuit resistance between conductors should read approximately 10 Ω to 20 Ω. If the resistance reading is still approximately the same value when the meter leads are reversed, one or more polarized devices are installed incorrectly. 3. Measure the resistance between each conductor and earth ground. The resistance should be infinite.
Audio notification appliance circuit	1. Measure the resistance between conductors. The circuit resistance between conductors should be infinite if no devices are installed on the circuit. The circuit resistance should be approximately 15 kΩ when the polarized notification appliances and the end-of-line resistor are correctly installed. 2. Reverse the meter leads. The circuit resistance between conductors should still read approximately 15 kΩ. 3. Measure the resistance between each conductor and earth ground. The circuit resistance between a conductors and earth ground should be infinite.
Signature data circuits	1. With field wiring disconnected, verify the continuity of each conductor. Each conductor should measure less than 38 Ω. 2. Measure the resistance between conductors. The circuit resistance between conductors should be infinite if no devices are connected to the circuit. The circuit resistance between conductors should be between approximately 18 kΩ (250 devices) and 4.5 MΩ (1 device) when devices are installed. 3. Measure the resistance between each conductor and earth ground. The circuit resistance between a conductors and earth ground should be infinite.

Table 5-3: Field wiring tests

Circuit type	Test
Addressable analog circuits	1. Verify the continuity of each conductor. Each conductor should measure less than 50 Ω. 2. Measure the resistance between conductors. The circuit resistance between conductors should be infinite if no devices are connected to the circuit. 3. Measure the resistance between each conductor and earth ground. The circuit resistance between a conductors and earth ground should be infinite.
Traditional initiating device circuits	1. Verify the continuity of each conductor. 2. Measure the resistance between conductors. The circuit resistance between conductors should be infinite if no devices are connected to the circuit. The circuit resistance between conductors should be approximately 4.7 kΩ when devices are installed. 3. Measure the resistance between each conductor and earth ground. The circuit resistance between a conductors and earth ground should be infinite.
Telephone riser circuit	1. Verify the continuity of each conductor. Each conductor should measure between 0 and 25 Ω. 2. Measure the resistance between conductors. The circuit resistance between conductors should be infinite if no devices are installed on the circuit. The circuit resistance between conductors should be approximately 15 kΩ with SIGA-CC1 Single Input Signal Modules and the end-of-line resistor correctly installed. 3. Measure the resistance between each conductor and earth ground. The circuit resistance between a conductors and earth ground should be infinite.
RS-485 communication circuits	EST3 uses RS485 circuits for the: • Network data riser • Network audio riser • SAC bus 1. Verify the continuity of each conductor. Each conductor should measure between 0 and 50 Ω. 2. Measure the resistance between conductors. The circuit resistance between conductors should be infinite if no devices are connected to the circuit. The circuit resistance between conductors should be approximately 50 Ω when devices are installed. 3. Measure the resistance between each conductor and earth ground. The circuit resistance between a conductors and earth ground should be infinite.

Table 5-3: Field wiring tests

Circuit type	Test
RS-232 Communication Circuits	With both ends of the circuit disconnected: 1. Verify the continuity of each conductor. Each conductor should measure between 0 and 25 Ω. 2. Measure the resistance between conductors. The circuit resistance between conductors should be infinite. 3. Measure the resistance between each conductor and earth ground. The circuit resistance between a conductors and earth ground should be infinite.
Earth Ground	1. Measure the resistance between the earth ground terminal and a convenient water pipe or electrical conduit. The circuit resistance should be less than 0.1Ω

Chassis installation in EIA 19-inch racks

Each 3-CHAS7 chassis or 3-ASU(/FT) Audio Source Unit requires 12 inches (30.48 cm) of vertical rack space. 3/4 inch (1.9 cm) blank plates are required at the top of the upper chassis and the bottom of the lower chassis. A 1-1/2 inch (3.81 cm) blank plate is required between each chassis.

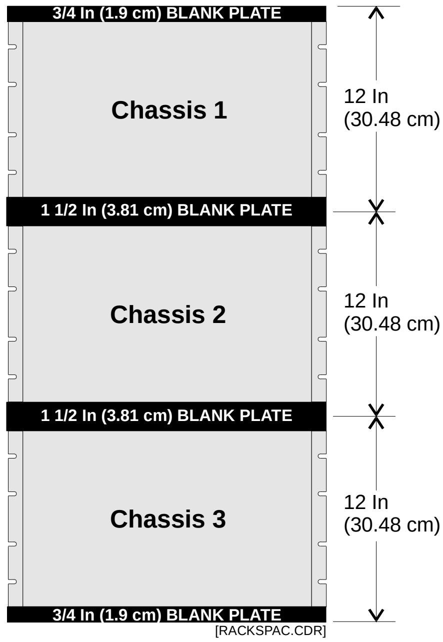


Figure 5-6: Rack-mounted chassis

ATCK Attack Kit for cabinets

EST3 supports several UL1635 certification installations. Each of these requires that an ATCK Attack Kit be attached to an RCC7R series control panel cabinet. The kit provides a two-minute attack delay time.

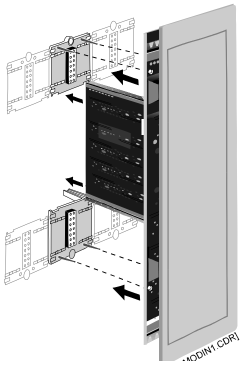
The ATCK kit lets you replace the standard, hinged outer door with a box cover that has no window. The cover attaches to the backbox sides using sheet metal screws and four locks.

The kit also includes special knockout locks that secure the unused knockout holes.

Follow the instructions shipped with the kit. In general, you'll need to:

1. Discard the standard door included with the cabinet.
2. For older cabinets, use the ATCK cover as a template to mark and drill screw holes. (New cabinets include the correct screw holes.)
3. Remove any unused knockouts and insert knockout locks.
4. Use the screws provided to attach the new cover.

Local rail module installation



Please refer to the installation sheet that came with the product for installation instructions.

Equipment locations within a chassis are referred to as rail slots. Figure 5-7 indicates the rail slot numbers for the various cabinet sizes available in the EST3 product line. The CPU module must always occupy rail slots 1 and 2. The primary power supply monitor module should occupy rail slot 3.

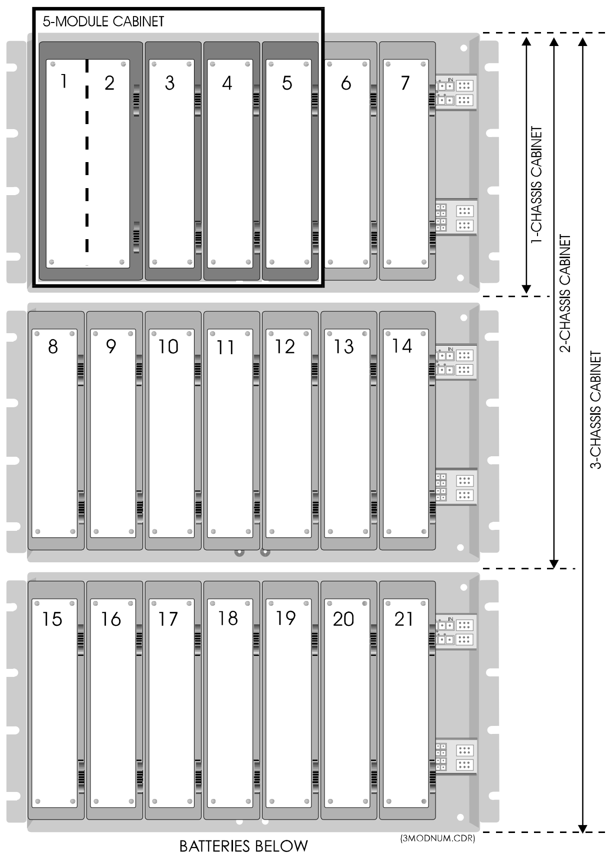


Figure 5-7: Local rail module slot identification

A 3-ASU Audio Source Unit occupies the first three slots on its chassis, and is identified using the lowest slot number of the three. When a Firefighters Telephone Control Unit is supplied as part of the 3-ASU/FT, the telephone control unit occupies the last four slots on the chassis, and is identified as the fourth slot number (11 or 18) on the chassis.

Connect the DC power cable (P/N 250187) to connector P2 on the power supply. For the 3-PPS Primary Power Supply, connect the 16-pin data ribbon cable (P/N 250188); (Booster = P/N 250189) to connector P3 on the power supply. For 3-BPS

Booster Power Supplies, connect a 14-pin data ribbon cable (P/N 250189) to connector P3 on the power supply. Route both cables up through the rails for later connection to the power supply/booster monitor module.

- Install any local rail module option cards required by your application. Option cards should be firmly seated in their connectors, and then secured to the rail module by pressing the snap rivet fastener.
- If a control/display module is required by your application, place the display in the recess on the front of the module. Secure the display with the four supplied plastic rivets. Install the display ribbon cable (P/N 250186) between the display's connector and the module's display connector. If no display is required, insert the blank plate supplied with the module.
- Locate the required rail slot positions on the rail chassis. Remember, the module location must match the location entered in the System Definition Utility program.
- Position the module so that any option card(s) rests in the card guides slot. Push the module toward the rails, sliding the daughter card into the slot.
- When the four alignment pins match up with the guide holes in the module, push the module in to firmly seat the module on the rail connectors.
- Push in the snap rivets to lock the module on to the rail.
- Plug in terminal strips can be removed from LRMs to facilitate field wiring.
- Close the module display door. Latch the door by sliding the upper latch down and the lower latch up.

Note: If there are empty rail spaces in a cabinet, you should consider installing 3-LRMF blank modules to fill up the spaces.

3-MODCOM Modem Communicator module

Features

The 3-MODCOM Modem Communicator is a local rail module that supports telephone line communication. It combines the functions of a dialer and modem in a single module.

The module has two eight-position modular jacks for connecting to telephone lines. It includes two red LEDs (DS1 and DS2) to annunciate line ringing and data exchange. The module accepts a control / display layer and has provision for a future expansion module.

A nonvolatile, flash memory chip stores customization data that includes account information, user identifiers, telephone numbers, and other dialing details.

The 3-MODCOMP is identical to the 3-MODCOM, but supports remote paging using the Telocator Alphanumeric Protocol (TAP). The 3-MODCOMP remote paging feature is supplemental and is not supervised.

Both versions of the module are equipped with a modem that is Bell 103 and V.32bis compliant. The modem includes support for these protocols:

- Contact ID
- SIA DCS
- SIA P2 (3/1 pulse format)
- SIA P3 (4/2 pulse format)
- TAP (3-MODCOMP only)

Several 3-MODCOMs (up to ten) can be installed in a network for increased reliability. These can be configured to provide dynamic failover operation.

You can program the 3-MODCOM in any of the following configurations:

- One-line dialer
- Two-line dialer
- Modem
- Modem and one-line dialer
- Modem and two-line dialer

The dialer circuit is compatible with pulse dialing or touch-tone (DTMF) dialing. The module can be configured to detect and answer any of these ring types:

- Any ring
- Normal ring
- Distinct ring 2 (type II)
- Distinct ring 3 (type III)

Note: Only Line 1 can be used to receive incoming calls.

Using the 3-MODCOM, messages can be sent to a central monitoring station (CMS) or received from remote computers.

When reporting to a CMS, alarm, trouble, and supervisory status data are transmitted as they occur. Each message identifies the point (or device or circuit) that is involved.

The 3-MODCOM can receive data from two programs: the Access Control Database program (ACDB) or the Keypad Display Configuration program (KDC).

ACDB and KDC information is downloaded on demand from remote computers. This lets the end users create and maintain their own security and access control databases.

Functions

Configuration

You create the required configuration data using the 3-SDU and download this data to the module using standard programming procedures. The data is stored in the nonvolatile memory of the 3-MODCOM.

Configuration data determines the setup of the 3-MODCOM, defines the line properties, the receiver attributes, and the account parameters. This data includes transmission details, such as telephone numbers and dialing options.

Some reference data relating to user access control and security systems is downloaded from the ACDB or KDC programs and stored in the 3-MODCOM.

Point transmission

Using enhanced communication protocols, the 3-MODCOM module is capable of transmitting data that identifies the specific device (or circuit) and event status, as reported by the CPU. This capability is known as point transmission because each and every device (or circuit) that goes into alarm or trouble, or is restored, can be reported by order of occurrence and priority.

Receiving user data

In addition to transmitting device data, the 3-MODCOM module can receive user data from remote computers. In this mode, the module receives access control or security database information from one or more end users. This data establishes the operating characteristics of the user's security and access control system as well as the various access options and PIN numbers. All downloaded data is received over the telephone lines.

The remote programs, ACDB and KDC, use passwords defined during 3-SDU programming to gain access to the 3-MODCOM.

At the start of the downloading process, a connection is established between the modem portion of the 3-MODCOM module and the ACDB or KDC program. Connection is over the telephone network.

The 3-MODCOM module receives data and transfers it to the CPU. The data is then routed via the 3-SAC to the CRC and KPDISP modules on the SAC bus. The data is stored in the nonvolatile flash memory chips of these devices.

Monitoring and diagnostics

Each line has a voltage monitor for detecting loss of telephone line during on-hook condition, and a current monitor for detecting the loss of telephone line and telephone line usage during off-hook conditions. Optical coupler circuits are used for these monitors.

Two red LEDs (DS1 and DS2) annunciate line ringing, in use, and fault conditions. States and explanations for DS1 and DS2 are given in the “Service and troubleshooting” chapter.

Equipment

3-MODCOM – Modem Communicator

The 3-MODCOM connects the EST3 system to the switched telephone network. The 3-MODCOM module is a single rail module with two eight-position modular jacks for connecting two loop-start lines. The 3-MODCOM module provides a control / display layer and space for a future expansion insert card.

The 3-MODCOM can support 255 accounts. It can communicate with 80 receivers in any of the following protocols:

- Contact ID
- SIA DCS
- SIA P2 (3/1 Pulse Format)
- SIA P3 (4/2 Pulse Format)

The 3-MODCOM is supplied with two seven-foot cables (P/N 360137). These are eight-conductor, flat telephone cables, with eight-position modular plugs on both ends. One end of the cable plugs into the 3-MODCOM. The other end plugs into an RJ-31X jack.

You must obtain the RJ-31X jack locally, and wire it to the telephone lines as indicated on the 3-MODCOM installation sheet.

3-MODCOMP – Modem Communicator with Paging

The 3-MODCOMP is identical to the 3-MODCOM except for the inclusion of the TAP paging protocol. The end user must subscribe to a TAP-compatible alphanumeric paging service.

Depending on the paging service provider, the TAP message can be broadcast via radio to a pager, converted to an e-mail, or faxed to an end user.

The module is supplied with two seven-foot cables (P/N 360137) for connecting the 3-MODCOMP to an RJ-31 jack. You must obtain the RJ-31X jack locally, and wire it to the telephone lines as indicated on the 3-MODCOM installation sheet.

RJ-31X jack – telephone company jack

An RJ-31X jack must be used to connect each line of the 3-MODCOM to the switched telephone network. One jack is required for each telephone line.

The jack is an eight-position jack with a special jumper between terminals 1 and 4 and 5 and 8. This jumper is in effect when the plug is removed from the jack.

Removing the plug re-establishes connection to the premises telephones. Inserting the plug opens the jumper and connects the 3-MODCOM, which provides a series connection to the telephones.

Refer to the 3-MODCOM installation sheet for a diagram of the jack wiring.

Note: Failure to use an RJ-31X jack violates FCC and NFPA regulations. A telephone connected directly to the incoming telephone line without the proper use of the RJ-31X jack will cause a telephone company trouble when used and possibly prevent the dialer from getting through to the CMS receiver in an emergency.

Configuration options

3-MODCOM and 3-MODCOMP can be configured as:

- One-line dialer
- Two-line dialer
- Modem
- Modem and one-line dialer
- Modem and two-line dialer

For UL listed or FM approved installations, you must configure the 3-MODCOM as a two-line dialer, and both lines must have supervision (line-cut detection) selected.

The 3-MODCOM operates in accordance with programmed instructions. Details of items such as telephone numbers, dialing details, activation of a dialer test signal, etc., are all a part of the information that is downloaded into the nonvolatile memory of the 3-MODCOM by the SDU.

The 3-MODCOM electronically dials receivers in the central monitoring station (CMS) using either pulse or tone dialing, as specified during configuration. The module dials the stored CMS telephone number using the same digits that would be used if a person were dialing from the premises with an ordinary telephone.

Each time the 3-MODCOM sends test messages to the CMS, it indicates whether the system is in a normal or abnormal state. You can select which system states (such as *alarm*, *trouble*, or *monitor*) represent an abnormal condition. This prevents the 3-MODCOM from reporting an abnormal condition when the system is in a state that occurs frequently as part of normal system operation.

There are provisions for programming a periodic test transmission to the CMS station on a one-minute to 45-day basis. A daily test signal is primarily intended for certified installations, and is mandatory for all fire alarm installations.

The 3-MODCOM sends messages in order of their priority. Messages may include device and user ID information regarding events, such as openings, closings, alarms, and tamper or trouble events. The module waits for acknowledgement that each message sent has been received. .Where necessary, the 3-MODCOM can be configured to begin dialing without waiting for a dial tone. This option is used in areas where the telephone line has an absent or erratic dial tone.

Failover operation

You can create dynamic failover operation for 3-MODCOMs. By *dynamic failover* we mean that in the event of a communication failure or device trouble, the system switches from accounts on one 3-MODCOM to matching accounts on another 3-MODCOM.

Failover operation results in a system that is resistant to trouble arising from telephone lines, 3-MODCOMs, or the CPU module. The operation can be limited to a single panel, or can span two or more panels anywhere in a network.

In systems with a single 3-MODCOM you can include a second 3-MODCOM that acts as a redundant unit. In systems with two or more 3-MODCOMs, you can program the system so that the units back up each other, while still handling their normal traffic.

Failover operates by enabling and disabling various accounts defined for the project. On detection of a fault or trouble, project rules disable accounts on the failed 3-MODCOM and enable matching accounts on the backup 3-MODCOM.

When a 3-MODCOM acts as a backup it still provides line supervision. Only the backup *accounts* are disabled. Further, backup units should conduct their own dialer tests, using unique accounts that identify the 3-MODCOM. Even when not in use, a backup unit should generate a trouble event if it cannot contact the assigned receiver.

Because of the way rules are processed, when the primary 3-MODCOM comes out of trouble, the accounts are automatically switched back to their normal state. Messages already queued for transmission in the backup unit will still be sent, even after backup accounts are disabled. Only new messages will be routed differently. This means that device activation and restoral messages sent to the CMS will still be properly paired.

Failover operation is created by specific configuration and programming steps. These are outlined below.

Configuration requirements

- For each primary 3-MODCOM add (or select) a backup 3-MODCOM in the same panel or in a different panel according to the scope of failover operation you need
- Configure the primary and backup 3-MODCOMs identically except for their labels and the labels of the accounts
- Label the accounts so that it’s easy to recognize the 3-MODCOM in which they are used
- Make sure each 3-MODCOM uses a unique account for dialer tests

Programming requirements

- Create message rules that send identical messages to both accounts
- On system startup, disable the accounts on the backup 3-MODCOM
- On activation of a panel comm fault, line fault, or LRM comm fault, disable the primary accounts and enable the backup accounts

ACDB requirements

Additional steps are required when the project includes reporting to a CMS that requires translation from a Cardholder ID to a cardholder name. In this situation, the ACDB user must enter a User ID (name) for both CMS Accounts (the primary and backup accounts).

These entries are made on the System tab of the Cardholder tab. The ACDB user should enter a User ID for each CMS Account.

Compatibility

EST3 versions

The 3-MODCOM Module will operate with EST3 Version. 3.0 or above. Do not use this communication module with earlier versions.

Receiver compatibility

Refer to the *EST3 ULI/ULC Compatibility Lists* (P/N 3100427), for a list of compatible receivers.

Transmission protocols

The 3-MODCOM is capable of transmitting messages in five formats, or protocols:

- Contact ID
- SIA DCS
- SIA P2 (3/1 Pulse Format)
- SIA P3 (4/2 Pulse Format)
- TAP (3-MODCOMP only)

All formats consist of short, predefined messages. Most contain several parameters, some of which are optional. Check with your dialer receiver and central monitoring station software provider for the exact structure they require.

When programming transmissions, remember that device messages require two separate send commands, one for activation, and one for restoration.

Contact ID: numeric messages with several parameters including event code, partition, and device or user. The format is:

[EventCode] [Partition] [DeviceNumber | User]

SIA DCS: ASCII text messages that include a number of optional parameters, including time, date, user, partition, and device. The format is:

[Date] [Time] [UserID] AlarmCode [Device | User | Partition]

SIA P2 (3/1): numeric messages that consist of four digits. These contain the account number (three digits) and the alarm code (one digit). The format is:

AccountNumber AlarmCode

The is no standard assignment of alarm codes and meanings. Obtain the codes used by your CMS.

SIA P3 (4/2): numeric messages that contain two numbers and no other parameters. The format is:

EventCode

TAP: consists of two fields separated by a carriage return (CR). The first field is the User ID. The second field is the text message that will be displayed on an alphanumeric pager. Message length, including User ID and CR is 60 characters. The format is:

User [CR] Message [Location]

No standards describe the content of the message. Typically, you'll use the device location message, as displayed on the LCD module. Check with your paging service provider to ensure they accept the TAP protocol and determine any message limitations.

Transmission process

The 3-MODCOM includes features that provide an appreciable level of transmission integrity. Multiple telephone lines and multiple telephone numbers help to ensure that a call to the receiver gets through. The 3-MODCOM module sequences through the following basic steps to contact the central monitoring station receiver.

1. The 3-MODCOM seizes one of the telephone lines and puts the line on-hook for a minimum of three seconds.

   This cuts off any ongoing call and disconnects the line from any telephone or dialing devices that are connected downstream.

   Note: The module tries to select an unused line for its first two attempts.

2. The 3-MODCOM takes the line off-hook and waits for a dial tone.

   LED DS1 or DS2 lights steadily.

   If a dial tone is not received by the configured time, the module goes on-hook, increments the attempt counter, and continues to alternate lines and numbers until a dial tone is acquired.

   If the 3-MODCOM is configured with two telephone numbers and only one telephone line, it will make four attempts using the first telephone number, then four attempts using the second telephone number. This alternation of telephone numbers continues as needed until a connection is made or the configured number of dial attempts have been made.

Note: In areas where the telephone system has no dial tone, or where the dial tone is erratic, you can set the 3-MODCOM to dial without waiting for a dial tone. This is called *blind call dialing*

3. The 3-MODCOM dials the CMS using the programmed dialing mode and telephone number.
4. The 3-MODCOM waits for a handshake message from the CMS indicating that a connection has been established.

   If a handshake is not received within 40 seconds the module puts the telephone line on-hook and waits for the configured period.

   After the wait, steps 2 through 4 are repeated. If the module is still unable to contact the receiver it seizes the other telephone line.

   The module repeats two attempts on the other telephone line. If still unable to contact the receiver it switches back to the first telephone line and attempts to contact the receiver using the secondary telephone number.

   If still unable to contact the receiver the module continues to alternate lines and numbers until the configured maximum number of attempts have been reached.

   If the maximum number of attempts is reached, the module sends a trouble message to the CPU.

   The 3-MODCOM retries the full number of attempts if another event is activated or make one attempt if a configured period (Wait Time Between Attempts) expires.
5. When the call is completed, ringing is detected by the CMS dialer-receiver (DACR). The DACR goes off-hook and transmits a handshake.
6. If the handshake matches the desired transmit format, the 3-MODCOM transmits, in the specified format, all premises event data.

   LED DS1 or DS2 flashes rapidly to indicate data is being transmitted.
7. The 3-MODCOM waits for an acknowledgement and a shutdown signal from the CMS receiver, then puts the line on-hook, ending the call.

   LED DS1 or DS2 extinguishes.

Programming considerations

Accounts and receivers

In addition to the general operating characteristics of the 3-MODCOM, you'll need to specify each account and receiver used by the system. You may want to gather this information before you begin using the SDU.

A *receiver* is a destination for a 3-MODCOM call to a CMS. Typically, a CMS will have many receivers in operation, each capable of receiving multiple calls. The CMS will determine which receiver you should use for each account. For configuration purposes, here's what you'll need to specify about the receiver:

- Label
- Description
- Primary telephone number
- Secondary telephone number
- Protocol to use
- Maximum number of dial attempts
- Wait time between dial attempts

An *account* links a specific end user to a specific receiver. Each message sent from the 3-MODCOM includes an account number assigned by the CMS. This identifies the user site sending the message and the receiver to which the message is sent. For each account you'll need to define:

- Label
- Description
- Receiver to use
- Account number (as assigned by the CMS)
- Dialing test interval and time of day

Several accounts may use the same receiver, but each account is assigned to only one receiver.

Events and commands

One event and two commands are particularly important when you create SDU rules for the 3-MODCOM. These are: activation, activate, and send.

Security and access control devices do not send event messages to the CPU. Rather, they send requests to execute predefined command lists. You need to define the command lists and assign the correct command list for each security or access control event.

Activation: an event that lets you define a command list.

Activate: a command that lets you execute a command list in a rule.

Send: a command that sends a message to a CMS through the 3-MODCOM.

Installation

Caution: Prior to installation, remove power from the rail.

To install the 3-MODCOM, you'll need to follow these general steps:

1. Arrange suitable telephone company lines and services.
2. Install the 3-MODCOM on the rail.
3. Connect the 3-MODCOM to the telephone company lines.
4. Download configuration data from the 3-SDU.
5. Make test transmissions to verify proper operation.

Requirements for telephone lines

3-MODCOM dialers can be used for most applications that use telephone lines, the exceptions being:

- The central station telephone number cannot be dialed directly (using access numbers and area code where necessary) without operator interception of the call
- Multiparty service (a party line) exists
- Operator assistance is required to complete a telephone call and a foreign exchange cannot be introduced
- Connection is not established within 38 seconds following completion of dialing

The 3-MODCOM dialer circuit is compatible with any switched telephone network that employs direct dialing (local) and Direct Distance Dialing (DDD), without operator interception of the call.

Operator interception occurs in some areas where message billing is not completely automatic. Where operator interception is involved, you must obtain a foreign exchange (FX) connection must from the central station exchange to the exchange serving the customer. The FX provides a local number for calling the central station without toll billing. A WATS or ground-start line connection must not be used for this purpose because the line cannot be supervised.

The 3-MODCOM includes a feature that prevents jamming by an incoming telephone call. The feature is based on a telephone service option referred to as *called party disconnect.* This option lets the receiver of a call disconnect by hanging up the telephone for a period of time, even if the caller stays on the line. The time required for disconnect varies in different areas, but is usually between 18 and 90 seconds. Called party disconnect is available in most areas. To determine whether called party disconnect control is available in the area to be served, consult the local telephone company.

In areas not having called party disconnect, the 3-MODCOM module is vulnerable to jamming by an incoming call. To minimize the possibility of jamming, we recommend that the customer order a separate, unlisted number for exclusive use of the 3-MODCOM module. The customer should keep this number confidential. In the case of the two-line dialer, two premises telephone numbers would have to be busied by incoming calls to jam the system.

Progressive anti-jamming measures would entail the use of one unlisted telephone number, or two unlisted numbers for maximum dialer integrity.

The 3-MODCOM must be connected to the incoming line *ahead* of all connected equipment on that line, but just behind the demarcation block. This puts the control unit telephone connection in series, assuring that all telephones, answering machines, and FAX machines are disconnected during dial-out to the CMS. This requirement is necessary so the 3-MODCOM dialer circuit can seize the line for its exclusive use in the event of an alarm.

Do not use a telephone line that is considered essential for conducting business at the site. Use a separate line for the 3-MODCOM. The dialer must be the first connection in line, and it seizes the line and disconnects all other equipment when making a call.

If the incoming lines to the protected premises involve a rotary telephone line arrangement, make the connection to the line having the highest number. This will create the least interference with business lines.

Note: If connection will be made to a telephone company line that is also used for normal business purposes, advise customer that the telephone service will be disrupted for a few minutes during the connection period.

In areas where the telephone company requires that their own connector block be installed, it should be wired as per the USOC RJ-31X or RJ-38X configuration. (The RJ-38X configuration is identical to RJ-31X except for a jumper between 2 and 7 which is used in some residential applications but is not used by the 3-MODCOM.)

When the 3-MODCOM is configured as a two-line dialer module, two incoming lines must be used and connections must be made to each line.

Installing the 3-MODCOM module

Make sure that panel power is off, then proceed as follows,

1. Use an antistatic wrist strap to ground yourself to an unpainted part of the cabinet.
2. Carefully remove the 3-MODCOM from the antistatic bag in which the module is packed. Always handle it by the edges or by the plastic door.
3. Place the bag on a flat work surface, then place the module, connector side up, on the empty bag.

   Check for shipping damage. Orient the module so the two eight-position modular telephone jacks are on the top.
4. If a control / display module is needed, remove the blank front plate and attach the ribbon cable to the front of the 3-MODCOM board.
5. Refer to the SDU cabinet report to determine the proper location for the module, then plug the module into the rail.

   Be careful to align the module and rail sockets so that the pins are in the proper holes and that seat the module firmly.
6. Fasten the module in place with the push-pins.
7. Restore power to the panel.
8. Install wiring to module as described on the 3-MODCOM installation sheet.

Connecting the 3-MODCOM to a telephone line

Plug one end of the supplied telephone connecting cord (P/N 3601370) into the telephone company line jack on the 3-MODCOM.

Do not plug the other end into the RJ-31X jack until you are ready to test the system. This prevents unnecessary interference with other equipment connect to the line downstream.

When you are ready for final connections and testing, use the telephone company line jacks as follows:

Line 1 jack	Line 2 jack
Single-line dialer Incoming modem line	Second line of 2-line dialer

For the installation of a fire alarm system in compliance with NFPA 72, the 3-MODCOM must be connected to loop-start telephone lines. If the site has ground-start lines, two separate loop-start lines must be installed for the dialer.

To determine the type of telephone company line, disconnect the line pair and connect the lines to a test meter.

If the line is equipped for loop-start, the meter should read 48 to 52 Vdc between the lines.

If the line is equipped for ground-start, the meter will read 0 Vdc between the lines, 48 to 52 Vdc between one line and ground, and 0 Vdc between the other line and ground.

Note: AT&T Horizon PBX systems and some Type 75 systems are of the loop-start type. AT&T Dimension PBX systems and other Type 75 systems are equipped for ground-start.

If this installation is for a certified fire alarm system or a burglar alarm system in compliance with NFPA 72, the telephone company line must be of the *called party disconnect* type (also called timed-release disconnect). This feature permits the communication module to seize the line and dial out, even when the telephone company line is in use.

To determine the whether the telephone line supports called party disconnect

1. Have someone telephone the premises from the outside.
2. Hang up the telephone that received the call, but have the individual who placed the call remain on the line.
3. After 40 seconds, pick up the called telephone again.
   - If you are no longer connected to the caller
   - If the caller is still on the line

Loading configuration data

After installing the 3-MODCOM, use the SDU network downloading process to load the configuration data for the 3-MODCOM.

The SDU provides a report that lists all CMS codes that can be transmitted from the 3-MODCOM. Give this report to the appropriate CMS.

Testing transmission

After the CMS has programmed the central monitoring database, perform transmission tests as required by the AHJ and CMS.

Note: Transmission failures are latched at the panel. This means that you must reset the panel in order to clear them.

3-SAC Security Access Control module

Product description

The 3-SAC is a high-speed RS-485 module used to support Card Reader Controller modules and Keypad Display modules. Events are passed to the 3-SAC module, then passed to the CPU for alarm processing.

The 3-SAC has two sets of circuit terminals, and is capable of Class A or Class B configuration. Each Class B circuit can handle 31 devices, for a total of 62 devices per module. Class A circuits can handle 30 devices total.

SAC bus

The 3-SAC Security Access Control module supports the SAC bus, an RS-485 communication line. When properly constructed, the SAC bus runs over longer distances, supports more drops, and is more immune to noise than an RS-232 line.

The SAC bus consists of two lines:

- SAC bus +
- SAC bus –

Recommended cabling

Since our security and access control devices require 24 Vdc, we suggest that you always use a four-wire cable for the SAC bus and a 24 Vdc power supply.

For the data wires we suggest unshielded, twisted pair, with greater than 6 twists per foot, in 14 to 22 AWG (1.50 to 0.25 sq mm).

For the power wires, we recommend 14 or 16 AWG.

Additional power supply wiring

When an additional power supply is required, you must connect a circuit common point for correct operation. To establish a circuit common, connect the –24 Vdc terminal on the additional power supply to the –24 Vdc terminal of the last device. This circuit common must be connected to the panel, to every device, and to the circuit common point of any additional power supplies.

3-AADC1 Addressable Analog Driver Controller and IRC-3

When upgrading an IRC-3 system to EST3, the 3-AADC1 Addressable Analog Driver Controller module lets you use existing IRC-3 system segments without rework.

The 3-AADC1 can be connected to an existing IRC-3 Remote Zone Interface Module (RZB(V/N)12-6/3) or a Universal Input Output Module (UIO-12).

The 3-AADC1 Addressable Analog Driver Controller module provides one Class A or Class B loop. This loop becomes the data communication line for the existing IRC-3 system.

The 3-AADC1 includes a line interface module (LIM) card. You can also use the LIM card from an existing 3-AADC module by installing it on a 3-AADC1-MB. The MB version is a local rail module without a LIM card.

The audio features of the EST3 system can be connected to the audio riser channels of the RZB module, or existing audio equipment can be left in place.

Similarly, the EST3 system power supplies can provide 24 Vdc power to the RZB or UIO cards, or existing power supplies can be left in place.

Refer to the following installation sheets for wiring details:

- *3-AADC1 and 3-AADC1-MB Addressable Analog Driver Controller Installation Sheet*
- *RZB(V/N)12-6/3 Remote Zone Interface Module Installation Sheet*
- *UIO-12 Universal Input Output Module Installation Sheet*

AC power and DC battery wiring

Due to power-limited/nonpower-limited wiring separation requirements, it is easier to route and wire the nonpower-limited AC power and battery conductors before installing the LRMs in the rails. Nonpower-limited wiring should be routed to the chassis notches to the left and rear of the cabinet. Power-limited wiring should be routed to the right and front of the cabinet.

WARNING: Do not energize power until instructed to do so!

1. Connect the AC power source to TB1, line, neutral, and ground terminals on the 3-PPS/M Primary Power Supply Heat Sink and the 3-BPS/M Booster Power Supply Heat Sink(s). DO NOT ENERGIZE THE AC POWER SOURCE AT THIS TIME!
2. Connect the positive battery lead to TB2-1 and the negative battery lead to TB2-2. Each heat sink assembly must have its own pair of 12 AWG (2.5 sq mm) wires going to the battery. Do not connect the heat sinks assemblies together and run a common wire to the battery! DO NOT TERMINATE THE WIRES AT THE BATTERY AT THIS TIME.

WARNING: Do not connect batteries until instructed to do so!

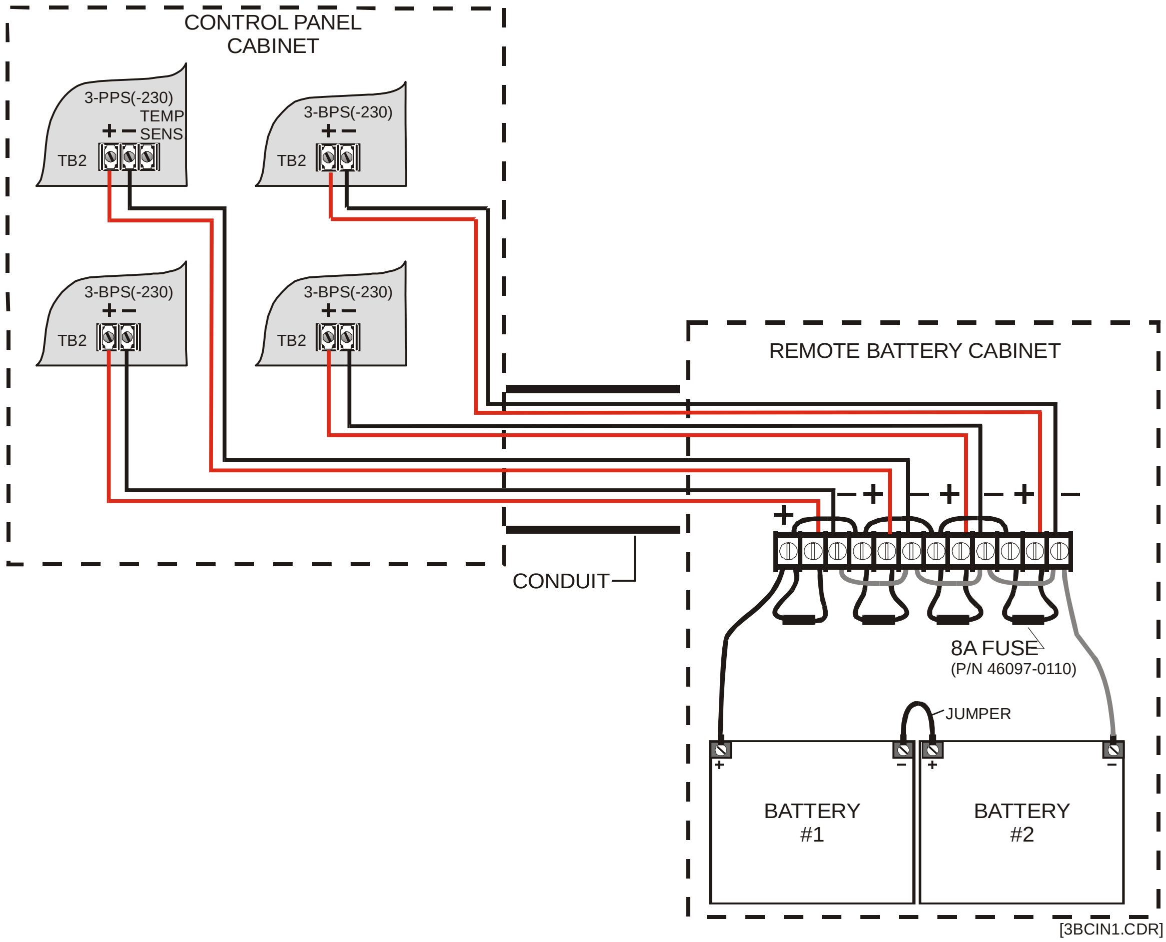


Figure 5-8: Remote battery cabinet wiring

Note: A minimum of a 10Ah battery must be used in all systems applications.

Connecting auxiliary/booster power supplies

UL requires that you monitor secondary power sources for loss of AC power. Upon loss of AC power, the control panel must provide an audible and visible trouble signal. In addition, remote station, central station, and proprietary-type protected premises units must transmit a trouble signal off-premises after a one- to three-hour delay.

To meet UL requirements you need to connect a SIGA-CC1 (or SIGA-CC1S) and a SIGA-CT1 to the booster supply. The SIGA-CC1 is used to activate the booster supply and to signal common troubles. The SIGA-CT1 is used to signal booster supply AC power failures.

Installation

Mount the SIGA-CC1 and SIGA-CT1 inside the booster supply as described in the booster supply's technical documentation and wire them as shown in Figure 32.

Configuration

Booster supply

Set SW2-6 to ON. This configures the booster supply's Trouble relay to close only on loss of AC power. All other booster troubles are signaled through the sense circuits.

Note: In Figure 32, the booster supply is configured so that Sense 1 controls all four NACs. For DIP switch settings for this and other booster supply configurations, refer to the booster supply's technical reference manual.

Signature modules

Configure the Signature modules as described below.

Module	Properties
SIGA-CC1	Model = CC1 Device Type = CommonAlarmOutput Personality = (5) Riser Selector Text 1 = REMOTE_SUPPLY Text 2 = SENSE_1
SIGA-CT1	Model = CT1 Device Type = ACFail Personality = (3) Active B Text 1 = REMOTE_SUPPLY Text 2 = AC_FAILURE

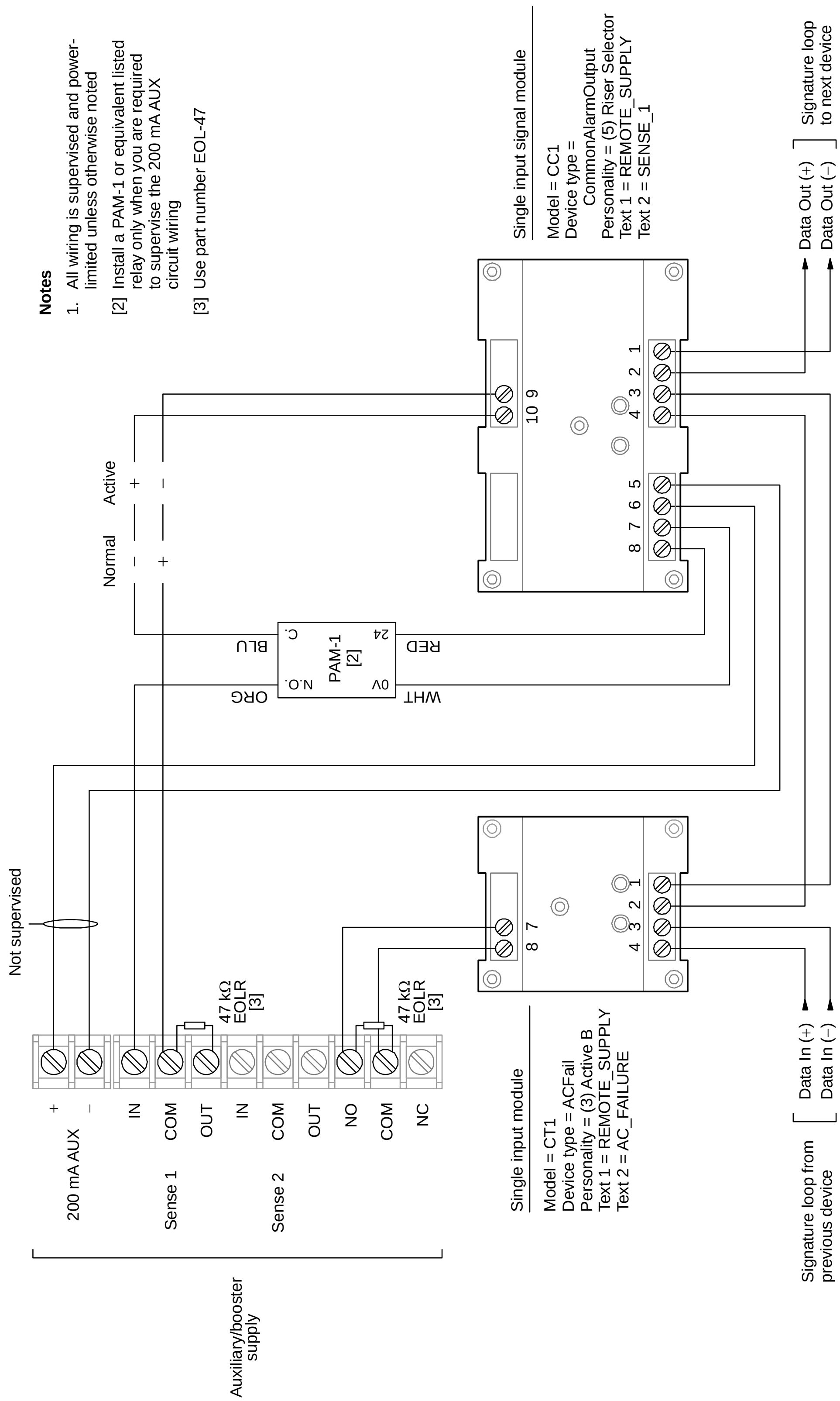
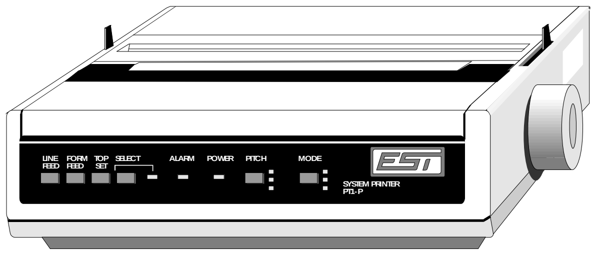


Figure 5-9: Typical booster power supply wiring

Connecting the PT-1S impact printer

The PT-1S impact printer can be connected to an EST3 panel to provide a hard copy printout of system status, active events, panel reports, etc. The PT-1S is a 80-character line width, freestanding printer that uses standard form feed paper.



[CPT1SX.CDR]

When connecting the PT-1S impact printer by itself:

- Configure the serial port as a Printer port type and set the baud rate for the printer’s baud rate.
- Set printer switches SW1-1, -2, and -3 to OFF, ON, and ON, respectively (8 bits, no parity).

When connecting the PT-1S impact printer to a serial port that is shared with a CDR-3 Zone Coder:

- Use an IOP3A to connect both devices. Refer to the topic “Connecting a CDR-3 Zone Coder for coded tone output” later in this chapter.
- Configure the panel’s serial port as a CDR-3/Printer port type and set the baud rate for the CDR-3’s baud rate.
- Set printer switches SW1-1, -2, and -3 to OFF, OFF, and ON, respectively (8 bits, even parity). These are the factory settings.
- Set printer switches SW2-1, -2, and -3 to match the baud rate set on the CDR-3 zone coder.

PT-1S Printer Specifications

Dimensions (HWD)	3.2 in x 14.2 in x 10.8 in (8.13 cm x 36 cm x 27.4 cm)
Print Speed	232 Characters/Second
Baud Rates	110, 300, 600, 1200, 2400, 4800, 9600, 19200 bps.
Wiring	3 #18 AWG (0.75 mm^2)
Voltage	120 Vac @ 60 Hz
Standby Power	40 VA

Printing Power	120 VA

Switch DIPSW factory settings (located on main board)

SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
OFF (English)	OFF (English)	OFF (English)	OFF (11-in form)	ON (11-in form)	OFF (auto LF off)	ON (8 bits)	OFF (enable front panel)

Switch SW1 factory settings (located on serial board)

Switch	Factory Setting	Description
SW1-1	OFF	ON: Odd parity OFF: Even parity
SW1-2	OFF	ON: No parity OFF: With parity
SW1-3	ON	ON: 8 bits OFF: 7 bits
SW1-4	OFF	ON: Ready/Busy protocol OFF: XON/XOFF protocol
SW1-5	ON	ON: Circuit test OFF: Monitor test
SW1-6	ON	ON: Print mode OFF: Test mode
SW1-7, -8	ON,ON	OFF,OFF: SSD Busy OFF,ON: SSD Busy ON,OFF: RTS Busy ON,ON: DTR Busy

Switch SW2 factory settings (located on serial board)

Switch	Factory Setting	Description
SW2-1, -2, -3	OFF,OFF,ON	OFF,OFF,OFF: 110 bps ON,OFF,OFF: 300 bps OFF,ON.OFF: 600 bps ON,ON,OFF: 1200 bps OFF,OFF,ON: 2400 bps ON,OFF,ON: 4800 bps OFF,ON,ON: 9600 bps ON,ON,ON: 19200 bps
SW2-4	OFF	ON: DSR active OFF: DSR inactive

Switch SW2 factory settings (located on serial board)

Switch	Factory Setting	Description
SW2-5	ON	ON: 32-byte buffer threshold OFF: 256-byte buffer threshold
SW2-6	ON	ON: 200ms busy signal OFF: 1s busy signal
SW1-7	OFF	ON: Space after power on OFF: Space after printer select
SW1-8	OFF	not used

System printer power supply

If your PT-1S system printer is required to operate during a brownout or AC power failure, install an uninterruptible power supply per Figure 5-10.

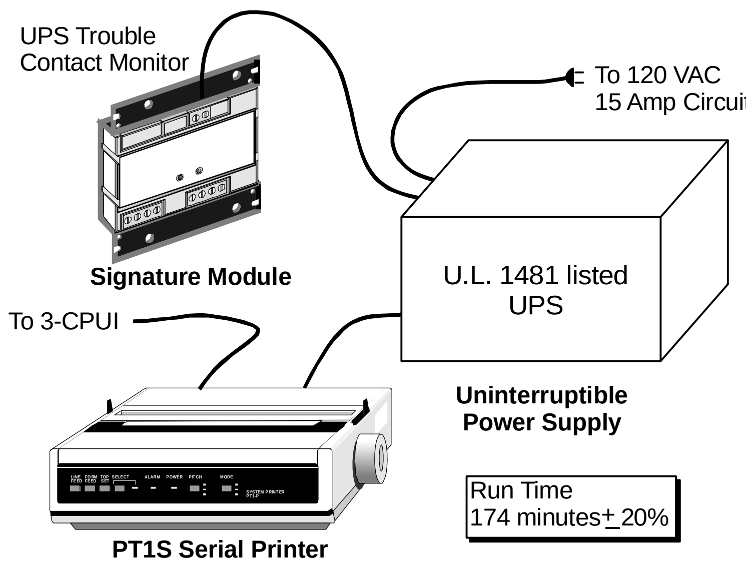


Figure 5-10: Printer uninterruptible power supply wiring

Adjusting amplifier output levels

What you will need

An initial startup version of the project database that contains a 1kHz tone and a switch programmed to turn the tone on. See “Creating an initial startup version of the project database.”

An RMS voltmeter (Fluke 83 or equivalent)

Adjustment procedure

1. Disconnect the field wiring to all the zoned amplifier modules in the cabinet.
2. Place an RMS meter across an amplifier’s TB2 NAC/B+ and NAC/B- terminals.
3. Use the 1KHZ_TONE switch to turn on the tone.
4. Adjust the amplifier’s gain pot until the RMS meter displays the configured output level (25 or 70 Vrms).
5. Connect the amplifier’s field wiring.
6. Use the 1KHZ_TONE switch again and verify that the output level remains the same. Readjust the amplifier’s gain pot if necessary.
7. Disconnect the amplifier’s field wiring.
8. Repeat steps 2 through 6 for each amplifier in the cabinet.
9. Reconnect the field wiring for all the amplifiers in the cabinet.

Design considerations

Your audio system will work best if the prerecorded tones and messages have roughly the same volume, or amplitude. The process of establishing a common maximum amplitude is sometimes called *normalizing.*

We suggest that you normalize your tones and messages to a maximum amplitude of 1 V peak-to-peak, or an average of 0.7 Vrms.

The SDU does not contain a tool for normalizing your audio clips, so you'll need to use a sound editor to normalize the clips before you import them into the SDU database.

The audio clips included in the EST3 Support Library CD have already been normalized.

Connecting a CDR-3 Zone Coder for coded tone output

The CDR-3 Zone coder can be connected to the 3-ASU's AUX input to provide a coded or march time tone to the audio system. Refer to Figure 5-11. If you're connecting a CDR-3 to a serial port that is shared with a PT-1S printer, you must connect both devices using an IOP3A, as shown in the wiring diagram in this topic.

What you will need

An initial startup version of the project database that contains a switch programmed to turn the amplifiers onto the Auxiliary channel. See "Creating an initial startup version of the project database."

An RMS voltmeter (Fluke 83 or equivalent)

Adjusting the gain on the 3-ASU auxiliary input

The 3-ASU auxiliary input gain adjustment is critical to the operation of this application. Before adjusting the 3-ASU, set each zoned amplifier module in the cabinet for their configured RMS output level. See "Adjusting amplifier output levels."

To adjust the gain on the 3-ASU auxiliary input

1. Connect the coded tone output on the CDR-3 directly to the 3-ASU auxiliary input by bypassing the duration relay.
2. Set the 3-ASU auxiliary input gain pot to the mid-range position.
3. Determine which zoned amplifier module requires the highest gain adjustment (the module whose gain adjustment pot is turned the most counter-clockwise). Use this amplifier as the worst-case amplifier.
4. Disconnect the field wiring from all the amplifiers in the cabinet except for the worst-case amplifier. This is to prevent the CDR-3's supervisory tone from being broadcast throughout the premises.
5. Place an RMS meter across the worst-case amplifier's TB2 NAC/B+ and NAC/B- terminals.
6. Press the AUX_INPUT_ADJ switch. This places the coder's supervisory tone onto the Auxiliary channel. The supervisory tone occurs approximately every 5 seconds.
7. Adjust the 3-ASU's auxiliary input gain pot until the RMS meter displays the amplifier's configured output level (22-28

Vrms or 65-75 Vrms). Turning the pot clockwise increases the gain while counter-clockwise decreases the gain.

8. Press the AUX_INPUT_ADJ switch a second time to restore the input.
9. Reconnect the coded tone output of the CDR-3 back through the duration relay.
10. Reconnect the field wiring to the remaining amplifier modules.

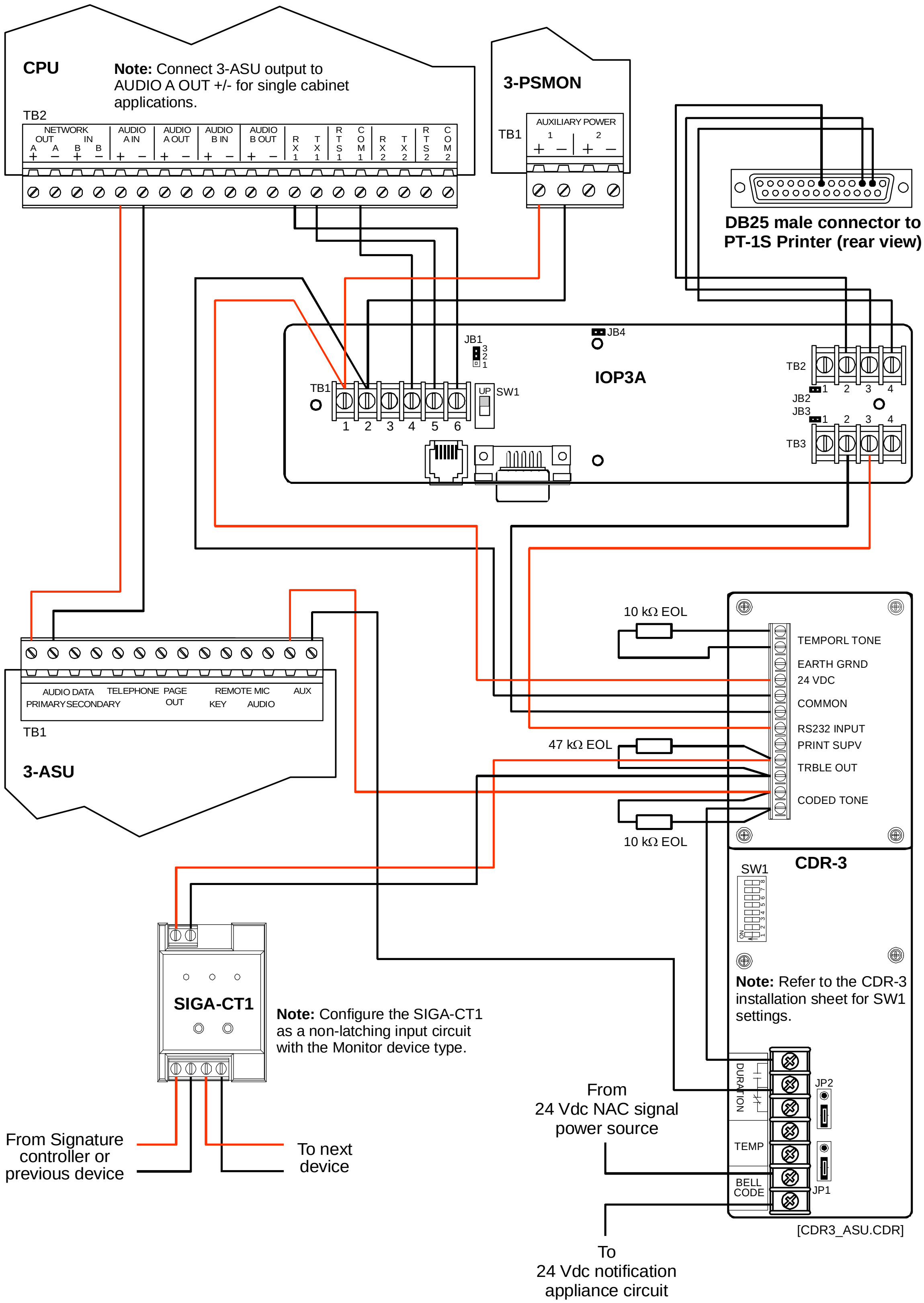


Figure 5-11: Application wiring diagram

Connecting an external modem for use with the Remote Diagnostics Utility

Using the Remote Diagnostics Utility requires that you connect an external modem to a CPU equipped with a 3-RS232 option card.

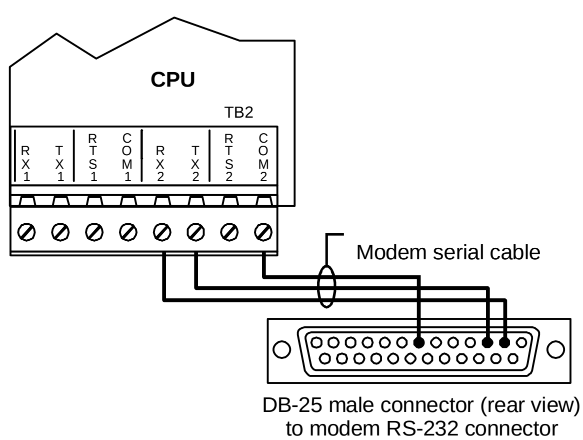
Some applications may require that the modem be permanently mounted. The following is a suggested method for mounting a modem connected to the CPU. First you will need to obtain the following parts

- MFCA accessory enclosure
- SIGA-MP1 mounting plate
- 2 cable ties long enough to go around the modem and through the slots on the SIGA-MP1

To mount the modem:

1. Mount the MFCA enclosure back box at an acceptable location within reach of the panel. Refer to Figure 5-12.
2. Secure the modem to the SIGA-MP1 with the 2 cable ties.
3. Screw the SIGA-MP1 to the MFCA enclosure back box.
4. Connect all modem wiring. Refer to the technical documentation that came with the modem for wiring connections.

   RS-232 wiring must maintain a 1/4-in minimum separation between nonpower-limited wiring.
5. Screw the MFCA cover to the back box.
6. Attach the modem RS-232 wires to the CPU serial port terminals. The serial port must be configured for Remote Diagnostics in the project database. See below.



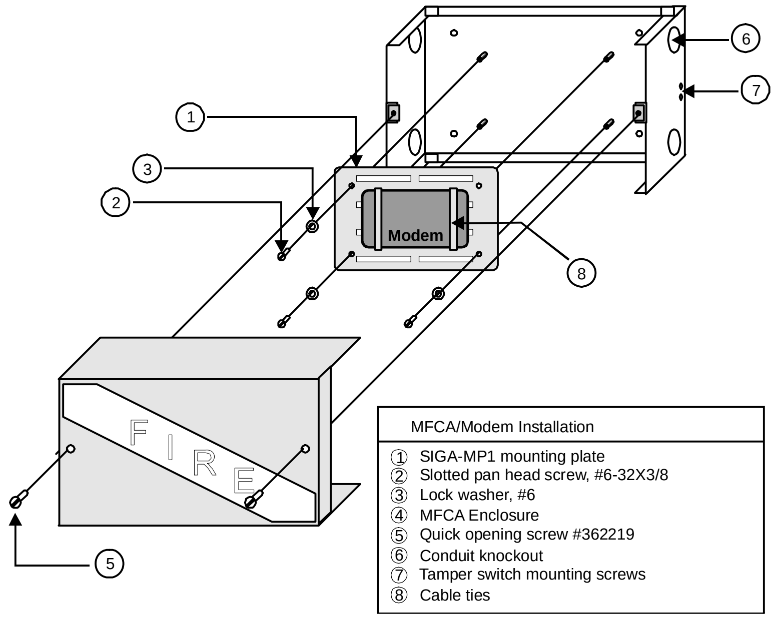


Figure 5-12: Suggested modem installation using MFCA and SIGA-MP1

Running the RPM and distributing profiles

The Resource Profile Manager (RPM) is an add-on tool that works with the SDU. The RPM lets you:

- Create a description of the companies and buildings at a site
- Assign security and access control devices to companies and buildings
- Specify a primary company (owner) for each CRC
- Allocate device resources among companies that share the devices

This information is displayed in a two-pane window that includes a tree structure and a data table. The tree structure shows the organization of companies and buildings and the assignment of partitions and devices to the buildings. The data table shows the labels, properties, and allocation numbers for the current tree selection. You could think of this as the overall resource profile for the project.

The RPM lets you export resource profiles for individual companies. These are later imported into the Access Control Database (ACDB) and Keypad Display Configuration (KDC) programs.

Once imported, the profiles determine what the users see and control when creating their portions of the security or access control system.

To create and distribute resource profiles, you follow these general steps:

1. Enter company and installer contact information.
2. Create buildings and assign them to companies.
3. Assign partitions and devices to the buildings for each company.
4. Allocate device resources to each company.
5. Export a resource profile for each company.

The RPM includes a Mass Assign function to help you establish a uniform baseline allocation of resources. A Summary display is available so you can review and print the profile in several different forms.

When your project includes security or access control applications, run the RPM and distribute resource profile diskettes to the ACDB and KDC users.

Refer to the *SDU Online Help* for details on these steps. Refer to the *Card Reader Controller (CRC) Technical Reference Manual* for details on configuring CRCs.

Chapter 6

Power-up and testing

Summary

This chapter provides information and procedures necessary to perform initial system power-up and acceptance testing.

Content

Cabinet power-up procedure

Initial power-up

1. Energize AC power at 3-PPS/M (-230) Power Supply and the 3-BPS/M (-230) Booster Power Supplies.
2. Connect batteries to the 3-PPS/M (-230) Power Supply and the 3-BPS/M (-230) Booster Power Supplies.

   While the CPU's microprocessor is initializing, the LCD displays status messages.
3. Connect the download cable assembly between the SDU computer and CPU connector J5.
4. Using the SDU, download the CPU database into the panel controller. Refer to the next topic, "Runtime and system errors," should error messages be displayed on the LCD module.
5. If an Audio Source Unit is part of the system, its database must be downloaded in addition to the CPU database. For best download performance, we suggest you connect directly to the 3-ASU/FT module and download its database in single-step mode.
6. Clear up any network communications faults between cabinets.
7. If any Signature controller modules are installed as part of the system, their individual databases must be downloaded in addition to the CPU database. You will need to restart the network for these changes to be effective.
8. Correct all the circuit faults.
9. Test the system as described in the next section.

Note: Remember that for a network system, you'll need to make the initial download to each CPU separately, to establish the correct cabinet numbers. After the initial download, all further downloads can be made from a single panel via the network.

Runtime and system errors

Introduction

There are two major categories of errors which can occur when configuring a database for the network. The System Definition Utility program is used to set up the contents of each cabinet. Once all the cabinets have been defined, devices labeled, and rules written, all this information is cross checked against itself. This process is called compiling the program. If there are incorrectly written rules, unreferenced input or output devices or other problems with the design, the compiler will generate a list of errors. These errors must be corrected using the SDU.

When the data has been properly compiled, the data is in a form that the CPU memory can receive. Sending this information to the memory of the various CPUs making up the network is called downloading. If an error occurs during the download process, it is referred to as a runtime error.

Runtime errors

There are a number of reasons that errors may occur when downloading data into the CPU controllers. Initially, certain “errors” are to be expected, as the network database is loaded in steps. Until all portions of the database are properly entered into memory, errors will be generated. During initial system configuration, this is to be expected. Most of these errors will resolve themselves as the system configuration progresses.

A second source of download errors is a mismatch between the cabinet configuration in the SDU and the actual hardware installation. The most common cause for this error is typically due to the installation of a local rail module in the wrong rail position. Another common cause is the installation of the wrong type module in the rail. Misidentification of an entire cabinet can also cause this type of error.

A third source of download error can occur after the cabinets have been initially downloaded. After the initial downloads, all subsequent downloads can be done using the network data circuit. The third type of error is primarily caused by communications problems between cabinets.

Table 6-1: Download errors

Error message	Possible cause
Unable to perform operation	General error. Restart CPU
Busy signal	System currently busy. Wait, then retry
Password Invalid	Incorrect or invalid password entered
Size parameter trouble	Check download connections and SDU settings, then retry
Storage media trouble	Problem with memory components. Swap module and retry.
Checksum error in packet	Check download connections and SDU settings, then retry
Device type error	Conflict between SDU download setting and connected device type
Parcel #	Check download connections and SDU settings, then retry
Inaccessible panel	SDU program cannot “see” the panel. Check network wiring
Session in progress	System is busy. Wait, then retry
Write protect	Write protect switch on 3-ASUMX is on
Erase program trouble	Check download connections and SDU settings, then retry
Block number	Check download connections and SDU settings, then retry
Version mismatch	Firmware downloaded does not agree with version setting

Note: If you are experiencing frequent problems downloading to a 3-CPU, low signal levels from the SDU computer may be the cause. The Buffered RS-232 Communications Cable, P/N SDU-CBL, may be used to correct signal level problems. Do not use this cable with the CPU.

System errors

The CPU does not send data to the SDU program. Except for problems with the communications between the CPU and the PC running the SDU program, the majority of problems with the runtime process are annunciated on the LCD module’s display. Refer to Chapter 5, “Service and Troubleshooting” for system error codes and their possible causes.

Initial and reacceptance test procedures

Introduction

Once the system has been wired, programmed, and the circuit faults corrected, all installed components should be tested *as a system*, to insure proper operation.

The initial system check is designed to verify that all components of the system are installed and operating as designed. Verifying that the system was designed and installed according to specifications requires all aspects of the system to be exercised and the results verified. Where test results differ from those expected, corrective action must be taken.

Before commencing testing, notify all areas where the alarm sounds and off-premises locations that receive alarm and trouble transmissions that testing is in progress.

Records of all testing and maintenance shall be kept on the protected premises for a period of at least five (5) years.

Required Tools:

- Slotted screwdriver, insulated
- Digital multimeter
- 12inch (30.5 cm) jumper lead with alligator clips
- Panel door key

A complete check of installed field wiring and devices should be made at regular intervals, in accordance with NFPA 72 and ULC 524 requirements. These requirements are covered in the chapter on preventive maintenance.

Control and emergency communications equipment testing

The procedures listed in the following sections should be performed on the equipment installed in each cabinet connected to the system. These procedures are designed to test the hardware and its installation. The applications programming will be tested later.

Note: The network configuration information must be downloaded into the network and Audio Source Unit, using the *System Definition Utility* (SDU) program, before starting testing.

Primary power supplies

1. Verify that all components are installed using accepted workmanship standards.
2. Verify adequate separation between power-limited and nonpower-limited wiring. Refer to NFPA 70, article 760, of the National Electrical Code.
3. Verify that the installed batteries are the proper capacity for the application.
4. With the batteries disconnected, verify that the supply's full alarm load can be sustained by the power supply without the batteries connected.
5. With the batteries connected, disconnect the AC source and verify that a power supply trouble is annunciated, and that the supply's full alarm load can be sustained by the batteries.
6. Verify that the battery charger properly charges the batteries connected to both the primary and booster power supplies to 80% capacity within 24 hours.

Booster power supplies

1. Verify that all components are installed using accepted workmanship standards.
2. Verify adequate separation between power-limited and nonpower-limited wiring.
3. Verify that the installed batteries are the proper capacity for the application.
4. With the batteries *disconnected*, verify that the supply's full alarm load can be sustained by the power supply without the batteries connected.
5. With the batteries connected, disconnect the AC source and verify that a power supply trouble is annunciated, and that the supply's full alarm load can be sustained by the batteries.

CPU with LCD module

1. Verify the module is properly seated in all four rail connectors and secured with the four snap rivets. Verify that removable terminal strips TB1 and TB2 are firmly seated.
2. Verify that all components are installed using accepted workmanship standards.
3. Verify that the correct date and time are displayed on the LCD module's display, and the Power LED is on.
4. Activate the lamp test and verify all lamps operated as follows:

   Select the Command Menus button to obtain the Main Menu screen.

   Select Test to obtain the Test Menu screen, then select Lamp Test.
5. Initiate a fire alarm and verify the following: the alarm LED flashes, the Alarm relay transfers, the correct device message appears at the top of the LCD window, the active point counter increments, the event sequence indicates a "1," the active Alarm events counter at the bottom of the display indicates A001, the event type indicates fire alarm, and the local panel buzzer sounds.

   Press the Alarm Silence switch and verify that the required notification appliances are silenced and the Alarm Silence LED lights.

   Press the Panel Silence switch to verify that the panel buzzer silences and the Panel Silence LED lights.

   Press the Alarm queue switch and verify that the Alarm LED lights steady.

   Press the Details switch and verify that the alarm device's message, if any, is displayed. If a printer is connected to the CPU, verify that all specified information appears on the printer.
6. Initiate a second fire alarm and verify that: it appears at the bottom of the LCD window, the active point counter changes, the event sequence indicates a "2," the active Alarm events counter at the bottom of the display indicates A002, the event type indicates fire alarm, the Alarm LED flashes again, the local panel buzzer resounds, and the *first* Alarm message remains at the top of the LCD window. Press the Alarm queue switch and verify that the Alarm LED lights steady.
7. Initiate a third fire alarm and verify that: its message appears at the bottom of the LCD window, the active point counter

changes, the event sequence indicates a “3,” the active Alarm events counter at the bottom of the display indicates A003, the event type indicates fire alarm, and the local panel buzzer resounds, and the first alarm message remains at the top of the LCD window. Press the Alarm queue switch and verify that the Alarm LED lights steady.

8. Use the previous and next message switches to verify that you can scroll through all three messages in the alarm queue, as indicated by the event sequence window.

9. Press the Reset switch. Verify that all initiating devices reset and that all panel indicators clear except the power LED.

10. Initiate an active Monitor condition and verify that: the Monitor LED flashes, the correct active Monitor device message appears in the top and bottom windows of the LCD, the active point counter changes, the event sequence indicates a “1,” the active Monitor events counter at the bottom of the display indicates M001, and the event type indicates Monitor. Press the Monitor queue switch and verify that the Monitor LED lights steady. Initiate a second active Monitor condition and verify that the first Monitor message remains at the top of the LCD window, that the second Monitor event message appears at the bottom of the display, the active point counter changes, the event sequence indicates a “2,” the active Monitor events counter at the bottom of the display indicates M002.

11. Initiate an active Trouble condition and verify that: the Trouble LED flashes, the correct active Trouble device message appears in the top and bottom windows of the LCD, the local panel buzzer sounds, the Trouble relay transfers, the active point counter changes, the event sequence indicates a “1,” the active Trouble events counter at the bottom of the display indicates T001, and the event type indicates Trouble. Press the Trouble queue switch and verify that the Trouble LED lights steady. Press the Panel Silence switch to verify the panel buzzer silences and the Panel Silenced LED lights. Initiate a second active Trouble condition and verify that the first Trouble message remains at the top of the LCD window, that the second Trouble event message appears at the bottom of the display, the active point counter changes, the event sequence indicates a “2,” the active Trouble events counter at the bottom of the display indicates T002.

12. Initiate an active Supervisory condition and verify that the Supervisory LED flashes, the correct active Supervisory device message appears in the top and bottom windows of the LCD, the local panel buzzer sounds, the Supervisory relay transfers, the active point counter changes, the event

sequence indicates a “1,” the active Supervisory events counter at the bottom of the display indicates S001 and the event type indicates Supervisory. Press the Supervisory queue switch and verify that the Supervisory LED lights steady. Press the Panel Silence switch to verify the panel buzzer silences and the Panel Silenced LED lights. Initiate a second active Supervisory condition and verify that the first Supervisory message remains at the top of the LCD window, that the second Supervisory event message appears at the bottom of the display, the active point counter changes, the event sequence indicates a “2,” the active Supervisory events counter at the bottom of the display indicates S002.

13. Initiate an active fire Alarm, verify that alarm LED flashes, the correct fire alarm message appears in the top and bottom windows of the LCD the active point counter changes, the event sequence indicates a “1,” the active fire alarm events counter at the bottom of the display indicates A001 and the event type indicates fire alarm. Press the Alarm queue switch and verify that the Alarm LED lights steady. Press the Panel Silence switch to verify the panel buzzer silences and the Panel Silenced LED lights. Initiate a second fire Alarm condition and verify that the first fire Alarm message remains at the top of the LCD window, that the second fire Alarm event message appears at the bottom of the display, the active point counter changes, the event sequence indicates a “2,” the active fire alarm events counter at the bottom of the display indicates A002.
14. Press the Reset switch and verify that all devices reset and the panel returns to the normal condition.

3-RS232 card installed in CPU

1. Verify the card is properly seated in its connector and secured with the snap rivet.
2. Verify that the baud rate of the peripheral device connected to the port matches the port setting as set using the SDU program.
3. Check the printer operation by initiating an active condition on the system or generating a system report via the keypad.

3-RS485 card installed in CPU, Class B configuration

1. Verify the card is properly seated in its connector and secured with the snap rivet.

2. Starting with the network in the normal condition, use the status command to verify all connected cabinets are communicating over the network.
3. Disconnect the network data communications wiring (TB2-17/18 & 19/20) from the cabinet with the primary LCD module, and verify that all the other system cabinets connected to the network appear in the trouble queue.

3-RS485 card installed in CPU, Class A configuration

1. Verify the card is properly seated in its connector and secured with the snap rivet.
2. Starting with the network in the normal condition, use the status command to verify all connected cabinets are communicating over the network.
3. Disconnect the network data communications wiring (TB2-17/18 & 19/20) from the cabinet with the primary LCD module and verify that a Class A network communications fault is annunciated. Repeat step 2 to verify that all connected cabinets still communicate over the network.

3-IDC8/4 Initiating Device Circuit module

1. Familiarize yourself with the circuit configuration of the individual module to be tested. Remember, modules of the same type can be configured differently.
2. For circuits configured as initiating device circuits (IDCs), activate the circuit by shorting the circuit's two terminals. Verify that the appropriate message appears in the proper message queue. Disconnect the circuit or EOL resistor. Verify that a Trouble message appears in the Trouble message queue.
3. For circuits configured as Notification Device Circuits (NACs), turn on the circuit by activating an IDC programmed to turn on the NAC, or use the activate output device command via the keypad. Verify that the circuit activates properly. Restore the circuit. Disconnect the circuit or EOL resistor. Verify that a Trouble message appears in the Trouble message queue.

3-SSDC(1) Signature Driver Controller module

1. Verify that the module is properly seated in both rail connectors and secured with the two snap rivets. Verify that removable terminal strips TB1 and TB2 are firmly seated.

2. Verify the wiring to all Signature devices.
3. Map the SDC circuit by reading the device data; adjusting, modifying, and accepting devices as required; writing the information back to the devices; and rereading the device data.
4. With no map errors displayed, put an input device on the circuit in the active mode, and verify the appropriate message is displayed on the LCD module. Put the input device in the Trouble mode and verify that the correct Trouble message is displayed.

Note: Individual device testing will be done later.

3-AADC(1) Addressable Analog Driver Controller module

1. Verify that the module is properly seated in both rail connectors and secured with the two snap rivets. Verify that removable terminal strip TB1 is firmly seated.
2. Verify the wiring to all addressable analog devices.
3. Read the addressable analog circuit device data; adjusting, modifying, and accepting devices as required; writing the information back to the addressable analog module.
4. With no errors displayed, put an input device on the circuit in the active mode, and verify the appropriate message is displayed on the LCD module. Put the input device in the Trouble mode and verify that the correct Trouble message is displayed.

Note: Individual device testing will be done later.

3-OPS Off-premises Signaling module

1. Verify that the module is properly seated in both rail connectors and secured with the two snap rivets. Verify that removable terminal strip TB1 is firmly seated.
2. Familiarize yourself with the configuration of the module to be tested.
3. If the module is connected to a municipal box or central station, advise the appropriate parties that testing is in progress.

4a. Local Energy Municipal Box (City-Tie) configuration: With the municipal box connected between TB1-2 and TB1-3, open the circuit. (Note: You can temporarily substitute a 15Ω, 2W resistor for the municipal box.) Verify that the module Trouble activates and the appropriate Trouble message appears in the Trouble message queue. Reconnect the circuit and initiate an active fire alarm. You should measure 20 to 25 volts between TB1-3 (+) and TB1-4 (-). Press the panel Reset switch, and wait for the system to reset. Verify receipt of the alarm at the municipal receiving station.

Note: If you activate the municipal box, it will indicate Trouble until rewound.

4b. Single Reverse Polarity Circuit (Old Style) configuration: Verify that 20 to 25 volts appears between TB1-5 (+) and TB1-6 (-), paying attention to polarity. Create a Trouble condition on the panel. Verify that 0 volts appears between TB1-5 (+) and TB1-6 (-). Verify that the module's Trouble relay activates, the appropriate Trouble message appears in the Trouble message queue, and that the receiving station receives the Trouble indication. Open the circuit wired between TB1-5 and TB1-6. Verify that the receiving station receives the Trouble indication.

Initiate an active fire alarm. You should measure 20 to 25 volts between TB1-5 (-) and TB1-6 (+), paying attention to the polarity change. Verify receipt of the alarm at the municipal receiving station.

4c. Three Reverse Polarity Circuit (New Style) configuration: Verify that 20 to 25 volts appears between TB1-5 (+) & TB1-6 (-), between TB1-7 (+) & TB1-8 (-), between TB1-9 (+) & TB1-10 (-), paying attention to polarity. Create a Trouble condition on the panel. Verify that 20 to 25 volts appears between TB1-8 (+) and TB1-8 (-). Verify that the module's Trouble relay activates, the appropriate Trouble message appears in the Trouble message queue, and that the receiving station receives the *Trouble* indication. Open the circuit wired between TB1-5 and TB1-6. Verify that the receiving station receives a *circuit fault* indication. Open the circuit wired between TB1-7 and TB1-8. Verify that the receiving station receives a *circuit fault* indication. Open the circuit wired between TB1-9 and TB1-10. Verify that the module's Trouble relay activates and the appropriate Trouble message appears in the Trouble message queue, and that the receiving station receives a *circuit fault* indication.

Initiate an active fire alarm. You should measure 20 to 25 volts between TB1-5 (-) and TB1-6 (+), paying attention to the polarity change. Verify receipt of the alarm at the municipal receiving station.

Initiate an active Supervisory condition. You should measure 20 to 25 volts between TB1-9 (-) and TB1-10 (+), paying attention to the polarity change. Verify receipt of the Supervisory condition at the municipal receiving station.

3-ASU Audio Source Unit

1. Verify that the 3-ASU is installed using accepted workmanship standards.
2. The audio sub-system messages and configuration information must be downloaded into the Audio Source Unit, using the System Definition Utility (SDU) program, before starting testing. Verify that the 3-ASUMX expansion card, if used, is firmly seated in its connector.
3. Verify the wiring to all devices.
4. Starting with the network in the normal condition, use the Status command to verify all amplifiers are communicating over the network.
5. Disconnect the network audio communications wiring (TB1-1/2) from the 3-ASU, and verify that all the audio amplifiers connected to the network appear in the Trouble queue. Restore the connection.
6. If a supervised remote microphone is used, disconnect the remote microphone wiring (TB1-11 & TB1-12) from the 3-ASU. Verify a remote microphone trouble is annunciated.
7. Press the All Call switch on the front of the 3-ASU. Verify the All Call LED next to the switch lights. Remove the microphone from its bracket, press the Push-To-Talk (PTT) switch. Verify that that the preannouncement tone (if configured) sounds, followed by the Ready to Page LED lighting. Speak into the microphone and verify that the Page Level Meter is operational, and the message is being transmitted over all speakers.

3-FTCU Firefighter Telephone Unit

1. Verify that the 3-FTCU is installed using accepted workmanship standards.
2. Verify the wiring to all devices. The SIGA-CC1 should be set to personality code 6.
3. Verify that the 3-FTCU display indicates: “0 Calls Pending” and “Unit: OK.”
4. Take the master handset off-hook. Verify that the display indicates: “Handset off hook..” Replace the master handset on-hook.
5. Take a firefighter telephone off-hook (plug a phone in a phone jack). Verify that the incoming call buzzer sounds, the display indicates “1 Calls Pending,” the location of the incoming call is displayed in reversed text, and “0 calls connected” is shown on the display. Silence the buzzer by

pressing the ACK switch. Press the Connect switch. Verify that the display indicates: “0 calls pending,” “1 calls connected,” and the location of the connected call is displayed in reversed text. Converse over the phone connection to verify clear, noise free communications.

Take a second firefighter telephone *on a different circuit* off-hook. Verify that the incoming call buzzer sounds, the display indicates “1 Calls Pending,” the location of the incoming call is displayed in reversed text, and “1 calls connected” is shown in the display. Silence the buzzer by pressing the ACK switch. Press the Connect switch. Verify that the display indicates: “0 calls pending,” “2 calls connected,” the location of the second connected call is displayed in reversed text, the location of the first call is displayed in normal text below the second call location. Converse over the phone connection to verify clear, noise free communications.

Press the Review Connected switch, moving the reversed text to the first call’s location message. Without hanging up the first telephone, press the Disconnect switch. Verify the display indicates: 1 Calls Pending,” the location of the call being disconnected is displayed in reversed text at the top of the screen, and “1 calls connected” is shown in the display. Hang up the first telephone. Verify that the display indicates: “0 Calls Pending” and “1 calls connected.”

6. Repeat Step 5, connecting five (5) phones simultaneously, and verify acceptable voice quality.

7. Press the All Call and Page by Phone switches on the 3-ASU Audio Source Unit. When the Ready to Page LED lights *steady*, speak into the telephone still connected, and verify that the telephone’s audio is distributed throughout the facility. Press the Disconnect switch on the 3-FTCU, and hang up the master and remote phones.

8a. *Class A telephone riser configuration:* Disconnect the telephone riser wiring (TB1-2 & TB1-2) or (TB1-3 & TB1-4) from the 3-FTCU, and verify that a riser trouble message appears in the Trouble queue. Take a firefighter telephone off-hook (plug a phone in a phone jack). Verify that the incoming call buzzer sounds, the display indicates “1 Calls Pending,” the location of the incoming call is displayed in reversed text, and “0 calls connected” is shown in the display. Restore the connection.

8b. *Class B telephone riser configuration:* Disconnect the telephone riser wiring (TB1-1 & TB1-2) from the 3-FTCU, and verify that a riser trouble message appears in the Trouble queue. Restore the connection.

9. Disconnect each phone station/jack station, and verify that a Trouble message appears in the Trouble queue. Restore the connections.

3-ZAxx Audio Amplifiers

1. Verify that the module is properly seated in both rail connectors and secured with the two snap rivets. Verify that removable terminal strips are firmly seated.
2. Verify that the 3-ASU is installed using accepted workmanship standards.
3. If wired with a backup amplifier, verify that the backup amplifier's wattage is equal to or greater than the wattage of any primary amplifier it can replace. If mixing 15-, and 30-watt amplifiers with 20-, and 40-watt amplifier modules, make sure the back up amplifier is 20 or 40 watts, whichever is required.
4. Verify that the EVAC and Page signals are available at the speakers
5. Create an amplifier fault. Verify backup amplifier substitution.
6. *Class B amp output configuration:* Disconnect the module's audio output wiring (TB2-7 & TB2-8) from the 3-ZAxx, and verify that the appropriate amplifier Trouble message appears in the Trouble queue. Restore the connection.
7. *Class B supplementary NAC output configuration* (3-ZA20 & 3-ZA40 only): Disconnect the module's supplementary notification appliance circuit wiring (TB2-3 & TB2-4) from the 3-ZAxx, and verify that the appropriate Trouble message appears in the Trouble queue. Restore the connection. Short the module's supplementary notification appliance circuit wiring (TB2-3 & TB2-4) from the 3-ZAxx, and verify that the appropriate Trouble message appears in the Trouble queue. Remove the short.

Control/display modules

1. Verify that the display(s) are properly seated in the module and secured with the four snap rivets. Verify that the ribbon cable between the display and its host module is firmly seated on both ends.

2 Activate the lamp test and verify all lamps operated as follows:

   Select the Command Menus button to obtain the Main Menu screen.

Select Test to obtain the Test Menu screen, then select Lamp Test.

2. Perform a functional switch test.

Amplifier transfer panel (ATP)

1. Disconnect power amplifier output. Verify amplifier/riser trouble annunciated on panel. Restore connection.
2. Initiate an All Call page. Verify that audio is available on all power amplifier outputs.
3. If back up amplifiers provided, create an amplifier failure and verify backup amp operates properly.
4. Disconnect AC power from amplifier rack. Initiate an All Call page. Verify that audio is available on all power amplifier outputs.

Detector, input module, and output module testing

The procedures listed in this section should be performed on the detectors, input modules, output modules, and related accessories connected to each cabinet. These procedures are designed to test the devices and the network applications programming.

Note: The network configuration, Signature Control module information must be downloaded into the network and Audio Source Unit, using the System Definition Utility (SDU) program, before starting testing.

Every circuit connected to the EST3 system should be visited, and manually activated during the installation process to verify that:

1. The installed location meets proper engineering practices.
2. The location annunciated by the system agrees with the physical location of the device.
3. That the activated device initiates the correct system response.

Duct detectors should be tested to verify that both minimum and maximum airflow requirements are met.

Signature Series detectors and bases on a 3-SSDC(1) module circuit

1. Verify that all components are installed using accepted workmanship standards.
2. Individually activate each detector. Verify that the appropriate Alarm and location message is displayed on the LCD module. Verify that the detector initiates the appropriate system responses. If the detector is installed in a relay base, verify that the base's relay function operates correctly. If the detector is installed in an isolator base, verify that the base isolates the required circuit segments.

Caution: Do not use magnets to test Signature series detectors. Doing so may damage the detector electronics. Instead, use an approved testing agent (e.g. canned smoke, canned CO, or heat gun.)

3. CO detectors should be tested using the CO aerosol spray SDI LLC model Solo C6-xxx (where xxx indicates a variable related only to marketplace) or the Testifire Multi-Stimulus Detector Tester.

4. Duct mounted detectors should be tested using an air velocity test kit (6263, 6263-SG) to verify that minimum/maximum airflow requirements are met.
5. Remove the detector from its base. Verify that the appropriate Trouble and location message is displayed on the LCD module.
6. After all detectors have been individually inspected, run a Sensitivity report, using the Reports command.

Addressable analog detectors on a 3-AADC(1) Module circuit

1. Verify that all components are installed using accepted workmanship standards.
2. Individually activate each detector. Verify that the appropriate Alarm and location message is displayed on the LCD module. Verify that the detector initiates the appropriate system responses.
3. Duct mounted detectors should be tested to verify that minimum/maximum airflow requirements are met.
4. Remove the detector from its base. Verify that the appropriate Trouble and location message is displayed on the LCD module.
5. After all detectors have been individually inspected, run a Sensitivity report, using the Reports command.

Traditional 2-wire smoke detectors connected to 3-IDC8/4 modules

1. Verify that all components are installed using accepted workmanship standards.
2. Individually activate each detector. Verify that the appropriate Alarm and location message is displayed on the LCD module. Verify the detector circuit initiates the appropriate system responses.
3. Duct mounted detectors should be tested to verify that minimum/maximum airflow requirements are met.
4. Remove the detector from its base. Verify that the appropriate circuit Trouble and location message is displayed on the LCD module.

Conventional 2-wire smoke detectors connected to SIGA-UM modules

1. Verify that all components are installed using accepted workmanship standards.
2. Verify that jumper JP1 on each SIGA-UM module is set to position 1/2.
3. Individually activate each detector. Verify that the appropriate Alarm and location message is displayed on the LCD module. Verify the SIGA-UM initiates the appropriate system responses.
4. Duct mounted detectors should be tested to verify that minimum/maximum airflow requirements are met.
5. Remove the detector from its base. Verify that the appropriate SIGA-UM Trouble and location message is displayed on the LCD module.

Signature series input modules

1. Verify that all components are installed using accepted workmanship standards.
2. Individually activate each initiation device. Verify that the appropriate circuit type and location message is displayed on the LCD module. Verify that the circuit initiates the appropriate system responses.
3. Open up the circuit. Verify that the appropriate circuit Trouble and location message is displayed on the LCD module.

Signature series output modules

1. Verify that all components are installed using accepted workmanship standards.
2. Using the Activate Output command, individually activate each output. Verify that the device responds appropriately.
3. For supervised output circuits, open up the circuit. Verify that the appropriate circuit Trouble and location message is displayed on the LCD module.
4. If the output is activated by one or more system inputs, activate these inputs and verify the output function operates appropriately.

Initiating device testing

The procedures listed in the following sections should be performed on the initiating devices connected to the system, in conjunction with the procedures in the topic “Detector, input module, and output module initial and reacceptance testing.” These procedures are designed to test the initiating devices and the network applications programming.

Manual stations

1. Visual inspection.
2. Activate mechanism.
3. Verify that the appropriate circuit type and device location message is displayed on the LCD module. Verify the device initiates the appropriate system responses.
4. Open up the circuit. Verify that the appropriate circuit Trouble and location message is displayed on the LCD module.

Nonrestorable heat detectors

1. Visual inspection.
2. Test mechanically and/or electrically.
3. Verify that the appropriate circuit type and device location message is displayed on the LCD module. Verify the device initiates the appropriate system responses.
4. Open up the circuit. Verify that the appropriate circuit Trouble and location message is displayed on the LCD module.

Restorable heat detectors

1. Visual inspection.
2. Activate detector.
3. Verify that the appropriate circuit type and device location message is displayed on the LCD module. Verify the device initiates the appropriate system responses.
4. Open up the circuit. Verify that the appropriate circuit Trouble and location message is displayed on the LCD module.

Waterflow switches

1. Visual inspection.

2. Activate sprinkler test valve. (Refer to Sprinkler system test procedure.)
3. Verify that the appropriate circuit type and device location message is displayed on the LCD module. Verify the device initiates the appropriate system responses.
4. Open up the circuit. Verify that the appropriate circuit Trouble and location message is displayed on the LCD module.

Notification appliance testing

The procedures listed in the following sections should be performed on the notification appliances connected to the system, in conjunction with the procedures in “Detector, input module, and output module initial and reacceptance testing.” These procedures are designed to test the notification appliances and the network applications programming.

Visual devices

1. Visual inspection.
2. Activate the circuit. Verify all indicating appliances operating properly.
3. Open up the circuit. Verify that the appropriate circuit Trouble and location message is displayed on the LCD module.

Speakers

1. Visual inspection.
2. Activate the circuit. Verify all indicating appliances operating properly.
3. Open up the circuit. Verify that the appropriate circuit Trouble and location message is displayed on the LCD module.

Bells and horns

1. Visual inspection.
2. Activate the circuit. Verify all indicating appliances operating properly.
3. Open up the circuit. Verify that the appropriate circuit Trouble and location message is displayed on the LCD module.

Record of completion

When the system has been tested and found to operate satisfactorily, make a copy and fill out the Record of Completion on the following pages, and mount it near the fire alarm panel or give it to the building representative.

Record of Completion

Page 1 of 2

Protected Property

Name: ______________________

Address: ______________________

____

Representative: ______________________

Phone: ______________________

Authority Having Jurisdiction: ______________________

Address: ______________________

____

Phone: ______________________

Record of System Installation

This system has been installed in accordance with the NFPA standards listed below, was inspected by __________________ on __________________, and includes the devices listed below, and has been in service since _______________ .

▬ NFPA 72: Year ________; Ch. 1 2 3 4 5 6 7 (circle all that apply)
▬ NFPA 70, *National Electrical Code*, Article 760
▬ Manufacturer's Instructions ▬ Other (specify): ______________________

Record of System Operation

All operational features and functions of this system were tested by __________on _________ and found to be operating properly and in accordance with the requirements of:

▬ NFPA 72: Year ________; Ch. 1 2 3 4 5 6 7 circle all that apply)
▬ NFPA 70, *National Electrical Code*, Article 760
▬ Manufacturer's Instructions ▬ Other (specify): ____________

Signed: ____________ Dated: ________ Organization: ____________

System Software

System Firmware

Installed Revision: ________ Checksum: ________ Date: ________

Application Programming

Initial Program Installation: ______________________ Date: ________

Revisions & Reasons: ______________________ Date: ________

______________________ Date: ________

______________________ Date: ________

Programmed by (name): ______________________

Date of Programmer's Latest Factory Certification: ____________

Data Entry Program Revision Used ____________

Maintenance

Frequency of routine tests and inspections, if other than in accordance with the referenced NFPA standards: ______________________

____

____

System deviations from the referenced standards are: ______________________

____

____

____

(signed) for Central Station or Alarm Service Company (title) (date)

____

(signed) for representative of the authority having jurisdiction (title) (date)

[EST3ROC1.CDR]

Record of Completion

Page 2 of 2

Initiating Devices and Circuits

(indicate quantity)

____ Manual Stations

Automatic Devices

____ Smoke Detectors: ____ Ion ____ Photo

____ Duct Detectors: ____ Ion ____ Photo

____ Waterflow Switches:

____ Other (list): ____

Combination Detectors (circle active sensors)

____ Ion/Photo/Heat/CO

____ Ion/Photo/Heat/CO

Supervisory Devices and Circuits

(indicate quantity)

____ Compulsory Guard's Tour comprised of ______ transmitter stations and _______ intermdediate stations.

Sprinkler System

____ Valve supervisory devices

____ Building temperature points

____ Site water temperature points

____ Site water supply level points:

Electric Fire Pump

____ Fire pump power

____ Fire pump running

____ Phase reversal

Engine Driven Fire Pump

____ Selector in auto position

____ Control panel trouble

____ Transfer switches

____ Engine running

Other Supervisory Function(s) (specify)

____ ____

Notification Appliances & Circuits

Notification Appliance Circuits ____

Type and quantity of installed Notification Appliances

____ Bells ____ inch

____ Speakers

____ Horns

____ Visual Signals Type: ____

____ with audible

____ without audible

____ Other: ____

____ Local Annunciator

Signaling Line Circuits

Quantity and Style of connected SLCs, per NFPA 72, Table 3-6.1

____ Quantity ____ Style

System & Service

____ **NFPA 72 - Local**

If alarm transmitted off premise, location(s) received: ____

____ **NFPA 72 - Emergency Voice Alarm Service**

Voice/alarm channels: ____ Single: ____ Multiple: ____

Installed speakers: ____ # speakers per zone: ____

Telephones/jacks installed: ____

____ **NFPA 72 - Auxiliary**

Type of connection:

Local Energy: ____ Shunt: ____ Parallel Telephone: ____

Location/Phone # for receipt of signals: ____

____ **NFPA 72 - Remote Station**

Alarm: ____

Supervisory: ____

____ **NFPA 72 - Proprietary**

If alarms retransmitted off premise, location & phone of receiving organization: ____

Method of alarm retransmission: ____

____ **NFPA 72 - Central Station**

Prime Contractor: ____

Central Station Location: ____

Method of transmission of alarms to central station:

____ McCulloh ____ One-Way Radio ____ Digital Alarm Communicator

____ Multiplex ____ Two-Way Radio ____ Others: ____

Method of transmission of alarms to public fire service comunications center:

1. ____ 2. ____

Power Supplies

Primary (main)

Nominal Voltage: ____

Current Rating: ____

Overcurrent protection:

Type: ____

Current rating: ____

Location: ____

Secondery (standby)

____ Storage battery

Amp-Hour rating: ____

Calculated for _____ hours of system operation.

____ Dedicated generator

Location of fuel supply: ____

Emergency or standby system used to backup primary supply

____ Emergency system described in NFPA 70, Article 700

____ Legally required standby system described in NFPA 70, Article 701

____ Optional standby system described in NFPA 70, Article 702, meeting the performance requirements of Article 700 or 701

[EST3ROC2.CDR]

Chapter 7

Preventive maintenance

Summary

This chapter provides a listing of required scheduled maintenance items and procedures.

Content

General

Before commencing testing, notify all areas where the alarm sounds and off premises locations that receive alarm and trouble transmissions that testing is in progress.

Records of all testing and maintenance shall be kept on the protected premises for a period of at least five (5) years.

Required Tools:

- Slotted Screwdriver, Insulated
- Digital multimeter
- 1.1 kΩ 1 W resistor
- 12 inch (30.5 cm) jumper lead with alligator clips
- Panel Door Key

In addition, make sure you have the required system passwords. If the system includes access control applications, you'll need a construction card, or other valid access card.

A complete check of installed field wiring and devices should be made at regular intervals, in accordance with NFPA 72 and ULC 524 requirements. This includes testing all alarm and supervisory alarm initiating devices and circuits, and any off premises connections.

Panel operation should be verified in the alarm, supervisory, and trouble modes.

To ensure that the panel can be powered when primary power is lost, the batteries should be periodically inspected, tested, and replaced (as a minimum) every 4 years.

Preventive maintenance schedule

To ensure proper operation, plan maintenance (regular or selected) in accordance with the requirements of the authority having jurisdiction. Refer to NFPA 72 *National Fire Alarm and Signaling Code,* CAN/ULC-S536, *Standard for the Inspection and Testing of Fire Alarm Systems,* and CAN/ULC-S537 *Standard for the Verification of Fire Alarm Systems.*

Use the table below to determine when to perform testing and preventative maintenance procedures.

Preventive maintenance schedule

Component	Testing Interval	Test Procedure
Manual stations	Semiannually	1. Make a visual inspection. 2. Put the zone in test mode. 3. Activate the mechanism. 4. Verify the proper IDC zone response.
Non-restorable heat detectors	Semiannually	1. Make a visual inspection. 2. Put the zone in test mode. 3. Test the detector mechanically and/or electrically. 4. Verify the proper IDC zone response.
Restorable heat detectors	Semiannually	1. Make a visual inspection. 2. Put the zone in test mode. 3. Activate at least one detector on each IDC. All detectors on each IDC must be tested within five years.
SIGA2 heat detectors	Semiannually	1. Visually inspect the detector. Verify that the green LED is flashing. 2. Put the detector/zone in test mode. 3. Activate the heat sensor using a hair dryer and maintaining a distance of three inches or using the Testifire Multi-Stimulus Detector Tester [2] per manufacturer’s instructions. **Caution:** Do not apply excessive heat when using a hair dryer. Excessive heat may damage the outer cover. 4. Verify that a detector activation indication is on the FACU per the system design.

Preventive maintenance schedule

Component	Testing Interval	Test Procedure
Smoke detectors	Annually	1. Make a visual inspection. 2. Put the zone in test mode. 3. Conduct a functional test to verify the proper IDC zone response. 4. Check the detector sensitivity. 5. Clean the detector as required.
SIGA2 smoke detectors	Annually	1. Visually inspect the detector. Verify that the green LED is flashing. 2. Put the detector/zone in test mode. 3. Activate the smoke sensor using No Climb Products model CHEK02-xxx [1] smoke aerosol spray, smoke generator, or the Testifire Multi-Stimulus Detector Tester [2] per manufacturer’s instructions. 4. Verify that a detector activation indication is listed on the printer. 5. Run a detector sensitivity and compensation report.
SIGA2 smoke and heat detectors	Annually	1. Visually inspect the detector. Verify that the green LED is flashing. 2. Put the detector/zone in test mode. 3. Activate the smoke sensor using No Climb Products model CHEK02-xxx smoke aerosol spray, smoke generator, or the Testifire Multi-Stimulus Detector Tester per manufacturer’s instructions. 4. Activate the heat sensor using a hair dryer and maintaining a distance of three inches or using the Testifire Multi-Stimulus Detector Tester per manufacturer’s instructions. **Caution:** Do not apply excessive heat when using a hair dryer. Excessive heat may damage the outer cover. 5. Verify that a detector activation indication is listed on the printer. 6. Run a detector sensitivity and compensation report.
CO sensors	Monthly [3]	1. Visually inspect the detector. Verify that the green LED is flashing. 2. Perform a CO sensor function test.
CO sensors	6 years after date of manufacture	1. Replace the CO sensor.

Preventive maintenance schedule

Component	Testing Interval	Test Procedure
SIGA2 smoke, heat, and CO detectors	Annually	1. Visually inspect the detector. Verify that the green LED is flashing. 2. Put the detector/zone in TEST mode. 3. Activate the smoke sensor using No Climb Products model CHEK02-xxx [1] smoke aerosol spray, smoke generator, or the Testifire Multi-Stimulus Detector Tester [2] per manufacturer's instructions. 4. Activate the heat sensor using a hair dryer and maintaining a distance of three inches or using the Testifire Multi-Stimulus Detector Tester per manufacturer's instructions. **Caution:** Do not apply excessive heat when using a hair dryer. Excessive heat may damage the outer cover. 5. Place the CO sensor in the accelerated response mode. a. At the panel, select Command Menus. b. Select Option 4) Activate. c. Select Option 9) Gas Accel Response. d. Enter the device number for the sensor to be tested. Format: PPCCDDDD where PP = panel number, CC = card number, and DDDD = device address. Refer to the SDU Help version 11.0 or later for information on programming for the accelerated response mode. 6. Activate the CO sensor using SDI LLC model Solo C6-xxx [1] CO aerosol spray without covering the head or with the Testifire Multi-Stimulus Detector Tester [2] per manufacturer's instructions. **Note:** If the CO sensor is programmed as the alarm point, it must comply with the requirements of NFPA 720. 7. Verify that a detector activation indication is listed on the printer. 8. Run a detector sensitivity and compensation report.
Waterflow switches	Every two months	1. Put the zone in test mode. 2. Activate the sprinkler test valve. Refer to the sprinkler system test procedure.

Preventive maintenance schedule

Component	Testing Interval	Test Procedure
All initiating device circuits	Annually	1. Put the IDC zone in test mode. 2. Activate the IDC zone. Appropriate NACs should activate and zone information should be annunciated. 3. Restore the test device and reset the zone. 4. Open the IDC field wiring. A trouble message should be annunciated. 5. Reset and lock the panel at the conclusion of all testing.
Remote annunciators	Annually	1. Verify that all indicators are operating properly.
Notification appliances	Annually	1. Make a visual inspection. 2. Put the panel in alarm, drill, or test mode. Verify that all indicating appliances are operating properly.
Panel LEDs and trouble buzzer	Annually	1. Illuminate all LEDs by pressing the Panel Silence and Trouble Silence switches at the same time. 2. Reset and lock the panel at the conclusion of all testing.
Panel primary power	Acceptance and reacceptance tests	1. Remove the primary AC power. 2. Verify that the panel operates from the battery. 3. Verify that the panel goes into trouble (after a 6 second delay). 4. Restore the AC power at the end of the test. 5. Reset and lock the panel at the conclusion of all testing.
Panel secondary power	Acceptance and reacceptance tests	1. Remove the primary AC power. 2. Measure the standby and alarm currents, and compare these with the battery calculations to verify adequate battery capacity. 3. Test the system under full load for 5 minutes. 4. Measure the battery voltage under full load. (The acceptable range is 20.4 to 27.3 VDC.) 5. Restore the AC power at the end of test. 6. Reset and lock the panel at the conclusion of all testing.
Panel trouble signals	Annually	1. Verify operation of system Trouble LED and trouble buzzer. 2. Reset and lock the panel at the conclusion of all testing.
LCD clock	Each visit	1. Verify that the displayed time is correct. Reset the clock if the time is incorrect.

Preventive maintenance schedule

Component	Testing Interval	Test Procedure
Supervisory signal initiating devices	Semiannually	1. Put the zone in test mode. 2. Operate the test valve. 3. Test the pressure, temperature, and water level sensors per the sprinkler system test procedure.
Auxiliary system off-premises fire alarm signal transmission	Monthly	1. Coordinate the test with the receiving location. 2. Verify the receipt of all transmitted signals. 3. Reset and lock the panel at the conclusion of all testing.
Remote system off-premises waterflow signal transmission	Every two months	1. Coordinate the test with the receiving location. 2. Verify the receipt of all transmitted signals. 3. Reset and lock the panel at the conclusion of all testing.

[1] xxx indicates a variable related only to marketplace.

[2] For more Testifire information, visit www.testifire.com

[3] Monthly until January, 2012, when it becomes an annual test.

Signature device routine maintenance tips

Detectors

When removing one detector at a time, wait 1 minute after replacing the first detector before removing the next detector. This gives the system time to recognize and re-map the first detector before generating a trouble condition caused by removing the second detector.

CO maintenance alert

In addition to displaying a maintenance alert when the photo element dirtiness is at or above 80%, the loop controller displays a maintenance alert when the CO sensor module is at or below 6 months until end of life. If both elements are at or above these thresholds, there is only one maintenance alert. Once the dirtiness threshold is at 100%, a dirty detector trouble displays for the photo element. Once there are 0 months until end of life, the panel displays the CO end-of-life trouble message.

CO maintenance report

The CO sensor module has a life span of 6 years. After 6 years, the detector sends out an end-of-life trouble message. When this trouble message is transmitted, replace the CO sensor module.

To determine the months until end of life, request a Maintenance Report.

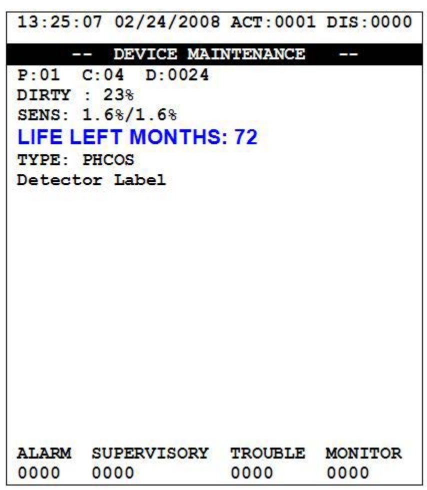


Figure 7-1: Maintenance report

Modules

Signature modules should be visually inspected to insure the physical installation is secure. Functional testing of the module should be done regularly as required by the AHJ.

Signature detector cleaning procedure

There are two cleaning procedures.

- SIGA detectors require using a conventional vacuum cleaner equipped with the detector cleaning tool from the Signature Series Tool Kit (P/N SIGA-ST). The tool is installed on the end of the suction hose (nominal 1.5 in. or 3.8 cm ID). This creates a high velocity vortex scrubbing action around the detector, removing loose dust and debris which is subsequently drawn into the vacuum.
- SIGA2 detectors require opening the detector and cleaning the interior using a vacuum cleaner and a soft brush as instructed below.

Note: In order to avoid false alarms, disable the detector being cleaned before cleaning.

To clean SIGA detectors:

1. Disable the detector to prevent false alarms.
2. Use the conventional vacuum cleaner brush attachment to remove any visible cobwebs etc. from the immediate area of the detector.
3. Connect the detector cleaning tool to the suction hose.
4. Place the detector cleaning tool over the detector head for approximately 10 seconds.
5. After the detector has been cleaned, restore it to proper operation.
6. Run the detector sensitivity routine to print a list of detector sensitivity and compensation readings and to verify the effectiveness of the cleaning.

Note: Without using the detector cleaning tool to clean the detectors, it is not possible to verify the dirtiness levels after cleaning. In this case, clean the detector per instructions above and operate for a minimum of two hours, then restart the loop controller. If the detectors are cleaned properly, the maintenance indicators return to normal condition.

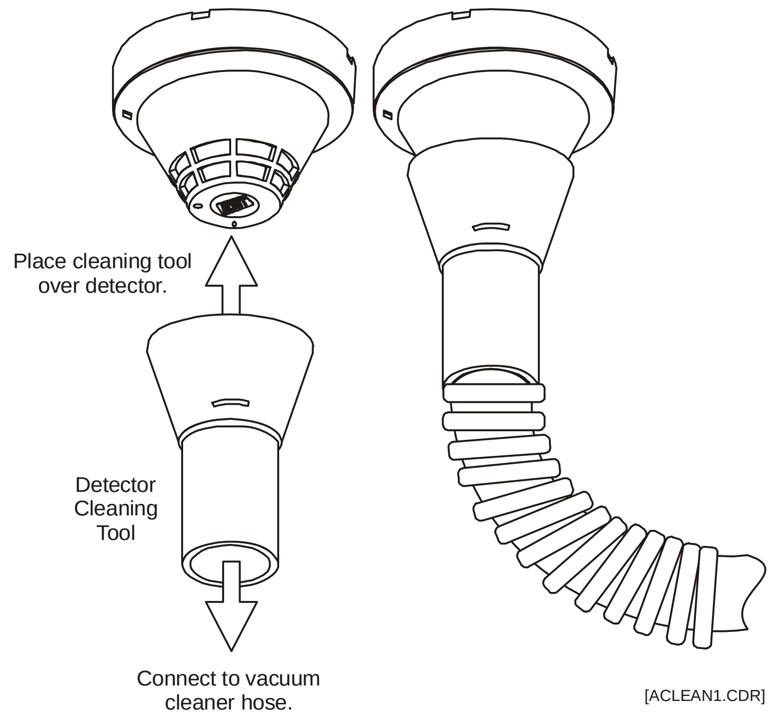
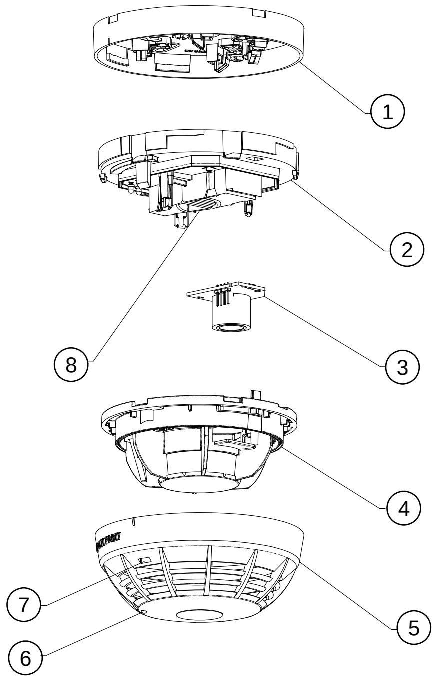


Figure 7-2: Detector Cleaning Tool

To clean SIGA2 detectors:

1. Disable the detector or zone to prevent false alarms.
2. Use a conventional vacuum cleaner brush to remove visible cobwebs, etc. from the immediate area of the detector.
3. Remove the detector from the detector base, by inserting a small screwdriver into the tamper-resist access slot while rotating the detector counterclockwise.
4. Push the locking tab on the bottom of the detector toward the center then twist and pull to remove the cover.
5. Using a soft brush and vacuum, carefully remove any dust or dirt from around the sensor chambers. See Figure 3.
6. After the detector has been cleaned, reassemble and restore it to proper operation.
7. Check and record the detector’s dirty level reading to verify the effectiveness of cleaning.
8. If cleaning is unsuccessful, return the detector to the factory and replace it with a new detector.



1. Mounting base
2. Detector base
3. CO sensor module (on CO detectors only)
4. Smoke chamber: to remove.
5. Detector cover: twist and pull to remove
6. LED indicator
7. Access slot for tamper-resist mechanism
8. Optics box

Figure 3: SIGA2 smoke detector with CO sensor

To properly judge the effectiveness of the detector cleaning process, observe the effect cleaning had on the detector's dirtiness level. If the detectors are cleaned properly, the maintenance indicators return to normal condition.

SIGA2 replacement procedures

Smoke chamber

The SIGA2 smoke detectors have replaceable smoke chambers. Replace the smoke chamber of these detectors when, after cleaning the detector, the control panel still indicates a dirty detector.

There are two replacement smoke chambers. Replace the smoke chamber as described on its installation sheet.

Table 1: Replaceable smoke chambers.

Model	Replaces smoke chamber on
2-SPRC1	SIGA2 -PS, SIGA2-PHS
2-SPRC2	SIGA2-PCOS, SIGA2-PHCOS

CO sensor module

2-CORPL is the replacement sensor for the Signature Series CO detectors. Replace the CO sensor module every six years or when the control panel indicates a sensor end-of-life condition. Refer to installation sheet P/N 3101589.

Note: For proper operation, never replace the CO sensor itself without the PCB as each board has calibration data specific to the CO sensor.

System trouble and maintenance log

Date	Time	Event	Initial

Chapter 8

Service and troubleshooting

Summary

This chapter provides a comprehensive set of procedures and tables to aid certified technical personnel in servicing and troubleshooting the system.

Content

Overview

Maintenance philosophy

The EST3 life safety system consists of modular assemblies utilizing surface mount technology (SMT) for easy installation and maintenance. SMT provides high reliability but prohibits component-level field repairs. For these and other reasons, the maintenance philosophy consists of fault isolating to the circuit card assembly, removing the defective circuit card, and then replacing it with a spare.

Service and repair of EST3 system components centers around the following assumptions:

1. Qualified technicians possessing a complete understanding of the system hardware and functions will perform maintenance.
2. Only certified maintenance technicians will service the equipment.
3. Maintenance technicians will have a ready available supply of replacement parts.

Problem classification

Problems with the system can generally be classified into two categories: application programming problems and hardware (including firmware) problems. Many times hardware problems are identified by the system itself. Application programming problems are typically suspected when an incorrect response happens, or when a response fails to happen or happens at the wrong time.

Handling static-sensitive circuit modules

Many of the circuit modules use components that are sensitive to static electricity. To reduce the possibility of damaging these components, take the following precautions when handling:

1. Use only approved grounding straps that are equipped with a 1 MΩ resistive path to earth ground.
2. Always keep circuit modules in their protective antistatic packaging. Remove only for inspection or installation.
3. Always hold circuit modules by the sides. Avoid touching component leads and connector pins.

Removing or replacing circuit modules

When removing or replacing circuit modules, always remember to:

1. First disconnect the battery then remove AC power. Removing or replacing circuit modules when power is applied will damage the equipment.
2. Avoid applying excessive force to the snap-rivet fasteners that lock the plug-in modules in place. If needed, use the extraction tool provided in the hardware kit.

Recommended spares list

As a general guideline, 10% of the quantity installed or a minimum of 1 each of the following installed equipment should be available as spare:

- Power supply
- Local rail modules
- Amplifiers (if no backup installed in system)
- Printer ribbon

As a general guideline, 10% of the quantity installed or a minimum of 3 each of the following installed equipment should be available as spare:

- Monitor modules
- Control modules
- Heat detectors
- Ionization smoke detectors
- Photoelectric smoke detectors
- CO detectors, including combination, heat, smoke, and CO
- Base, detector
- Duct detector filter kits
- Breakglass replacement for pull stations
- Breakglass replacement for warden stations
- Horn, bell, strobe, and speaker

System batteries and CO replacement modules should be replaced at recommended intervals. Stocking of spare batteries and CO modules is not recommended because of shelf-life limitations.

The SIGA2 smoke detectors have replaceable smoke chambers. These should be replaced when, after cleaning the detector, the control panel still indicates a dirty detector. As a general guideline, 10% of the quantity installed or a minimum of 3 each dependent on environmental conditions.

Hardware problems

Identification

Hardware problems are typically identified by an intermittent or total failure of a device.

Isolation

Hardware problems may be categorized as problems within an equipment cabinet, and problems with field wiring and devices.

The quickest way to locate a hardware problem is by selectively isolating portions of the system and observing the results of the isolation. By selectively isolating smaller and smaller portions of the system, hardware faults can usually be isolated. The suspect component may then be replaced with a known good component, and the results again observed.

Substituting hardware

Caution: Never install or remove a module while power is applied to the cabinet.

The local rail modules in the EST3 system are microprocessor based. The Signature driver controller module, Central Processor Module (CPU) module, 3-AADC1 Addressable Analog Device Controller module, and 3-ASU Audio Source Unit all have “flash” memory, which is used to store the operating firmware. The flash memory is empty when the module is shipped from the factory. When the configuration database is downloaded into the cabinet, each component using flash memory receives specific information. This information includes the module’s location in the system and its configuration.

Note: Because the content of each module is specific to its cabinet location, do not substitute 3-SSDC(1), CPU, 3-AADC1, or 3-ASU modules without downloading the new cabinet configuration database.

If you are substituting a Signature driver controller module, you must also download the specific Signature circuit information into the module’s memory. If you are substituting a 3-AADC1 driver controller module, you must also download its specific circuit configuration into its database. If you are substituting 3-ASU modules, you must also download the audio message database directly into the 3-ASU.

Rail module substitution and replacement rules

Rule 1: Modules must be replaced with modules of the same model number.

Rule 2: LED / Switch Displays must be replaced with LED / Switch Displays of the same model number.

Rule 3: Substitute modules *must* have an *identical* LED / Switch Display installed as the module it replaces.

Rule 4: Substitute modules should be installed in the same rail location as the module it is replacing.

Adding hardware

When hardware is added to a cabinet, a portion of the network configuration database must also be changed. The extent of the changes depends on the rule relationships between the added component and the balance of the network. Revised copies of the database must then be downloaded using the SDU.

Downloading problems

If you are experiencing frequent downloading problems, low signal level from the download computer may be the cause. The Buffered RS-232 Communication Cable, Catalog No. SDU-CBL, may be used to correct signal level problems.

Note: Do not use the buffered RS-232 communication cable with a CPU.

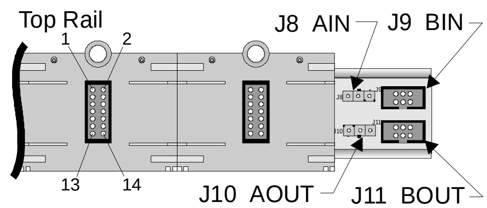
Modules

Rail signals

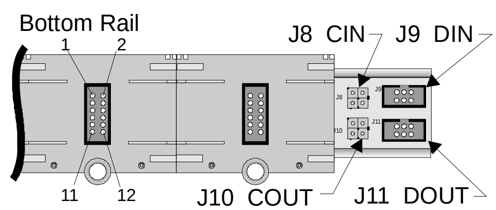
The figure below shows the signals normally present on a pair of chassis rails.

Note: The panel controller and the power supply monitor module must be installed in order to measure the voltages indicated.

Top Rail	
Pin	Function
1 - 2	+6.25 VDC
3	+Sense
4	-Sense
5	-Audio Data
6	+Audio Data
7	-Rail Data
8	+Rail Data
9 - 10	Not Used
11 - 14	Common



Bottom Rail	
Pin	Function
1 - 4	+24 VDC
5	All Fail
6 - 9	Not Used
10 - 12	Ground

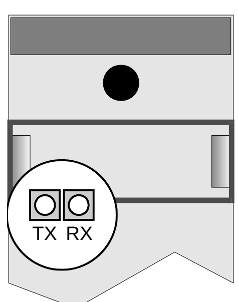


[3RAILSIG.CDR]

The DC voltages can be checked with a digital meter. Data signals on pins 7 and 8 of the top rail can be verified by looking at the Receive (RX) and Transmit (TX) LEDs on any module installed on the rail.

3-PPS/M Primary Power Supply module

The transmit (TX) and receive (RX) LEDs on the Primary Power Supply Monitor Module should flicker, indicating normal two way communication activity with the CPU.



[PSMONLED.CDR]

If the 3-PPS/M Primary Power Supply is used in conjunction with one or more 3-BPS/M Booster Power Supplies, there is interaction between the supplies. Under most conditions, a defective power supply will be identified by the system, and annunciated as a trouble. The system may continue to operate nearly normally, as the battery connected to the faulty supply will automatically be switched into the circuit, as the load demands.

Table 8-1: Nominal primary and booster power supply voltages

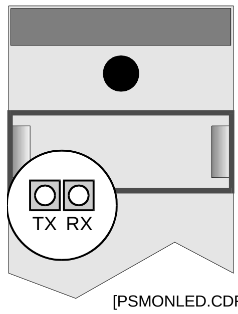
Test Point	Voltage
Rail Power	25 - 26.4 Vdc w/AC power on
Auxiliary Power	25 - 26.4 Vdc w/AC power on
Battery	27.3 V (battery under charge @ 25 °C)

Table 8-2: Primary Power Supply module troubleshooting

Problem	Possible cause
Supply will not operate from AC line	1. AC line fuse F2 (3.15A slow blow) open 2. Rectified DC fuse F3 (3.15A slow blow) open
RX or TX LED OFF No communication between 3-PSMON and CPU	1. Defective or poor connection on ribbon cable between 3-PSMON and 3-PPS 2. 3-PSMON Defective 3. 3-PPS Defective
Auxiliary and Rail voltage low	1. Excessive load causing supply to fold back 2. Power Cable between 3-PSMON and 3-PPS loose or defective 3. Booster Supply failure causing primary supply to fold back
Batteries will not charge	1. System in alarm mode 2. Fuse F1 (8A) on 3-PPS open 3. 30 to 60 Ah battery installed, 10 to 29 Ah battery specified in SDU 4. Battery shorted 5. Battery not wired to power supplies correctly (only wired to BPS/M)
System will not operate on batteries	1. Battery voltage below 18 Vdc. (system automatically turns off when batteries too low to properly operate system) 2. Fuse F1 (8A) on 3-PPS open 3. Batteries connected before AC power energized 4. Battery temperature too high 5. Defective batteries

3-BPS/M Booster Power Supply module

The transmit (TX) and receive (RX) LEDs on the Booster Power Supply Monitor Module should flicker, indicating normal two way communication activity with the CPU.



[PSMONLED.CDR]

The booster power supply voltages are indicated in Table 8-1. Table 8-3 lists common problems with the booster power supply and booster monitor module.

Table 8-3: Booster Power Supply module troubleshooting

Problem	Possible cause
Supply will not operate from AC line	1. AC line fuse F2 (3.15A slow blow) open 2. Rectified DC fuse F3 (3.15A slow blow) open
RX or TX LED OFF No communication between 3-BPSMON and CPU	1. Defective or poor connection on ribbon cable between 3-BPSMON and 3-BPS 2. 3-BPSMON defective 3. 3-BPS defective
Auxiliary and Rail voltage low	1. Excessive load causing supply to fold back 2. Power Cable between 3-BPSMON and 3-BPS loose or defective 3. Booster Supply failure causing primary supply to fold back
System will not operate on batteries	1. Battery voltage below 18 Vdc. (system automatically turns off when batteries too low to properly operate system) 2. Fuse F1 (8A) on 3-BPS open 3. Batteries connected before AC power energized 4. Battery temperature too high 5. Defective batteries

CPU Central Processor module

The CPU controls all the communication and processing of information for modules located in its cabinet. Token ring network communication between CPU modules in other cabinets is also processed by the CPU. Network communication is RS-485 when the 3-RS485 card is installed in CPU connector J2, and fiber optic when the 3-FIBMB or 3-NSHM module is connected to J2 of the CPU.

Network and audio data circuits

Figure 8-1 and Table 8-4 show the location and normal state of the communication status LEDs on the CPU module.

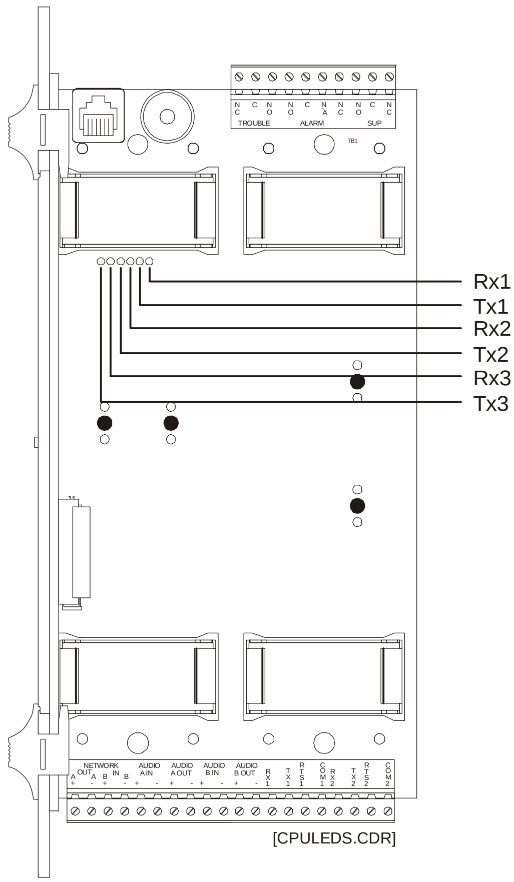


Figure 8-1: CPU module

Table 8-4: CPU LED indications

LED	Normal state	Description
RX1	Flicker	Local Rail Receive Activity
TX1	Flicker	Local Rail Transmit Activity
RX2	Flicker	Network Data Ch A Receive Activity
TX2	Flicker	Network Data Ch A Transmit Activity

RX3	Flicker	Network Data Ch B Receive Activity
TX3	Flicker	Network Data Ch B Transmit Activity

EST3 network wiring alternates between channel A and channel B, as shown in Figure 8-2.

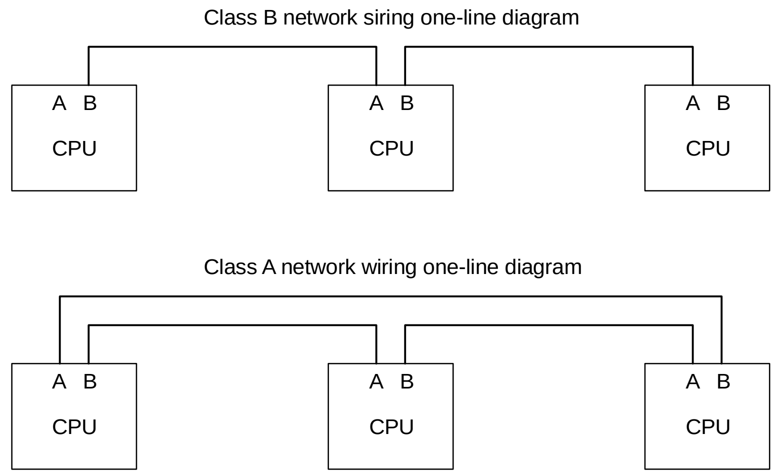


Figure 8-2: Network wiring one-line diagrams

RX1 and TX1 should flicker continuously, indicating normal two-way CPU module to rail module communication activity.

When multiple CPU modules are networked together using Class B wiring, RX2, TX2, RX3, and TX3 on all panels except the first and last should flicker continuously, indicating normal two-way network communication activity on both data channels.

When multiple CPU modules are networked together using Class A wiring, RX2, TX2, RX3, and TX3 should flicker continuously, indicating normal two way network communication activity on data channels A, and B.

The network and audio riser data circuits are isolated at each CPU module. This prevents a shorted data circuit from interrupting communication on the entire circuit. Figure 8-3 shows typical Class B network data circuit.

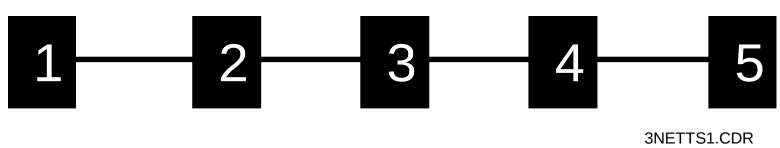


Figure 8-3: Class B network data circuit

When trying to isolate trouble on a network or audio data circuit, remember that both shorted and open circuit segments will interrupt communication between two CPU modules.

Figure 8-4 shows an open or short circuit fault between cabinets 3 and 4.

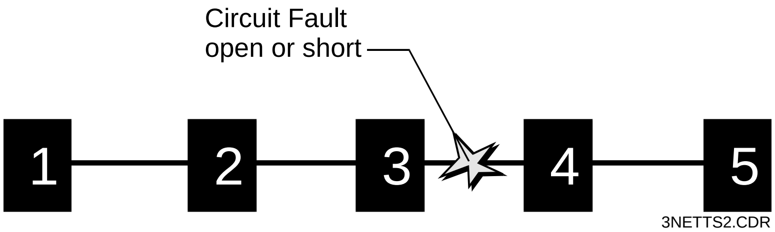


Figure 8-4: Network data circuit fault

Either an open or shorted circuit will interrupt communication between cabinets 3 and 4. The token ring network will reconfigure and operate as two independent sub-networks, one consisting of cabinets 1, 2, and 3; the second consisting of cabinets 4 and 5.

Due to the isolation between cabinets, during a ground fault condition, the number of potential circuits to be investigated is limited to those originating from a single cabinet.

Table 8-5: CPU troubleshooting

Problem	Possible cause
RX1 or TX1 off	1. CPU not firmly seated in rail connectors 2. CPU failure
RX2, TX2 or RX3, TX3 off, or both pairs off	1. (+) and (-) wires reversed. 2. Circuit not properly terminated 3. Network A and Network B circuits crossed 4. Improper wire installed 5 Ground fault 6. 3-RS485 card loose
RS-232 port (J5) inoperative	1. TX and RX wires reversed 2. CPU and peripheral device baud rate mismatched 3. PC improperly configured
Ancillary RS-232 port (TB2-1 to 4 or TB2-5 to 8) inoperative	1. TX and RX wires reversed. 2. CPU and peripheral device baud rate mismatched 3. Peripheral device off-line or improperly configured

Table 8-5: CPU troubleshooting

Problem	Possible cause
RS-485 port (TB2 17 to 20) inoperative	1. (+) and (-) wires reversed. 2. 3-RS485 card not seated properly 3. Network A and Network B circuits crossed 4. Improper wire
Power LED off, no characters on display, switches inoperative	1. No power to panel. 2. Ribbon cable between LCD and CPU loose or defective. 3. CPU defective 4 LCD defective 5. CPU not configured in SDU for LCD
All Module LEDs and switches inoperative AND host module working correctly.	1. Ribbon cable between display and CPU module loose or defective 2. Display not configured in SDU 3. Display defective
Switch activation does not perform the required function.	1 Display not defined in SDU database 2. Domain not configured correctly.

3-FIBMB fiber optic interface

Several models of the 3-FIB card are available to support compatible operations with different models of the CPU.

3-FIB: Compatible with the 3-CPU.

3-FIBA: Compatible with the 3-CPU and 3-CPU1. The 3-FIBA provides Class A audio when used with the 3-CPU1, but not when used with the 3-CPU.

3-FIBMB: Compatible with both the 3-CPU1 and the 3-CPU3, but not with the 3-CPU.

Note: If network communication must be maintained when the node is powered down for service, connect a 12 V battery to J2 on the fiber optic interface card.

The LEDs on the 3-FIBMB interface board adjacent to the fiber optic indicate circuit activity.

Test jumpers

Jumper JP1 is used to put the module in test mode. In the test mode, the “OUT” ports transmit a constant signal, which can be used to measure cable loss.

Table 8-6: 3-FIB troubleshooting

Symptom	Possible causes
No LED activity on any fiber optic port	1. Ribbon cable between interface and electronics card loose, Improperly installed, or broken. 2. Electronics card not properly seated in J2 of CPU.
No LED activity on “IN” fiber optic port	1. Incorrect cable connected to port.
Steady on LED on “IN” fiber optic port	1. Jumper JP1 left in test position.

Signature Controller modules

Please refer to Signature Component Troubleshooting Chapter for complete information on Signature related troubleshooting.

Control / display modules

The information in this section applies to the following models of control / display modules:

3-12/1RY	3-2RY	3-12/2RY
3-12SG	3-12SR	3-12SY
3-12/SIGY	3-12/S1RY	3-12/AS2Y
3-24G	3-24R	3-24Y
3-6/3S3L	3-6/3S1G2Y	3-6/S1GYR

The control / display modules operate independently of the host module on which they are installed. The displays do use the host module’s electronics to communicate with the CPU.

The Lamp Test function (pressing Panel Silence and Alarm Silence Switches simultaneously) will quickly isolate hardware problems from programming problems with any display.

Table 8-7: Control / display module troubleshooting

Problem	Possible cause
Module LEDs and switches inoperative AND host module inoperative	1. No power to panel 2. Ribbon cable between display and host module loose or defective 3. Display defective 4. Host module defective

Table 8-7: Control / display module troubleshooting

Problem	Possible cause
All module LEDs and switches inoperative AND host module working correctly	1. Ribbon cable between display and host module loose or defective 2. Display not configured in SDU 3. Display defective
LEDs respond incorrectly	1. Display not defined in SDU database 2. LED misidentified in SDU database 3. Rule governing LED operation not correctly written
Switch activation does not perform the required function	1. Display not defined in SDU database 2. Switch misidentified in SDU database 3. Rule governing switch operation not correctly written

Audio amplifier modules

Table 8-8: 3-ZAxx Zoned Audio Amplifier module troubleshooting

Problem	Possible cause
Audio output level too low	1. Jumpers set for 25 Vrms when connected to a 70 Vrms circuit 2. Gain adjusted too low 3. Input level to ASU too low
No or extremely low audio output	1. Fuse blown 2. Gain set too low
Audio level too high	1. Jumper set for 70 Vrms when connected to 25 Vrms circuit 2. Gain adjusted too high 3. Input level to ASU too high
Amplifier current limiting	1. Audio circuit overloaded 2. Input level to ASU too high
Incorrect amplifier version reported to CPU module	1. Jumpers installed incorrectly

3-OPS Off-Premises Signal module

Table 8-9: 3-OPS Off-Premises Signal module troubleshooting

Problem	Possible cause
Module in trouble	1. Master box circuit open or not reset 2. Reverse polarity circuit open 3. 3.6 kΩ EOL resistor not installed on unused circuits
Remote receiver indicates circuit trouble and does not receive alarm	1. Circuit polarity reversed 2. Circuit open 3. Excessive circuit resistance 4. Incompatible receiver 5. Defective module
Remote receiver does NOT indicate circuit trouble and does not receive alarm	1. 3-OPS Not activated by panel (SDU database) 2. Incompatible receiver 3. Defective module

3-IDC8/4 Initiating Device Circuit module

Table 8-10: 3-IDC8/4 Initiating Device Circuit module troubleshooting

Problem	Possible cause
Module in trouble	1. 4.7 kΩ EOL resistor not installed on unused IDC circuits 2. 15 kΩ EOL resistor not installed on unused NAC circuits 3. No communication with CPU module 4. Module not defined in SDU database. 5. Field wiring connector not plugged into module
NAC output not working	1. Jumpers installed incorrectly 2. External source configured but not connected 3. Circuit folding back due to overload. 4. Circuit “Silenced” 5. Circuit shorted 6. Polarized device defective or reversed on circuit
IDC circuit not working	1. Incompatible 2-wire smoke detectors 2. Excessive wiring resistance or capacitance

3-LDSM Display Support module

Table 8-11: 3-LDSM Display Support module troubleshooting

Problem	Possible cause
All Module LEDs and switches inoperative *and* host module working correctly	1. Ribbon cable between display and 3-LDSM module loose or defective 2. Module not configured in SDU 3. Display not configured in SDU 4. Display defective

3-MODCOM(P) Modem Communicator module

Diagnostic aids

Two LEDs (DS1 and DS2) provide diagnostic information. The activity of DS1 and DS2 during dialing and data transmission are outlined in the following table.

Table 8-12: 3-MODCOM LED states and meanings

LED state	DS1 meaning	DS2 meaning
Off	No activity	No activity
On	Line 1 has been seized	Line 2 has been seized
Slow flash	Dialer or modem data is being passed on Line 1	Dialer data is being passed on line 2. (Modem data is passed only on line 1.)
Slow flash (both)	Slow flash on both LEDs indicates an ongoing download of application code or configuration code from CPU or SDU	
Fast flash	Reflects ringing on Line 1. (Flashing follows pattern detected.)	N/A - line 2 does not have ring detection

A Radio Shack Mini Audio Amplifier (catalog number 277-1008) facilitates listening to the distinctive sounds associated with dialing, receiving handshakes, transmitting data, and receiving acknowledgements. Obtain this device locally and place a 0.1 μF 200 V or greater capacitor in series with one of the leads. (You can install the capacitor permanently, within the case, if you prefer.) Alternately, you can use a lineman's butt set in monitor mode.

During downloading from a remote computer, you will hear the distinct sound of modems establishing a connection, then a series of rapid chirps as data is transmitted from the ACDB or KDC program.

Note: Remove the amplifier when you finish troubleshooting. Do not install the amplifier permanently.

Common causes of problems

Evaluation of visual and audible indications will usually serve to isolate the source of trouble. Before attempting to replace the 3-MODCOM module, the following causes of problems should be investigated:

- The 3-MODCOM module is not properly seated on the rail connectors, or one or more connector pins have been bent away from the associated sockets
- A modular telephone plug is not connected to the appropriate line 1 or line 2 jack, or is not fully seated, or is not connected at the telephone block
- The 3-MODCOM has been configured with incorrect CMS telephone numbers
- The telephone line is faulty

If the module and telephone line are okay, check the CMS telephone number by dialing it using a standard telephone plugged directly into the RJ-31X jack. (The jack will accommodate a standard modular phone plug.)

You should hear a dial tone when going off-hook, lose the dial tone after dialing the first digit, hear the receiver ringing, hear the CMS receiver go off-hook and send a handshake tone.

Typical problems dialing the CMS involve missing or incorrect area codes, the need to dial 1 for long distance, and missing line access codes (example: dialing 9 for an outside line).

If the receiver answers, check that it is sending out the correct handshake. For SIA P2 (3/1 pulse), SIA P3 (4/2 pulse), and SIA DCS the receiver should send a single tone of 0.5 to 1.0 seconds in duration. For Contact ID, the handshake signal consists of two short tones of different frequency. For TAP there should be a modem-type exchange of handshake messages.

If the receiver sends the correct handshake and the 3-MODCOM transmits data but the receiver does not send an acknowledgement, check that the receiver is compatible with the desired protocol. (SIA DCS, P2, and P3 standards are available from the Security Industry Association). Typical problems involve an incompatible format or data message.

If the handshake and acknowledge signals are audible, check that the correct account number was configured in the 3-MODCOM and that the code being sent was correctly programmed in the CMS computer.

Where a 3-MODCOM module is suspected of being faulty, try substituting a known good one that has been properly programmed.

Audio components

3-ASU Audio Source Unit

Table 8-13: 3-ASU Audio Source Unit Troubleshooting

Problem	Possible cause
Unit does not respond. No network RX or TX LED activity	1. Power or data connectors loose or connected wrong on Rail Chassis Interface Card 2. Ribbon cable between Rail Chassis Interface Card and 3-ASU (and 3-FTCU, if installed) loose or defective 3. Ribbon cable between 3-ASU main board and cover loose or defective
No *All Call* page audio output from network amplifiers and low level page output terminals	1. Defective microphone 2. Page inhibit timer set too long 3. Defective 3-ASU 4. Ribbon cable between 3-ASU main board and cover loose or defective 5. Defective amplifier
No *All Call* page audio output from network amplifiers, output available at low level page output terminals	1. Network audio data riser open, shorted, or incorrectly wired 2. Network data riser open, shorted, or incorrectly wired 3. TB2 on the CPU loose or incorrectly wired 4. 3-ASU not properly configured in SDU database 5. Amplifiers not properly installed or defective
Page audio distorted	1. Speaking too loud into microphone. Speak such that the last green LED on the page level meter only flickers occasionally 2. Gain of individual amplifiers set too high
Auxiliary Input volume level too low	1. Adjust Aux input gain control on ASU 2. Auxiliary input wiring open or shorted
Auxiliary Input volume level too high	1. Adjust Aux input gain control on ASU
Recorded messages not working properly	1. 3-ASUMX memory not firmly seated in connector 2. Audio database not correctly downloaded into 3-ASU 3. Incorrect message label referenced.
Wrong messages going to wrong floors	1. Amplifier and message labels and rules incorrect or mislabeled
Telephone Page inoperative	1. Wiring between 3-ASU and 3-FTCU open, shorted, or incorrectly wired

Table 8-13: 3-ASU Audio Source Unit Troubleshooting

Problem	Possible cause
Remote Microphone trouble	1. Wrong or missing EOL resistor on microphone key input 2. No supervisory tone on DC current on remote microphone audio output

3-FTCU Firefighter Telephone Control Unit

Table 8-14: 3-FTCU (3-ASU/FT) Firefighter Telephone Control Unit Troubleshooting

Problem	Possible cause
Unit does not respond No RX or TX LED activity	1. Power or data connectors loose or connected wrong on Rail Chassis Interface Card 2. Ribbon cable between Rail Chassis Interface Card and 3-FTCU loose or defective 3. Ribbon cable between 3-FTCU main board and cover loose or defective 4. Defective 3-FTCU
Signature modules do not switch telephones correctly	1. Network data riser open, shorted, or wired incorrectly 2. TB2 on the CPU loose or wired incorrectly 3. Defective 3-FTCU 4. Signature module has incorrect label, personality code, or device type 5. Defective Signature module
Low telephone volume level	1. More than five handsets active at one time 2. Phone riser open, shorted, or wired incorrectly 3. Connector TB1 on 3-FTCU loose 4. Defective telephone
Call displayed by LCD doesn't match connected call	1. Signature module incorrectly labeled in rule 2. Signature module misidentified or installed in wrong location

SIGA audio amplifiers

The following material refers to these amplifier models:

- SIGA-AA30 Audio Amplifier
- SIGA-AA50 Audio Amplifier

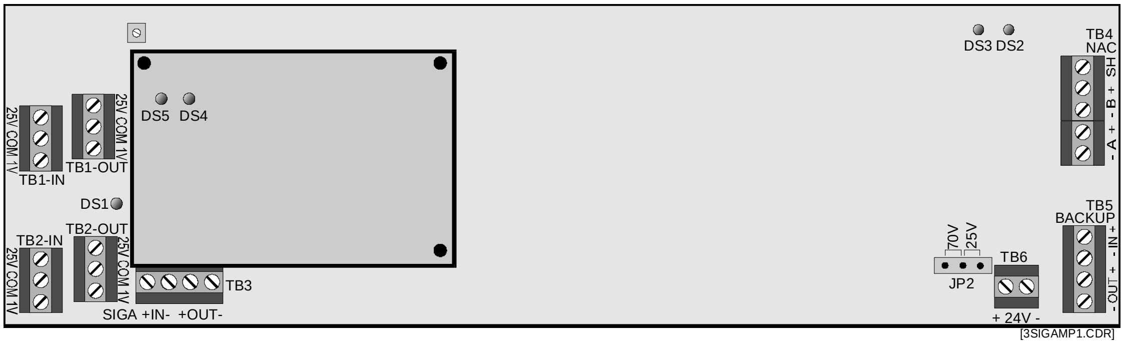


Table 8-15: SIGA-AAxx LED indications

LED	Color	Description
DS1	Yellow	Power Amp Enabled
DS2	Yellow	Backup Mode
DS3	Green	Amplifier Active
DS4 (daughter board)	Green (flashing)	Normal
DS5 (daughter board)	Red (flashing)	Active Condition

Gain adjustment

With the amplifier connected to the speaker load, use the gain adjust potentiometer (R116) to get a 25 Vrms or 70 Vrms signal (depending on JP2 setting) with a 1Vrms 1 kHz tone at the amplifier input. If a oscilloscope is used to adjust levels, use the following peak-to-peak voltage levels:

- 25 Vrms = $71V_{PP}$
- 70 Vrms = $200\ V_{PP}$

The amplifier must be connected to a load to properly adjust the gain. In the event the actual speaker circuit cannot be used, a dummy load must be fabricated according to Table 8-16. The wattage rating of the dummy load must exceed the output power rating of the amplifier.

Table 8-16: Amplifier dummy load values

Output power	25 Vrms output	70 Vrms output
30 Watts	20.8 Ω @ 30W	167Ω @ 30W
50 Watts	12.5 Ω @ 50W	100Ω @ 50W

To maintain DC supervision and keep the amplifier out of trouble while adjusting the gain, connect a 47 kΩ EOL resistor across the NAC B output (TB4-2 and TB4-3), then connect the dummy load to the NAC A Output terminals (TB4-4 and TB4-5).

Caution: Do not operate the amplifier with both the speaker circuit and the dummy load connected.

Table 8-17: SIGA-AAxx Audio Amplifier troubleshooting

Problem	Possible cause
No output	1. 24 Vdc power or input signal missing 2. Output circuits wired incorrectly 3. Daughter board not firmly seated in connector 4. Module defined incorrectly in database 5. In backup mode with backup amplifier or wiring problem 6. Branch circuit control modules inoperative or programmed incorrectly
Backup 1 kHz Tone sounding	1. Input wiring incorrect or missing 2. Low or no audio input
Low Output	1. 70 Vrms speakers with 25 Vrms jumper setting 2. Too many SIGA-CC1s or SIGA-CC2s installed causing amplifier to shut down 3. Gain (R116) setting too low

Pseudo point descriptions

Table 8-18: System pseudo points

Address	Label	Source	Functional description
0001	Startup Response	CPU	Changes to the active state when the panel is energized or an operator initiates a Restart from the LCD module.
0002	First Alarm Response	CPU	Changes to the active state when the first point on a panel or any panel in the same network routing group changes to the alarm state.
0003	First Supervisory Response	CPU	Changes to the active state when the first point on a panel or any panel in the same network routing group changes to the supervisory state.
0004	First Trouble Response	CPU	Changes to the active state when the first point on a panel or any panel in the same network routing group changes to the trouble state.
0005	First Monitor Response	CPU	Changes to the active state when the first point on a panel or any panel in the same network routing group changes to the monitor state.
0006	Evacuation Response	CPU	Changes to the active state when an operator presses a switch that executes the Evacuation command.
0007	Drill Response	CPU	Pseudo point that changes to the active state when an operator presses a switch that executes the Drill command.
0008	AllCall Response	CPU	Changes to the active state when an operator presses the All Call or All Call Minus switch on the 3-ASU.
0009	Alarm Silence Response	CPU	Changes to the active state when an operator presses a switch that executes the AlarmSilence command.
0010	Two Stage Timer Expiration	CPU	Changes to the active state when a panel’s two-stage alarm timer expires.
0011	Reset Active	CPU	Changes to the active state when an operator presses a switch that executes the Reset command.
0012	Reset Phase 1	CPU	Changes to the active state when the first phase of the 3-phase reset cycle starts.
0013	Reset Phase 2	CPU	Changes to the active state when the second phase of the 3-phase reset cycle starts.

Table 8-18: System pseudo points

Address	Label	Source	Functional description
0014	Reset Phase 3	CPU	Changes to the active state when the third phase of the 3-phase reset cycle starts.
0015	First Disable Response	CPU	Changes to the active state when the first point on a panel or any panel in the same network routing group changes to the disable state.
0016	Fail Safe Event	CPU	Changes to the active state when a device asserts the rail alarm-not line and the CPU module has not registered an alarm event.
0017	Service Group Active	CPU	Changes to the active state when an operator enables a Service Group from the LCD module.
0018	Two Stage Timer Active	CPU	Changes to the active state when a panel’s two-stage alarm timer starts.
0019	Loop Controller Reset Extension	CPU	Changes to the active state when a loop controller stays in the reset mode longer than expected.
0020	Service Device Supervision	CPU	Changes to the active state when an operator cancels a Service Group test while a circuit under test remained active.
0021	User Trouble	CPU	Changes to the active state when an operator forces a trouble into the system. Not implemented at this time.
0022	Ext Database Incompatibility	CPU	Changes to the active state when a different database in one or more network nodes
0023	Reboot Fault	CPU	Changes to the active state when the CPU module is interrupted unexpectedly.
0101–0164	Comm Fail xx	CPU	Changes to the active state when the CPU is unable communicate with the networked CPU module in cabinet xx.
0200–0222	Task xx Watchdog Violation	CPU	Changes to the active state when task xx fails to execute properly.
0261–0279	Configuration Mismatch Card xx.	CPU	Changes to the active state when the card in slot xx cannot perform the programmed advance feature (currently only degraded mode).
0281–0299	DB Out Of Sync with CPU Card xx	CPU	Changes to the active state when the Signature controller module in rail slot xx reports an actual and expected data mismatch.

Table 8-19: Local alarm pseudo points

Address	Label	Source	Description
0676	Unprogrammed Device	3-AADC1	Device not defined in SDU database is in alarm or trouble state
0676	Unprogrammed Device Data Card 1	3-DSDC 3-SSDC1 3-SDDC1	Device not defined in SDU database is in alarm or trouble state
0686	Unprogrammed Device Data Card 2	3-DSDC 3-SSDC1 3-SDDC1	Device not defined in SDU database is in alarm or trouble state

Table 8-20: Local trouble pseudo points

Address	Label	Source	Description
0001	Class A Fault Spur	3-SAC	Fault or break in Class A loop on SAC bus
0002	Class A Fault Video Bus	3-SAC	Fault or break in Class A loop on video bus
0003	Annunciator Supervision	3-SAC	Control / display module faulty or missing or not properly configured
0004	Rail Module Communication Fault	3-SAC	Cabinet local rail communication failure
0005	Video Communication Fault	3-SAC	Fault or break in video signal lines
0006	RAM Fault or Stack Fault	3-SAC	Fault in internal 3-SAC processor
0007	Code Supervision	3-SAC	Executable program corrupt
0008	Internal Fault	3-SAC	3-SAC hardware failure
0009	Configuration Fault	3-SAC	1. Module in wrong slot 2. Incorrect display on module
0010	Database Supervision	3-SAC	Database corrupt
0071	Task Failure	3-SAC	
0071	Waiting for SDU Download	3-SAC	Database download from the SDU is in progress or was incomplete
0600	Annunciator Supervision	General	Control / display module faulty or missing or not properly configured
0601	Class A Failure	CPU	Fault or break in Class A network data riser connection
0601	Rail Module Communication Fault	General	Cabinet local rail communication failure
0602	Ground Fault Detection	CPU	Any cabinet component or field wiring
0603	Audio Supervision	CPU	Audio data circuit open or shorted

Table 8-20: Local trouble pseudo points

Address	Label	Source	Description
0604	Internal Fault	General	CPU hardware failure
0604	RAM Fault or Stack Fault	3-AADC1	RAM or Stack (memory) fails its interval check
0605	Database Supervision	General	Database corrupt
0605	DB Supervision Audio Default Tone	3-ASU	No message present, problem erasing flash, message space fails internal checks
0606	Code Supervision	General	Executable program corrupt
0607	Auxiliary Port One	CPU	Port 1 serial communication circuit open or shorted
0607	Data Card Fault	3-AADC1	N/A
0607	Data Card Fault 1	3-DSDC 3-SSDC1 3-SDDC1	N/A
0608	Auxiliary Port Two	CPU	Port 2 serial communication circuit open or shorted
0608	Data Card Fault 2	3-DSDC 3-SSDC1 3-SDDC1	N/A
0609	Panel in Download Mode	CPU	Panel out of service. In mode to accept download data
0609	Configuration Fault	General	1. Module in wrong slot 2. Incorrect display on module
0610	Network Audio Circuit A Fault	CPU	Loss of signal on primary audio connection
0610	Rail Voltage Out of Spec	3-PPS/M 3-BPS/M 3-BBC/M	1. Rail voltage >30 Vdc or <24 Vdc 2. Excessive rail current load 3. Faulty or misadjusted 3-PPS/3-BPS
0610	Telephone Line 1	3-MODCOM	Line-cut fault detected on phone line 1
0611	Network Audio Circuit B Fault	CPU	Loss of signal on secondary audio connection
0611	Rail Vltg Blw Batt	3-PS/M	Excessive rail current load
0611	Telephone Line 2	3-MODCOM	Line-cut fault detected on phone line 2
0612	Heat Sink Too Hot	3-PPS/M 3-BPS/M 3-BBC/M	1. Enclosure vents clogged 2. Heat sink not fastened properly

Table 8-20: Local trouble pseudo points

Address	Label	Source	Description
0612	Receiver Test - Line 1	3-MODCOM	Line 1 test transmission to CMS failed
0613	Lo Batt Cut Off	3-PPS/M 3-BPS/M 3-BBC/M	Battery voltage below 19.5 Vdc when on battery backup
0613	Receiver Test - Line 2	3-MODCOM	Line 2 test transmission to CMS failed
0614	AC Brownout	3-PPS/M 3-BPS/M 3-BBC/M	AC line voltage below 96 Vac for 3-PPS or 196 Vac for 3-PPS/230
0614	RS-232 Channel	3-MODCOM	Communication failure with RS-232 card on module
0615	Batt Trbl	3-PPS/M 3-BPS/M 3-BBC/M	1. Battery wiring open 2. Battery voltage below 24 Vdc 3. Battery internal resistance too high (load test failure)
0616	Network_ClassA_CircuitA_Failure_01_01	CPU	CPU unable to receive data on data riser circuit A
0617	Network_ClassA_CircuitB_Failure_01_01	CPU	CPU unable to receive data on data riser circuit B
0616	Aux Pwr Ovld Ckt 2	3-PPS/M 3-BPS/M 3-BBC/M	1. Excessive load 2. Circuit shorted
0617	DSP Supervision	3-MODCOM	The DSP chip on the module failed.
0617	Pwr Supply Fail	3-PPS/M 3-BPS/M 3-BBC/M	1. Cables between power supply and monitor module loose or missing 2. Defective power supply or monitor module
0618	Aux Pwr Ovld Ckt 1	3-PPS/M 3-BPS/M 3-BBC/M	1. Excessive load 2. Circuit shorted
0619	Drvr Pwr Supply Fail	3-PPS/M 3-BPS/M 3-BBC/M	1. Cables between power supply and monitor module loose or missing 2. Defective power supply or monitor module
0620	Demux Audio Input	3-ZAxx	Digitized audio data missing
0620	Waiting for SDU Download	3-MODCOM	Database download from the SDU is in progress or was incomplete

Table 8-20: Local trouble pseudo points

Address	Label	Source	Description
0621	Amp Overcurrent	3-ZAxx	1. Circuit shorted 2. Speaker wattage tap setting exceeds output rating of amplifier 3. 70 Vrms jumper setting used with 25 Vrms speakers. .
0622	Primary Audio Output DC	3-ZAxx	1. Open DC NAC circuit, missing or wrong value EOL resistor 2. Shorted DC NAC circuit
0623	Primary Audio Output Analog	3-ZAxx	1. Open Audio NAC circuit, missing or wrong value EOL resistor 2. Shorted Audio NAC circuit 3. Output voltage jumper set wrong
0624	Backup Audio Output Analog	3-ZAxx	1. Open Audio NAC circuit, missing or wrong value EOL resistor 2. Shorted Audio NAC circuit 3. Output voltage jumper set wrong
0625	Amplifier Daughter Board	3-ZAxx	Defective board
0626	Fuse Supervision	3-ZAxx	Open fuse in amplifier
0627	PAL Supervision	3-ZAxx	Bad PAL chip. Replace amplifier.
0629	Request Backup	3-ZAxx	N/A
0630	Riser Supervision	3-FTCU	1. Open circuit, missing or wrong value EOL resistor 2. Shorted circuit
0631	User Interface	3-FTCU	Ribbon cable between display and main PC board loose or missing.
0632	Master Phone Supervision	3-FTCU	Master handset internal wiring fault
0633	Handset Off Hook	3-FTCU	Hook switch defective
0640	Jumper Fault	3-OPS	Jumpers incorrectly set
0641	AtoD Converter Failure	3-OPS	Internal module failure
0642	City Tie Open	3-OPS	N/A
0652	Input Supervision Trbls	3-ASU	Defective microphone or connections
0653	Phone Page Time Out	3-ASU	Phone page switch has been activated for a period which exceeds the time limit set via SDU program
0654	Audio Hardware Mismatch	3-ASU	Mismatch between 3-ASUMX specified via SDU program and that installed in the 3-ASU

Table 8-20: Local trouble pseudo points

Address	Label	Source	Description
0655	RAM Diagnostic Failure	3-ASU	Memory failure in 3-ASU
0656	Audio Default Failure	3-ASU	1. 3-ASUMX memory card missing 2. Audio database does not exist
0658	Audio Interface Failure	3-ASU	3-ASU hardware fault
0659	Audio Class Supervision	3-ASU	One riser open or shorted
0670	In Bootloader	3-AADC1	PC connected to card attempting download
0670	In Bootloader	3-DSDC 3-SSDC1 3-SDDC1	PC connected to card attempting download
0671	Line Opened or Shorted	3-AADC1	Wiring Fault
0671	Line Opened or Shorted Data Card 1	3-DSDC 3-SSDC1 3-SDDC1	Wiring Fault
0672	Map Fault Data Card 1	3-DSDC 3-SSDC1 3-SDDC1	1. Mismatch between actual data and expected data 2. Defective wiring 3. Defective device
0677	Grnd Fault	3-AADC1	Wiring Fault
0677	Grnd Fault Data Card 1	3-DSDC 3-SSDC1 3-SDDC1	Wiring Fault
0678	Reconstct Line	3-AADC1	N/A
0679	Smoke Power Current Limit	3-AADC1	N/A
0679	Smoke Power Current Limit Card 1	3-DSDC 3-SSDC1 3-SDDC1	N/A
0680	Internal Failure	3-LDSM	N/A
0681	Line Opened or Shorted Data Card 2	3-DSDC 3-SSDC1 3-SDDC1	Wiring Fault
0682	Map Fault Data Card 2	3-DSDC 3-SSDC1 3-SDDC1	1. Mismatch between actual data and expected data 2. Defective wiring 3. Defective device
0687	Grnd Fault Data Card 2	3-DSDC 3-SSDC1 3-SDDC1	Wiring Fault

Table 8-20: Local trouble pseudo points

Address	Label	Source	Description
0689	Smoke Power Current Limit Card 2	3-DSDC 3-SSDC1 3-SDDC1	Defective module
0690	Configuration Mismatch Slot 1	3-DSDC 3-SSDC1 3-SDDC1	N/A

Table 8-21: Local monitor pseudo points

Address	Label	Source	Description
0615	Incoming Ring	3-MODCOM	An incoming call was received by the module.
0622	Outgoing Call in Progress		Dialer is active
0650	All Call Active	3-ASU	Changes to the active state when an operator presses the All Call switch
0651	Mic Key Active	3-ASU	Changes to the active state when an operator presses the push-to-talk switch on the paging microphone.
0673	Mapping In Progress Data Card 1	3-DSDC 3-SSDC1 3-SDDC1	N/A
0674	Mapping Disbld Data Card 1	3-DSDC 3-SSDC1 3-SDDC1	Mapping manually disabled
0675	Device Maint Alert	3-AADC1	N/A
0675	Device Maint Alert Data Card 1	3-DSDC 3-SSDC1 3-SDDC1	Dirty detector on loop 1
0678	Reconstct Line Data Card 1	3-DSDC 3-SSDC1 3-SDDC1	N/A
0683	Mapping In Progress Data Card 2	3-DSDC 3-SSDC1 3-SDDC1	N/A
0684	Mapping Disbld Data Card 2	3-DSDC 3-SSDC1 3-SDDC1	Mapping manually disabled
0685	Device Maint Alert Data Card 2	3-DSDC 3-SSDC1 3-SDDC1	Dirty detector on loop 2

Table 8-21: Local monitor pseudo points

Address	Label	Source	Description
0688	Reconstct Line Data Card 2	3-DSDC 3-SSDC1 3-SDDC1	N/A

Table 8-22: Nonsupervised output pseudo points

Address	Label	Source	Description
0621	Manual Answer Control	3-MODCOM	Answers incoming call

Table 8-23: CRC pseudo points

Address	Label	Event type	Description
SS01	AC Brownout	Access trouble	Sustained low voltage from CRC supply to device
SS02	Low Battery	Access trouble	CRC battery below specified voltage
SS03	Tamper	Security alarm	CRC tamper switch was activated
SS04	Strike Fault	Access trouble	Strike device failed
SS05	Reader Fault	Access trouble	Card reader failed
SS06	RAM Fault or Stack Fault	Access trouble	CRC processor failed
SS07	Code Supervision	Access trouble	CRC executable program corrupt
SS08	Database Supervision	Access trouble	CRC database corrupt
SS09	Communications Fault	Access trouble	CRC lost communication with 3-SAC
SS10	Loop 1	Security alarm (configurable)	Input device on loop 1 activated
SS11	Loop 2	Security alarm (configurable)	Input device on loop 2 activated
SS12	Task Failure	Local trouble	Changes to the active state when a task fails to execute properly
SS15	Waiting for SDU Download	Local trouble	Database download from the SDU is in progress or was incomplete
SS32	CRC Strike Timed	Access output	Activate the strike device for a specified interval
SS33	CRC Strike Unlock	Access output	Activate the strike device
SS34	CRC Relay Timed	Access output	Activate the CRC relay for a specified interval

Table 8-23: CRC pseudo points

Address	Label	Event type	Description
SS35	CRC Relay Open	Access output	Activate the CRC relay
SS36	CRC Inside Reader Disable	Access output	Disable the inside card reader device (for load shedding)
SS37	CRC Outside Reader Disable	Access output	Disable the outside card reader device (for load shedding)
SS38	CRC Sounder	Access trouble	CRC sounder base trouble
SS represents the CRC device number, as configured in the SDU.			

Table 8-24: KPDISP pseudo points

Address	Label	Event type	Description
SS06	RAM Fault or Stack Fault	Local trouble	KPDISP processor failed
SS07	Code Supervision	Local trouble	KPDISP executable program corrupt
SS08	Database Supervision	Local trouble	KPDISP database corrupt
SS09	Communications Fault	Local trouble	KPDISP lost communication with 3-SAC
SS12	Task Supervision	Local trouble	Changes to the active state when a task fails to execute properly
SS13	Waiting for Download	Local trouble	Database download from the SDU is in progress or was incomplete
SS14	User Record Supervision	Local trouble	N/A
SS15	Controller Communication Fault	Local trouble	KPDISP lost communication with 3-SAC (displayed on KPDISP only)
SS16	Panel Communication Fault	Local trouble	KPDISP lost communication with panel (displayed on KPDISP only)
SS32	Entry Buzzer	Nonsupervised output	Activates for configured time to allow the partition to be disarmed before going into alarm
SS33	Exit Buzzer	Nonsupervised output	Activates for configured time to allow the person arming a partition to exit before signaling any alarm events
SS represents the KPDISP device number, as configured in the SDU.			

Table 8-25: Local relay pseudo points

Address	Label	Source	Description
0002	Amplifier Backup	3-ZAxx	Changes to the active state when the amplifier’s input relay selects the back up amplifier input as its signal source.
0003	Channel_1_Relay_ Confirmation	3-ZAxx	Changes to the active state when the amplifier’s input relay selects channel 1.
0004	Channel_2_Relay_ Confirmation	3-ZAxx	Changes to the active state when the amplifier’s input relay selects channel 2.
0005	Channel_3_Relay_ Confirmation	3-ZAxx	Changes to the active state when the amplifier’s input relay selects channel 3.
0006	Channel_4_Relay_ Confirmation	3-ZAxx	Changes to the active state when the amplifier’s input relay selects channel 4.
0007	Channel_5_Relay_ Confirmation	3-ZAxx	Changes to the active state when the amplifier’s input relay selects channel 5.
0008	Channel_6_Relay_ Confirmation	3-ZAxx	Changes to the active state when the amplifier’s input relay selects channel 6.
0009	Channel_7_Relay_ Confirmation	3-ZAxx	Changes to the active state when the amplifier’s input relay selects channel 7.
0010	Channel_8_Relay_ Confirmation	3-ZAxx	Changes to the active state when the amplifier’s input relay selects channel 8.
0011	Page Select	3-ZAxx	Changes to the active state when the amplifier’s input relay selects the Page channel.

Signature data circuit (SDC) operation

The advanced features of the Signature controller module perform a number of advanced operations. These operations are not always apparent from the panel controller. Table 8-26 lists a number of SDC conditions and describes the circuit's operation.

Table 8-26: SDC operation

Condition	Operation
Remove a detector, then re-install the same detector in the same base.	1. The system displays a trouble with the detector's label or address when the detector is removed. 2. The system restores completely when the detector is re-installed in its original base.
Remove a module or pull station, then re-install the same device in the same location.	1. The system displays a trouble with the module's label or address when the device is disconnected. 2. The panel restores completely when the device is re-installed in its original location.
Remove a detector, then re-install a different detector of the same type in the same base.	1. The system displays a trouble with the detector's label or address when the detector is removed 2. When the new detector is installed, the Signature controller module re-maps the circuit, replacing the S/N of the old detector with the S/N of the new detector. All the old detector's sensitivity and verification settings are transferred to the new detector. The system will return to normal when mapping is finished.
Remove a module or pull station, then re-install a different device of the same type in the same location. (SIGA-UM replacement modules must have jumper JP1 set in the same position as the original module.)	1. The system displays a trouble with the device's label or address when the device is disconnected. 2. When the new device is installed, the Signature controller module re-maps the circuit, replacing the S/N of the old device with the S/N of the new device. If the devices are modules (not pull stations), the old module's personality codes are transferred to the new module. The panel will return to normal when mapping is finished.
Remove a detector, then re-install a different type detector in the same base.	1. The system displays a trouble with the detector's label or address when the detector is removed. 2. When the new detector is installed, the Signature controller module re-maps the circuit, replacing the S/N of the old detector with the S/N of the new detector. All the old detector's sensitivity and verification settings (when applicable) are transferred to the new detector. The new detector will be operational, however the panel will be in trouble, indicating a device type mismatch. The System Definition Utility program must be used to re-assign the device type to get the system out of trouble.

Table 8-26: SDC operation

Condition	Operation
Remove a module or pull station, then re-install a different type module or pull station in the same location.	1. The system displays a trouble at the device's label or address when the device is removed. 2. When the new device is installed, the Signature controller module re-maps the circuit, replacing the S/N of the old device with the S/N of the new device. The new module is NOT operational. The panel will be in trouble, indicating a device type mismatch. System Definition Utility program must be used to re-assign the device type to get the panel out of trouble. 3. If a single address module is replaced with a dual address module or vice versa, a map fault will be generated by the address count mismatch.

Basic Signature data circuit troubleshooting

Isolating circuit and device problems

The process of isolating a problem on a Signature data circuit is similar to that used on a conventional fire alarm Initiating Device Circuit (IDC). An accurate and complete wiring diagram of the data circuit installation is the best troubleshooting aid available. When used in conjunction with the information provided by the control panel, you should be able to easily isolate open conditions or defective devices. The data circuit shown in Figure 8-5 will be used to illustrate basic troubleshooting techniques.

When troubleshooting Class A circuits, disconnect the circuit from the return (SIGA/A) terminals, and temporarily jumper both SIGA/A terminals to the respective SIGA/B terminals. Then troubleshoot the circuit as a Class B circuit.

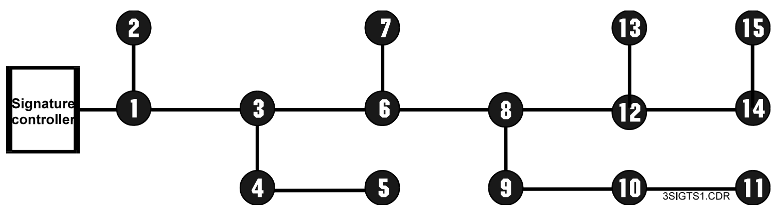


Figure 8-5: Normal circuit topology

Open circuit conditions

On a circuit with an open fault, the Signature modules will be communicating with devices up to the break. The LCD module will indicate a trouble condition on all devices beyond the break. This is illustrated in Figure 8-6 where devices 1 through 7 continue to operate while devices 8 through 15 report device troubles.

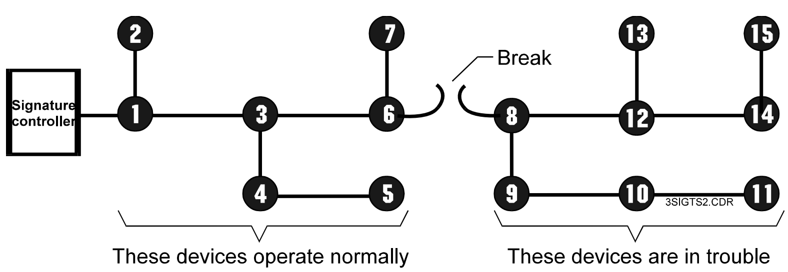


Figure 8-6: Break in circuit between devices 6 and 8

Referring again to Figure 8-6, a wire break or intermittent connection between devices 6 and 8 is the most probable cause of the failure. Other possible but unlikely causes with the same symptoms include device failure of only devices 9 -15; and devices 9-15 not loaded in the Signature module's database or not properly configured using the Signature portion of the data entry program.

Short circuit conditions

Short circuit conditions require selective isolation of portions of the data circuit to systematically narrow down the fault's location. A shorted circuit will typically show a trouble condition on all devices, as illustrated in Figure 8-7.

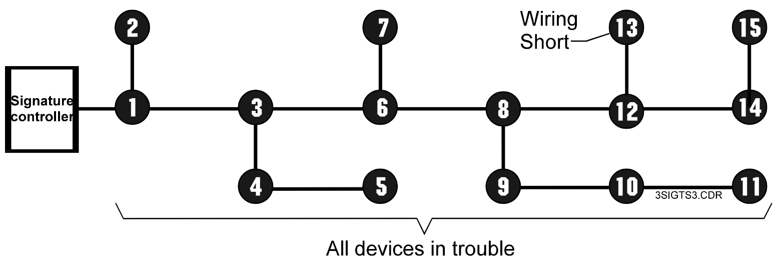


Figure 8-7: Wiring Short On device 13

To isolate the short, open the circuit at a location that will disconnect approximately 50% of the installed devices, as shown in Figure 8-8.

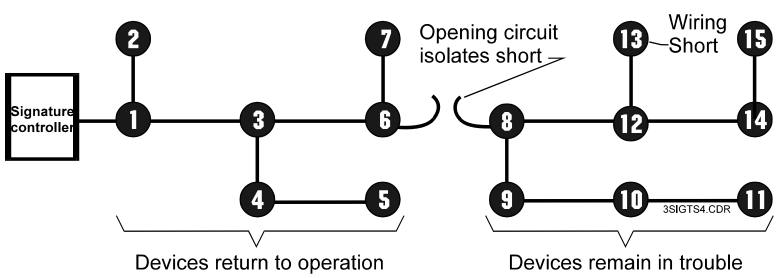


Figure 8-8: Isolating circuit short

If some of the devices restore in Figure 8-8, the short is located on the portion of the circuit that has been disconnected. If no devices restore when the circuit is opened, the short has been isolated to the first 50% of the circuit.

Re-connect the previously isolated portion of the circuit, and open the circuit at a new location. If during the first open circuit test some devices restored, open the circuit at a location "electrically farther" from the Signature controller module and repeat the test. If during the first open circuit test no devices restored, open the circuit at a location "electrically closer" to the module, and repeat the test. Continue to increase or decrease the number of devices on the opened circuit leg until you eventually isolate the single device or wire segment that is causing the problem.

Distinguishing short circuits from off-hook conditions in telephone risers

If local regulations require the ability to distinguish between a short circuit and an off-hook condition in a telephone riser, you must configure the circuit so that it functions as a 4-state telephone. The table below lists compatible riser selector modules and compatible telephone sets:

Table 8-27: Devices than can be used to configure a 4-state telephone

Riser selectors	Telephone modules
SIGA-CC1 SIGA-CC1S SIGA-MCC1 SIGA-MCC1S	Portable handset and receptacle (P/N 6833–1 and 6830–3) Remote telephone and wall box, Break Glass Type (P/N 6831–1 and 6830–1) Remote telephone and wall box, Nonbreak Glass (P/N 6831–4 and 6830–1)

For instructions on configuring a four-state telephone, refer to the installation sheet supplied with the SIGA input or output module.

Ground fault conditions

Ground fault conditions require selective isolation of portions of the data circuit to systematically narrow down the fault's location. A circuit with a ground fault (approximately 10 kΩ or less to ground) will cause the LCD module to light the Ground Fault LED. Ground fault conditions can occur on the data circuit, the 24 Vdc smoke power circuit or the input circuits to Signature series modules. The general location of a ground fault can be determined using the LCD status command and Table 8-28 below.

Table 8-28: Ground fault indications

LCD	Ground Fault Location
Ground Fault LED ON No Device Trouble	1. Signature data circuit 2. 24 Vdc smoke power circuit
Ground Fault LED ON Device PPCCDDDD Trouble	1. Positive leg of input circuit of device PPCCDDDD

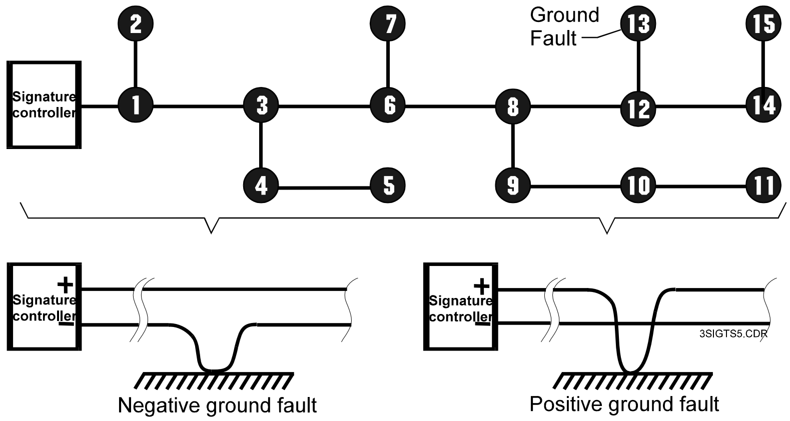


Figure 8-9: Signature data circuit ground faults

To isolate the ground fault, open the suspect circuit (both conductors) at a location that will disconnect approximately 50% of the installed devices. Figure 8-10 illustrates the technique on a data circuit. A similar technique is used on smoke power or module input circuits to isolate ground faults.

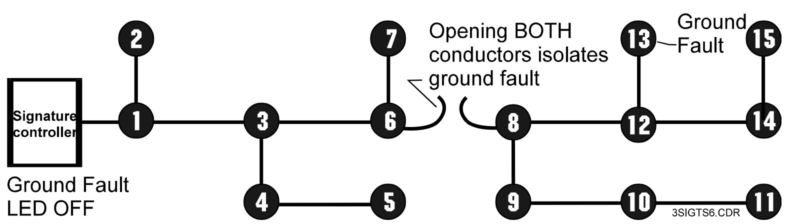


Figure 8-10: Ground fault isolation

If the LCD Ground Fault LED goes out, the ground fault is located on the portion of the circuit that has been disconnected.

If the LCD Ground Fault LED remains on and no devices restore, the short has been isolated to the first 50% of the circuit.

Re-connect the previously isolated portion of the circuit, and open the circuit at a new location. If during the first open circuit test the Ground Fault LED went off, open the circuit at a location “electrically farther” from the Signature controller module, and repeat the test. If during the first open circuit test the Ground Fault LED remained on, open the circuit at a location “electrically closer” to the 3-SSDC(1), and repeat the test. Continue to increase or decrease the number of devices on the opened circuit leg and you will eventually isolate a single device or wire segment that is causing the problem.

The ground fault detection circuitry requires approximately 30 to 40 seconds to respond when the fault is removed.

The panel performs a ground fault test for 2 seconds at 40-second intervals. If the system is working properly, the voltage between earth ground and logic negative should be between 12.3 Vdc and 16.8 Vdc during the 2-second test. The system reports a ground fault when the voltages are less than 12.3 and more than 16.8. In a non-faulted system, the voltage outside the 2-second test period may float randomly, but if the system is faulted the voltage is likely to be a fixed value such as 3 or 19.

Substituting known good Signature series devices

When substituting a “known good” detector or module in place of a suspect device, one of two scenarios can take place.

If the substituted device is the same model as the suspect device, the system accepts it with no further operator action. When the substituted device is installed, the system goes into trouble. When the quantity of devices defined on the circuit is reached, the system automatically remaps the circuit, stores the revised information, and returns to normal. This process may take a few minutes.

If the substituted device is a different model than the suspect device, when the device count is correct, the Signature controller module automatically remaps the circuit. A trouble occurs at the address of the suspect device as the result of a map fault, because the known good device’s parameters differ from those of the suspect device that was removed from the circuit. You must accept the parameters of the known good device to remove the map fault. These can be changed later.

You cannot use device substitution as a troubleshooting technique for Signature security devices. By design, the Signature controller does not automatically remap a replaced security device. This is intended to prevent swapping a security device with one that has been compromised for criminal purposes.

Detectors

When one or more devices are removed from a Signature Data Circuit for servicing, as shown in Figure 8-11, the panel will display a trouble condition for each device. If the System Definition Utility program (SDU) were connected to the panel, the DSDC Status screen would also indicate a trouble condition and the need to re-map.

If the detector is removed from an isolator base, the isolator will transfer.

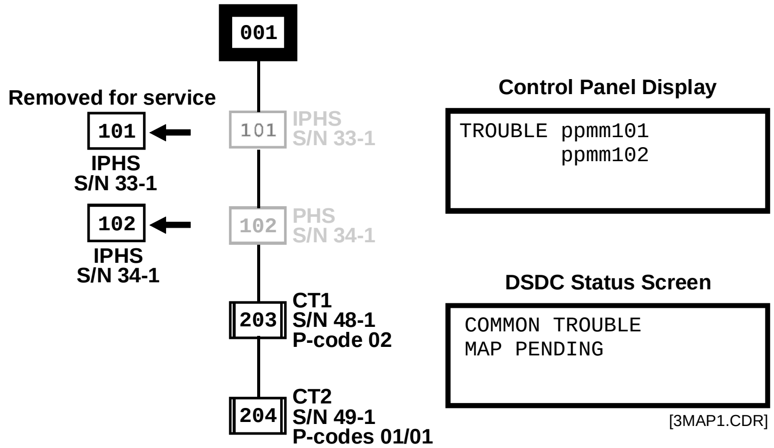


Figure 8-11: Detectors removed for service

If these devices are returned to their original locations, as shown in Figure 8-12, the map supervision function recognizes the detectors have been returned as originally installed (and mapped), and takes no additional action.

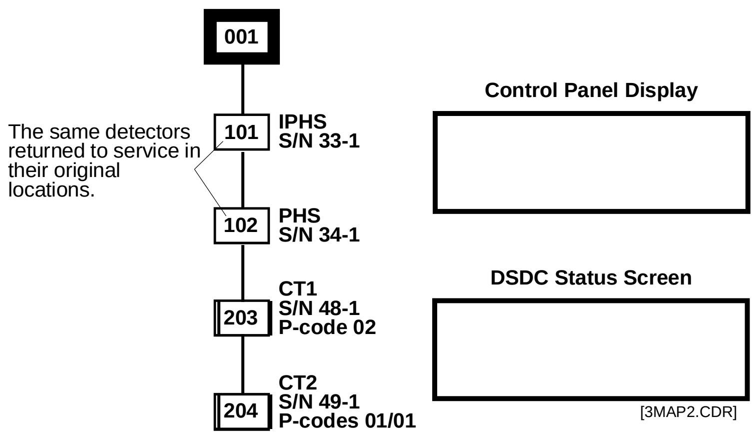


Figure 8-12: Detectors returned to service in original locations

If the devices are returned to the Signature Data Circuit but are not returned to their original locations, the map supervision function recognizes that previously mapped serial numbers occupy new map locations. Once the mapping supervision function has recognized the need to re-map the circuit, the panel is put in the “map pending” state. Once in the map pending state, the panel will automatically re-map the circuit when the quantity of devices re-installed on the circuit is equal to or greater than the quantity of devices defined in the original map. If the panel were connected to a computer running the SDU Program, the DSDC status function would indicate *map pending*.

In Figure 8-13, The PHS (S/N 34-1) originally installed at address 102 has been installed in the location originally occupied by the IPHS (S/N 33-1).

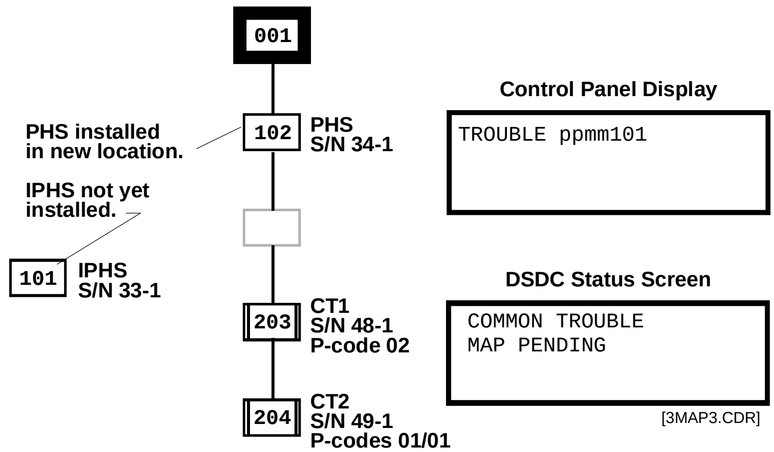


Figure 8-13: Partially restored circuit

Until all devices are re-installed on the circuit and the circuit is automatically re-mapped, the original S/N to panel address correlation is still valid. Examination of Figure 8-13 shows that the device address moves with the detector until the circuit is re-mapped. In this example, relocating the PHS detector temporarily relocated address 102. Until all devices are installed and the circuit re-mapped, testing a relocated detector will cause the panel to respond as though the detector was still installed in its original location.

During mapping, all devices remain operational and are capable of initiating an alarm. Figure 8-14 shows that both the IPHS and the PHS retain their old S/N to address correlations while the circuit is mapping. Mapping activity is indicated on the front panel display and the DSDC Status screen, if the data entry computer is connected.

Once mapped, the mapping supervision function will automatically correlate a panel address to a specific map location until manually changed using the data entry program.

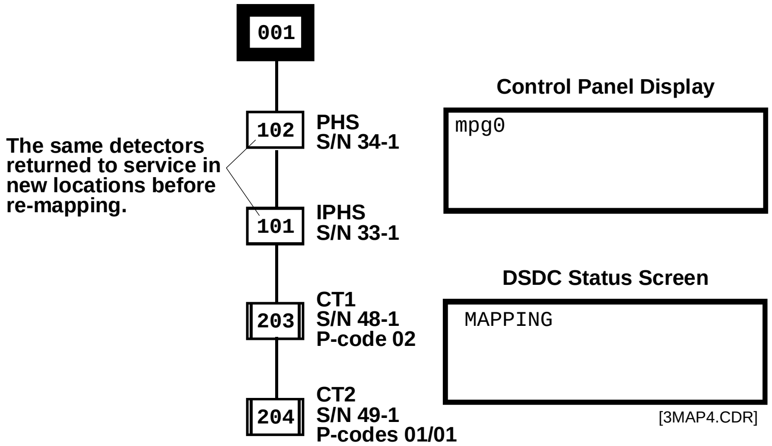


Figure 8-14: Detectors returned to new locations during re-mapping

Figure 8-15 shows the resultant map after re-mapping. Note that the new S/N to panel address correlations have been made, the IPHS is now correlated with address 102 and the PHS is correlated with address 101. The relocated devices will now respond as programmed for the original address location.

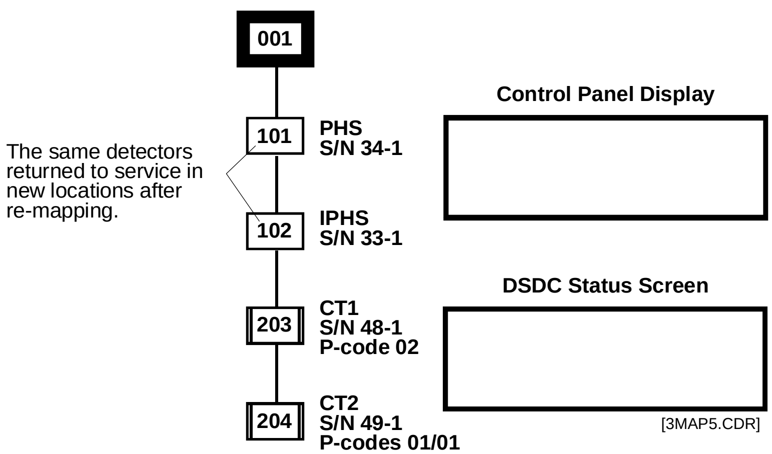


Figure 8-15: Final map

When a factory-new detector replaces an in-service detector, until mapped, the new detector is operational with a default address of 00. When the circuit is re-mapped, the new detector will be given the address assigned to its map location. If a factory-new detector is added over and above the expected number of devices on the circuit, it will be operational with a default address of 00, however the panel will be in trouble as the “actual map” contains one more device than the “expected map.”

Modules

When a module is replaced with another module of the same type, upon automatic re-mapping, the replacement module will be assigned the personality code of the module originally installed at that map location. If a module is replaced with a module of a different type one of three things can happen.

If you replace a single address module such as the SIGA-CT1, or SIGA-CC1, with a different type of single input module, the circuit will re-map all devices; however the new device type will not operate, due to incompatible personality codes. A map fault will be generated because the actual device differs from the expected device. The data entry program must be used to accept the new device type and clear the map fault.

Notes

- Do not replace factory-programmed devices such as pull stations and MM1 modules with a SIGA-CT1.
- For mapping purposes, give all manual pull stations the device type *pull*, regardless of their model numbers.

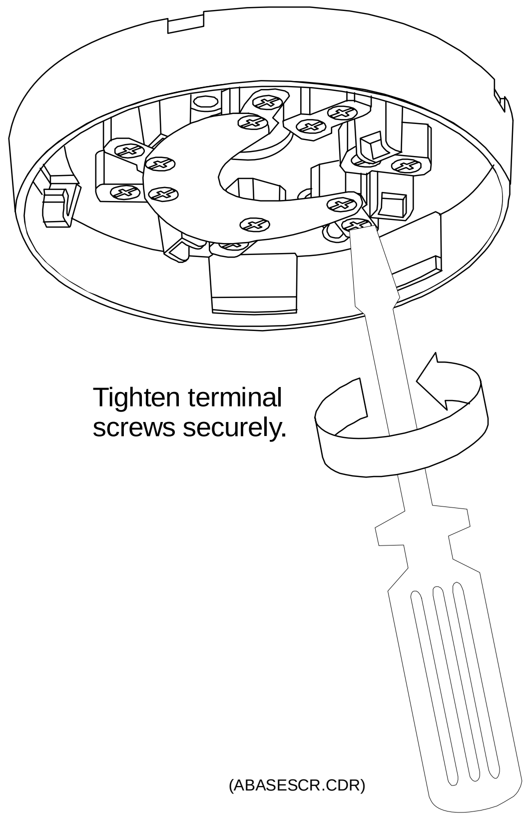
If a dual address module replaces a single address module, the panel will attempt to re-map all devices, however the circuit will not be successfully re-mapped. A map fault will be generated because the actual device differs from the expected device, and the dual address module will not operate. The data entry program must be used to accept the new device type and clear the map fault.

If a dual address module is replaced with a single address module, the panel will never attempt to re-map all devices because the panel does not see enough devices (one address less) to automatically re-map the circuit. The panel remains in the map pending mode and will not re-map. If the panel could be forced to re-map all devices, the circuit would still not be successfully re-mapped, because the actual device count differs from the expected device count. The panel will be in trouble with a map fault. The SDU program must be used to accept the new device type and clear the map fault.

Device type replacement

If a different Signature device model is substituted for the suspect device, when the device count is correct, the Signature controller module will automatically re-map the circuit. A trouble will occur at the address of the suspect device as the result of a map fault, because the known good device's parameters differ from those of the suspect device that was removed from the circuit. You must accept the parameters, which may be changed later, of the known good device to remove the map fault.

Signature series devices require a solid connection at their terminals. If a wire can be wiggled, it will be subject to contact resistance variations due to temperature changes, resulting in an intermittent connection, which will affect communication between the Signature devices and the control module. Use the proper size screwdriver and tighten all connections securely.



Signature controller modules

Substituting Signature controller modules

When substituting a "known good" Signature controller module in place of a suspect rail module, you must download the system configuration and Signature data circuit information into the CPU module. This operation requires a PC and the SDU Program.

The Signature controller module actually has two separate memories. The first memory contains the firmware that makes the module operate. If there is a problem with the firmware, or if an upgrade has been issued, the new firmware is downloaded into the module. When upgrading the module firmware (code), you do not need to download the "Bootstrap" data unless specifically instructed to do so.

The SDC configuration information is stored in the module's second memory. If you suspect that the module itself is bad, you must download the configuration information for the circuit that will be connected to the substitute module.

The database must be converted before it can be downloaded into the Signature controller.

Table 8-29: Signature controller module troubleshooting

Problem	Possible cause
Signature Data Circuit Open	1. Circuit incorrectly wired or connector loose 2. Defective detector or isolator base 3. Broken conductor 4. Device not installed on circuit 5. Device not entered into SDU databases
Signature Data Circuit Shorted	1. Circuit incorrectly wired (often crossed wires on a device base) 2. Defective detector, detector base, or module 3. Nicked insulation between conductors
Signature Data Circuit Ground Fault	1. Pinched wire between device and electrical box 2. Nicked wire insulation

Mapping errors

Table 8-30 provides basic information on mapping errors. For detailed information on identifying and locating mapping errors, refer to the SSDC Diagnostic and Status sections found later in this chapter.

Table 8-30: Mapping errors

Fault	Possible causes
Mapping Error	1. A discrepancy between the internal map and the devices installed on the Data Circuit (serial #, personality code, or device type) 2. Device ID entered incorrectly into SDU database 3. More than 124 “T-taps” on a data circuit 4. Excessive circuit resistance 5. Excessive circuit capacitance
System continues to re-map data circuit	1. An intermittent connection causing one or more devices to loose then re-establish communication with the Signature controller module 2. A defective device or detector base
Device Type Error	1. There is a discrepancy between the device type recorded on the internal map and the device installed on the Data Circuit

Device troubleshooting

Each Signature series device has a red and green LED. Their functions are indicated in Table 8-31. These LEDs are useful when trying to determine the communication and alarm or active status of Signature devices.

Table 8-31: Signature device LEDs

LED	Device status
Green flashing	Normal communication
Red flashing	Alarm or Active (either input of dual input modules)
Red and Green steady	Stand-alone Alarm or Active (either input of dual input modules)

Table 8-32 lists common troubles and possible causes for Signature Series modules. For detailed information on identifying and locating Signature device problems, refer to the Signature Diagnostic Tools Section found later in this chapter.

Table 8-32: Signature module troubleshooting matrix

Module not responding correctly

CC1	CC2	CR	CRR	CT1	CT2	MM1	UM	WTM	Possible Causes
x	x	x	x	x	x	x	x	x	Module installed in wrong location or improperly addressed
x	x	x	x	x	x	x	x	x	Module not entered into Signature database
x	x			x	x		x		Incorrect personality code loaded into module
					x		x		Personality code for unused portion of module not set at 0 (P-codes 1, 2, 3, 4, 8, 13, 14, 16, and 18)
							x		Jumper JP1 set incorrectly (P-code 8)
							x		24 Vdc for smoke power low or missing (P-codes 3, 14, 18, 20, and 21)
					x		x	x	Inputs 1 and 2 swapped (P-codes 1, 2, 3, and 4)
	x								Signal sources 1 and 2 swapped (P-code 7)
x	x	x		x	x	x	x	x	Ground Fault on data circuit or (-) side of input / output circuit

Module in trouble on Signature controller module

Table 8-32: Signature module troubleshooting matrix

x			x	x	x	x	x	x	Module missing or incorrectly wired on Signature data circuit.
x			x	x	x	x	x	x	Mapping error. Module not loaded into Signature database
x				x	x	x	x	x	Ground Fault on input or output circuit
x	x						x		Output circuit open, shorted, incorrectly wired, polarized device installed in reverse, incorrect or missing EOL resistor
				x	x	x	x	x	Missing or incorrect EOL resistor (P-codes 1, 2, 3, 4, 13, 14, 16, 18, 20, 21)
							x		24 Vdc for smoke power low or missing (P-codes 13, 14, 18, 20, and 21)
Module incorrectly in alarm or active on Signature controller module									
				x	x	x	x	x	Initiating device circuit shorted or initiating device incorrectly installed
				x	x	x	x	x	Incorrect EOL resistor value (too low)

x = Applicable for module

This table also applies to equivalent M-series components and products that emulate these module types.

Table 8-33: Signature detector troubleshooting

Symptom	Possible causes
Detector not responding correctly	1. Detector installed in wrong location or improperly addressed. 2. Detector not entered in system database. 3. Incorrect device response in database.
Detector in trouble on CPU	1. Detector missing or incorrectly wired on Signature data circuit. 2. Mapping error. Detector not loaded into control module database. 3. Ground Fault on Signature Data circuit 4. Internal detector fault. Refer to Advanced Techniques Section.
Detector incorrectly in alarm on control panel.	1. Detector extremely dirty. 2. Ionization detector installed in area of extremely high airflow. 3. Detector installed in area of high ambient smoke. 4. Defective detector.

Signature diagnostic tools

The SDU Signature diagnostic tools are designed to assist the installing technician in isolating and correcting faults with the Signature Data Circuit (SDC), detectors and modules. The troubleshooting techniques described in the basic Signature troubleshooting section should be tried before using these tools.

Using Signature diagnostics

Tip: Signature diagnostic tools are on the SDU Tools menu.

To access the Signature diagnostic tools, Click Tools on the main menu bar, then click Signature Series diagnostics.

Signature device circuit selection

The Signature diagnostic tools affect only the SDC circuit that is specified in the drop down list boxes at the top of the DSDC Diagnostics window, as shown in Figure 8-16.

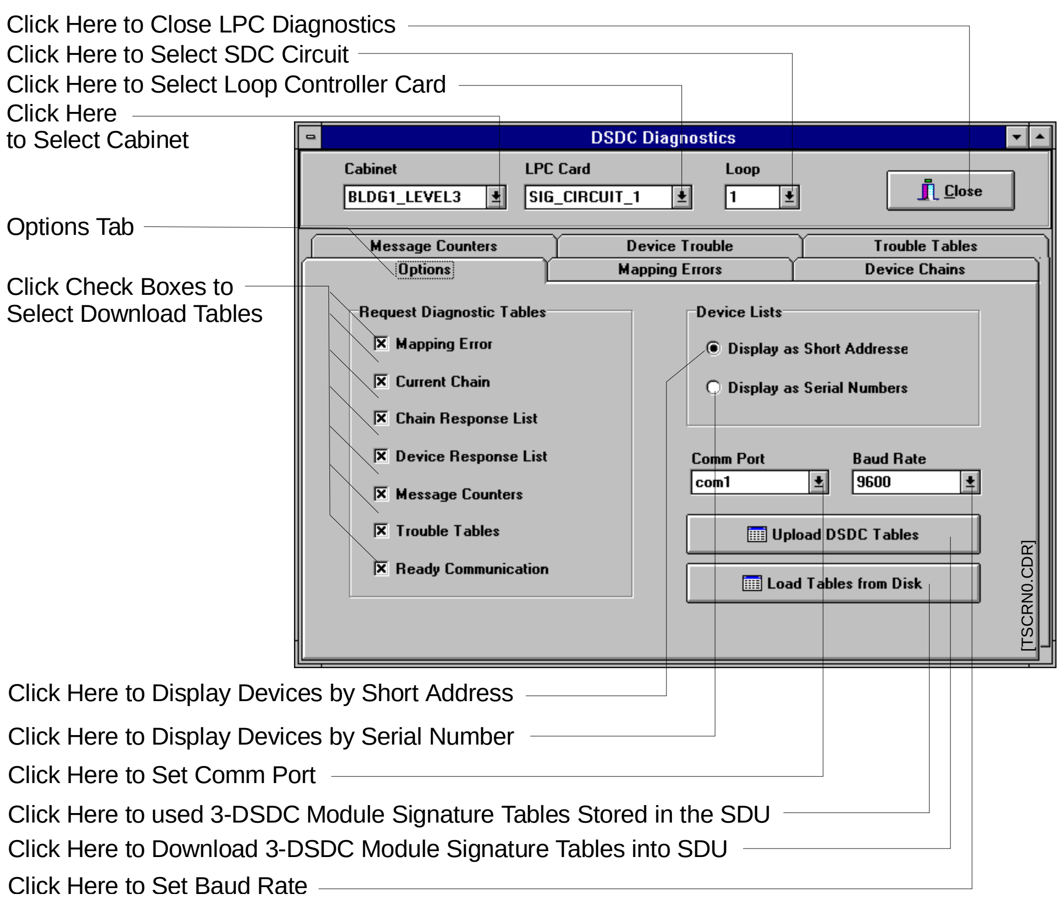


Figure 8-16: Options Screen

Select the cabinet that houses the Signature controller module with the trouble condition, using the Cabinet drop-down list.

Select the label of the Signature controller module with the trouble condition.

Select the loop (Signature Data circuit) on the module having the trouble condition, using the loop (SDC) drop down list.

COM port and baud rate

Note: You must upload Signature data from the Signature controller module into the SDU program before you can use the Signature diagnostic tools.

To use the Signature diagnostic tools, the information from the faulty Signature data circuit or device must first be read (uploaded) into the System Definition Utility (SDU) program. Use the COM Port and Baud Rate drop down lists to set the COM port parameters on the SDU computer that is to be used during uploading. The suggested baud rate is 19200.

Upload

To upload the Signature data from the Signature controller module into the SDU program, click the Download DSDC Tables button. When the Signature data has been downloaded from the Signature controller module, it is stored as part of the project. The Signature data can be recalled without being connected to the module by using the Load Tables from Disk button.

Serial number or short address

The devices listed in the diagnostic tables can be displayed by serial number or short address. You can mix short address and serial number displays using the Requested Diagnostic Table check boxes and the Device Lists radio buttons in combination.

Signature diagnostic sequence

Table 8-34 lists the suggested sequence when using the Signature Diagnostic tools to isolate problems on a Signature Data Circuit and problems with individual Signature devices.

Table 8-34: Signature troubleshooting tool sequence

SDC circuit faults	Signature device faults
1. Mapping Errors	1. Device Tables
2. Device Chains	2. Trouble Tables
3. Message Counters	

Displaying mapping errors

Mapping errors prevent the system from generating a successful Signature Data Circuit map. To display errors generated during the mapping process, click the Mapping Errors tab. The Mapping

Errors text box lists the eight (8) most recent mapping errors. The Total Errors field lists the total number of mapping errors that have been identified. Clicking on an error in the list highlights the error, and displays the appropriate troubleshooting tip in the lower Troubleshooting Tips text box.

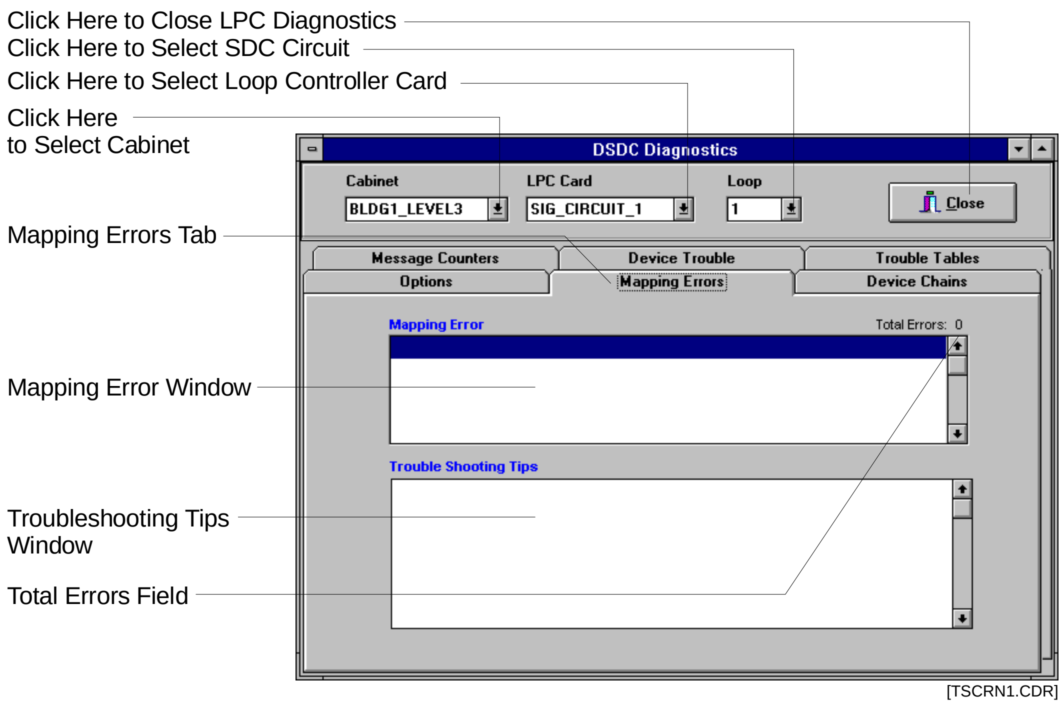


Figure 8-17: Mapping errors dialog box

Table 8-35: Mapping error messages

Message	Suggested corrective action
The mapping command failed because the sensor did not draw current or it was not possible to obtain stable mapping data from the SDC.	Indicative of faulty wiring on the circuit, or a faulty device. 1. Verify correct wiring. 2. Verify operational devices. 3. Review the Chain Response List. 4. Review the Device Response List.
While mapping a chain from a device back to the Signature controller module, the chain was built with “holes” in it.	Indicative of devices not operating consistently. 1. View the Chain and Device Response Lists to see a list of the devices that are present in the chain being processed. 2. Compare the serial numbers in the above lists with the actual wiring to identify a conflict.

Table 8-35: Mapping error messages

Message	Suggested corrective action
The map tables are inconsistent.	1. Upload the current map. 2. Compare current map with expected map. 3. Write the map back to the Signature controller module.
The actual SDC map does not match the stored expected map.	1. Upload the current map. 2. Compare current map with expected map. 3. Write the map back to the Signature controller module
Setting the Address in the device failed.	1. Review the Serial Number or Short Address. If missing, replace the device. 2. Persistent problem is indicative of a wiring fault.
Map supervision failure. The map in use has invalid data. This error initiates an automatic reconstruction of the map.	1. Please wait for automatic map reconstruction to complete before continuing.
Mapping supervision detected a change on the SDC. A rebuild of the map was scheduled.	1. Please wait for automatic map reconstruction to complete before continuing.
Mapping supervision detected that the device address or the short address of the device being supervised has changed. A rebuild of the map was scheduled.	1. Please wait for automatic map reconstruction to complete before continuing.
The mapping command failed, the sensor did not draw current or it was not possible to obtain stable mapping data from the SDC. A rebuild of the map was scheduled.	1. Please wait for the automatic map reconstruction to complete before continuing.
Mapping was aborted by an external event, such a new start on a device. A rebuild of the map was scheduled.	1. Please wait for the automatic map reconstruction to complete before continuing.
Mapping supervision detected that the Device Type of the Device being supervised has changed. A Map Fault was flagged.	1. Replace the device. 2. Correct the Signature controller module programming.
Mapping was aborted because there is short or open on the SDC wiring.	1. An open or short on a Class A circuit. 2. A short across the entire Class B circuit. 3. A Reset may be needed to restart mapping.
Unable to recreate current map at panel startup. The panel will re-map to reconstruct the map.	1. Please wait for the automatic map reconstruction to complete before continuing.

Table 8-35: Mapping error messages

Message	Suggested corrective action
Assignment of a short address to a device failed. This could lead to duplicate short addresses and mapping failures.	1. View the Chain and Device Response Lists to see a list of the devices that are present in the chain being processed and identify the failed device. 2. Replace the device. 3. Persistent problem is indicative of a wiring fault.
Mapping has been disabled.	1. Enable mapping.
While mapping a chain from a device back to the Signature controller module, the chain appears to have 2 devices at the same location in the chain.	1. Indicative of faulty wiring on the circuit, or a faulty device. 2. Review the Chain and Device Response lists to identify the conflict.
More than 125 End of Line devices have been found on the SDC.	1. Correct the wiring. 2. Re-map the circuit.
While mapping a chain from a device back to the Signature controller module, the chain was found to have a device present past the end of the chain. This indicates that at least one device is responding improperly to the mapping commands.	1. Click the Device Chains tab to see a list of the devices that are present in the chain being processed. 2. Compare the serial numbers or short addresses with the actual wiring to identify the problem.
Mapping has detected a difference between the device at the end of line and the devices in its chain.	This indicates that devices not communicating properly. 1. Click the Communication List tab to see a list of the devices that are communicating. 2. Compare the serial numbers or short addresses with the actual wiring, in order to identify the conflict.

Displaying device chain errors

A chain is a list of devices connected between the Signature controller module and a device being interrogated during circuit mapping. The chains and sub-chains created during the mapping process evolve into the circuit map.

Should a circuit fail to map properly, further insight into the problem may be gained by investigating the devices making up individual chains and sub-chains.

To display a chain generated during the failed mapping process, click the Device Chains tab. Four categories of device chains are listed. Each list displays the short address or serial number of the devices in the chain. The total number of entries in each list is indicated at the bottom of the list. To determine the position of a specific Signature device in the chain, click the small data entry box at the top of each column and enter the device's short address or serial number. The position field at the bottom of the column will indicate the selected device's chain position and the cursor will move over that device entry in the main list.

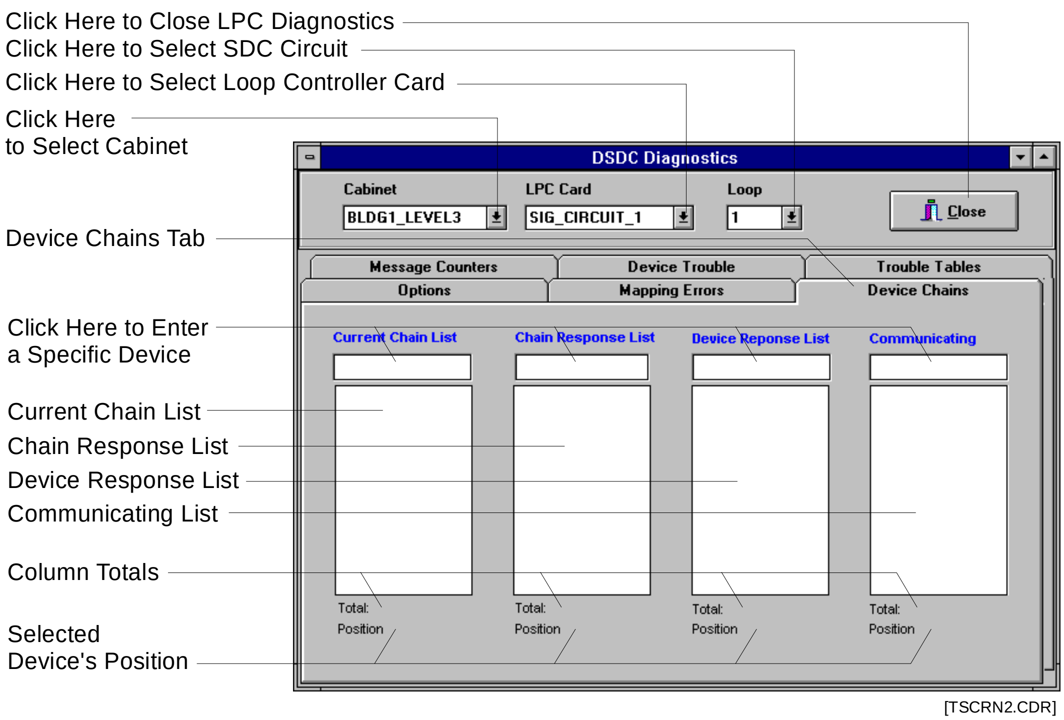


Figure 8-18: Device chains dialog box

Current chain list

The Current Chain List displays the sequence of Signature devices in the chain or sub-chain that was being created when the mapping failure occurred.

Chain response list

The Chain Response List displays the sequence of Signature devices in the *main chain*, when the mapping failure occurred.

Device response list

The Device Response List displays the sequence of Signature devices in a *sub-chain* that was being created when the mapping failure occurred.

Communicating list

The Communicating List displays a list of all Signature devices seen by the Signature controller module.

Using the chain lists

An element in the displayed chain caused the map fault. Examine the chain and look for gaps within the short address or serial number lists of a chain or sub-chain.

- Gaps in the list indicate areas that were not successfully mapped. A gap within the chain does not mean that the missing device has a problem, only that that device was not successfully mapped.
- Compare the Chain and Device response lists. All the devices on the Device Response list should also appear on the Chain Response list.
- Look for duplicate short addresses or serial numbers on the same list.

Failure of a device to successfully map may be the result of a problem with another device, or wiring in a chain or sub-chain not directly connected to the unmapped device. Although the missing or duplicate devices are not always the cause of map failure, good troubleshooting technique suggests that these devices be examined for defects, wiring errors, and duplicate entries in the SDU program, etc.

Displaying message counters

During normal operation, the Signature controller module issues numerous communication messages to the Signature devices on its SDCs. The message counters indicate how many times a communication message has been issued and the number of successful return messages.

To display the message counters, click the Message Counters tab.

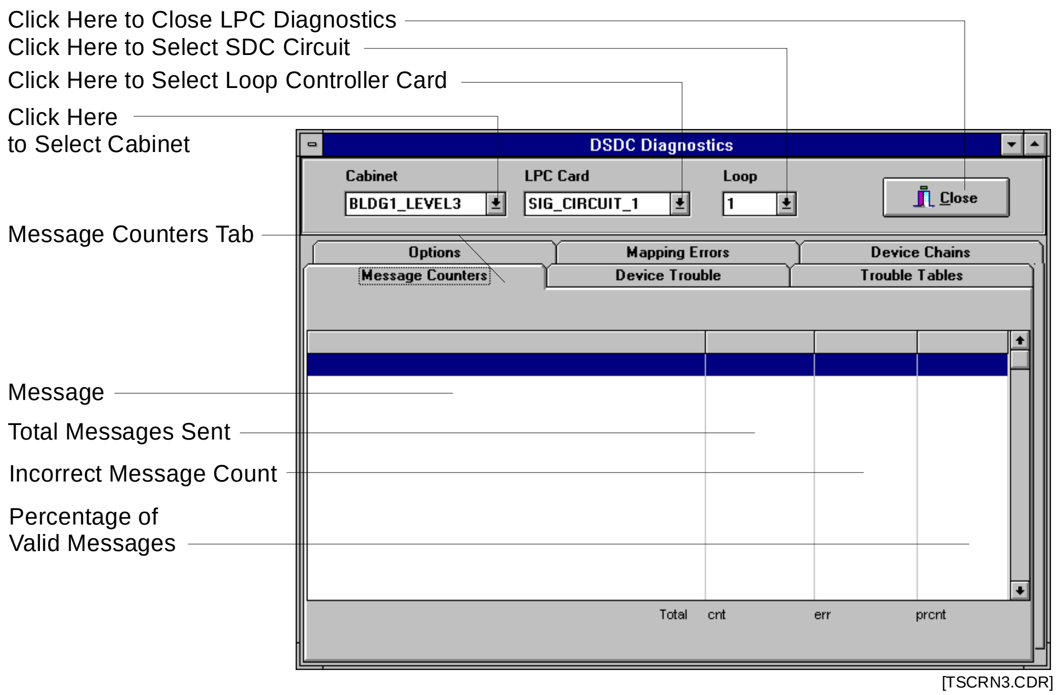


Figure 8-19**:** Message counters dialog box

The message command appears in the left column, followed by the number of times it has been issued, the number of errors received after the message was issued, and the percentage of correct responses. During normal operation, the percentage of messages received correctly should exceed 99%.

Intermittent device or wiring problems are indicated by a low successful message rate. If successful message rates are tracked over time, one can generate base line information for each circuit. From the base line information, any changes from the norm can be quickly identified, and preventive measures taken, before a communication problem develops. Table 8-36 lists the messages sent and received by the Signature driver controller module.

Table 8-36: Signature controller module Internal Messages

Query End Of Line	Query Relay Status	Find New Start
Query Isolator	Ground Fault Check	Find New Active
Query Status	Query Device Mask	Find New Unused2
Pulse Visible LED	Query Group Mask	Find New Unused3
Query Map Result	Module PFX	Reset Device
Query Alarm Status	Query Ready Comm	Enable Device
Query PreAlarm Status	Find Serial Number	Disable Device
Query Normal Status	Find New Alarm	Start Device

Table 8-36: Signature controller module Internal Messages

Query Trouble Status	Find New PreAlarm	Enable Visible LED
Query New Start Status	Find New Normal	Disable Visible LED
Query Active Status	Find New Trouble	Enable External Output
Disable External Output	Assign All Address	3-SDC Processor Status Query
Open Line Isolator	Relay Control	3-SDC Enable Loop
Close Line Isolator	Read Software Version	3-SDC Disable Loop
Reset Device Status	Read Device Status	3-SDC Line Initialization Complete
Move EEPROM to RAM	Read Sensor Values	3-SDC Send a Device Msg.
Assign Short Address	Read Specific Trouble	3-SDC Get a Device Reply
Assign Group Address	Read Value From RAM	3-SDC Configure Loop
Enter Service Mode	Send Value to Visible LED	3-SDC Query Current Configuration
Select Sensors	Query New Status	3-SDC Send Signal Rate
Write Value to RAM	3-SDC Command Initiate Reset	3-SDC Query Signal Status
Write Value to EEPROM	3-SDC Command Initiate Restart	

Displaying device trouble

Each Signature device is equipped with a 32-bit trouble register. Should a device's trouble bit be set *at any time in the device's history*, the device and the nature of the trouble will appear in the Latching Troubles By Device Address window. Clicking on the device will reveal a list of the trouble conditions affecting that device. Click the device a second time to remove the trouble listing.

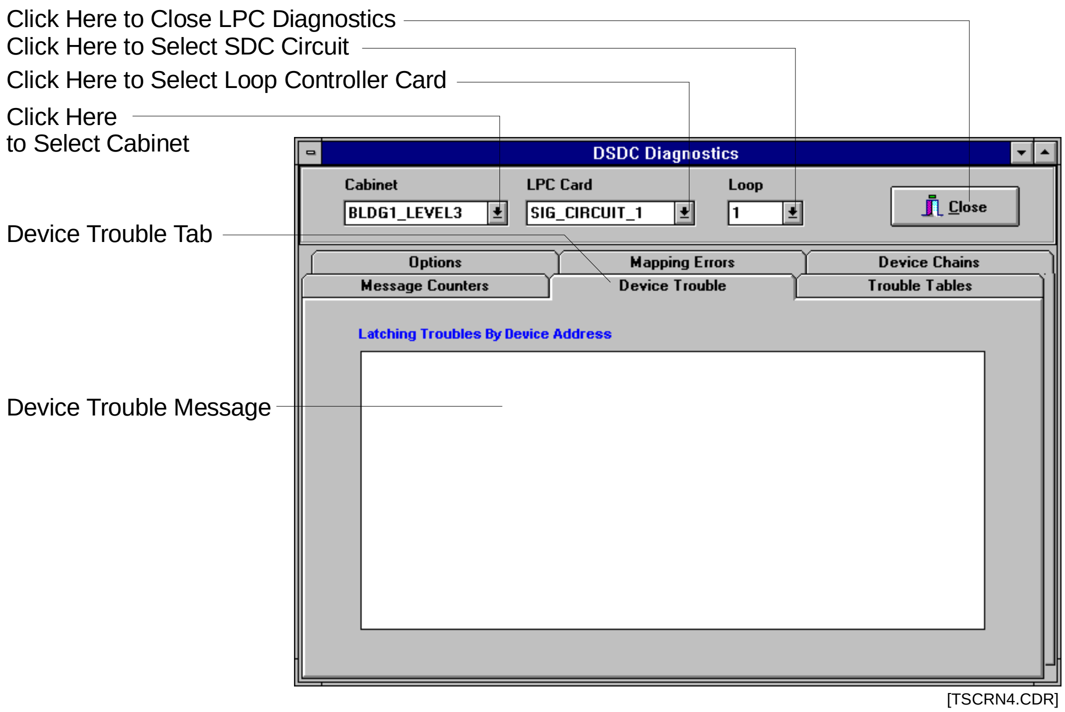


Figure 8-20**:** Device trouble dialog box

Table 8-37 below lists the Signature *Detector* trouble messages, and possible causes and solutions. Table 8-38 lists the Signature *Module* trouble messages, and possible causes and solutions.

Table 8-37: Signature detector trouble messages

Trouble message	Possible cause	Possible solution
External Device Line Short	Defective Detector	Replace Detector
External Device Line Open	Defective Detector	Replace Detector
Error XMIT Light	Detector Dirty	Clean detector
Device switched to short after isolator relay operated	Short on Signature data circuit	Locate and remove cause of short.
ESK Value Too Low	1. Dirty Detector 2. Bad Ion Chamber	1. Clean Detector 2. Replace Detector
ESK Slope Too High	1. Dirty Detector 2. Bad Ion Chamber	1. Clean Detector 2. Replace Detector
ESK Slope Too Low	1. Dirty Detector 2. Bad Ion Chamber	1. Clean Detector 2. Replace Detector
Quiescent Too Large	Devices on the Signature data circuit are drawing too much current during the mapping process.	Place a short or low resistance shunt across the data circuit.

Table 8-37: Signature detector trouble messages

Trouble message	Possible cause	Possible solution
Quiescent Too Small	Devices on the Signature data circuit are not drawing enough current during the mapping process.	Check the device wiring or replace the device.
Short on Relay Base	Bad Relay Base	Replace Relay Base
External or Isolator Relay Failure to Switch	Bad Base	Replace Base
External or Isolator Relay Switched	1. Bad Relay Base 2. External Electrical Noise	1. Replace Relay Base 2. Remove or Shield Noise Source
“O” Value Too Small	Bad Base	Replace Base
Ion Rate-of-Rise Too High	Bad Ion Chamber	Replace Detector
Ion Quiescent Too High	Dirty Detector	Clean Detector
Ion Quiescent Too Low	Dirty Detector	Clean Detector
Ion Value Too Low	Defective Detector	Replace Detector
Thermal Value Too High	Bad Base	Replace Base
Thermal Value Too Low	Bad Base	Replace Base
A/D Converter Fault	Defective A/D converter	Replace Detector
EEPROM Checksum Error	Bad EEPROM	Replace Detector
EEPROM Write Time-out	Bad EEPROM	Replace Detector
Unknown Device Type	Bad EEPROM	Replace Detector
EEPROM Write Verify Fault	Bad EEPROM	Replace Detector
Ambient Light Too High	1. Dirty Detector 2. Outside light reaching detector chamber	1. Clean Detector 2. Eliminate light source
Photo Quiescent Too High	Dirty Detector	Clean Detector
Photo Quiescent Too Low	Dirty Detector	Clean Detector
Photo Value Too High	Bad Base	Replace Base

Table 8-38: Signature module trouble messages

Trouble message	Possible cause	Possible solution
Open data Circuit	See Table 8-32	See Table 8-32
Shorted data Circuit	See Table 8-32	See Table 8-32

Table 8-38: Signature module trouble messages

Trouble message	Possible cause	Possible solution
Relay switched	Relay toggled from actual state	Manually reset relay Replace Module
Data circuit ground fault	See Table 8-32	See Table 8-32
Vector Current Too Large	Devices on the Signature data circuit are drawing too much current during the mapping procedure.	Short or low resistance shunt on Signature data circuit
Vector Current Too Small	Devices on the Signature data circuit are not drawing enough current during the mapping procedure.	Excessive circuit resistance Defective base Defective wiring
EEPROM Not Initialized	EEPROM not properly programmed	Replace module
EEPROM Write Time-out	Bad EEPROM	Replace module
A/D Time-out	Defective A/D converter	Replace module
EEPROM Write Verify Fault	Defective EEPROM	Replace module
Line Monitor Trouble	Signature data circuit voltage low	Check Signature data circuit
Class A Trouble	Open or shorted input or output circuit	Check input / output circuit wiring
3rd Wire Trouble	Voltage is out of range on the wire that supplies 24 Vdc power to SIGA-UM.	Check power supply output Check wiring
3rd Wire Trouble	Voltage on the wire supplying 24 Vdc smoke power to SIGA-UM is out of range.	Check power supply output. Check wiring
RAM Not Programmed	Bad RAM	Replace Module

Displaying trouble tables

Note: You must be actively connected to the network via download cable to display the trouble tables.

The Trouble Tables display eight categories of *active* device trouble. Each list displays the short address or serial number of the devices experiencing that trouble condition. The total number of devices in each list is indicated at the bottom of the list.

The active troubles displayed in the Trouble Tables should be compared with a device’s trouble history displayed in the Display Device Trouble lists, to determine any possible trouble pattern.

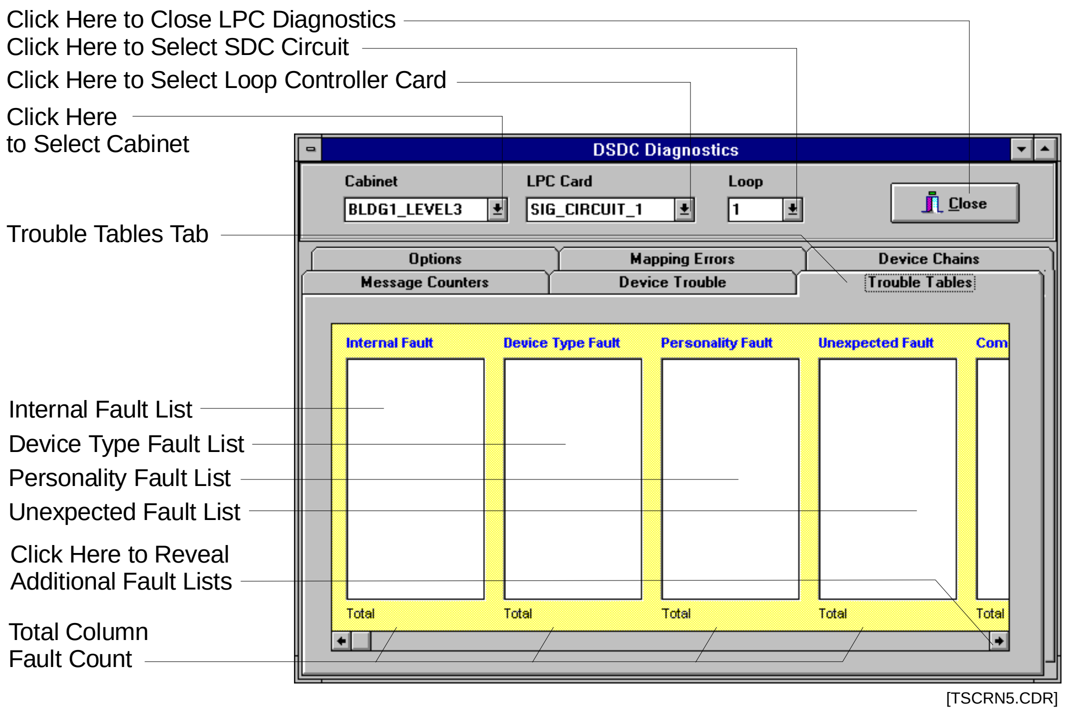


Figure 8-21: Trouble Tables dialog box

Internal fault

The Internal Fault List indicates an internal problem with a Signature Device or Module. Refer to the Displaying Device Trouble section to determine the specific cause.

Device type fault

The Device Type Fault List indicates that the device type entered in the SDU does not agree with the device type installed on the SDC.

Personality fault and sensitivity fault

The Personality Fault List indicates that the personality code (p-code) of a Signature module entered in the SDU does not agree with the p-code of the module actually installed on the circuit. The Sensitivity Fault List indicates that the sensitivity of a Signature detector entered in the SDU does not agree with the sensitivity of the detector actually installed on the circuit.

Personality and sensitivity faults should be corrected by the system, and these faults should clear automatically.

Unexpected fault

The Unexpected Fault List displays the serial number of devices which appear on the actual circuit, but which were not listed in the SDU program.

Communication fault

The Communication Fault List indicates those Signature devices that are not communicating with the Signature controller module.

Open fault

The Open Fault List indicates those Signature modules with an open on their input or output circuits (all p-codes except 8.)

Ground fault

The Ground Fault List indicates those Signature modules with a ground fault on their input or output circuits (all p-codes except 8.)

Short fault

North American marketplaces: The Short Fault List indicates those Signature modules with a short on their supervised output circuits (p-codes 5, 7, 15, 16.)

European marketplace: The Short Fault List indicates those Signature modules with a short on their supervised input circuits (p-codes 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 20, 21) and those Signature modules with a short on their supervised output circuits (p-codes 5, 7, 15, 16.)

Brand fault

Incorrect brand of Signature devices installed on SDC.

DSDC status

Introduction

The DSDC status function is used to determine the *real-time* status of a Signature Data Circuit (SDC). This function is useful in isolating and correcting faults on an SDC. The DSDC status function is useful in conjunction with the download and DSDC diagnostic functions.

Setting up the System Definition Utility program

In order to use the DSDC Status function, the computer running the SDU program must be connected to the 3-SSDC(1). The appropriate communication port must be connected to the modular phone jack on the Signature controller module or on the CPU module.

Com port and baud rate settings can be made directly from the DSDC Status window. The default baud rate is 9600 baud.

Using DSDC status

To access the DSDC Status function, click Tools > Signature Status.

Select the SDC to be monitored by using the Cabinet, SSDC, and Loop drop down lists.

The Delay drop down box sets the interval at which the status screens receives updated information from the Signature controller module. The default value is 3 seconds. Increasing the delay time permits the module to process more information between reports to the SDU, thus decreasing the overall time it takes to generate a full status report.

To start the DSDC Status function, click the Start Status Button. Should the Confirm window appear after a short delay, the SDU computer is not communicating with the 3-SSDC(1).

Verify the module address, download wiring, COM port, and baud rate are set correctly and click the retry button. If communications fail when connected to the module via the CPU, try connecting directly to the modular phone jack on the Signature controller module.

Displaying the current SDC status

Click the Current Status Tab at the bottom of the window to display an annunciator panel showing the real-time status of the connected SDC. Refer to Table 8-39 to interpret the indicators.

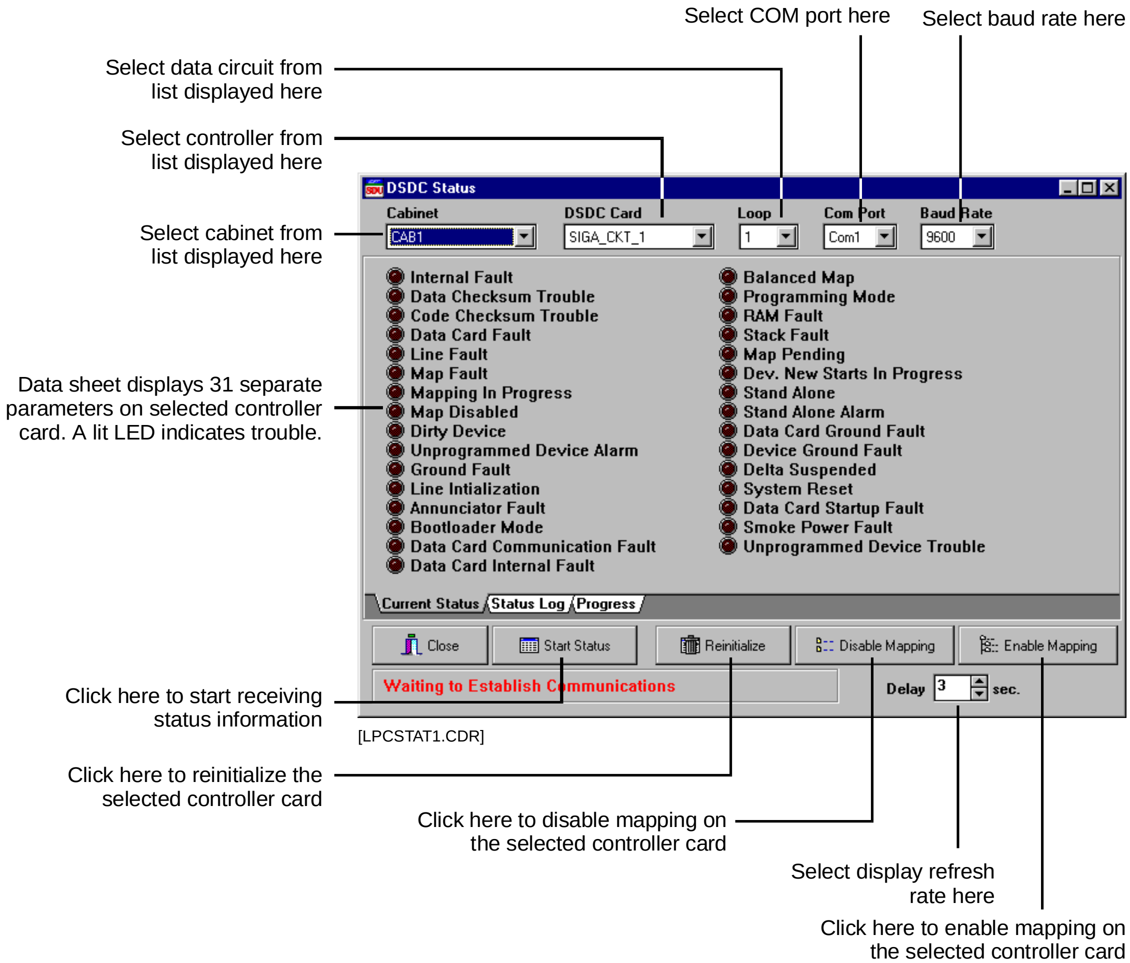


Figure 8-22: DSDC Status dialog box

Table 8-39: Current status parameters

Indicator	Function
Internal Fault	Signature controller module hardware problem
Data Checksum Trouble	Configuration data bad
I/F Fault	3-SDC Card hardware problem
Line Fault	SDC open or shorted
Map Fault	Memory contents differ from actual SDC device conditions.
Mapping in Progress	The Signature controller module is currently mapping the SDC
Map disabled	The mapping process has been manually turned off

Table 8-39: Current status parameters

Indicator	Function
Dirty Device	A dirty smoke detector has been identified
Unconfigured Alarm	The module has detected an alarm on a device which is not in its database
Line Initialization	SDC power on phase, devices not supervised
Serial Table Full	Indicates when data controller card needs to be reinitialized
I/F Communication Fault	Signature controller module to 3-SDC communication problem
I/F Internal Fault	3-SDC card hardware problem
Balanced Map	Two or more device strings appear identical to the system.
Programming Mode	Signature controller module in upload or download mode
RAM Fault	Internal memory problem
Stack Fault	Internal program error
Map Pending	Ready to map SDC when SDC conditions warrant
Dev. New Starts in Progress	The Signature controller module is processing a new SIGA device start up
Stand Alone	The SDC is in the stand alone mode
Stand Alone Alarm	The module has detected an alarm while in the stand alone mode
Ground Fault	The SDC wiring has low resistance continuity to ground
Device Ground Fault	A SIGA module IDC/NAC has low resistance continuity to ground
Delta suspended	Module in reset phase. No changes reported by Signature controller module

Displaying a log of current SDC status events

Click the Status Log Tab at the bottom of the window to display a chronological list of the events that occurred on the SDC after the Start Status Button was activated.

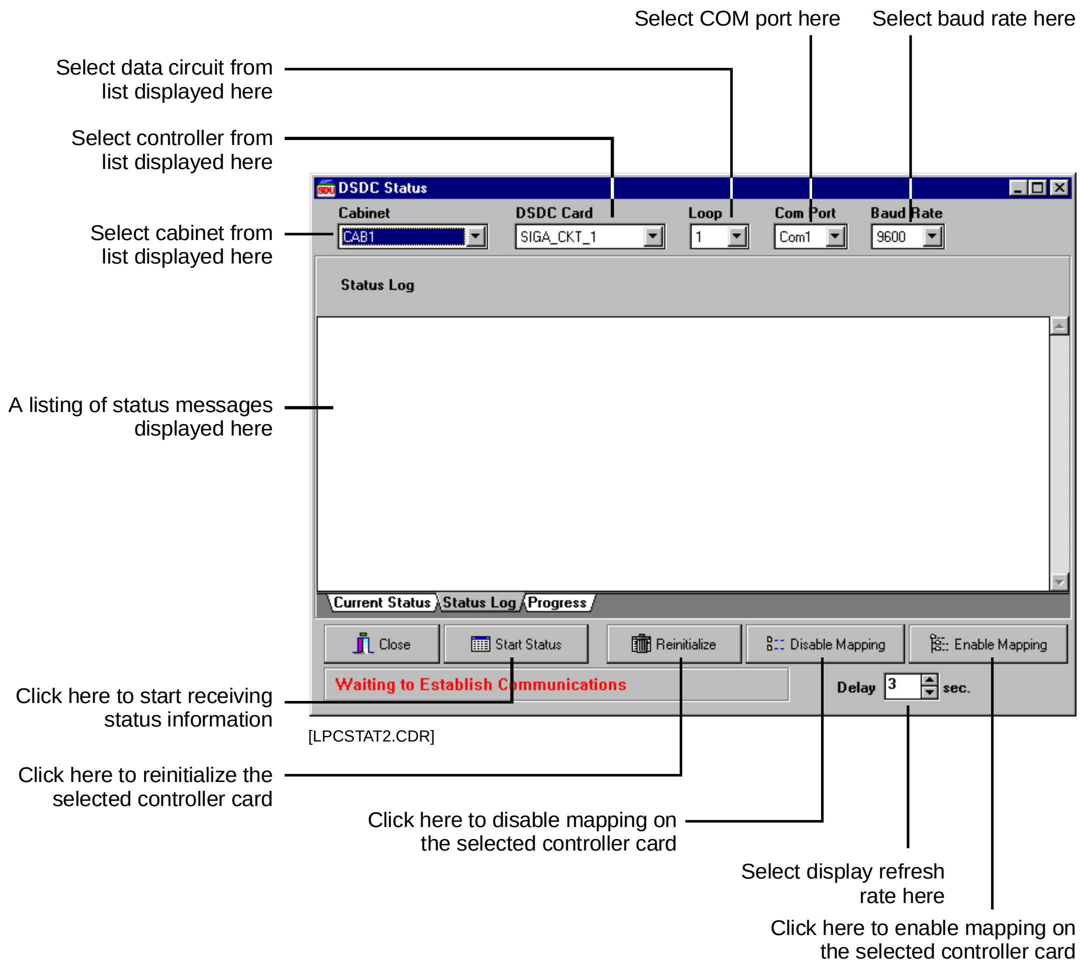


Figure 8-23: DSDC status event log

Displaying the SDC in-process progress chart

Click the Progress Tab at the bottom of the window to display a graphical presentation of the five major processes that take place during SDC configuration:

- Finding device serial numbers
- Communicating with individual devices
- Mapping the devices
- Verifying the End Of Line (EOL) status of a device
- Programming parameters into a device's memory

This display is useful in determining an overall picture of SDC configuration activity.

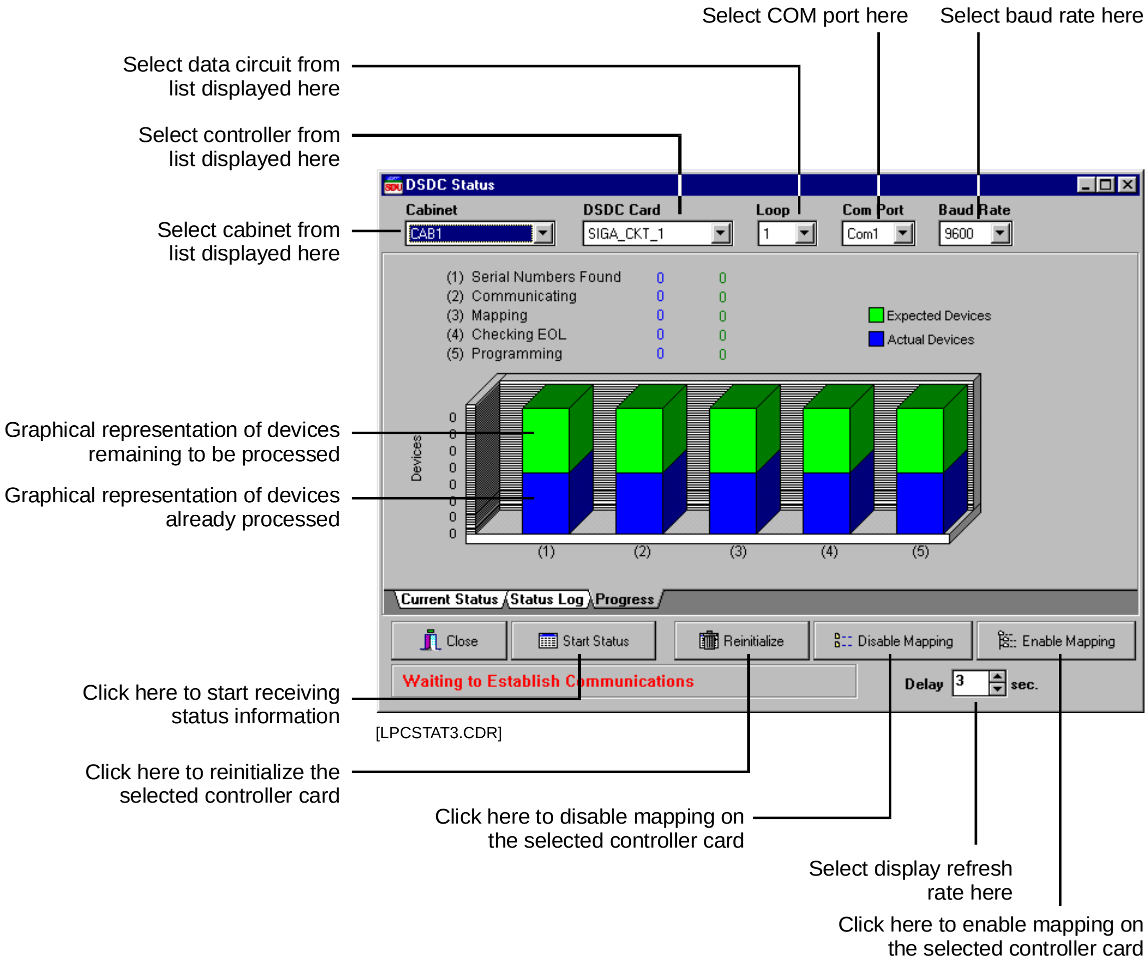


Figure 8-24: DSDC in-process progress chart

Addressable analog diagnostic tools

The SDU addressable analog diagnostic tools are designed to assist in isolating and correcting faults with addressable analog circuits, detectors, and modules.

System definition utility

The quickest method for isolating most common problems is with the Systems Definition Utility (SDU) diagnostic tools.

1. Connect the computer that runs the SDU to the system, and open the appropriate project.

   If the actual project is not available, create a phantom project with an empty 3-AADC1 circuit and connect directly to the module in question.

2. From the menu bar, select Tools > System Sensor > Diagnostics.
3. On the Options tab, clear the selection from Message Counters, and upload. Trouble Tables, Ready Communication, and Display as Device Addresses should be selected.
4. Click: Upload AADC Tables.
5. Select the Status Tables tab when the table upload is complete.

Addressable analog diagnostic table interpretation

Each table lists the addresses for the modules and sensors reporting the associated condition with a total at the bottom. When displayed as Device Addresses, sensor addresses correspond with the rotary switch setting, and modules are reported as 100 plus the rotary switch setting. Multiple faults will make the process more difficult but the addresses noted in the fault tables make an excellent starting point

Table 8-40: Addressable analog diagnostic table interpretation

Table Name	Description	Possible causes
Communicating Devices	Lists sensor and module addresses talking to the 3-AADC1.	Total number of communicating devices should equal number of installed devices. If total is low, see Communication Fault table for missing or not connected device(s). If total is high, see Unexpected Fault table for extra device(s) installed on circuit.
Internal Fault	Devices reporting an internal failure	Replace device

Table 8-40: Addressable analog diagnostic table interpretation

Table Name	Description	Possible causes
Device Type Fault	The wrong device type for the current configuration.	Photo detector installed for ion detector Ion detector installed for photo detector Monitor module installed for control module Control module installed for monitor module Two device addresses are transposed.
Unexpected Fault	A device is reporting at an unconfigured address. All unconfigured addresses are polled at startup and at 10-minute intervals thereafter.	If the total number of Communicating Devices is correct, and a Communication Fault is reported, the Unexpected Fault device should be set to the address listed as a Communication fault.
Duplicate Device Fault	Two or more devices have the same address.	If the total number of Communicating Devices shown in the table is correct, a device has been assigned the same address as a configured device. If the total number of Communicating Devices is too low, and a Communication Fault is reported, the device in the Communication fault table is addressed at the location shown in the Duplicate Device table.
Communication Fault	Missing device.	Wiring error or device not installed If Communicating Devices table short by one and Duplicate Device fault exists, then address shown in Comm Fault table is addressed at location shown in Duplicate Device table. OR If Communicating Devices table OK and Unexpected Fault exists, then the Unexpected Fault device should be set to the address shown in the Communication Fault table.
Open Fault	Module field wiring is open.	Circuit incorrectly wired or connector loose Defective detector or isolator base Broken conductor Device not installed on circuit Device not entered into SDU databases
Short Fault	Module field wiring is shorted.	Circuit incorrectly wired Defective detector, detector base, or module Nicked insulation between conductors

Table 8-40: Addressable analog diagnostic table interpretation

Table Name	Description	Possible causes
Compatibility Fault	Incorrect brand of device installed, replace device.	SIGA, GSX, or XLS brand devices intermixed on circuit.

Problem solving hints

Addressing faults

Most addressing faults are quickly located because the wrong address gives a clue as to the fault location. For example module 164 is duplicated while module 174 is missing. The device at location 174 probably has its tens digit addressing switch off by one position.

Duplicate device faults are harder to locate, e.g. the carpenter put up a partition hiding sensor 53, then the electrician noticed it was missing and spliced in a new base and now there are two sensors at address 53.

To identify devices with duplicate addresses, remove one of the suspected duplicate sensors. The duplicate fault should clear within 30 seconds if the sensor removed is a duplicate. Disconnect half of the circuit. Allow a minute or so for the circuit to stabilize and the faults to report. Upload the “Ready Communication” diagnostics table only. The remaining duplicate sensor, 53, should still appear, as if it is physically connected between the circuit controller and the wiring break. Continue to add or remove segments of the circuit in gradual increments repeating the diagnostics upload until the physical location of the problem detector is located.

Intermittent communication and wiring faults

EST3 counts of the number of communications and errors associated with each device. You can use this information to diagnose problems.

- A message counter tracks the number of communications sent between each device and the 3-AADC1 controller.
- An error counter tracks the number of communications failures occurring between each device and the 3-AADC1 controller

Both counts return to 0 each time the controller is restarted. You can use these To help to isolate a problem, compare the number of messages sent to a specific device to the number sent to a neighboring device of the same type.

Devices are polled each time the system is started, and any time an object reports its status as trouble or alarm. Polling frequency differs for different objects and circumstances. Pull stations are polled much more frequently than detectors or modules. Devices that report communication failure are polled more often than devices that are not experiencing the failure.

- Devices with high message counts but few errors may be pull stations or devices that change state regularly such as monitor modules.
- Devices that have increased error counts and only marginally increased message counts may indicate wiring or device problems.
- Devices with low message counts and an equal number of errors are non-existent devices.
- All 198 addressed are polled occasionally to identify any devices that may have been installed and not configured.

If the message and error counts are confused because of the length of time the circuit has been running, restarting the panel will cause a restart of the circuit and the zero the counters. You may need to monitor the circuit for twenty minutes or more before a trend in messages becomes apparent. Locating intermittent faults may require extended operating periods.

3-AADC1 Addressable Analog Driver Controller

Substituting 3-AADC1 local rail modules

When substituting a known good 3-AADC1 rail module in place of a suspect rail module, you must download the system configuration and Addressable Analog circuit data circuit information into the CPU module. This operation requires a PC and the SDU Program.

The 3-AADC1 actually has two separate memories. The first memory contains the firmware that makes the module operate. If there is a problem with the firmware, or if an upgrade has been issued, the new firmware is downloaded into the module using the 3-AADC1 Code tab, which is found in the Version Control (Code) function of the Tools, Download menu. When upgrading the module firmware (code), you do NOT need to download the "Bootstrap" data unless specifically instructed to do so.

The SDC configuration information is stored in the module's second memory. If you suspect that the module itself is bad, you must download the configuration information for the circuit that will be connected to the substitute module, using the 3-AADC1 Database tab, which is found in the Version Control (Database) function of the Tools, Download menu.

Connect the PC to the CPU RS-232 connector J5.

Table 8-41: 3-AADC1 Local Rail Module troubleshooting

Problem	Possible cause
Analog Circuit Open	1. Circuit incorrectly wired or connector loose 2. Defective detector or isolator base 3. Broken conductor 4. Device not installed on circuit 5. Device not entered into SDU databases
Analog Circuit Shorted	1. Circuit incorrectly wired 2. Defective detector, detector base, or module 3. Nicked insulation between conductors
Analog Circuit Ground Fault	1. Pinched wire between device and electrical box 2. Nicked wire insulation

Addressable analog device troubleshooting

Each addressable analog device has an integral Red LED. The function of this LED is indicated in Table 8-42. The LED is useful when trying to determine the communication and alarm or active status of a device.

Table 8-42: Addressable analog device LEDs

LED	Device status
Flashing Red	Polling device
Steady Red	Alarm or Active

Table 8-43 lists common troubles and possible causes for addressable analog modules.

For detailed information on identifying and locating these errors, use the SDU program's Addressable Analog Diagnostic Tools. Information about these tools appears later in this chapter.

Table 8-43: Addressable analog module troubleshooting matrix

M500 MF	M501 MF	M500 CF	M500 XF	Possible Causes
Module not responding correctly				
x	x	x	x	Module is installed in the wrong location or is improperly addressed
x	x	x	x	Module has not been entered into 3-AADC1 database
-	-	x	-	Break-off tab is set incorrectly
x	x	x	x	A ground fault has occurred on data circuit or (-) side of input / output circuit
Module in trouble on 3-AADC1 circuit				
x	x	x	x	Module is missing or is incorrectly connected to the circuit
x	x	x	x	ID error. Module has not been loaded into the 3-AADC1 database.
x	x	x	x	A ground fault has occurred on input or output circuit
-	-	x	x	The output circuit may be open, shorted, or incorrectly wired. A polarized device may be installed in reverse. The EOL resistor may be missing or incorrect
x	x	x	x	Missing or incorrect EOL resistor
Module incorrectly in alarm or active on CPU/LCD module				
x	x	-	-	Initiating Device Circuit may be shorted, or an initiating device is incorrectly installed

x	x	-	-	EOL resistor value is too low

x = Applicable
- = Not applicable

Table 8-44: Addressable analog detector troubleshooting

Symptom	Possible causes
Detector not responding correctly	1. Detector installed in wrong location or improperly addressed 2. Detector not entered into system database 3. Incorrect device response in database
Detector in trouble on CPU/LCD	1. Detector missing or incorrectly wired on circuit 2. ID error. Detector not loaded into 3-AADC1 module database. 3. Ground Fault on circuit 4. Internal detector fault
Detector incorrectly in alarm on CPU/LCD	1. Detector extremely dirty 2. Ionization detector Installed in area of extremely high airflow 3. Detector installed in area of high ambient smoke 4. Defective detector

For detailed information on identifying and locating device problems, refer to topic “Addressable analog diagnostic tools,” earlier in this chapter.

Wiring problems

There are three basic causes of wire-related erratic Addressable Analog circuit operation:

Excessive wiring resistance

Rarely is excessive wiring resistance the sole cause of Addressable Analog circuit problems. For any length of cable, the amount of resistance and capacitance per foot doesn't change and the Addressable Analog circuit capacitance limits are usually reached before the resistance limits. The digital signal operates between 0 and 24 Vdc. Excessive circuit resistance causes the signal to shrink from a maximum of 23 Vdc to a lower voltage, for example 20 Vdc. The 3-volt drop in the wiring is due to wire resistance.

To measure Addressable Analog circuit voltage drop, use an oscilloscope to measure the peak voltage at the Addressable Analog module and at each analog addressable device. If the voltage difference is greater than 2 Vdc, the resistance in the wire run is excessive. Too much resistance in the Addressable Analog wire run is typically caused by small wire size or a bad connection.

If the wire size is too small for the run length, the only remedies are to replace the wire with a larger size, or install additional Addressable Analog modules, dividing the circuit into acceptable lengths. Breaks or bad connections in the Addressable Analog circuit wiring can be identified by comparing the calculated circuit resistance value (described earlier) with the measured circuit resistance value. The measured wiring circuit resistance should not be different from the calculated circuit resistance by much more than a few ohms.

Excessive wiring capacitance

The second cause of erratic Addressable Analog circuit operation is too much capacitance in the Addressable Analog circuit wiring. Capacitance distorts the digital signal. As wiring capacitance increases, the square edges of the digital waveform start to curve. Excessive wiring capacitance causes the waveform to curve beyond the point where a device can recognize the waveform and respond when polled.

Wiring capacitance also effects the turn-on current spike. If the turn on current spike is not present in the digital sequence, there is a high probability the analog addressable device's communication will not be understood by the Addressable Analog communication module.

Addressable Analog circuit capacitance problems are typically caused by long wire runs, ground faults on the Addressable Analog circuit, improper T-taps, or improper shielding.

If shielded wire is used, the shield must be treated as a third conductor. It must be free of all ground faults and have continuity throughout. If the wire capacitance is too large for the run length, the only remedies are to replace the wire with a cable having a lower capacitance per foot or install additional Addressable Analog modules, dividing the circuit into acceptable lengths.

Ground faults

Eliminating ground faults on the Addressable Analog circuit reduces the amount of capacitance on the Addressable Analog wiring.

Verify the Addressable Analog circuit is free of ground faults.

Correcting addressable analog circuit wiring problems

If the Addressable Analog circuit is wired with improper T-taps or excessive capacitance, corrective measures include:

- Designing the Addressable Analog circuit properly and re-pulling the wire
- Balancing the circuit. Balancing the circuit can help in some cases but is not a substitute for proper wiring practice. If circuit balancing is required, call Technical Services for additional information.

Appendix A

System addresses

Summary

This appendix provides a quick reference for interpreting the mapping of system addresses.

Content

Address format

Tip: To determine a local panel's cabinet number, use the LCD command menu to get the status on all the active points on the panel. When prompted for a panel number, enter 00. The panel returns the startup response point's logical address. The first two numbers of the logical address is the cabinet number.

The system derives the addresses it assigns from the panel's cabinet number and the LRM's location within the panel (see Figure A-1). The basic address format is PPCCDDDD, where:

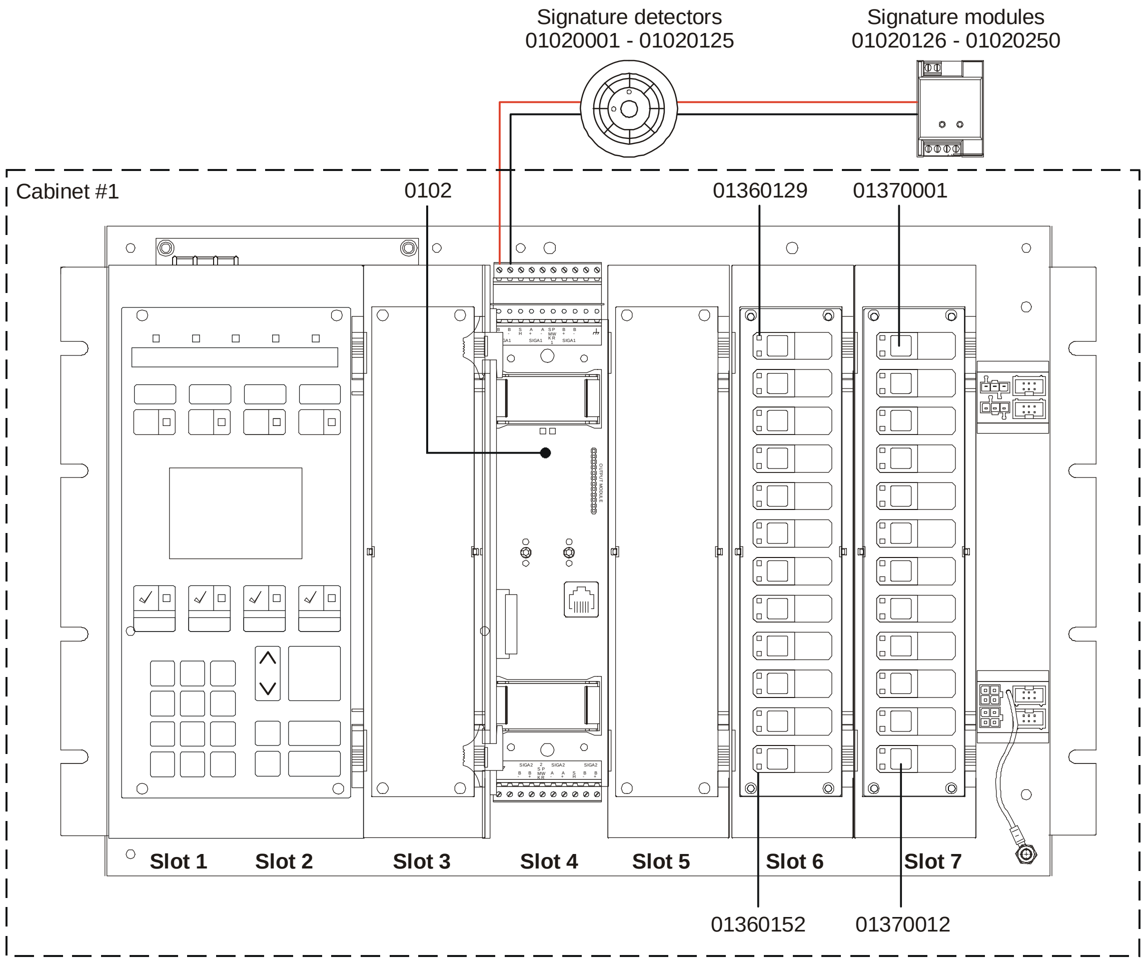
PP is the panel's cabinet number. The cabinet number is assigned when the installer downloads the CPU database into the panel.

CC is the LRM's slot address. The cabinet number and the slot address make up the LRM's logical address.

DDDD is the device's point address. The LRM's logical address and device's point address make up the device or circuit's logical address.

The CRC Card Reader Controller and KPDISP Keypad Display are devices supported by a 3-SAC module. However, they also act as independent processors, and have their own pseudo points. For this reason, their device numbers are further subdivided.

You can think of a SAC device as having this address format: PPCCSSDD: SS is the CRC or KPDISP device number, as assigned during LRM configuration. DD is a pseudo point within the device.



[SYS_ADDR_EX1.CDR]

Figure A-1: Addressing example

LRM addresses

Figure A-2, Figure A-3, and Figure A-4 show the logical addresses that the system assigns to LRMs based on the panel configurations. Figure A 5 shows the effect of using a wide LCD module, such as the 3 LCDXL1 Main LCD Display.

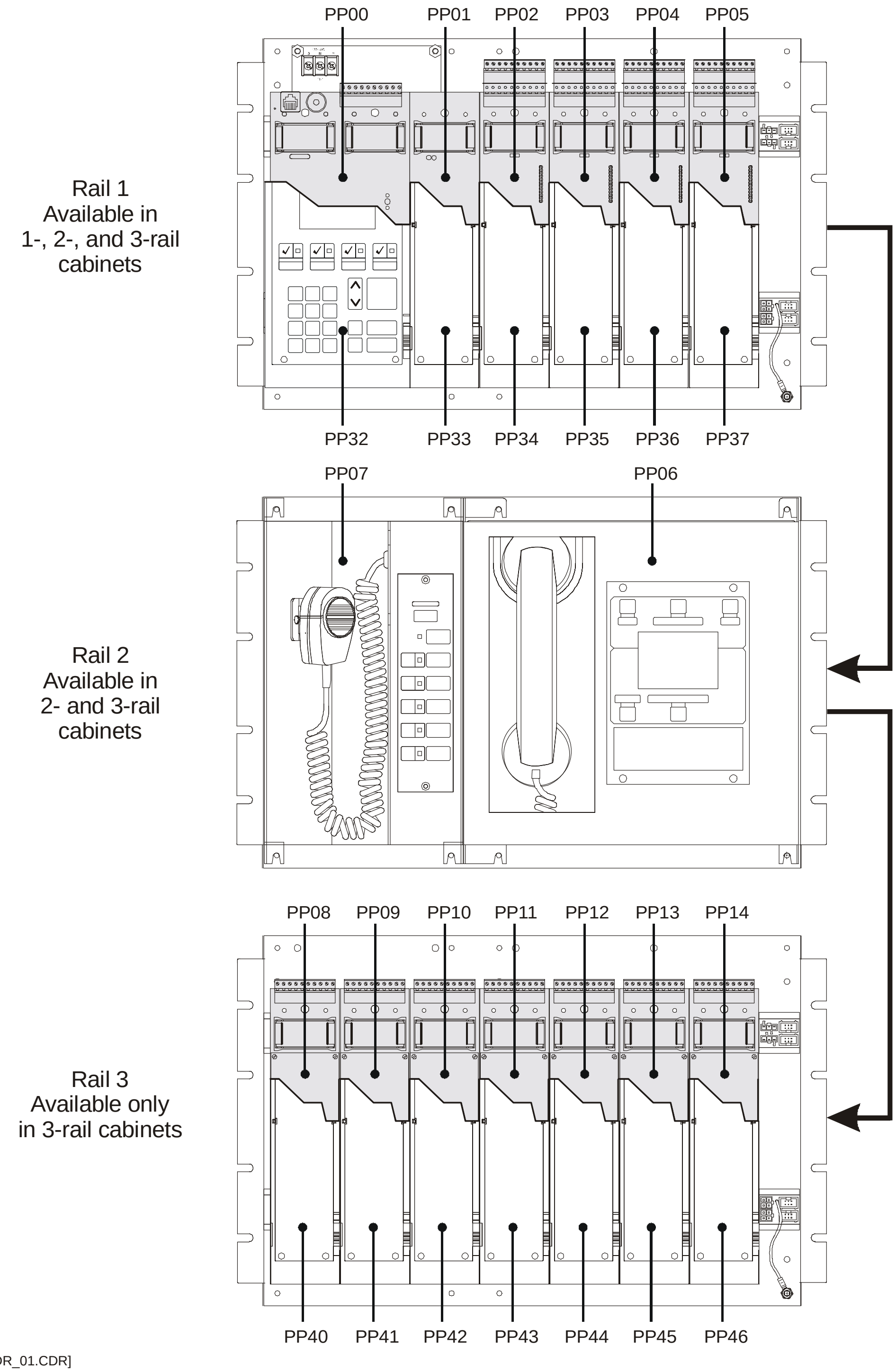


Figure A-2: LRM addresses for 3-CHAS7, 3-ASU/FT, 3-CHAS7 configuration

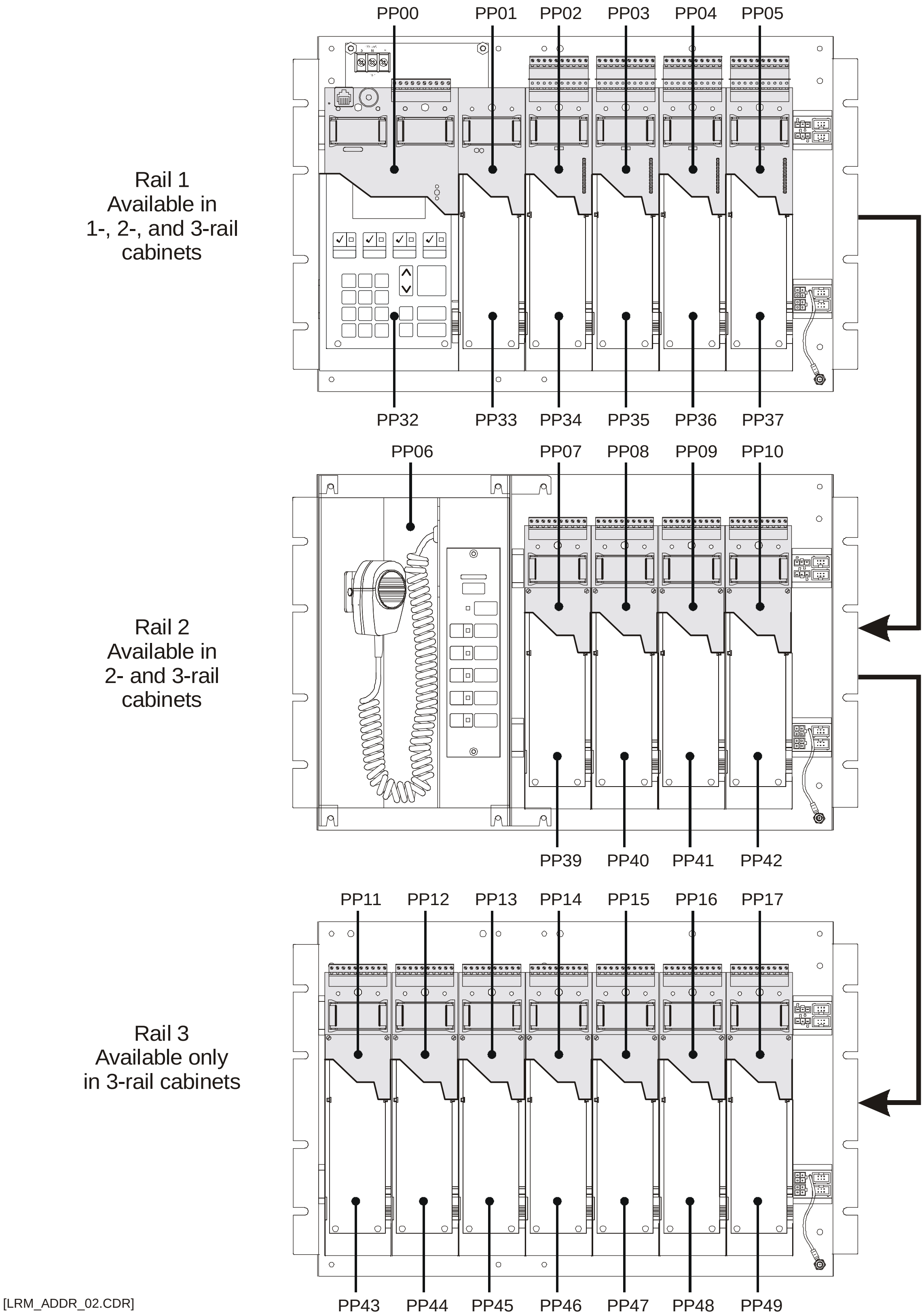


Figure A-3: LRM addresses for 3-CHAS7, 3-ASU/CHAS4, 3-CHAS7 configuration

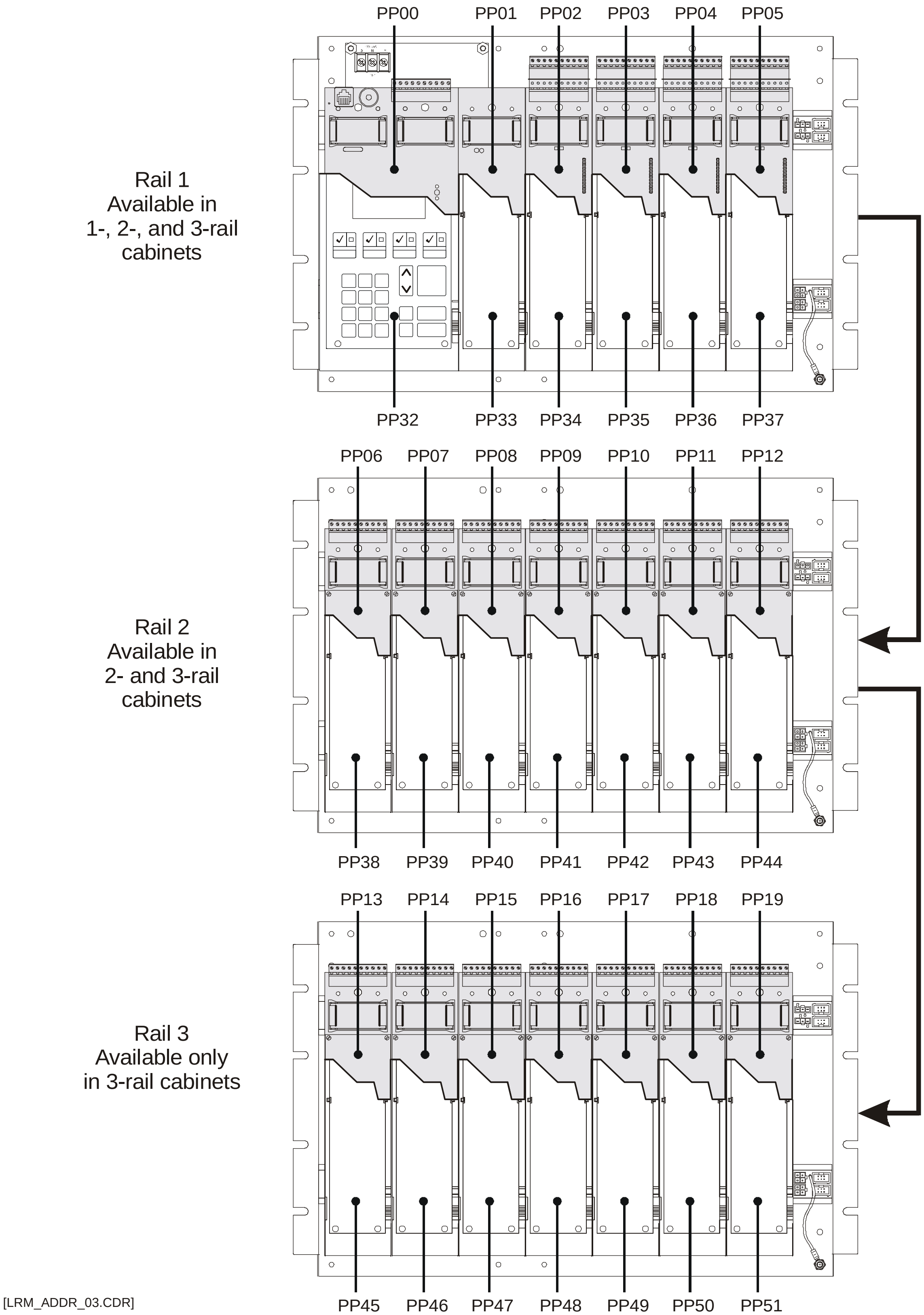


Figure A-4: LRM addresses for 3-CHAS7, 3-CHAS7, 3-CHAS7 configuration

Rail 1
Available in
1-, 2-, and 3-rail
cabinets

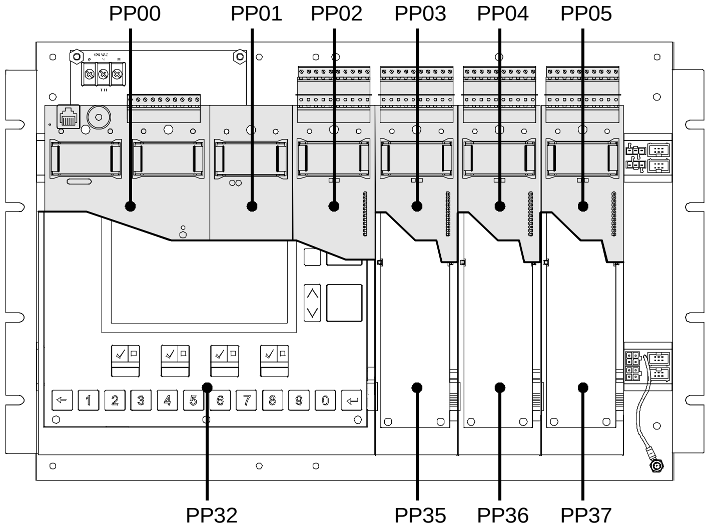
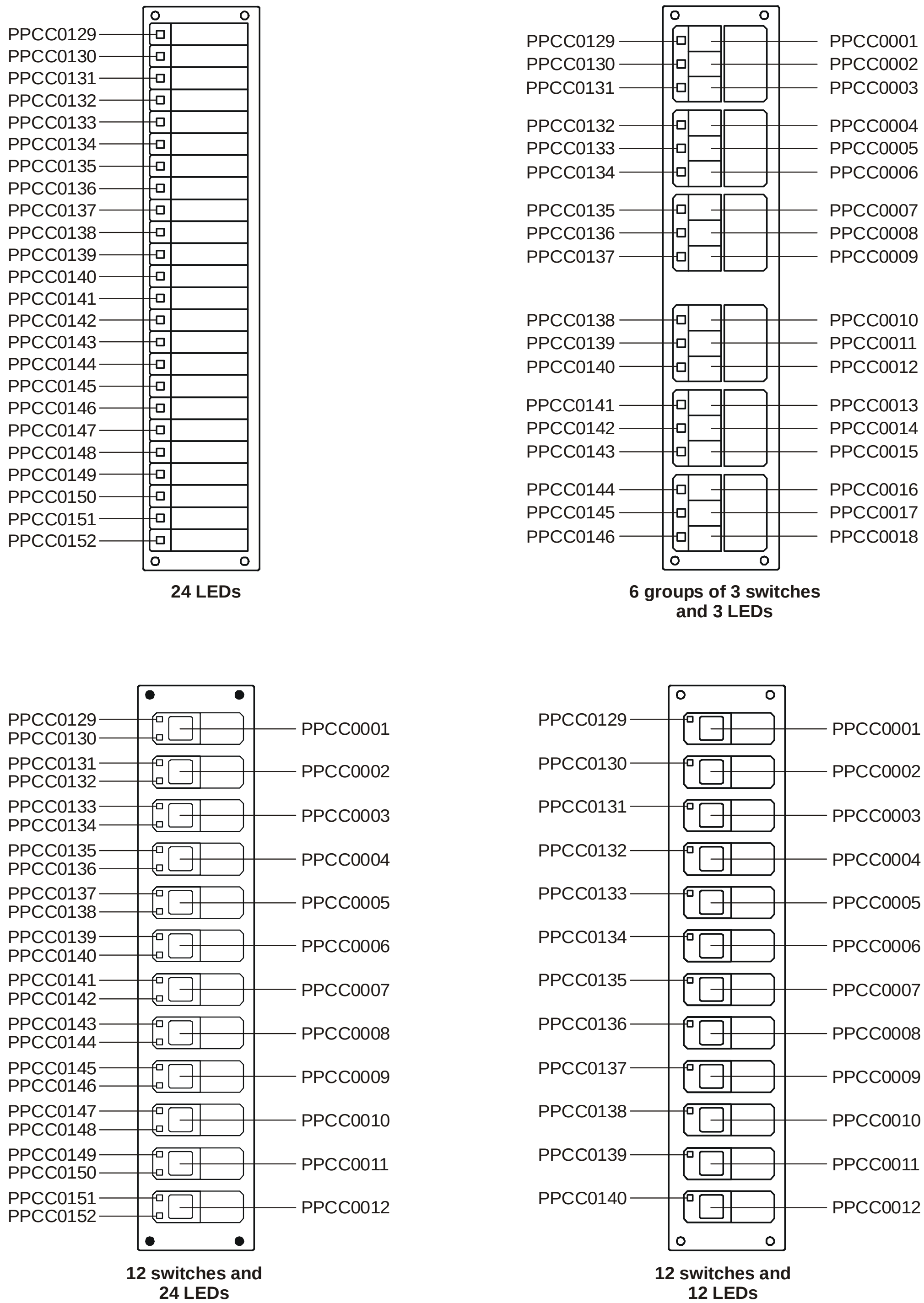


Figure A-5: LRM addresses when using a 3-LCDXL1 Main LCD Display

Control / display module addresses

Figure A-6 shows the device logical addresses that the system assigns the control/display modules.



[DEV_ADDRESS_01.CDR]

Figure A-6: Control/display module switch and LED device addresses

Device addresses

Figure A-7 shows the device logical addresses that the system assigns to various rail modules.

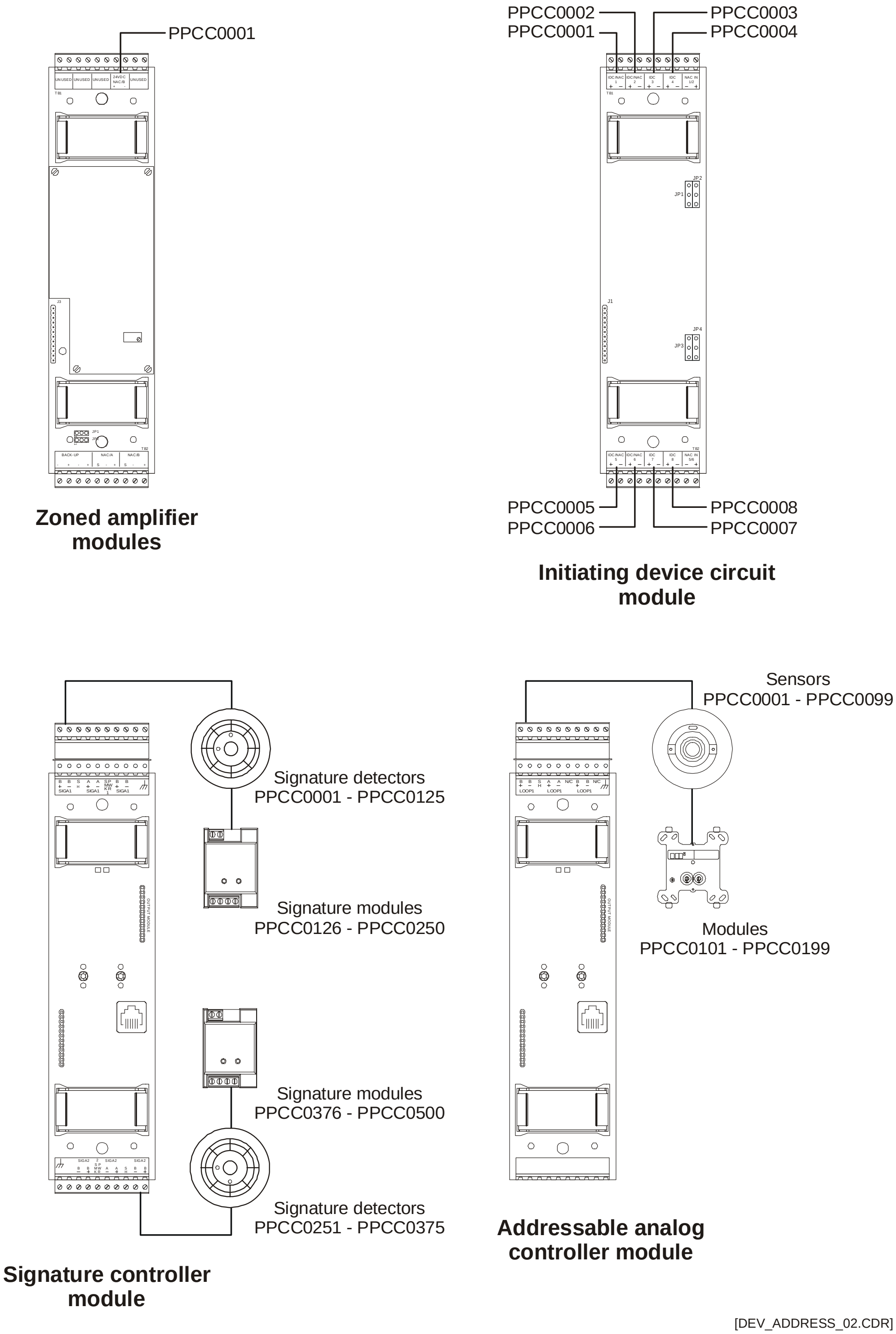
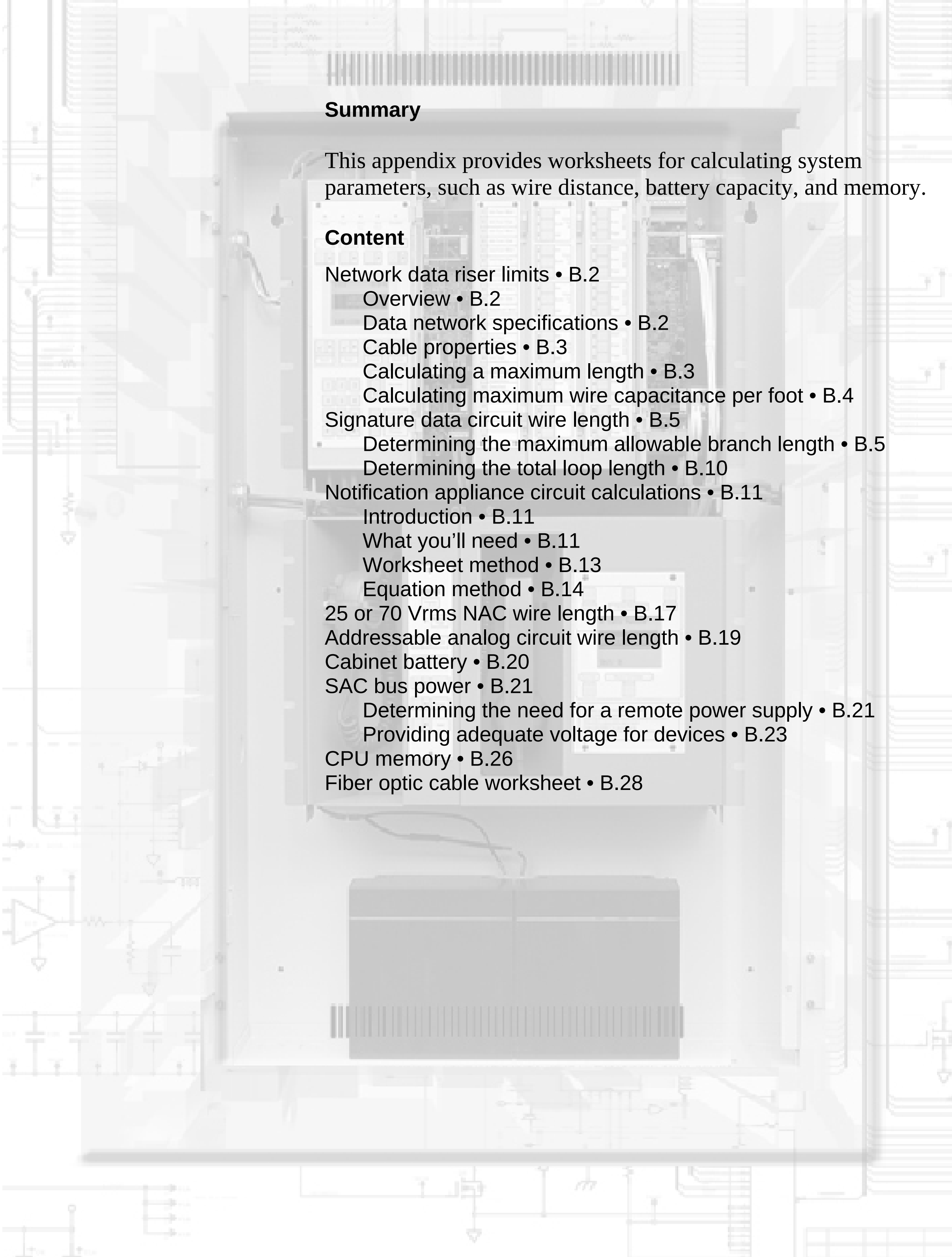


Figure A-7: Rail module device addresses

Appendix B

System calculations



Summary

This appendix provides worksheets for calculating system parameters, such as wire distance, battery capacity, and memory.

Content

Network data riser limits

Overview

Cumulative data network capacitance refers to the total capacitance of all copper wire used for the data riser. The cumulative capacitance of data networks must be within certain limits to permit stable network communications.

Audio networks are not affected by cumulative capacitance, due to the method of retransmitting data. The audio network retransmits data byte-by-byte, so the individual bit times of a byte are restored at each node in the network.

The data network retransmits data bit-by-bit. This method of retransmitting data restores the amplitude of a bit at each node, but any distortions in bit timing are passed through to the next node. Data network communication faults begin to occur at about 23% distortion of bit timing.

Cumulative data network capacitance induces bit timing distortion.

A fiber link in a data network electrically isolates two nodes, but distortions in bit timing are *not* restored by the fiber segment. Distortions in bit timing are passed through the fiber to the next node. The bit transition time of model 3-FIB fiber cards is fast enough to be neglected in determining the maximum wire length that can be used in the data network.

Data network specifications

Here are the maximum allowed values between any three nodes of a network.

- Resistance: 90 ohms (Ω)
- Capacitance: 0.3 microfarads (μF)
- Distance: 5,000 feet

The following table lists the maximum cumulative capacitance for the entire data network given various wire sizes and transmission rates. *Maximum cumulative capacitance* is the total capacitance of all installed copper wire used in the data network.

Maximum cumulative capacitance in microfarads

Wire size (AWG)	At 38.4 Kbaud	At 19.2 Kbaud
18	1.4	2.8
16	1.8	3.6
14	2.1	4.2

Cable properties

Data and audio networks in an EST3 system do *not* require the use of shielded cable, and networks designed with twisted-pair can be about twice as long as those designed with shielded cable.

The maximum length of a data network varies with the properties of the wire used. Wire manufacturers typically provide specifications for wire resistance and capacitance.

Resistance is generally specified in ohms per 1,000 feet, and must be doubled for 1,000 feet of a twisted-pair cable. Capacitance is specified in picofarads per foot (pF/ft).

The capacitance between conductors of a twisted-pair is commonly referred too as *conductor-conductor* or *mutual* capacitance. Shielded cable has an additional capacitance between each conductor and the shield. The capacitance of either conductor to shield is typically twice the value of mutual capacitance, and the highest value of capacitance must be used when calculating the maximum length of a data network.

The overall length of data networks designed with twisted-pair cable is about twice as long as data networks designed with shielded cable due to the additional capacitance resulting from the shield.

Calculating a maximum length

The maximum length of a data network can be calculated by dividing the maximum cumulative capacitance allowed by the highest capacitance rating of the selected cable.

For example, say you wanted to determine maximum length of a data network using 18 AWG cable that is rated at 25 pF per foot. The network will communicate at 38.4 Kbaud.

The maximum length equals the maximum cumulative capacitance divided by the capacitance per foot. In equation form:

ML = MCC / CPF

Where:

ML = Maximum length
MCC = Maximum cumulative capacitance
CPF = Capacitance per foot

In our example:

ML = 1.4 μF / 25 pF/ft
ML = 56,000 ft

Calculating maximum wire capacitance per foot

The capacitive property of twisted-pair cable varies and the cost of cable generally increases as the capacitance per foot decreases. Following is a sample calculation for determining the maximum capacitance per foot that a cable can have for a given network length.

The maximum capacitance per foot equals the maximum cumulative capacitance divided by the total network length. In equation form:

MCPF = MCC / TNL

Where:

MCC = Maximum cumulative capacitance, from the table given in this topic

TNL = •Total network length, the sum of the lengths of individual copper runs in the network

Here's an example. The total copper distance of a network is 26,000 feet. Calculate the maximum capacitance per foot that can be used for 18 AWG twisted-pair cable at 38.4K baud.

MCPF = MCC / TNL

MCPF = 1.4 μF / 26,000 ft

MCPF = 53.8 pF/ft

Signature data circuit wire length

Circuit resistance and capacitance determines the maximum length of a Signature data circuit. Circuit resistance affects the wire length of the longest circuit branch. Circuit capacitance affects the total amount of wire that can be used on the circuit.

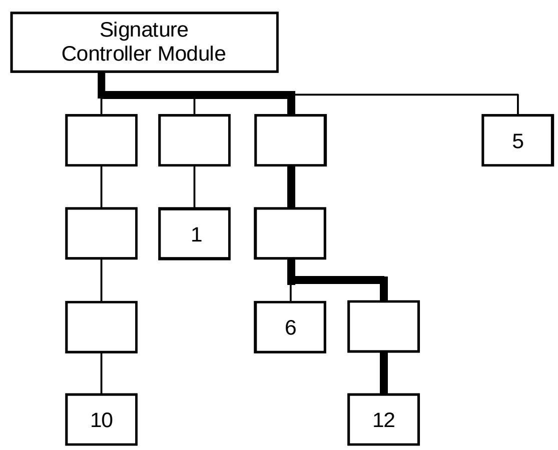
Notes

The design of the Signature data circuit must not exceed either of the two measurements.

There are no restrictions placed on the wiring used for the Signature data circuit. Longer wire runs may be obtained using standard (non-twisted, non-shielded) wire pairs.

Determining the maximum allowable branch length

The maximum branch length is the wire distance measured from the Signature controller module to the last device on the longest circuit path as shown below.



[WIRECALC2.CDR]

Several factors influence the maximum allowable branch length:

- Wire gauge and type
- Number of Signature detectors and modules installed on the branch
- Number of SIGA-UMs configured for 2-wire smoke detectors installed on the branch

Table B-1 through Table B-3 provide the maximum allowable branch length for any detector, module, SIGA-UM, and wire gauge combination. Using the wire distances specified in the tables ensures that the circuit does not exceed the maximum circuit resistance of the Signature data circuit.

Note: To calculate the wire distance with respect to circuit resistance, the tables assume that the circuit is end-loaded (all devices are clustered more towards the end of the circuit) and the circuit uses standard non-shielded wire.

To determine the maximum allowable length of a Signature data circuit branch:

1. Identify the device located farthest from the Signature controller.
2. Determine the number of Signature detectors, modules, and SIGA-UMs configured for 2-wire smokes that lie on the same conductive path between the device identified in step 1 and the Signature controller.
3. Calculate the number of detector and module addresses. Some Signature modules require two addresses.
4. Determine the size of the wire used to construct the circuit.
5. Find the maximum allowable wire distance for the longest branch in the lookup tables as follows:

   If no SIGA-UMs are installed, use Table B-1.

   If 1 to 5 SIGA-UMs are installed, use Table B-2.

   If 6 to 10 SIGA-UMs are installed, use Table B-3.

Table B-1: Maximum branch length with 0 SIGA-UMs configured for 2-wire smokes

Signature detector addresses	Signature module addresses	Maximum allowable wire distance using non-twisted, non-shielded wire pairs					
		18 AWG		16 AWG		14 AWG	
		ft	m	ft	m	ft	m
1–25	0	7437	2267	11815	3601	18792	5728
26–50	0	7038	2145	11180	3408	17782	5420
51–75	0	6638	2023	10545	3214	16772	5112
76–100	0	6238	1901	9910	3021	15762	4804
101–125	0	5839	1780	9275	2827	14752	4497
0	1–25	7267	2215	11544	3519	18361	5597
1–25	1–25	6867	2093	10909	3325	17351	5289
26–50	1–25	6467	1971	10275	3132	16342	4981
51–75	1–25	6068	1849	9640	2938	15332	4673
76–100	1–25	5668	1728	9005	2745	14322	4365
101–125	1–25	5268	1606	8370	2551	13312	4057
0	26–50	6697	2041	10639	3243	16921	5157
1–25	26–50	6297	1919	10004	3049	15911	4850
26–50	26–50	5897	1798	9369	2856	14901	4542
51–75	26–50	5498	1676	8734	2662	13891	4234
76–100	26–50	5098	1554	8099	2469	12881	3926
101–125	26–50	4698	1432	7464	2275	11871	3618
0	51–75	5906	1800	9383	2860	14923	4549
1–25	51–75	5250	1600	8340	2542	13265	4043
26–50	51–75	4633	1412	7360	2243	11707	3568
51–75	51–75	4051	1235	6435	1961	10235	3120
76–100	51–75	3498	1066	5558	1694	8839	2694
101–125	51–75	2973	906	4723	1440	7512	2290
0	76–100	3931	1198	6245	1903	9932	3027
1–25	76–100	3404	1037	5407	1648	8601	2621
26–50	76–100	2899	883	4605	1404	7324	2232
51–75	76–100	2413	735	3833	1168	6096	1858
76–100	76–100	1945	593	3089	942	4913	1498
101–125	76–100	1493	455	2371	723	3771	1149
0	101–125	2631	802	4180	1274	6649	2027
1–25	101–125	2165	660	3439	1048	5470	1667
26–50	101–125	1713	522	2721	829	4328	1319
51–75	101–125	1274	388	2023	617	3218	981
76–100	101–125	847	258	1345	410	2140	652
101–125	101–125	431	131	685	209	1089	332

Table B-2: Maximum branch length with 1 to 5 SIGA-UMs configured for 2-wire smokes

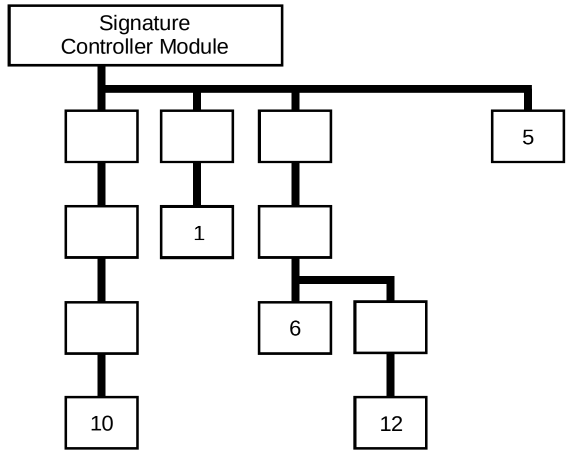
Signature detector addresses	Signature module addresses	Maximum allowable wire distance using non-twisted, non-shielded wire pairs					
		18 AWG		16 AWG		14 AWG	
		ft	m	ft	m	ft	m
1–25	0	6778	2066	10768	3282	17126	5220
26–50	0	6131	1869	9741	2969	15492	4722
51–75	0	5501	1677	8739	2664	13899	4236
76–100	0	4885	1489	7760	2365	12342	3762
101–125	0	4282	1305	6802	2073	10819	3298
0	1–25	5353	1632	8504	2592	13525	4122
1–25	1–25	4720	1439	7498	2286	11926	3635
26–50	1–25	4100	1250	6513	1985	10359	3157
51–75	1–25	3491	1064	5546	1691	8821	2689
76–100	1–25	2893	882	4597	1401	7311	2228
101–125	1–25	2306	703	3663	1116	5826	1776
0	26–50	3776	1151	5999	1829	9542	2908
1–25	26–50	3153	961	5009	1527	7966	2428
26–50	26–50	2539	774	4034	1230	6416	1956
51–75	26–50	1935	590	3075	937	4890	1491
76–100	26–50	1340	409	2130	649	3387	1032
101–125	26–50	754	230	1197	365	1905	581
0	51–75	2491	759	3957	1206	6293	1918
1–25	51–75	1868	569	2967	904	4720	1439
26–50	51–75	1254	382	1992	607	3168	966
51–75	51–75	648	198	1030	314	1638	499
76–100	51–75	50	15	80	24	126	39
101–125	51–75						
0	76–100	1386	422	2201	671	3501	1067
1–25	76–100	760	232	1208	368	1921	586
26–50	76–100	143	44	227	69	361	110
51–75	76–100						
76–100	76–100						
101–125	76–100						
0	101–125						
1–25	101–125						
26–50	101–125						
51–75	101–125						
76–100	101–125						
101–125	101–125						

Table B-3: Maximum branch length with 6 to 9 SIGA-UMs configured for 2-wire smokes

Signature detector addresses	Signature module addresses	Maximum allowable wire distance using non-twisted, non-shielded wire pairs					
		18 AWG		16 AWG		14 AWG	
		ft	m	ft	m	ft	m
1–25	0	5045	1538	8015	2443	12748	3886
26–50	0	4494	1370	7139	2176	11355	3461
51–75	0	3950	1204	6275	1913	9981	3042
76–100	0	3414	1040	5423	1653	8625	2629
101–125	0	2884	879	4581	1396	7286	2221
0	1–25	4106	1252	6523	1988	10375	3162
1–25	1–25	3542	1080	5627	1715	8950	2728
26–50	1–25	2985	910	4742	1445	7542	2299
51–75	1–25	2435	742	3868	1179	6152	1875
76–100	1–25	1891	576	3004	916	4778	1456
101–125	1–25	1353	412	2150	655	3419	1042
0	26–50	2869	874	4557	1389	7248	2209
1–25	26–50	2296	700	3648	1112	5802	1768
26–50	26–50	1730	527	2749	838	4372	1332
51–75	26–50	1170	357	1859	567	2957	901
76–100	26–50	617	188	979	299	1558	475
101–125	26–50	68	21	108	33	172	53
0	51–75	1796	547	2853	869	4537	1383
1–25	51–75	1214	370	1929	588	3067	935
26–50	51–75	638	195	1014	309	1613	492
51–75	51–75	69	21	109	33	173	53
76–100	51–75						
101–125	51–75						
0	76–100	833	254	1323	403	2105	642
1–25	76–100	242	74	385	117	613	187
26–50	76–100						
51–75	76–100						
76–100	76–100						
101–125	76–100						
0	101–125						
1–25	101–125						
26–50	101–125						
51–75	101–125						
76–100	101–125						
101–125	101–125						

Determining the total loop length

The total loop length is the sum of the lengths of all the wire segments installed in the data circuit.



[WIRECALC3.CDR]

The total length of all the cable installed in the Signature data circuit cannot exceed the values listed below:

	Wire Size		
Wire type	**14 AWG**	**16 AWG**	**18 AWG**
Twisted pair	13,157 ft (4,010 m)	13,888 ft (4,233 m)	20,000 ft (6,096 m)
Twisted-shielded pair	5,952 ft (1,814 m)	6,098 ft (1,859 m)	8,621 ft (2,628 m)
Non-twisted, non-shielded pair	20,000 ft (6,096 m)	20,000 ft (6,096 m)	20,000 ft (6,096 m)

If the cable manufacturer's data indicates the capacitance per foot of the cable, the following method may be used to determine the maximum total loop length.

Note: In no case may the total loop length of a Signature data circuit exceed 20,000 feet (6,098 meters).

Lmax = 500,000 / Cpf

where:

- Lmax = maximum total cable length in feet
- Cpf = Cable capacitance in picofarads per foot

Note: A short circuit on a Signature data circuit can disable the entire circuit. In order to limit the effect of a single short circuit on the SDC, SIGA-IB Isolator Bases or SIGA-IM Isolator modules can be installed at strategic points in the circuit.

Notification appliance circuit calculations

Introduction

This topic shows you how to determine the maximum cable length of a notification appliance circuit (NAC) for a given number of appliances.

Two methods are presented: worksheet and equation. The worksheet method is simpler, but your installation must meet the criteria listed on the worksheet. If your installation does not meet these criteria, you need to use the equation method.

The methods given here determine cable lengths that work under all operating conditions. The calculations ensure that the required operating voltage and current will be supplied to all notification appliances. To do this, we assume these two worst-case conditions:

- The voltage at the NAC terminals is the minimum provided by the power supply
- The notification appliances are clustered at the end of the NAC cable

Other, more detailed methods that distribute the appliance load along the NAC cable may indicate that longer cable runs are possible.

What you'll need

Appliance and cable values

Whether you use the worksheet method or the equation method, you'll need to know:

- The minimum operating voltage required for the appliances
- The maximum operating current drawn by each appliance
- The resistance per unit length of the wire used (Ω/ft)

This information can be found on the appliance installation sheets, and on the cable specification sheet.

Power supply values

For either method, you'll need some fixed or calculated operating values for your specific power supply. The fixed values are:

- Maximum voltage = 27.4 V
- Rated voltage = 20.4 V
- Load factor = 0.37 V/A
- Power type = DC

The *maximum voltage* is the highest voltage measured at the NAC terminals. This value is not used in the calculations, but is given so you can ensure appliance compatibility.

The *rated voltage* is the theoretical operating minimum for the power supply, and is calculated as 85% of 24 volts.

The *load factor* is a measure of how the power supply voltage reacts when a load is applied. The load factor measures the voltage drop per ampere of current drawn by the load.

The *power type* reflects the type of power supplied to the NAC terminals at minimum voltage. The current draw of notification appliances can vary substantially with the type of power supplied: full-wave rectified (Vfwr) or direct current (Vdc). It is important to know the power type at minimum terminal voltage.

You'll need to calculate the following values relating to your power supply and to the NAC circuit current. These are:

- Minimum voltage
- Voltage drop

The *minimum voltage* is the lowest voltage measured at the NAC terminals when the power supply is under the maximum load for that circuit (i.e. for the appliances that constitute the NAC.)

The *voltage drop* is the difference between the minimum voltage and 16 V. This value is for use with the worksheet only.

Worksheet method

Use this worksheet to determine the maximum cable length of a notification appliance circuit for a given number of appliances.

Use this worksheet only if all the appliances are regulated. That is, they must have a minimum operating voltage of 16 V.

Worksheet 1: NAC cable length

		NAC1	NAC2	NAC3	NAC4	
Total operating current [1]						A
Load factor	×	0.37	0.37	0.37	0.37	V/A
Load voltage drop	=					V
Rated voltage		20.4	20.4	20.4	20.4	V
Load voltage drop	−					V
Minimum voltage	=					V
Regulated appliance voltage	−	16.0	16.0	16.0	16.0	V
Voltage drop [2]	=					V
Total operating current	÷					A
Maximum resistance	=					Ω
Wire resistance (Ω/ft) [3]	÷					
Maximum wire length	=					ft
	÷	2	2	2	2	
Maximum cable length	=					ft

[1] Total of the maximum operating currents for all appliances as specified for DC power. See the appliance installation sheets for operating currents.

[2] This voltage drop is valid for regulated notification appliances only. For unregulated appliances, see “Equation method,” later in this topic.

[3] Use the manufacturer’s published wire resistance expressed in ohms per foot. For typical values, see Table 4, later in this topic.

Equation method

Appliance operating voltage and current

Regulated notification appliances have an operating range from 16 V to 33 V. Use 16 V as the minimum appliance voltage when using regulated notification appliances.

When using unregulated notification appliances, refer to the installation sheets to determine the minimum appliance voltage required.

What if there are different types of appliances in the NAC, and each type has a different minimum operating voltage? In this case, use the *highest* minimum voltage required by any appliance.

The total current requirement for the appliances will be the sum of the individual maximum currents drawn by each appliance when using DC power. Use the maximum current for the appliance over the 16 V to 33 V range.

If all appliances draw the same maximum current, the total current is the maximum current multiplied by the number of appliances. If different appliance types have different maximum currents, the total current is the sum of the maximum current for each appliance type multiplied by the number of appliances of that type.

Wire resistance

Typical wire resistances are shown in the following table.

Table 4: Typical wire resistances

Wire gauge (AWG)	Resistance 1 strand uncoated copper		Resistance 7 strand uncoated copper	
	Ω per foot	Ω per meter	Ω per foot	Ω per meter
12	0.00193	0.00633	0.00198	0.00649
14	0.00307	0.01007	0.00314	0.01030
16	0.00489	0.01604	0.00499	0.01637
18	0.00777	0.02549	0.00795	0.02608

When performing these calculations, always refer to the actual cable supplier documentation and use the actual Ω/ft (or Ω/m) for the cable being used.

Calculating cable length

To calculate the maximum NAC cable length:

1. Calculate the total current (Itot) as the sum of the maximum operating currents for all the appliances.

   $Itot = \Sigma Ia$

   Where:
   Ia = appliance maximum current

   See the appliance installation sheets for Ia. Remember to use the maximum operating current specified for DC power.

2. Calculate the minimum voltage (Vm).

   $Vm = Vr - (Itot \times K)$

   Where:
   Vr = rated voltage
   Itot = total current (from above)
   K = load factor

   For the power supply, Vr is 20.4 V and K is 0.37 V/A.

3. Calculate the allowable voltage drop (Vd) between the power supply and the appliances.

   $Vd = Vm - Va$

   Where:
   Vm = minimum voltage (from above)
   Va = appliance minimum voltage

   For regulated notification appliances, Va is 16 V. For unregulated notification appliances, Va is the lowest operating voltage specified on the appliance installation sheet.

4. Calculate the maximum resistance (Rmax) the wire can have.

   $Rmax = Vd / Itot$

   Where:
   Vd = voltage drop
   Itot = total current

5. Calculate the maximum length of the cable (Lc), based on the maximum resistance allowed, the resistance of the wire, and the number of wires in the cable (two).

   $Lc = (Rmax / Rw) / 2$

   Where:
   Rmax = maximum resistance
   Rw = wire resistance factor

Example: You're using regulated notification appliances. Assume that the maximum operating current for each appliance is 100 mA for DC power, and that 20 appliances will be placed on the NAC. The cable is 12 AWG wire, and the manufacturer specifies a wire resistance factor of 0.002 Ω/ft.

$$
\begin{aligned}
Itot &= \Sigma Ia \\
&= 20 \times 0.1\ \text{A} \\
&= 2\ \text{A}
\end{aligned}
$$

$$
\begin{aligned}
Vm &= Vr - (Itot \times K) \\
&= 20.4\ \text{V} - (2\ \text{A} \times 0.37\ \text{V/A}) \\
&= 20.4\ \text{V} - 0.74\ \text{V} \\
&= 19.66\ \text{V}
\end{aligned}
$$

$$
\begin{aligned}
Vd &= Vm - Va \\
&= 19.66\ \text{V} - 16.0\ \text{V} \\
&= 3.66\ \text{V}
\end{aligned}
$$

$$
\begin{aligned}
Rmax &= Vd / Itot \\
&= 3.66\ \text{V} / 2.0\ \text{A} \\
&= 1.83\ \Omega
\end{aligned}
$$

$$
\begin{aligned}
Lc &= (Rmax / Rw) / 2 \\
&= (1.83\ \Omega / 0.002\ \Omega\text{/ft}) / 2 \\
&= (915\ \text{ft}) / 2 \\
&= 457.5\ \text{ft}
\end{aligned}
$$

So the maximum wire run for this NAC would be 457 ft (rounding down for safety).

25 or 70 Vrms NAC wire length

The maximum allowable wire length is the farthest distance that a pair of wires can extend from the amplifier to the last speaker on the notification appliance circuit without losing more than 0.5 dB of signal. Calculating the maximum allowable wire length using this method ensures that each speaker operates at its full potential.

Several factors influence the maximum allowable wire length:

- Wire size
- Output signal level of the amplifier driving the circuit
- Number of speakers installed on the circuit

To calculate the maximum allowable wire length for a 0.5 dB loss, use the following formula:

$$\text{Max length} = \frac{59.25 \text{ X Amplifier output}^2}{\text{Wire resistance X Circuit load}}$$

where:

- Amplifier output is the signal level in Vrms supplied by the amplifier driving the circuit
- Circuit load is the total watts required by the audio circuit
- Wire resistance is the resistance rating of the wire per 1000 ft pair, see Table B-5.

For example, the maximum allowable wire length for an audio circuit consisting of a 30 W, 25 Vrms amplifier driving thirty 1-watt speakers, using 18-guage wire would be 95 ft.

$$94.95 = \frac{59.25 \text{ X } 25^2}{13 \text{ X } 30}$$

Table B-5: Wire resistance ratings

Wire Size	Resistance per 1,000 ft pair (ohms)
18 AWG (0.75 sq mm)	13.0
16 AWG (1.0 sq mm)	8.0
14 AWG (1.50 sq mm)	5.2
12 AWG (2.5 sq mm)	3.2

Table B-6 and Table B-7 give the maximum allowable wire lengths for various wire sizes and loads. Use Table B-6 when designing circuits for amplifiers set for 25 Vrms output. Use

Table B-7 when designing circuits for amplifiers set for a 70 Vrms output.

Table B-6: Maximum allowable length at 25 Vrms, 0.5 dB loss

Wire size	Circuit load requirement											
	15 W		20 W		30 W		40 W		95 W		120 W	
	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
18 AWG (0.75 sq mm)	190	58	142	43	95	29	71	22	Over max current limit		Over max current limit	
16 AWG (1.0 sq mm)	309	94	231	70	154	47	116	35	48.7	15	39	12
14 AWG (1.5 sq mm)	475	145	356	109	237	72	178	54	75	23	59	18
12 AWG (2.5 sq mm)	772	235	579	176	386	118	289	88	121.8	37	96	29

Table B-7: Maximum allowable length at 70 Vrms, 0.5 dB loss

Wire size	Circuit load requirement											
	15 W		20 W		30 W		40 W		95 W		120 W	
	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
18 AWG (0.75 sq mm)	1489	454	1117	340	744	227	558	170	235	72	186	57
16 AWG (1.0 sq mm)	2420	738	1815	553	1210	369	907	276	382	116	302	92
14 AWG (1.5 sq mm)	3722	1134	2792	851	1861	567	1396	426	588.7	180	465	142
12 AWG (2.5 sq mm)	6049	1844	4537	1383	3024	922	2268	691	955	291	756	230

Addressable analog circuit wire length

Table B-8 lists the maximum wire distances allowed for Addressable Analog circuits.

Notes

Maximum wire resistance cannot exceed 50 ohms.

Maximum wire capacitance cannot exceed 0.05 microfarads.

Table B-8: Maximum allowable wire distance for Addressable Analog circuits

Wire gauge	Max loop Capacitance	Twisted, non-shielded ft	Twisted, non-shielded m	Twisted, shielded ft	Twisted, shielded m	Non-twisted, non-shielded ft	Non-twisted, non-shielded m
18	0.01 µF	4000	1219	1724	525	5000	1524
	0.02 µF	8000	2438	3448	1051	10000	3048
	0.03 µF	12000	3658	5172	1576	15000	4572
	0.04 µF	16000	4877	6896	2102	20000	6096
	0.05 µF	20000	6096	8620	2627	25000	7620
16	0.01 µF	2777	846	1219	372	5000	1524
	0.02 µF	5555	1693	2439	743	10000	3048
	0.03 µF	8333	2540	3658	1115	15000	4572
	0.04 µF	11111	3387	4878	1487	20000	6096
	0.05 µF	13888	4233	6097	1858	25000	7620
14	0.01 µF	2631	802	1190	363	5000	1524
	0.02 µF	5263	1604	2380	725	10000	3048
	0.03 µF	7894	2406	3571	1088	15000	4572
	0.04 µF	10526	3208	4761	1451	20000	6096
	0.05 µF	13157	4010	5952	1814	25000	7620

Cabinet battery

Use the following method to calculate the minimum ampere-hour capacity of a battery required in order to operate a panel in the absence of AC power. Battery calculations must be performed separately for each cabinet in the system.

Determine the total amount of current in milliamps required by all of the components that derive power from the battery while the panel is in standby mode. Multiply the total amount of standby current by the number of hours that the panel is required to operate in standby mode while on battery power.

Determine the total amount of current in milliamps required by all of the components that derive power from the battery while the panel is in alarm mode. Multiply the total amount of alarm current by the number of minutes that the panel is required to operate in alarm mode while on battery power. Divide the result by 60 to convert minutes to hours.

Add the total amount of standby current and the total amount of alarm current then divide the result by 1000 to convert to ampere-hours. Multiply this number by 1.2 to add a 20% safety factor to the calculations.

EST3 is UL Listed for battery operation durations as follows:

- Standby: 60 hours max.
- Alarm: 30 minutes max.

SAC bus power

This topic provides information to help you determine whether:

A power supply must be added to the SAC bus

Adequate voltage will be available to CRCs and KPDISPs on the SAC bus

The standby battery in each CRC is properly sized

Determining the need for a remote power supply

The need for additional power is dictated by the current drawn by the devices on the SAC bus. Each 3-PPS/M can supply a total of 7 A through two 3.5 A outputs. Each SAC line can therefore draw a maximum of 3.5 A. This consists of the current drawn by the CRCs and KPDISPs plus any readers, strikes, or maglocks.

If the load on the 3-PPS/M supply is greater than 3.5 A, you'll need to split the devices over two SAC busses, or add a remote power supply.

To determine the total load on the 3-PPS/M:

1. Complete Form A (below) to calculate the system alarm and standby load current.
2. Total the columns to determine the Total Alarm Load and Total Amp Hours. These two totals will be used in later calculations.
3. If the Total Alarm Load is greater than 3.5 A, the devices must be divided between two SAC busses, each with a separate supply—OR—a remote power supply must be installed.

Form A: 3-SAC alarm and standby load

Device	Qty	Alarm current (mA)	Total alarm current (mA)	Standby current (mA)	Total standby current (mA)	Standby time (Hours)	Amp hours (mAH)
KPDISP		100		35			
CRC		950		940			
CR-5355		72		70			
CR-5365		31		25			
CR-5395		24		20			
CR-6005		20		20			
Reader sounder		8		0			
CRCSND		8		0			
Strike rating							
100 mA @ 12 V		33		0			
150 mA @ 12 V		40		0			
200 mA @ 12 V		42		0			
250 mA @ 12 V		47		0			
300 mA @ 12 V		51		0			
35 mA @ 12 V		55		0			
400 mA @ 12 V		58		0			
450 mA @ 12 V		63		0			
500 mA @ 12 V		65		0			
Maglock rating							
100 mA @ 12 V		80		80			
150 mA @ 12 V		126		126			
200 mA @ 12 V		156		156			
250 mA @ 12 V		187		187			
300 mA @ 12 V		233		233			
350 mA @ 12 V		283		283			
400 mA @ 12 V		376		376			
450 mA @ 12 V		436		436			
500 mA @ 12 V		470		470			
Total alarm load (must be < 3.5 A)				Total amp hours (Battery)			

Note: Standby time = length of time that the device will draw standby current from battery. There is no minimum standby time for access control.

Providing adequate voltage for devices

To determine whether each CRC and KPDISP will have adequate input voltage, calculate the voltage drops along the SAC bus. Voltage drops can be estimated or actual.

Estimated voltage drop

To estimate the voltage drop use Table B-9 and Table B-10, which show the maximum wire length for a given number of doors at a given current load. The tables assume even spacing between the doors and an equal load at each door.

1. First, determine the load per door by adding the alarm currents of the CRC, door lock, card reader, and sounder.
2. Determine the number of doors you need to secure. Find the number of doors Table B-9 then search across that row for the column with the current you calculated in step 1.
3. The intersection gives the maximum distance from the 3-PPS/M or remote power supply to the last door.
4. If the distance to the last door in your installation is less than this distance no further calculations are needed.
5. If the distance to the last door in you installation is greater than this distance check Table B-10 using steps 1 through 4.
6. If changing the gauge of the wire does not work, you must run a second power line, or divide the SAC bus and add a remote power supply. In either case, recheck your estimates.

For example: You are putting a CRC, a strike rated at 250 mA @ 12 Vdc, a CR-5395 and a CRCSND at 8 doors. The furthest door is 500 feet from the control.

Using step 1 above, you determine that the total alarm current for this door is 149 mA. In Table B-9 (for 16 AWG), find 8 in the Doors column, go across this row to the 150 mA column. The intersection shows a maximum length of 584 feet. Since the distance from the control panel to the last door is less than 584 feet, no further calculations are needed.

Actual voltage drop

To calculate the actual voltage drop based on the actual load for each device and the actual distance between each device, follow these steps:

1. Start the EST3 System Builder and select the 16 AWG check box.
2. Enter the actual alarm load for the first device and the distance from the control panel to that device. The system will calculate the voltage drop and indicate whether it is OK to continue.

3. Continue by adding the actual alarm load and the distance from the previous device for each device on the SAC bus.
4. If you successfully enter all devices with no error messages, no further calculations are required. The panel supply will be adequate and each device will receive sufficient voltage.
5. If an error message occurs, you have the following options:

   Repeat the process using 14 AWG in step 1
   Run a second power supply line
   Divide the SAC bus and add a remote power supply

SAC bus wire length tables

Table B-9: SAC bus wire length for number of doors vs. current loads using 16 AWG wire

	Load (mA)												
Doors	**70**	**100**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**550**	**600**	**650**
1	4000	4000	2650	2000	1600	1300	1140	1000	885	800	720	665	616
2	3800	2660	1776	1300	1060	880	760	666	594	532	484	444	410
3	2850	1950	1320	990	780	660	570	498	444	399	363	333	306
4	2240	1600	1040	800	624	520	452	400	355	320	288	266	244
5	1875	1350	885	650	525	435	375	333	296	266	242	222	205
6	1620	1140	756	558	450	378	324	286	254	228	207	190	X
7	1400	980	665	497	392	329	285	250	222	199	X	X	X
8	1240	880	584	440	352	288	253	222	197	X	X	X	X
9	1125	810	522	396	315	261	228	200	X	X	X	X	X
10	1030	730	480	360	290	240	207	X	X	X	X	X	X
11	946	660	440	330	264	220	X	X	X	X	X	X	X
12	876	600	408	300	240	X	X	X	X	X	X	X	X
13	806	559	377	273	X	X	X	X	X	X	X	X	X
14	756	518	350	X	X	X	X	X	X	X	X	X	X
15	705	495	330	X	X	X	X	X	X	X	X	X	X
16	672	464	304	X	X	X	X	X	X	X	X	X	X
17	629	442	X	X	X	X	X	X	X	X	X	X	X
18	576	414	X	X	X	X	X	X	X	X	X	X	X
19	570	399	X	X	X	X	X	X	X	X	X	X	X
20	540	380	X	X	X	X	X	X	X	X	X	X	X

Note: All distance measurements given in feet. X means that the 3-PPS/M will not support these devices at any distance.

Table B-10: SAC bus wire length for number of doors vs. current loads using 14 AWG wire

	Load (mA)												
Doors	**70**	**100**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**550**	**600**	**650**
1	4000	4000	4000	3000	2400	2000	1750	1500	1360	1200	1100	1000	940
2	4000	4000	2700	2000	1600	1360	1160	1000	900	800	740	680	620
3	4000	3000	2040	1500	1200	1020	870	750	660	600	555	510	471
4	3480	2400	1600	1200	960	800	700	600	544	480	436	400	376
5	2900	2000	1365	1000	800	675	575	500	455	405	365	335	315
6	2460	1710	1140	870	690	582	492	438	390	348	312	X	X
7	2170	1505	1015	756	602	511	434	378	336	301	X	X	X
8	1920	1360	904	680	544	448	384	336	X	X	X	X	X
9	1710	1215	810	612	477	405	351	X	X	X	X	X	X
10	1550	1100	740	550	440	370	310	X	X	X	X	X	X
11	1430	1012	682	506	407	341	X	X	X	X	X	X	X
12	1344	936	624	468	372	X	X	X	X	X	X	X	X
13	1248	858	585	429	351	X	X	X	X	X	X	X	X
14	1162	812	532	406	322	X	X	X	X	X	X	X	X
15	1095	750	510	375	X	X	X	X	X	X	X	X	X
16	1024	720	480	352	X	X	X	X	X	X	X	X	X
17	969	680	442	340	X	X	X	X	X	X	X	X	X
18	918	630	414	X	X	X	X	X	X	X	X	X	X
19	874	608	399	X	X	X	X	X	X	X	X	X	X
20	820	580	380	X	X	X	X	X	X	X	X	X	X

Note: All distance measurements given in feet. X means that the 3-PPS/M will not support these devices at any distance.

CPU memory

Use the CPU memory calculation worksheet, Table B-11, to determine if a CPU requires additional memory. Each line in the worksheet is a system variable and is referenced by a line identification (ID) letter. The line IDs also appear in the formula column. The result of solving a formula is then placed in the "Results" column.

1. Enter the values for each variable in the "#" column on the same line.
2. Replace the variables in the formula by the value entered in the "#" column having the same letter as the formula.
3. Calculate the formula and put the results in the "Results" column.
4. Determine the memory size required as indicated at the bottom of the worksheet.

Note: The Systems Definition Utility will prevent you from downloading if the compiled project database exceeds the amount of memory on the CPU.

Table B-11: CPU memory calculation worksheet

Line	Variable	#	Formula	Result
A	Base usage	N/A	N/A	70,000
B	Label usage	N/A	48+(22 x (H+K+L+N+Q+S+T))	
C	Average number of characters in a message		Between 0 and 42	
D	Average number of characters in a rule		Between 4 and 10 per controlled output	
E	Number of routing definitions		2 + (E x 8)	
F	Number of rail modules other than Signature controller modules		F x 916	
G	Number of Signature controller modules		G x 1,776	
H	Number of zones		H x (22 + C + (J x 4) + (D x 2))	
J	Average number of devices in typical zone		N/A	
K	Number of Service groups		K x (14 x C + (2 x D))	
L	Number of AND groups		L x (22 + C + (D x 2) + (M x 4))	
M	Average number of devices in AND Group		N/A	
N	Number of Matrix groups		N x (22 + C + (2 x D) + (4 x P))	
P	Average number of devices in a Matrix Group		N/A	
S	Number of time controls		S x ((26 + C) + (2 x D) + 14))	
T	Number of Guard Patrols		T x (22 + C + (V x 4) + (U x 4))	
U	Number of Guard Patrol routes		N/A	
V	Number of Guard Patrol stations		N/A	
W	Number of physical devices		W x (46 + C + (Y x 4) + (2 x D) + 8)	
Y	Average number of Logics per device		N/A	
Z	Sum of Results Lines A to Y		A+B+C+D+E+F+G+H+J+K+L+M+N+P+S+T+U+V+W+Y	

If result on line Z is less than 262,144, no additional memory is required.

If result on line Z is greater than 500,000 then enter the job in 3-SDU to determine the exact size requirement (size of CABxx.bin file).

If result on line Z is still greater than 500,000 reduce the number of points on the panel, for example, by splitting the panel into two panels.

Fiber optic cable worksheet

The fiber optic cable worksheet should be used to verify that the light attenuation factors do not exceed the fiber optic budget for any fiber optic cable segment.

Notes

The contractor installing the fiber optic cable provides items A, B, and D.

Fiber optic budget must be greater than the total link loss (F).

Table B-12: Fiber Optic Cable Worksheet

Link Name	A Cable loss per unit distance [ ] dB/Ft [ ] dB/Km [ ] dB/Mi	B Distance [ ] Feet [ ] Km [ ] Miles	C Cable Loss A x B	D Number of Splices	E Contingency Splices	F Total Link Loss (dB) C+2[D+E]

Appendix C

Listing requirements

Summary

This appendix describes the requirements your EST3 system must meet in order to conform to UL or ULC listings.

Content

NFPA standards

EST3 meets the requirements of NFPA 72 for Local, Auxiliary, Remote Station, Proprietary, and Emergency Voice/Alarm fire systems.

Minimum requirements for UL security applications

Local mercantile premises

Standard: UL 609

Minimum hardware:

- 3-RCC7 Remote Closet Cabinet
- ATCK Attack Kit
- 3-TAMPRCC Cabinet Tamper Switch
- Central Processor Unit (CPU)
- 3-PPS/M Primary Power Supply
- Main LCD Display (LCD)
  —or—
  KPDISP Keypad Display
- 3-SAC Security Access Module
- Signature Controller Module
- Listed bell and bell housing: Ademco model AB12M Bell in Box
- 24DC12 12 Vdc Voltage Regulator with Security Bell Interface
- 3-IDC8/4 Traditional Zone I/O Module
- SIGA-MD Motion Detector
- SIGA-SEC2 Security Loop Module

Additional requirements:

- Standby power must provide 24 hours of standby with 15 minutes of alarm
- Maximum entry or exit delay must be 60 seconds
- Bell test must be included in system programming, if not a built-in feature of the software
- System must be programmed for a minimum of 15 minutes bell ring on alarm
- System must be programmed to indicate bell timeout with an LED
- System power supply, bell power supply (24DC12), and bell monitoring module (IDC8/4), must all be inside the ATCK Attack Kit protected cabinet

Police station connection using a 3-MODCOM or FireWorks

Standard: UL 365

Minimum hardware:

- 3-RCC7 Remote Closet Cabinet
- ATCK Attack Kit
- 3-TAMPRCC Cabinet Tamper Switch

- Central Processor Unit (CPU)
- 3-PPS/M Primary Power Supply
- Main LCD Display (LCD)
  —or—
  KPDISP Keypad Display
- 3-MODCOM Modem Communication Module
  —or—
  FireWorks
- 3-SAC Security Access Module
- Signature Controller Modules
- Listed bell and bell housing: Ademco model AB12M Bell in Box
- 24DC12 12 Vdc Voltage Regulator with Security Bell Interface
- 3-IDC8/4 Traditional Zone I/O Module
- SIGA-MD Motion Detector
- SIGA-SEC2 Security Loop Module

Additional requirements:

- Standby power must provide 24 hours of standby with 15 minutes of alarm
- Maximum entry or exit delay must be 60 seconds
- System must be programmed for a minimum of 15 minutes bell ring on alarm
- System must be programmed to indicate bell timeout with an LED
- System power supply, bell power supply (24DC12), and bell monitoring module (IDC8/4), must all be inside the ATCK Attack Kit protected cabinet
- Systems using a 3-MODCOM must be configured using two phone lines with line-cut detection
  —or—
  a single line with 24-hour test
- System must be programmed to provide closing confirmation (ring-back) at the arming station

Central station connection using FireWorks

Standard: UL 1610

Minimum hardware:

- 3-RCC7 Remote Closet Cabinet
- ATCK Attack Kit
- 3-TAMPRCC Cabinet Tamper Switch
- Central Processor Unit (CPU)
- 3-PPS/M Primary Power Supply
- Main LCD Display (LCD)

—or—
KPDISP Keypad Display
- FireWorks
- 3-SAC Security Access Module
- Signature Controller Modules
- SIGA-MD Motion Detector
- SIGA-SEC2 Security Loop Module

Additional requirements:

- System must be connected to a FireWorks workstation
- Standby power must provide 24 hours of standby with 15 minutes of alarm
- Maximum entry or exit delay must be 60 seconds
- System must be programmed to transmit opening and closing messages to the central monitoring station
- System must be programmed to provide closing confirmation (ring-back) at the arming station

Central station with local bell timeout using a 3-MODCOM

Standard: UL 1610

Minimum hardware:

- 3-RCC7 Remote Closet Cabinet
- ATCK Attack Kit
- 3-TAMPRCC Cabinet Tamper Switch
- Central Processor Unit (CPU)
- 3-PPS/M Primary Power Supply
- Main LCD Display (LCD)
  —or—
  KPDISP Keypad Display
- 3-MODCOM Modem Communication Module
- 3-SAC Security Access Module
- Signature Controller Module
- Listed bell and bell housing: Ademco model AB12M Bell in Box
- 24DC12 12 Vdc Voltage Regulator with Security Bell Interface
- 3-IDC8/4 Traditional Zone I/O Module
- SIGA-MD Motion Detector
- SIGA-SEC2 Security Loop Module

Additional requirements:

- Standby power must provide 24 hours of standby with 15 minutes of alarm
- Maximum entry or exit delay must be 60 seconds

- System must be programmed for a minimum of 15 minutes bell ring on alarm
- System must be programmed to indicate bell timeout with an LED
- System power supply, bell power supply (24DC12), and bell monitoring module (IDC8/4), must all be inside the ATCK Attack Kit protected cabinet
- System must be programmed to transmit opening and closing messages to the central monitoring station
- System must be configured using two phone lines with line-cut detection *or* a single line with 24-hour test
- System must be programmed to provide closing confirmation (ring-back) at the arming station

Central station using a 3-MODCOM

Standard: UL 1610

Minimum hardware:

- 3-RCC7 Remote Closet Cabinet
- ATCK Attack Kit
- 3-TAMPRCC Cabinet Tamper Switch
- Central Processor Unit (CPU)
- 3-PPS/M Primary Power Supply
- Main LCD Display (LCD)
  —or—
  KPDISP Keypad Display
- 3-MODCOM Modem Communication Module
- 3-SAC Security Access Module
- Signature Controller Modules
- SIGA-MD Motion Detector
- SIGA-SEC2 Security Loop Module

Additional requirements:

- Standby power must provide 24 hours of standby with 15 minutes of alarm
- Maximum entry or exit delay must be 60 seconds
- System must be programmed to transmit opening and closing messages to the central monitoring station
- System must be configured using two phone lines with line-cut detection
  —or—
  3-RCC7 a single line with 24-hour test
- System must be programmed to provide closing confirmation (ring-back) at the arming station

Proprietary using 3-MODCOM or FireWorks

Standard: UL 1076

Minimum hardware:

- 3-RCC7 Remote Closet Cabinet
- ATCK Attack Kit
- 3-TAMPRCC Cabinet Tamper Switch
- Central Processor Unit (CPU)
- 3-PPS/M Primary Power Supply
- Main LCD Display (LCD)
  —or—
  KPDISPKeypad Display
- 3-MODCOM Modem Communication Module
  —or—
  FireWorks
- 3-SAC Security Access Module
- Signature Controller Modules
- SIGA-MD Motion Detector
- SIGA-SEC2 Security Loop Module

Additional requirements:

- Standby power must provide 24 hours of standby with 15 minutes of alarm
- Maximum entry or exit delay must be 60 seconds
- Systems using a 3-MODCOM must be configured using two phone lines with line-cut detection
  —or—
  a single line with 24-hour test
- System must be programmed to provide closing confirmation (ring-back) at the arming station

Proprietary with standard line security

Standard: UL 1076

Minimum hardware:

- 3-CAB5, 3-CAB7, 3-CAB14, 3-CAB21, 3-RCC7, 3-RCC14, or 3-RCC21 with 3-CHAS7
- 3-TAMP, 3-TAMP5, or 3-TAMPRCC Cabinet Tamper Switch
- Central Processor Unit (CPU)
- 3-PPS/M Primary Power Supply
- 3-IDC8/4
  —or—
  3-SSDC(1) or 3-SDDC(1) with SIGA-CT1, SIGA-CT2, or SIGA-UM
- 3-RS485A, 3-RS485B, or 3-RS485R

Additional requirements:

- Standard line security is for stand-alone or networked EST3 systems only

Access control

Standard: UL 294

Minimum hardware:

- Central Processor Unit (CPU)
- 3-PPS/M Primary Power Supply
- Main LCD Display (LCD)
- 3-SAC Security Access Module
- CRC or CRCXM Card Reader Controller

Note: The CRC or CRCXM Card Reader Controller is fully functional and does not require a supportive PC for access decisions. Refer to the *CRC and CRCXM - Card Reader Controller Installation Sheet.*

Holdup alarm

Standard: UL 636

Minimum hardware:

- 3-RCC7 Remote Closet Cabinet
- ATCK Attack Kit
- 3-TAMPRCC Cabinet Tamper Switch
- Central Processor Unit (CPU)
- 3-PPS/M Primary Power Supply
- Main LCD Display (LCD)
- 3-MODCOM Modem Communication Module
—or—
FireWorks
- 3-IDC8/4 Traditional Zone I/O Module
—or—
Signature Controller Module
—plus—
SIGA-CT1, SIGA-CT2, or SIGA-UM module
- Listed compatible holdup IDC devices

Additional requirements:

- Standby power must provide 24 hours of standby with 15 minutes of alarm
- Maximum entry or exit delay must be 60 seconds
- Systems using a 3-MODCOM must be configured using two phone lines with line-cut detection
—or—
a single line with 24-hour test
- IDC8/4 devices must be configured as a security zone (in the SDU, Hard Zone Type = SECURITY)

- Signature modules must be configured as security devices (in 3-SDU, Device Type = Active Latching > Security)
- IDC8/4 devices must be configured so Routing Label and Alternate Routing Label are set to *No_Cabinets* (that is, the holdup event messages must not be displayed on any panel or other annunciator device)
- The system must be programmed so that all local outputs are suppressed.
- SIGA-CT1, SIGA-CT2, and SIGA-UM module loops used for holdup must be configured so Routing Label and Alternate Routing Label are set to *No_Cabinets* (that is, the holdup event messages must not be displayed on any panel or other annunciator device)
- The central monitoring station or FireWorks workstation must manned on a 24-hour basis

The following material is extracted from UL 636, Section 86. It applies to Holdup alarm applications.

86 Types of Remote Stations

86.1 A holdup alarm signal shall be transmitted to one of the following remote stations:

a) Direct to a constantly manned police department equipped for broadcasting radio calls to cruising squad cars or to a central station or residential monitoring station with facilities for relaying calls to a police department with such broadcasting facilities. The central station shall comply with the Standard for Central-Station Burglar Alarm Systems, UL 611, or the Standard for Central-Stations for Watchman, Fire Alarm and Supervisory Services, UL 827. The residential monitoring station shall comply with UL 611, UL 827, or both.

b) Two or more private stations in places of business constantly open during the day, located within 500 feet (152 m) of the protected premises and commanding all public approaches to the premises.

UL and ULC requirements

The following table describes the requirements your system must meet in order to conform to UL or ULC.

UL	ULC	Requirement
X		Partitioned security systems with central monitoring station reporting A partition that contains an EST3 panel equipped with a 3-MODCOM and local bell must be armed 24 hours a day, and have limited, high-level access. When FireWorks is used as the central monitoring station, the EST3 panel to which it connects must be in a partition that is armed 24 hours a day, and has limited, high-level access. Closing confirmation (ring back) must be provided at all arming stations. Use of multiple sounders or bells is acceptable.
X	X	Partitioned security systems using local bells A local bell must be positioned where it can be heard at each arming station. Use of multiple bells is acceptable. The system must be programmed to sound the bell for a minimum of 15 minutes on alarm. If the bell stops sounding after 15 minutes (timeout), the system must be programmed to light an LED to indicate bell timeout. When using a 24DC12 module to power the bell, that module must be installed in an EST3 cabinet that has a 3-TAMPRCC Cabinet Tamper Switch and an ATCK Attack Kit.
X	X	Partitioned security systems for certification All partitions in a certificated partitioned access control or security system must be under the control of a single company. In a certificated system, each separately owned business must have its own security system.
X	X	Security systems All security systems must specify a master arming station which receives all security event messages. Alternately, the system may be configured so that all messages are routed to all keypads. All cabinets in a system that includes security functionality must include tamper switches. On activation, all security points must generate an appropriate output device response. The SDU cannot guarantee correlation between security input devices and output devices. The system programmer must ensure that all points are accounted for. When the system includes a bell, you should create a general rule to sound the bell on activation of any security device.
X	X	Panel programming Fire and security functionality cannot be programmed into a control panel from a remote location. You must perform all panel programming on site.

Glossary

A device or zone	An alarm device or zone
ACDB	Access Control Database program. Software that lets end users create and maintain an access control database. The program communicates with the system either by direct RS-232 connection, or by telephone lines to a 3-MODCOM.
activate	To turn on or energize. Pertains to outputs (including logical outputs).
address	A number used to uniquely identify a device, output, panel, etc. within an EST3 system
alarm	The state of a fire alarm initiating device that has detected a smoke or fire condition. The state of a security device that has been triggered.
alarm silence timer	A panel option that automatically silences the notification appliance circuits (NACs) after a preprogrammed time limit after the last alarm
alarm silence or reset inhibit timer	A panel option that prevents anyone from silencing notification appliance circuits (NACs) or resetting the panel for a programmed period after the last alarm
AND statement	A system input that activates when ALL the input conditions as indicated in its AND statement list, are active
audible circuit	A notification appliance circuit that is turned OFF when the Alarm Silence switch is pressed.
change of state	Occurs whenever an input zone or device changes from a restored to an active condition, or from the active condition back to the restored condition
Class A IDC	A circuit, connected directly to initiating devices, that signals a trouble condition upon an open condition on the circuit. All devices wired on the circuit to continue to operate in the event of a single open. Similar to Style D & E integrity monitoring.
Class A NAC	A circuit, connected directly to notification appliances, that signals a trouble condition upon an open or shorted condition on the circuit. All appliances wired on the circuit to continue to operate in the event of a single open. Similar to Style Z integrity monitoring.
Class B IDC	A circuit, connected directly to initiating devices, that signals a trouble condition upon an open condition on the circuit. All devices wired on the circuit to continue to operate up to the location of a break. Similar to Styles A, B, C, & D integrity monitoring.

Class B NAC	A circuit, connected directly to notification appliances, that signals a trouble condition upon an open or shorted condition on the circuit. All appliances wired on the circuit to continue to operate up to the location of a break. Similar to Styles W, X, & Y integrity monitoring.
CMS	Central monitoring station
coder	A device that provides interruption of power to audible devices at a predetermined rate or sequence
command list	A predefined list of SDU commands. You can activate a command list from a rule, from another command list, or from an external command and control system. Users of the ACDB program can specify which command list is executed for an access control event. The RPM exports the command list names (labels) in the resource profile.
compile	To convert data entered during programming into a format used by the fire alarm control panel
CRC	Card Reader Controller
DACT	Digital alarm communicator transmitter. A system component which transmits digital alarm, supervisory, and trouble signals to a central monitoring station (CMS) over dial-up telephone lines. The 3-MODCOM is a DACT.
database	User-defined, permanently stored, system parameters containing system zone definitions, device types, responses, messages, etc.
device	Any Signature Series detector or module
device address	A number that uniquely identifies a detector or module on a Signature data circuit
dialer	See DACT
disable	Prevent an input, output, or system feature from functioning
download	To send a compiled project database from your PC to the system control panel.
EEPROM	Electrically erasable programmable read-only memory. Nonvolatile memory containing the system database.
enable	Permit an input, output, or system feature to function.
EPROM	Erasable programmable read-only memory. Nonvolatile memory containing the operating system. EPROM is erasable only by ultraviolet light.
external command port	An RS-232 connection which permits the CPU module to be connected to a remotely located control system.
fiber optic	Communication format that uses light signals carried on glass fibers to transmit and receive data
flash memory	Nonvolatile read-write memory
global domain	Features which operate in all network cabinets

group	A collection of Signature devices that is treated as a single entity for programming purposes. Groups can have messages and responses over and above the messages and responses of the individual group members.
group domain	Features that operate in a specific group of network cabinets
IDC	Initiating device circuit. An input circuit connected directly to any manual or automatic initiating device, whose normal operation results in an alarm or supervisory signal indication at the control panel. The electrical integrity of the circuit is monitored by the fire alarm system.
input	A signal generated by a field device and sent to the control panel for evaluation and responses as determined by the system database. Inputs to the system are detectors, modules, and switches.
KDC	Keypad Display Configuration program. Software that lets end users create and maintain a security database. The program communicates with the system via 3-MODCOM.
KPDISP	Keypad Display
label	A unique identifier for an object
listing	A printed version of all system configuration data contained in the panel
local domain	Features which operate only within the local cabinet
local system	A system which operates according to the provisions of NFPA 72, Chapter 3
logic functions	AND and OR statements
M device or zone	A monitor device or zone
march time	A 50% duty cycle, 120 beats per minute signal pattern
matrix	A correlation sheet that indicates the relationship between the activation of an input and the effect it will have upon all system outputs
modem	Short for modulator/demodulator. A communications device that enables a computer to transmit information over a standard telephone line. Sophisticated modems are also capable of such functions as automatic dialing, answering, and redialing in addition to transmitting and receiving. The 3-MODCOM includes a modem.
NAC	Notification appliance circuit. A circuit connected directly to notification appliances. The electrical integrity of the circuit is monitored by the fire alarm system.
nonsilenceable	A notification appliance circuit that remains active after initiating, independent of the panel's alarm silence features. Nonsilenceable NACs are typically used for visual devices.
object	Inputs, outputs, and controls which are used as the basis for creating system rules

output	A signal generated by the system, based upon responses defined in the system database, and sent to external field devices. Outputs are LEDs, and modules.
output priority	A system of hierarchy that allows or prevents setting or resetting outputs. Output priorities range from low to high.
personality code	A number code used to set the configuration and operation of a SIGA module. A personality code is either factory installed or must be downloaded into SIGA modules for proper operation.
power-limited	Wiring and equipment that conforms with, and is installed to, the National Electrical Code, Article 760, power-limited provisions
proprietary system	A system which operates according to the provisions of NFPA 72, Chapter 4-4
pseudo point	An input or output point that is not a physical device. Example: ground fault and communication fault notification.
PSNI	Positive, successive, non-interfering code
RAM	Random access memory. Volatile memory containing the system online or active status.
reset	An active condition or command used to force an output to its OFF condition. An output's OFF state may be in the restored condition (normal condition, not under the influence of a response) or the reset condition. An output reset state contains a priority level.
response	A list of outputs or functions that occur as a result of the change of state of an input.
restore	Refers to a condition of an input, where the input is not active. It also refers to the condition of an output where the output is not in its SET or RESET condition and does not have a priority value associated with it.
retard	The delay of water flow signals to prevent false alarms due to fluctuations in water pressure.
riser	An electrical path that contains power or signal that is used by multiple outputs, zones, or circuits.
RS-232	A serial communications format normally used for serial peripheral devices (i.e., printers) from a computer. RS-232 cables have a maximum length of 50 ft (15.2M).
RS-485	A serial differential communications format used to communicate between the panel and some remote annunciators.
rule	A logical relationship between objects defined in the network's object list. Rule format:[rule label] (input state) (input device type) 'input label' : Output command (output device type) (priority) 'output label' {comments};
S device or zone	Supervisory device or zone

SDU	EST3 System Definition Utility program. Software that lets programmers configure and program an EST3 integrated system.
sensitivity	The relative percent obscuration of a detector
sequence	A series of actions separated by time delays
service group	A collection of devices that are configured for testing as a group using the system test function
SIGA	An abbreviation for Signature A
Signature data circuit	The wiring which connects Signature Series devices to the fire alarm panel
silenceable	Notification appliance circuits that follow the action of the panel's alarm silence features. Silenceable NACs are used for audible devices only.
SPM	Strokes per minute
start action	An action that is activated upon power-up of the panel and remains active until manually reset
start sequence	A sequence that is begun upon power-up of the panel
supervisory circuit	An IDC input circuit used to monitor the status of critical fire protection equipment, e.g. sprinkler valves
supervisory open (trouble)	Condition generated when a supervisory zone is open, in ground fault, or when a Signature Series device is not responding to a poll
supervisory short	Condition generated when a supervisory zone or device is shorted.
System Definition Utility	A Windows-based program used to enter and modify information contained in the system
TAP protocol	Telocator Alphanumeric Protocol. A communication protocol that lets the EST3 system transmit text messages to suitably equipped and supported alphanumeric pagers, via the 3-MODCOMP.
telco	Telephone company
temporal pattern	A universal 3-pulse evacuation signal meeting the requirements of NFPA Standard 72, section A-2-4.10(a) and ULC 527
time control	An input activated by the time of day or day of the month
verification alarm	Upon receipt of an alarm by a smoke detector, verified detectors attempt to automatically reset. Receipt of a second alarm within the 60-second confirmation period after the automatic detector reset period is indicative of a verified alarm.
waterflow device	Devices or zones defined as waterflow devices are not permitted to silence their notification appliances while the alarm is active

zone	A group of Signature Series detectors and modules which has a unique zone number and acts as a single entity for programming purposes, whenever any component of the zone is activated

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EST3
System Operation Manual

P/N 270382 • REV 9.0 • ISS 13APR12

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TRADEMARKS	

Content

About this manual

This manual provides information on how to operate an EST3 integrated system. The information presented here is of a general nature, since each site and system is unique. The EST3 system at your site has been designed by professionals to meet the specific requirements of the fire and security codes in your location. Please refer to the site-specific instructions, provided by your UTCFS representative, to determine the exact operation of your system.

Model number JB-TBZL-EST3, used to describe the EST3 life safety system in the Chinese marketplace, carries the same UL listings and approvals as EST3 when installed and configured using the subcomponents and methodologies described in this manual.

Organization

The manual contains the following chapters:

- *Chapter 1: Introduction:* gives you a general description of system functions and operations.
- *Chapter 2: 3-LCD and 3-LCDXL1 operating instructions:* provides detailed operating instructions for the primary control module, the 3-LCD(XL1) module.
- *Chapter 3: 3-ASU operating instructions:* provides detailed operating instructions for the 3-ASU audio source unit.
- *Chapter 4: 3-FTCU operating instructions:* provides detailed operating instructions for the 3-FTCU firefighter telephone control unit.
- *Appendix A: System addresses:* contains figures that show you how to determine various device addresses.
- *Appendix B: Operation sequence charts:* contains tables or charts that show the sequence of events, actions, and displays for the most common panel operations.

The EST3 library

EST3 documents

A library of documents and multi-media presentations supports the EST3 life safety system. A brief description of each is provided below.

EST3 Installation and Service Manual (P/N 270380): Gives complete information on how to install and service the EST3 hardware. The manual also includes installation information on selected Signature Series components.

SDU Online Help (P/N 180653): Provides full online support for configuring and programming a system using the EST3 System Definition Utility program.

EST3 System Operation Manual (P/N 270382): Provides detailed information on how to operate the system and system components.

EST3 Smoke Management Application Manual (P/N 270913): Provides information for designing, programming, and testing an EST3 smoke control system

EST3 Users Self-Study Course (P/N 270684): Contains a self-paced manual and accompanying video. The course is designed for building personal, security guards, firefighters, and other individuals that may be required to operate the system.

Other documents

In addition to documents in the *EST3* library, you may find the following documents useful.

Signature Series Intelligent Smoke and Heat Detectors Applications Bulletin (P/N 270145): Provides additional applications information on the Signature series smoke and heat detector applications.

Signature Series Component Installation Manual (P/N 270497): Contains detailed mounting and wiring information for all Signature series devices.

Speaker Application Guide (P/N 85000-0033): Provides information on the placement and layout of speakers for fire alarm signaling and emergency voice communications.

Strobe Applications Guide (P/N 85000-0049): Provides information on the placement and layout of strobes for fire alarm signaling.

Important information

Limitation of liability

This product has been designed to meet the requirements of NFPA Standard 72; Underwriters Laboratories, Inc., Standard 864; and Underwriters Laboratories of Canada, Inc., Standard ULC S527. Installation in accordance with this manual, applicable codes, and the instructions of the Authority Having Jurisdiction is mandatory. UTCFS shall not, under any circumstances, be liable for any incidental or consequential damages arising from loss of property or other damages or losses owing to the failure of UTCFS products beyond the cost of repair or replacement of any defective products. UTCFS reserves the right to make product improvements and change product specifications at any time.

While every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents, UTCFS assumes no responsibility for errors or omissions.

FCC warning

This equipment can generate and radiate radio frequency energy. If this equipment is not installed in accordance with this manual, it may cause interference to radio communications. This equipment has been tested and found to comply within the limits for Class A computing devices pursuant to Subpart B of Part 15 of the FCC Rules. These rules are designed to provide reasonable protection against such interference when this equipment is operated in a commercial environment. Operation of this equipment is likely to cause interference, in which case the user at his own expense, will be required to take whatever measures may be required to correct the interference.

Industry Canada information

Note: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. Industry Canada does not guarantee the equipment will operate to the user’s satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate

Note: The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirements that the sum of the Load Numbers of all the devices does not exceed 100.

Chapter 1

Introduction

Summary

This chapter provides a general description of system functions and their operation.

Content

Table 1-1: Password privileges

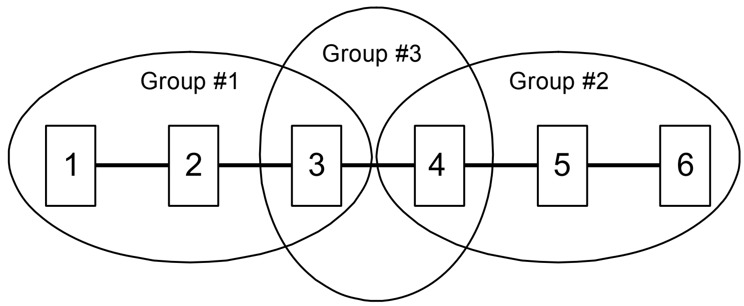
Password Level	Privileges
User access level 2	All default and User 1 privileges, plus: • History reports • Devices (enable/disable) • Zone groups (enable/disable) • Alternate sensitivity (activate) • Alternate message route (activate) • Primary sensitivity (restore) • Primary message route (restore) • Change time (program) • Change date (program) • Security devices (bypass/unbypass) • Partitions (arm/disarm) • Change password for level 1
User access level 3	All default, User 1 and 2 privileges, plus: • AND group (enable/disable) • Matrix group (enable/disable) • Service group (enable/disable) • Guard patrol group (enable/disable) • Instruction text (enable/disable) • Time control (enable/disable) • Switch (enable/disable) • LED (enable/disable) • Relay (activate/restore) • LED (activate/restore) • Audio amp (activate/restore) • Audio message (activate/restore) • Holiday list (program) • Change password for level 2
Service access level 4	All default, User 1, 2, and 3 privileges, plus: • Security functions: NONE • Output: Primary printer select • Card (LRM)(enable/disable) • Restart by panel (program) • Restart all panels (program) • Clear history (program) • Test (start/cancel) • Signature Device Test • Change password for level 3

Feature and function domains

The *domain* of a feature or function is the group of cabinets on the network that are affected when the feature or function is activated. Three domains are available:

- Local: The feature/function affects only the cabinet on which the 3-LCD or 3-LCDXL1 display module is installed
- Group: The feature/function affects a pre-defined group of cabinets on the network
- Global: The feature/function affects all the cabinets on the network

A network cabinet may be a part of one or more groups. Multiple control locations are permitted for any group.



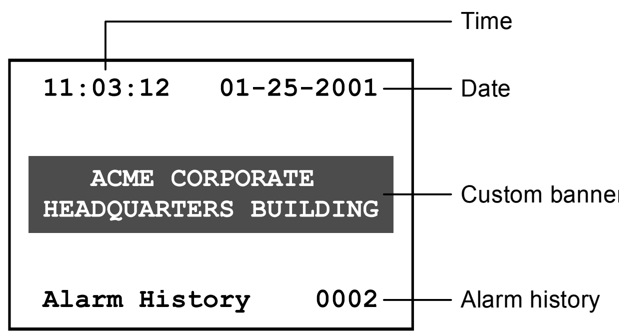
The configuration of features and functions varies with each installation. Please consult your site-specific documentation to determine if any custom features or functions have been designed into your system.

Display operation

The information presented on the main display depends on the operating condition of the panel: normal state (no events present) or off-normal state (at least one event).

Normal state

Figure 1-1 shows the information presented on the main display when the panel is in a normal operating condition.



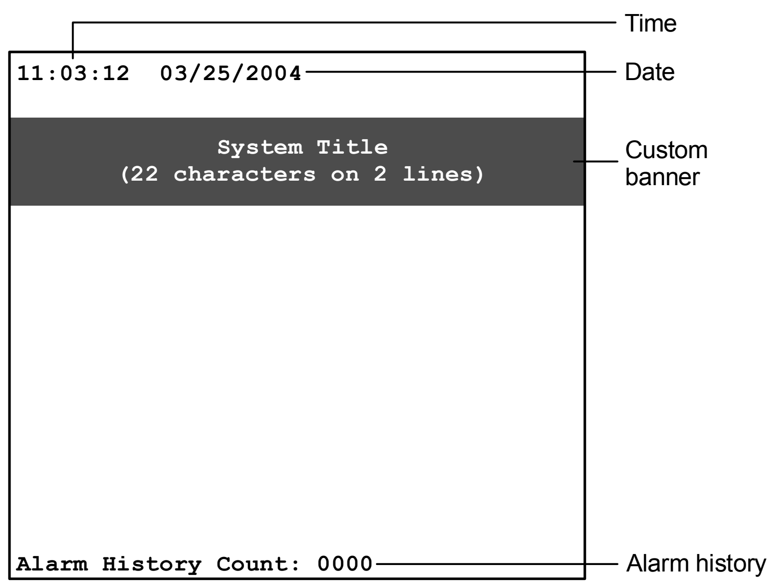


Figure 1-1: Main 3-LCD (top) and 3-LCDXL1 (bottom) display screens when the panel is in a normal state

- The top of the screen displays the system time and date. The time is in 24-hour format. The project configuration settings determine the date format.

- The middle of the screen displays an optional custom banner message, if programmed into the system. Otherwise, this area is left blank.
- The bottom of the screen displays the total number of times that the panel has gone into alarm since the last time the alarm history was cleared.

Off-normal state

Figure 1-2 and Figure 1-3 show the information presented on the main display when the panel is in an off-normal operating condition.

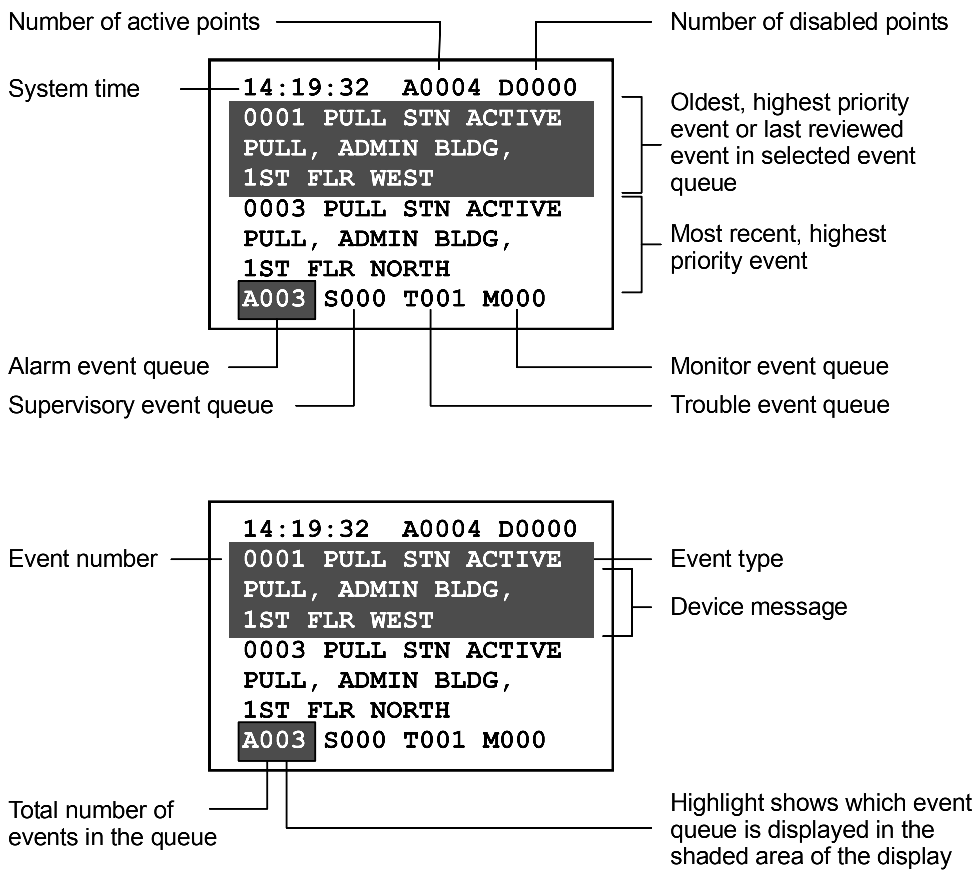


Figure 1-2: Main 3-LCD display screen when the panel is in an off-normal state

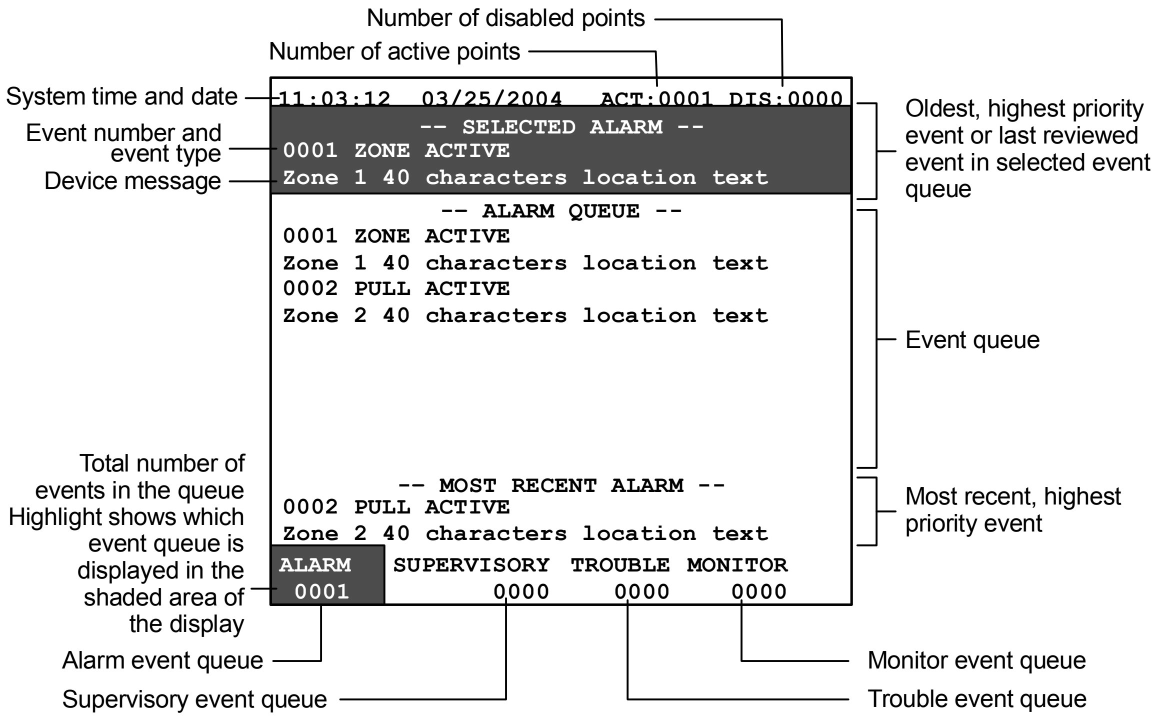


Figure 1-3: Main 3-LCDXL1 display screen when the panel is in an off-normal state

- The top line of the screen displays the system time in 24-hour format, the number of active points in the system, and the number of disabled points.
- The shaded area displays the oldest, highest priority, event received by the panel, or the last reviewed event in the selected event queue, depending on whether the display is in unattended mode (regular off-normal operation) or in attended mode. In either case, the display shows the event number, the event type, and the active device's message.

  Note: Pressing any one of the queue select buttons places the display in the attended mode for reviewing or acknowledging events and prevents the shaded area from being updated by an event with a higher priority. The display automatically returns to the unattended mode after the user timeout period has expired.
- The area immediately below the shaded area on the 3-LCD always displays the most recent, highest priority event in an event queue. This area on the 3-LCDXL1 displays the event queue and the area below the event queue displays the most recent, highest priority event in an event queue.

  Note: Cabinet configuration option settings determine which events are routed to the main display and placed in an event queue.

- The bottom line of the display shows the number of events in each event queue. The highlight around the event counter indicates which event queue is displayed in the shaded area.

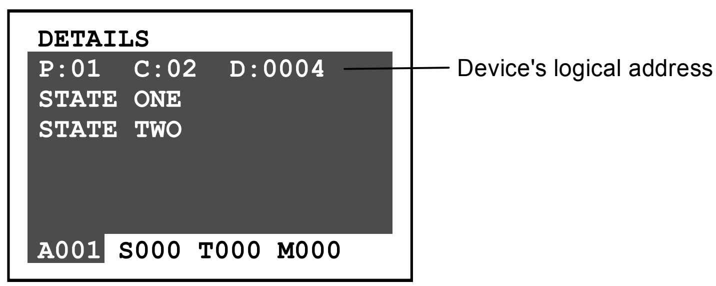
  Note: The event counter stops at 999. It is possible for an event queue to hold more than 999 events. If an event queue holds more than 999 events, “***” is displayed.

Message details

Pressing the Details button displays additional information about the event displayed on the LCD. Different detail information is displayed for each of the following:

- Device
- Group
- Guard patrol
- Instruction text

Device details



If a device activation causes the event, pressing Details displays the active device’s logical address in the following format:

`P:99 C:99 D:9999`

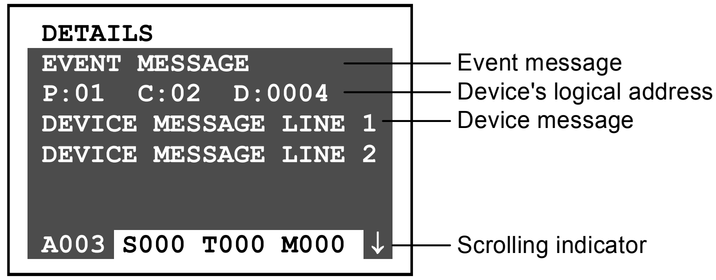
Where:

- P:99 = panel address
- C:99 = rail module address
- D:9999 = device address

Lines below the device address list the off-normal states the device is currently in.

Group details

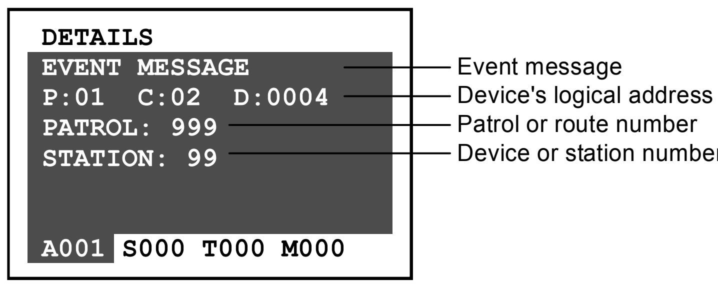
If a group activation causes the event, pressing Details displays a series of descriptions, one for each device in the group.



Each device panel shows the event message or state of the device, the device address, and the device message (usually the device location) which can be one or two lines long.

Guard patrol details

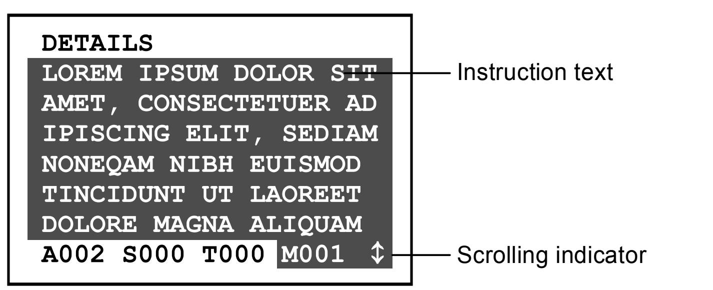
When a guard patrol route goes active, pressing Details displays information about the station (device) that is in alarm.



The Details panel shows the event or state of the off-normal station, as well as the logical address, patrol or route number, and station number of the device.

Instruction text details

Your system may be programmed to include detailed instructions for certain events. When specific devices go into alarm, the system generates a related monitor event. If you select the monitor event, then press Details, the instruction text is displayed.



Normally, systems are designed so that instruction text is sent directly to a printer. While accessible, instruction text is not formatted for the display.

Display priorities

The panel controller places all events into one of five categories:

- Fire alarms - life safety related events, e.g. smoke detector, sprinkler system waterflow, manual pull station, etc.
- Security alarms - include burglar and holdup alarms, as generated by security devices
- Supervisory events - off normal conditions of a related fire protection system, e.g. sprinkler system valve closed.
- Trouble events - faults within the system
- Monitor events - changes in the status of an ancillary system

Because events can happen at random, the system prioritizes which event is the most critical and displays its information first. Alarm events have the highest priority and monitor events have the lowest priority.

In the U.S. Local and Proprietary market place, security events have a higher priority than monitor events and are stored in the supervisory queue. For all market place settings other than the U.S. (except the Middle East and Asia, which is the same as the U.S.) Local and Proprietary, security events, and monitor events have equal priority and are stored in the monitor queue.

Message processing

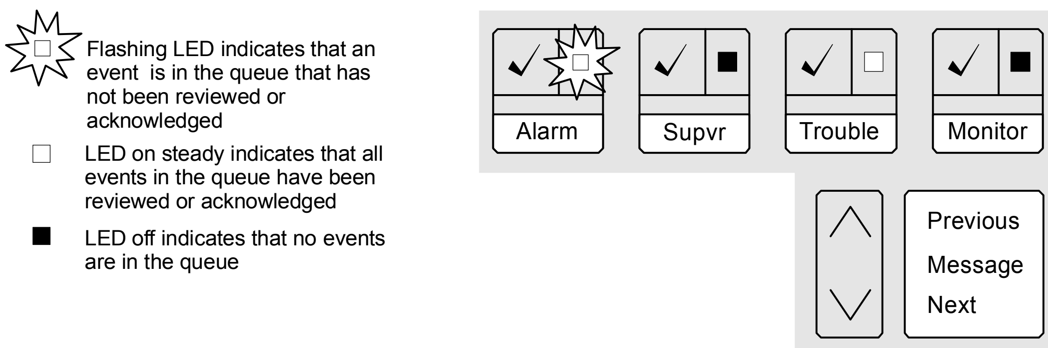
When an event occurs, the system categorizes the event as a fire alarm, security alarm, supervisory event, trouble event, or monitor event. Information about the event is added to a corresponding message queue on the 3-LCD or 3-LCDXL1 display module. The information available in each queue is displayed using the event queue buttons on the front of the LCD.

Note that for display purposes, security alarms and supervisory events are both stored in the supervisory queue.

A panel can store up to 2,000 event messages.

Common event LEDs and queue buttons

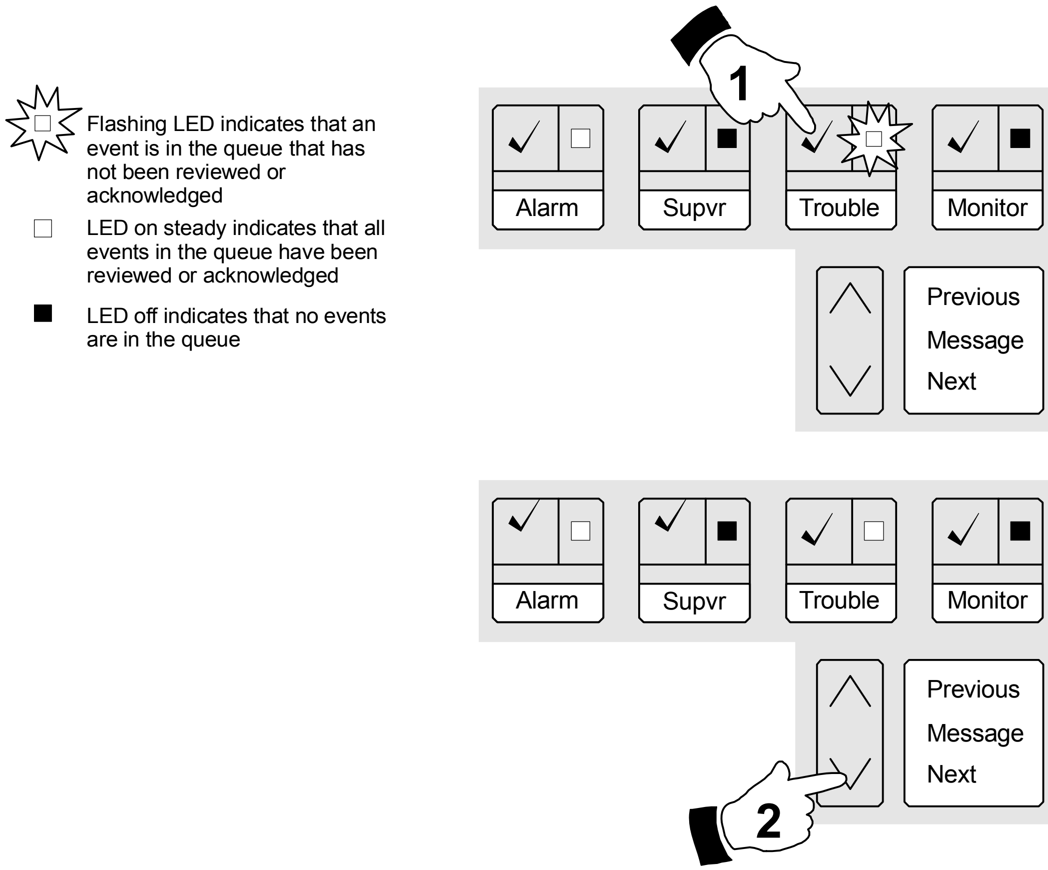
The event queue LEDs act as a common event indicator, flashing any time a new event is added to the queue.



When an event is received, the respective event queue LED flashes, indicating that the event has not been reviewed or acknowledged.

1. Select the highest priority active queue by pressing the respective queue button.
2. Scroll through all available event messages using Previous/Next buttons.

You may use the Previous and Next Message or the queue buttons to scroll through the activation messages at any time after a queue is selected.


Flashing LED indicates that an event is in the queue that has not been reviewed or acknowledged
LED on steady indicates that all events in the queue have been reviewed or acknowledged
LED off indicates that no events are in the queue
1
Alarm
Supvr
Trouble
Monitor
Previous
Message
Next
Alarm
Supvr
Trouble
Monitor
Previous
Message
Next
2

Optional features

The EST3 system can be configured with many optional features that provide additional capabilities. Your system may include some or all of these options, depending on the needs of your facility. See the site-specific information provided by your system installer to determine which options are installed.

Guard patrol

The guard patrol feature is used to monitor the activities of security guards. Guards are required to walk any one of a number of predetermined routes called tours. During each tour, the guard must activate guard patrol stations that are strategically located along the route. Should a guard activate a station too early, too late, or out of sequence, an active guard patrol message will be displayed on the panel LCD.

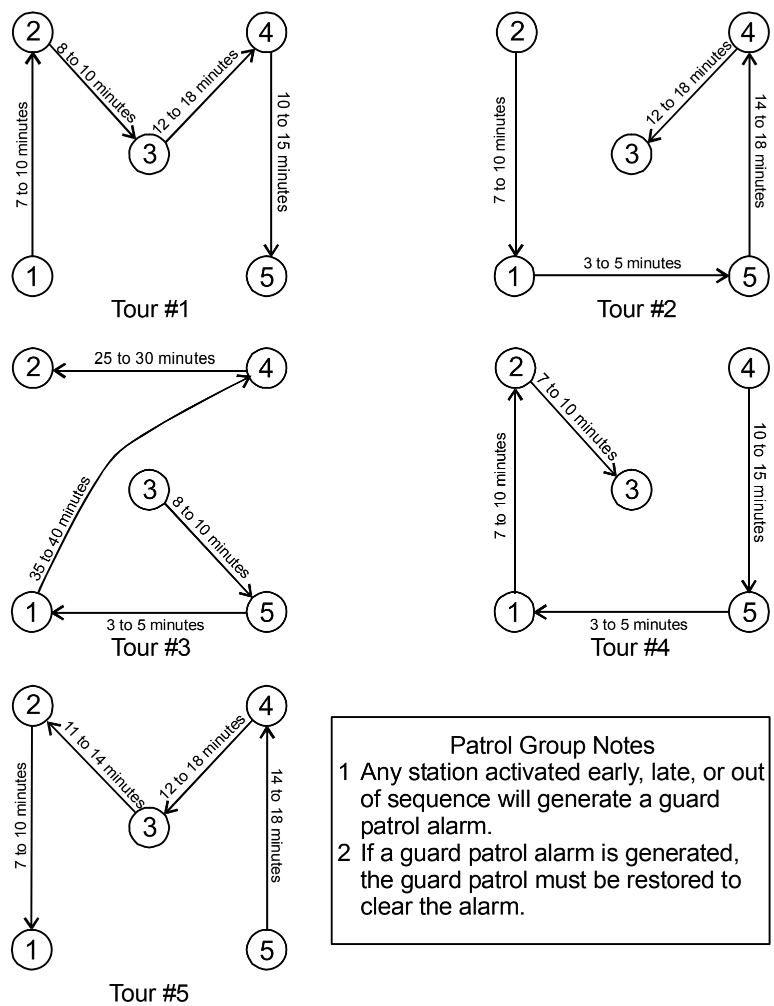


Figure 1-4: Sample guard patrol route assignments

Figure 1-4 shows five guard patrol routes consisting of five stations. The system designer has assigned a minimum and maximum time allowance for the guard to go between any two guard stations. If the guard arrives too early, too late or at the wrong station, an active guard patrol event is generated.

Starting a tour

There are three ways to start a guard patrol tour:

- Activate the first guard patrol station on the route
- Enable the Guard Patrol group from the LCD module (either 3-LCD or 3-LCDXL1)
- Press a control/display panel button programmed to turn on the Guard Patrol group

Note: A guard patrol station designated as the first station in one guard patrol route cannot be the first station in another route.

Ending a tour

A guard patrol tour is automatically ended when all stations on the route have been successfully operated within the allowable time period and in the proper sequence.

Should a tour end with an active guard patrol response, the system must be reset to clear the guard patrol response.

Press the Details button to reveal the stations reporting in.

Clearing a guard patrol alarm

When a guard patrol alarm is generated, you must restore the guard patrol route to clear the alarm. The steps are detailed later in this manual.

System timers

The system has a number of optional timers that are required by certain jurisdictions to comply with fire codes. Most of these timer functions do not require operator action, however, understanding the function of these optional timers (if enabled) will improve your understanding of why the system functions as it does.

Alarm silence/reset inhibit timer

The alarm silence/reset inhibit timer is used to guarantee that the notification appliances will sound for the minimum specified period. This timer effectively disables the alarm silence and reset buttons for a predetermined period. While the timers are active, pressing the alarm silence and reset buttons has no effect.

Notes

- Your system may be equipped with notification appliances associated with the fire sprinkler system, which cannot be silenced.
- Visual notification appliances can be configured *not* to turn off when the audible notification appliances are silenced.

Automatic alarm silence timer

The automatic alarm silence timer is used to automatically silence the notification appliances after a preset period, if they have not been silenced using the alarm silence button. Typical timer settings silence the signals from 5 to 30 minutes after operation.

Automatic general alarm (GA) timer

Some systems can be used to implement a positive alarm sequence. They are designed to permit a short investigation period between the detection of a fire and sending a general alarm to the entire facility. The automatic general alarm timer is used to initiate the general alarm after a predetermined time period, if no action has been taken by the operator to prevent the general alarm from being sent.

Time controls

Time controls provide for the automatic starting and stopping of system events based on time and date. Time controls run in the background and do not require any operator action.

Setting holidays

The system provides for special time controls, referred to as holiday time controls. Holiday time controls supersede the normal time controls on dates that are designated as holidays. The list of dates that are defined as holidays is entered into the system from the 3-LCD or 3-LCDXL1 display module.

Control/display module buttons

The buttons on a control/display module use one of three available operating modes.

- Toggle - The state of the button changes each time the button is pushed, i.e. “off” to “on” or “on” to “off.”
- Interlocked - Three adjacent toggle buttons that operate as a group. Pushing any button in the group turns the output of the other two buttons “off” and turns its own output “on.”
- Momentary - The button is “on” only while pressed by the operator.

You may find multiple button modes on a single control/display module. Consult your site-specific documentation for additional information.

Toggle buttons

Toggle buttons are commonly used to control two state operations such as on/off, open/close, speaker select, telephone select, etc. The output of an “on” button remains “on” during panel reset, and must be manually turned “off” when no longer required.

Interlocked buttons

The interlocked mode is commonly used for *hands-off auto* control of HVAC systems. An interlocked button in the “on” state can be turned “off” without activating a second button by pressing the “on” button a second time. The output of the “on” button remains on, during panel reset, and must be manually returned to “Auto” when no longer required.

Momentary buttons

Momentary buttons are typically to issue brief commands. Example uses for momentary buttons: lamp tests, function reset, and test sequences. The command is issued only while the button is pressed.

Entering logical addresses

Each addressable device or circuit in the system has a logical address. This includes panels, local rail modules, and devices. Depending on the operation you are performing, you will be prompted to enter a logical address in one of several formats.

Tip: Get an SDU Objects report for your system and keep it with this documentation. The SDU Objects report lists all of the addressable devices or circuits in the system and shows their logical addresses.

Panels

The logical address format for a panel is PP, where PP is the cabinet number (01 to 64). For example, enter 01 for the panel designated as Cabinet 1.

(System-wide events that are not related to a particular cabinet use panel number 00.)

To determine a cabinet's panel number, use the Command Menus to request a Status report. Choose any type of list. The system displays the cabinet's panel number as the default panel number. Once you've noted the panel number, press the Backspace key to exit from the function.

Local rail modules

Local rail modules include the rail modules that connect to the local rail bus and the control/display modules. The logical address format for a local rail module is PPCC, where:

- PP is the cabinet number of the panel containing the rail module
- CC is the address of the rail module
- CC+32 is the address of the control/display module connected to the rail module at slot address CC

For example, enter 0102 for the rail module installed in chassis rail 1, slot 4 of Cabinet 1. Enter 0134 for the control/display module connected to the rail module installed in chassis rail 1, slot 4 of Cabinet 1.

Note: The rail-slot number and the slot address are not the same. Slot addresses vary with the cabinet configuration. Refer to *Appendix A: System addresses*.

Devices

Devices include the circuits, buttons, or LEDs that exist on the local rail module and all addressable devices connected by the field wiring. The address format for a device is PPCCDDDD, where:

- PP is the cabinet number of the panel containing the rail module
- CC is the address of the rail module responsible for the device
- DDDD is the address of the individual component or circuit

For example, Enter 01340129 for the first LED on the control/display module connected to the rail module installed in chassis rail 1, slot 4 of Cabinet 1.

The CRC Card Reader Controller and KPDISP Keypad Display are devices supported by a 3-SAC module. However, they also act as independent processors, and have their own points and pseudo points. For this reason, their device numbers are further subdivided.

You can think of a SAC device as having this address format: PPCCSSDD: SS is the CRC or KPDISP device number, as assigned during LRM configuration. DD is a point or pseudo point within the device.

Chapter 2

3-LCD and 3-LCDXL1 operating instructions

Summary

This chapter provides a functional description of the controls and indicators provided on the 3-LCD and 3-LCDXL1 display modules.

Content

Controls and indicators

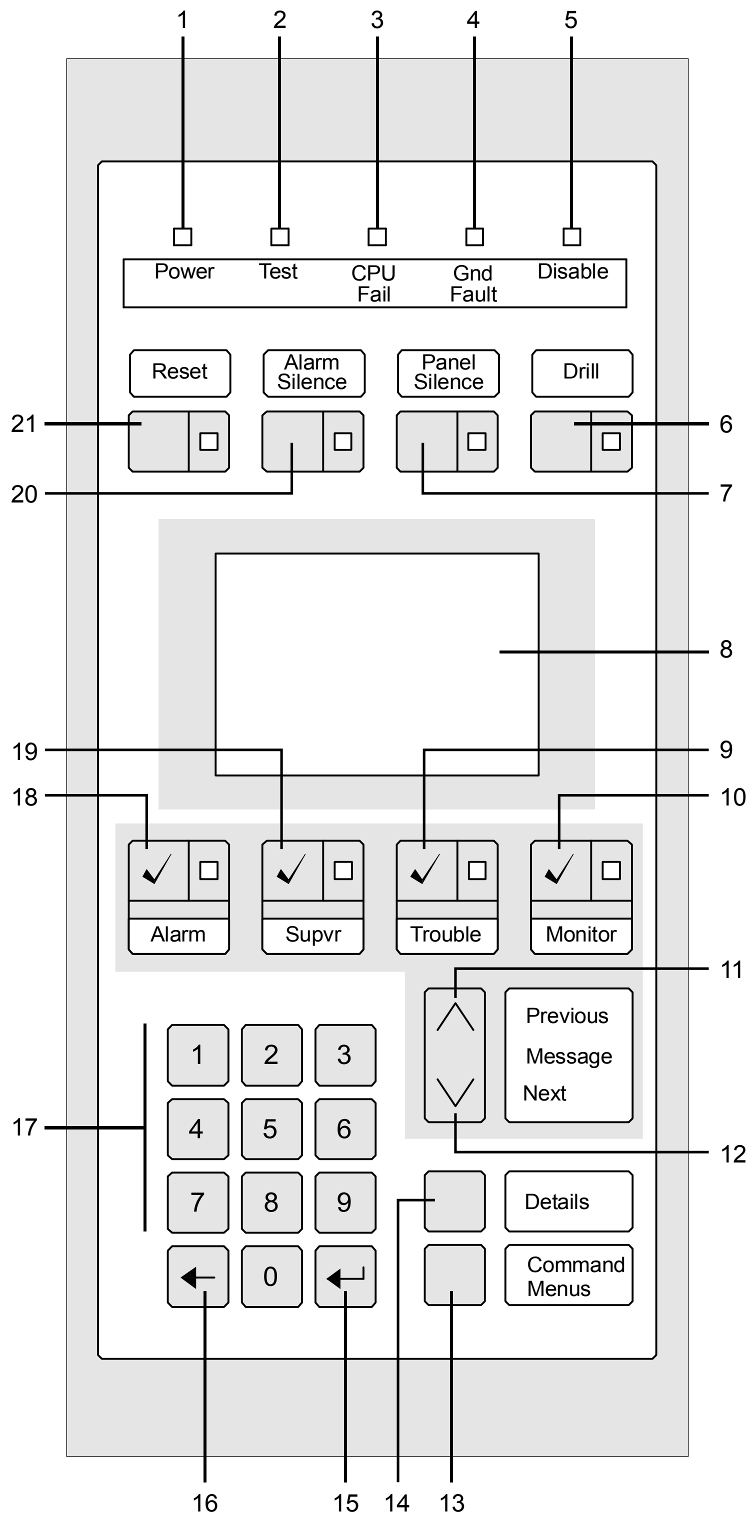


Figure 2-1: 3-LCD controls and indicators

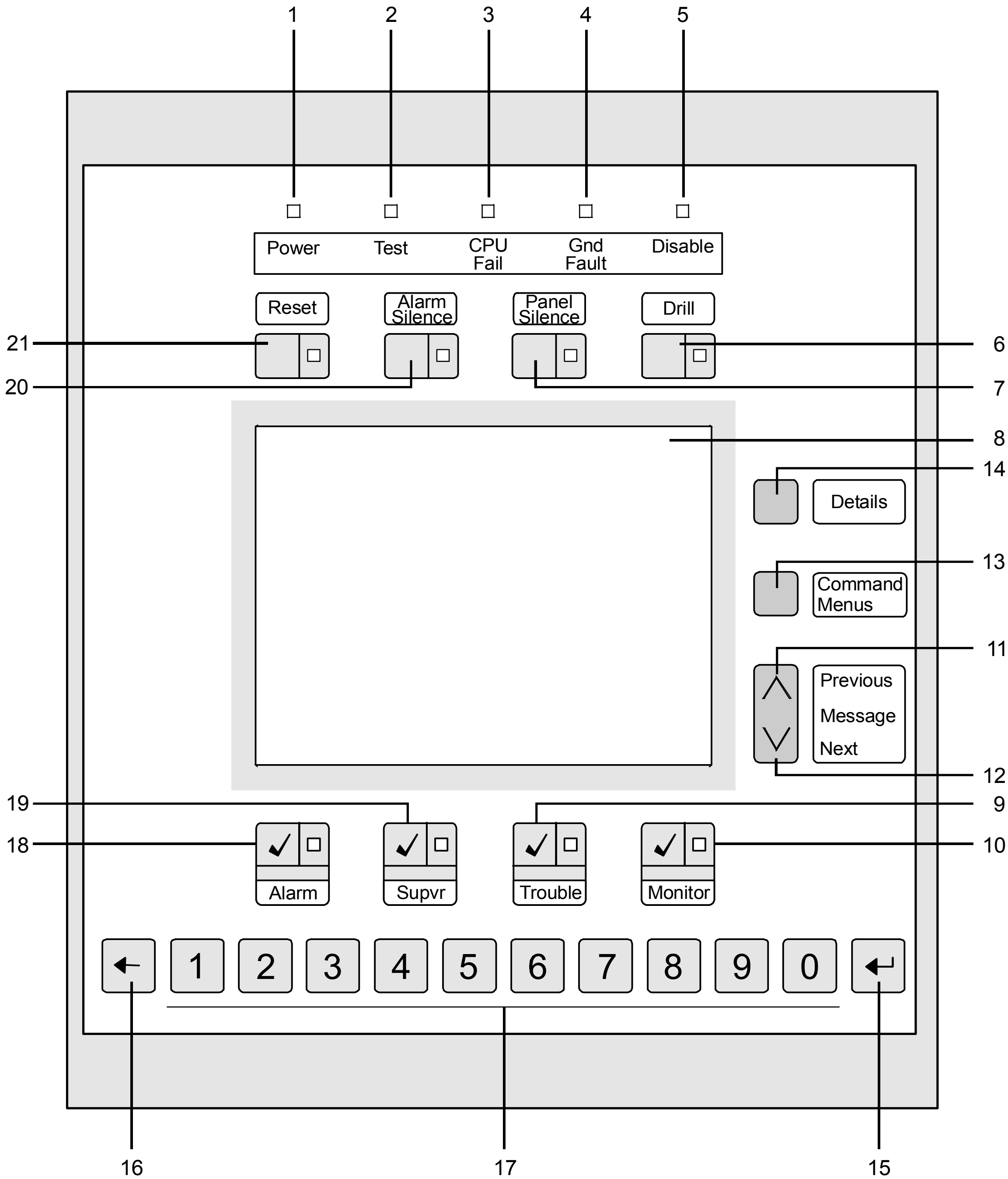


Figure 2-2: 3-LCDXL1 controls and indicators

3-LCD and 3-LCDXL1 controls and indicators (see Figure 2-1 and Figure 2-2)

Index	Control or indicator	Functional description
1	Power LED	The Power LED indicates that mains AC is applied to the panel.
2	Test LED	The Test LED indicates that a part of the system is in test mode. A programmable timer automatically exits the test mode after a period of system inactivity.
3	CPU Fail LED	The CPU Fail LED indicates the CPU module has detected a processor failure. Processor failures must be reset manually.
4	Gnd Fault LED	The Gnd Fault LED indicates that the CPU module has detected a ground fault.
5	Disable LED	The Disable LED indicates that a point or zone has been disabled using the Disable command.
6	Drill Button / LED	Pressing the Drill button activates the Drill command function. The Drill LED, when lit, indicates that the Drill command function is active.
7	Panel Silence Button / LED	For U.S. Local and Canadian Local systems, pressing the Panel Silence button turns the CPU buzzer off. The Panel Silence LED, when lit, indicates the panel is in an off-normal condition and the panel has been placed in Panel Silence mode. For U.S. Proprietary and Canadian Proprietary systems, the Panel Silence button is not operational. The panel buzzer only silences after all events have been acknowledged. **Note:** The CPU buzzer can be configured to resound at a regular interval to remind the operator that the panel has been silenced.
8	Liquid crystal display screen	168 character, backlit alphanumeric display of system status.
9	Trouble Button / LED	Pressing the Trouble button places the contents of the Trouble queue onto the display screen for review. Active trouble events are displayed in the order in which they are received. When a trouble event is highlighted on the display, pressing the Trouble button acknowledges the event and advances the display to the next event. The Trouble LED serves as a common trouble event indicator. The LED, when flashing, indicates that there is an event in the queue that has not been reviewed (local systems) or acknowledged (proprietary systems). When on steady, the LED indicates that all events in the queue have been reviewed or acknowledged.

3-LCD and 3-LCDXL1 controls and indicators (see Figure 2-1 and Figure 2-2)

Index	Control or indicator	Functional description
10	Monitor Button / LED	Pressing the Monitor button places the contents of the Monitor queue onto the display screen for review. Active monitor events are displayed in the order in which they are received. When a monitor event is highlighted on the display, pressing the Monitor button acknowledges the event and advances the display to the next event. The Monitor LED serves as a common monitor event indicator. The LED, when flashing, indicates that there is an event in the queue that has not been reviewed (local systems) or acknowledged (proprietary systems). When on steady, the LED indicates that all events in the queue have been reviewed or acknowledged.
11	Previous Message Button	For U.S. Local and Canadian Local systems, pressing the Previous Message button scrolls the display to show the preceding event in the selected event queue. Reviewing events using the Previous Message button does not acknowledge the event. For U.S. Proprietary and Canadian Proprietary systems, the Previous event button is not operational. Events must be acknowledged in order of their occurrence. **Note:** Press and hold for auto-scroll.
12	Next Message Button	For U.S. Local and Canadian Local systems, pressing the Next Message button scrolls the display to show the following event in the selected event queue. Reviewing events using the Next Message button does not acknowledge the event. For U.S. Proprietary and Canadian Proprietary systems, the Next Message button is not operational. Events must be acknowledged in order of their occurrence. **Note:** Press and hold for auto-scroll.
13	Command Menus Button	Pressing the Command Menus button displays the system command menu to access the following system functions: Status, Enable, Disable, Activate, Restore, Control Output, Reports, Program, and Test Pressing the button a second time returns the user to the current event window.

3-LCD and 3-LCDXL1 controls and indicators (see Figure 2-1 and Figure 2-2)

Index	Control or indicator	Functional description
14	Details Button	Pressing the Details button displays additional information about the event highlighted on the display screen. • For Zone Groups, pressing the Details button displays a list of the active devices in the zone group. • For Instruction Text Groups, pressing the Details button displays the entire instruction text. • For Maintenance Alerts, pressing the Details button displays a list of the dirty devices. • For Common Troubles, pressing the Details button displays a list of the specific troubles for the selected device. • For Guard Patrols, pressing the Details button displays the offending station and indicates whether the activation was caused because of an early, late, or out of sequence condition.
15	Enter key	Pressing the Enter key selects the highlighted menu option or causes the system to start processing the information shown in the display.
16	Delete / Backspace key	Pressing the Delete / Backspace key moves the cursor to the left of the current position and removes the character from the display. The Delete / Backspace key is also used to cancel functions and move the operator back through the menus.
17	Numeric Keypad	Pressing any number key selects the menu item or enters the respective number into the system for use in conjunction with other system functions.
18	Alarm Button / LED	Pressing the Alarm button places the contents of the Alarm queue onto the display screen for review. Active alarm events are displayed in the order in which they are received. When an alarm event is highlighted on the display, pressing the Alarm button acknowledges the event and advances the display to the next event. The Alarm LED serves as a common alarm event indicator. The LED, when flashing, indicates that there is an event in the queue that has not been reviewed (local systems) or acknowledged (proprietary systems). When on steady, the LED indicates that all events in the queue have been reviewed or acknowledged.

3-LCD and 3-LCDXL1 controls and indicators (see Figure 2-1 and Figure 2-2)

Index	Control or indicator	Functional description
19	Supvr Button / LED	Pressing the Supervisory button places the contents of the Supervisory queue onto the display screen for review. Active supervisory events are displayed in the order in which they are received. When a supervisory event is highlighted on the display, pressing the Supervisory button acknowledges the event and advances the display to the next event. The Supervisory LED serves as a common supervisory event indicator. The LED, when flashing, indicates that there is an event in the queue that has not been reviewed (local systems) or acknowledged (proprietary systems). When on steady, the LED indicates that all events in the queue have been reviewed or acknowledged. **Note:** Security events allow for multiple activations from the same point. It is not uncommon for this to happen.
20	Alarm Silence Button / LED	Pressing the Alarm Silence button turns off the EVAC and ALERT channels, and all active audible and visible notification appliance circuits. Pushing the button a second time turns the notification appliance circuits back on. This button may be used to cancel the drill signal. The Alarm silence LED, when lit, indicates that the active notification appliance circuits have been silenced. **Note:** Project configuration settings affect the operation of the Alarm Silence function
21	Reset Button / LED	Pressing the Reset button activates the system’s reset sequence to restore the system to normal. The Reset LED flashes quickly during the smoke power-down phase, flashes slowly during the power-up phase, is on steady during the restoral phase, and is off when the system has reset. **Notes** • The Reset button is disabled as long as the alarm silence inhibit timer is running • The Reset button does not affect disabled points or manually overridden functions • The Reset button may not affect security or access control devices. These points may be included in the supervisory or monitor display queues.

3-LCD and 3-LCDXL1 controls and indicators (see Figure 2-1 and Figure 2-2)

Index	Control or indicator	Functional description
n/a	Buzzer	The buzzer on the CPU sounds to alert the operator to off-normal system conditions, such as: • Active alarms • Active test or disabled zones • Active fault conditions • Active monitor conditions The buzzer sounds a pattern associated with each event as determined by the market place settings. Alarm: 3-3-3 pattern Supervisory: 2-2 pattern Trouble: 15 pulses per minute Monitor: 3-3-3 pattern

Creating a status report

Use the Status command to create reports of off-normal points, or to determine the status of points in a security partition. The Status command generates a list that you can view on the LCD module or print on a local printer.

The Status Menu lets you choose the following reports:

- All active points
- Alarm points
- Supervisory points
- Trouble points
- Monitor points
- Test points
- Disabled points
- Output points
- Security points

On the Security Status Menu, you can choose between Partition and Holdup status reports.

To create a status report:

1. Press the Command Menus button, then choose Status.
2. Choose the type of list you want to generate.
3. Enter the target panel's 2-digit address (PP).
   —or—
   Choose a partition from the Partition List.
4. Do one of the following:

   Choose Display if you want to view the list on the LCD module (either 3-LCD or 3-LCDXL1).

   Choose Print Locally, then select a printer, if you want to send the list to a printer connected to the local panel.

Disabling groups

A *group* is an object created during system programming. Groups are required in order to execute certain system functions, but groups bear no physical relationship to the system.

For example, smoke detectors can be assigned to the same *zone group* even though they are not attached to the same wire run.

Disabling a group isolates the group from the system just as if it were a hardware component. Disabling a zone group disables each of the devices in the group individually. Disabling other groups only disables the group response.

There are several types of group:

- And group
- Matrix group
- Service group
- Guard patrol group
- Zone group
- Instruction text group

When you disable a group, the CPU lights the Disable LED on the LCD module and places a *Disabled Active* event in the trouble queue.

Note: Before disabling a group, you need to know which devices are included in the group. You should be able to get a list of logical groups and their members from the company that installed the system.

To disable a group:

1. Press the Command Menus button, then choose Disable.
2. Choose Group.
3. Choose the group type.
4. Select the group from the list.
5. If prompted, enter a valid user access level password.

Enabling groups

A *group* is an object created during system programming. Groups are required in order to execute certain system functions, but groups bear no physical relationship to the system.

For example, smoke detectors can be assigned to the same *zone group* even though they are not attached to the same wire run.

Enabling a group establishes the group as part of the system just as if it were a hardware component. When enabled, any changes in state that occurred while the group was disabled are processed. Enabling a zone group enables each of the devices in the group individually. Enabling other groups only enables their group response.

There are several types of group:

- And group
- Matrix group
- Service group
- Guard patrol group
- Zone group
- Instruction text group

To enable a group:

1. Press the Command Menus button, then choose Enable.
2. Choose Group.
3. Choose the group type.
4. Select the group from the list.
5. If prompted, enter a valid user access level password.

Disabling hardware components

Disabling a hardware component isolates the component from the system. While disabled, a component's state changes are not processed. For example, if a disabled smoke detector changes to the alarm state, the panel will not go into alarm. The panel will go into alarm if you enable the disabled smoke detector and the smoke detector is still in the alarm state.

Hardware components include:

- Devices (input and output circuits, detectors, and modules)
- Rail modules
- Buttons
- LEDs

When you disable a hardware component, the CPU lights the Disable LED on the LCD module and places a *Disabled Active* event in the trouble queue.

Note: To disable a component you need the component's logical address. You can get component's logical addresses from an SDU Objects report.

To disable a hardware component:

1. Press the Command Menus button, then choose Disable.
2. Do one of the following:

- Choose Device to disable: input circuits, output circuits, detectors, or modules
- Choose Card to disable: rail modules or control / display modules
- Choose Button to disable: control / display module buttons
- Choose LED to disable: control / display module LEDs

3. Enter the target component's logical address.
4. If prompted, enter a valid user access level password.

Enabling hardware components

Enabling a hardware component re-establishes a disabled component as part of the system. When enabled, any changes in state that occurred while the component was disabled are processed. For example, if you enable a smoke detector that changed to the alarm state while it was disabled the panel will go into alarm.

Hardware components consist of:

- Devices (input and output circuits, detectors, and modules)
- Rail modules
- Buttons
- LEDs

To enable a disabled component you need the component's logical address. You can get a disabled component's logical address from the disabled points list.

Note: All components are enabled at startup, unless programmed otherwise. The LCD module does not indicate a trouble for any points disabled at startup and points disabled at startup are not listed on the disabled points list.

To enable a hardware component:

1. Press the Command Menus button, then choose Enable.
2. Do one of the following:

- Choose Device to enable: input circuits, output circuits, detectors, or modules
- Choose Card to enable: rail modules or control / display modules
- Choose Button to enable: control / display module buttons
- Choose LED to enable: control / display module LEDs

3. Enter the component's logical address.
4. If prompted, enter a valid user access level password.

Arming security partitions

A ‘Partition’ can comprise any combination of security, fire, supervisory, and monitor device types as well as system pseudo points. Note that only security device types will generate security alarm events. Partition alarm events are not annunciated on the 3-LCD, they only get annunciated in FireWorks, Keypad Display units, or as activated LEDs on 3-ANNs and Envoy. Non-security device types will not trigger Partition Alarm events. There is virtually no limit on the number of ‘objects’ that can be assigned to a single partition.

A security partition is a group of devices intended to secure a physical area. When you arm a partition, you instruct the system to monitor those devices for armed alarm events.

Partitions can be armed for two states: *Stay* and *Away.* Arming to Stay causes the system to monitor only those devices on the perimeter of the protected area. This leaves you free to move about inside the partition. Arming to Away causes the system to monitor all devices, both perimeter and interior.

Before arming the partition, the system checks all the devices in the partition to ensure that they’re in the normal state. Typically, if a device is off-normal it may prevent the partition from being armed. However, you can elect to disable the off-normal device and arm the remaining devices in the partition.

When commanded to conditionally arm, the partition may arm directly or may generate an error or warning under the following conditions:

- The Partition is configured to issue a warning (not error) for non-security objects that are “off-normal”. If non-security objects are configured to issue an error on Partition arming, then the Partition will always issue an error message and will not arm conditionally when any one single error device is “off-normal”. When this occurs, the Partition can only be ‘forced’ into an arm state.
- The total number of “off-normal” non-security devices plus the total number of bypassed or disabled regular security devices do not exceed the maximum number of bypassed/disabled devices (as set in the 3-SDU.)
- When security devices are in a “Test” condition (see Testing Security Devices), the Partition will arm with no warning even if the number of devices in “Test” exceed the 3-SDU setting for maximum number of bypassed/disabled devices.

Partitions can be commanded to arm unconditionally (i.e., forced arm) irrespective of the error or warning conditions presented, via the following methods:

- An SDU Rule activated by a switch on an EST3 panel.
- An unconditional arm command is issued via FireWorks. This also requires the proper user access level.

Note: Issuing an unconditional forced arm command to a Partition may result in undesirable false security alarm events.

After choosing to arm the partition, the system displays a list of partitions. Scroll through this list and select the partition you wish to arm.

Note: 3-LCD and 3-LCDXL1 security commands are optional. Cabinet configuration settings determine whether security commands appear on the panel menus.

To arm a security partition:

1. Press the Command Menus button, then choose Security.
2. Choose Partition.
3. Choose the type of arming you want: Partition Away or Partition Stay.
4. Scroll through the Partition List and choose the partition you want to arm.
5. If prompted, enter a valid user access level password.

Disarming security partitions

A security partition is a group of devices intended to secure a physical area. When you disarm a partition, you instruct the system to stop monitoring those devices for armed alarm events.

When a partition is disarmed the system generates disarmed alarm events, except for 24Hour security devices which always generate armed alarm events.

When you choose the disarm command, the system checks all the devices in the partition to ensure that they're in a normal state. If a device is in an off-normal condition while the partition is armed, the panel will restore the armed event and activate the disarmed event.

After you choose the disarm command, the system displays a list of partitions. You scroll through this list and select the partition you wish to disarm.

Note: Security commands are optional. Project configuration settings determine whether security commands appear on the panel menus.

To disarm a security partition:

1. Press the Command Menus button, then choose Security.
2. Choose Partition.
3. Choose Partition Disarm.
4. Scroll through the Partition List and choose the partition you want to disarm.
5. If prompted, enter a valid user access level password.

Resetting security partitions

A security partition is a group of devices intended to secure a physical area. When you reset a partition, you instruct the system to update the status of the devices, then update the event messages in all annunciator message queues.

When you choose the reset command, the system checks all the devices in the partition to determine their current state. Event messages previously stored in message queues are deleted, and new event messages are added as required by the current state of the devices.

After you choose the reset command, the system displays a list of partitions. Only disarmed partitions can be reset. You scroll through this list and select the partition you wish to reset.

Note: Security commands are optional. Cabinet configuration and card access settings determine whether security commands appear on the panel menus. The Partition Reset command has no effect on fire alarm devices.

To restore a security partition:

1. Press the Command Menus button, then choose Security.
2. Choose Partition.
3. Choose Partition Reset.
4. Scroll through the Partition List and choose the partition you want to reset.
5. If prompted, enter a valid user access level password.

Bypassing security devices

When you *bypass* a security device, the system suppresses the device's security alarm events, but continues to process all other events (e.g. Tamper, Fault, and Maintenance). For example, say a loading bay door is damaged so that the door contact cannot be closed. This prevents arming of the partition. As a temporary measure you can bypass the door contact to make it possible to arm the partition.

Devices can only be bypassed and unbypassed while the partition is disarmed. When armed, you cannot bypass or remove bypasses.

While bypassed, the device's alarm events are not processed. The panel will go into alarm if you unbypass the device while it is still in an alarm state.

Security points may be bypassed and disabled at the same time. In this state, the disable takes priority and only the disable state is annunciated. When the point becomes enabled, the bypass indication will once again be displayed.

Note: To bypass a device you need the device's logical address. You can get device's logical addresses from an SDU Objects report. In addition, the SDU includes a setting that defines how many points in a partition can be bypassed and still allow arming of that partition.

To bypass a security device:

1. Press the Command Menus button, then choose Security.
2. Choose Device.
3. Choose Bypass.
4. Enter the logical address of the device.
5. If prompted, enter a valid user access level password.

Removing bypasses from security devices

When you remove a bypass from a security device, the system resumes processing the device's alarm events. The panel will go into alarm if you remove a bypass from a device while it is in an active state (i.e., in its otherwise alarm position).

To unbypass a device, you need the device's logical address. You can get the logical address from the Disabled Points list.

To remove a bypass from a security device:

1. Press the Command Menus button, then choose Security.
2. Choose Device.
3. Choose Remove Bypass.
4. Enter the logical address of the device.
5. If prompted, enter a valid user access level password.

Guard patrol groups

Guard patrol groups are used to monitor the activities of security guards. A security guard can be required to walk any one of a number of predetermined tours. During each tour, the guard must activate guard patrol stations that are located along the tour.

When a guard activates a station too early, too late, or out of sequence, the LCD module displays a *Guard Patrol Active* message in the alarm message queue. The operator can press the Details button to determine which station reported in.

Starting a guard patrol

Activating a guard patrol group starts the system's early, late, and out of sequence sensing mechanisms. If a station reports in early, late, or out of sequence, the guard patrol sensing mechanisms stop and the tour is ended.

To activate a guard patrol:

1. Press the Command Menus button, then choose Activate.
2. Choose Guard Patrol Route.
3. Select the guard patrol route from the list.
4. If prompted, enter a valid user access level password.

Restoring a guard patrol

When a guard patrol tour ends because a guard patrol station was not activated at the proper time, you must restore the Guard Patrol group to which the station belonged.

To restore a guard patrol:

1. Press the Command Menus button then choose Restore.
2. Choose Guard Patrol Route.
3. Select the guard patrol route from the list.
4. If prompted, enter a valid user access level password.

Changing the smoke detector sensitivity level

Smoke detectors can operate using two levels of sensitivity, called *primary sensitivity* and *alternate sensitivity.* The system configures smoke detectors to use their primary sensitivity level (typically, less sensitive) during normal business hours. A time control then reconfigures the smoke detectors to use their alternate sensitivity level (typically, more sensitive) after hours when the premises are unoccupied.

You can use menu commands to manually switch between sensitivity levels as required. To change to the alternate sensitivity level, you activate alternate sensitivity. To change to primary sensitivity level, you restore primary sensitivity.

Note: You should be able to get a list of the primary and alternate sensitivity setting for each smoke detector from the company that installed the system.

To change to alternate sensitivity level:

1. Press the Command Menus button, then choose Activate.
2. Choose Alt. Sensitivity.
3. If prompted, enter a valid user access level password.

To change to primary sensitivity level:

1. Press the Command Menus button, then choose Restore.
2. Choose Primary Sensitivity.
3. If prompted, enter a valid user access level password.

Changing event message routing

Each device in the system is configured with a primary and alternate message routing. When a device in the system changes state, the panel connected to the device produces an event. The panel distributes the event according to the active message routing setting that is active at the time.

Activating event alternate message routing

Activating the alternate event message routing directs the panel to use the alternate routing destinations for any device that changes state.

To activate event alternate message routing:

1. Press the Command Menus button, then choose Activate.
2. Choose Alt Message Route
3. If prompted, enter a valid user access level password.

Restoring event primary message routing

Restoring the primary message directs the panel to use the primary routing destinations for any device that changes state.

To restore event primary message routing:

1. Press the Command Menus button, then choose Restore.
2. Choose Primary Msg Route
3. If prompted, enter a valid user access level password.

Changing the output state of a relay or LED

Use the Control Output command to change the output state of a relay or LED.

- A relay module can be On (energized) or Off (deenergized). In the energized state, the relay module's normally-open contacts are held closed and the normally-closed contacts are held open.
- An LED can be off, on, blink slow, or blink fast. The fast and slow blinking rate is determined by the marketplace.

Changing the output state of a relay or LED requires entering a command priority level.

Priority	Description
Set	This priority overrides low, medium, and high priority instructions and forces the device to the desired state. The set priority does not reset the device's priority counters.
Latch	This priority overrides low, medium, and high priority instructions and forces the device to the desired state. The latch priority does reset the device's priority counters.
Low	This priority forces the device to the desired state and adjusts the low priority counter accordingly.
Medium	This priority forces a device to the desired state and adjusts the medium priority counter accordingly.
High	This priority forces a device to the desired state and adjusts the high priority counter accordingly.

To change the output state of a relay or LED:

1. Press the Command Menus button, then choose Activate.
2. Choose the device type.
3. Select the desired output state.
4. Select the priority this command has over other commands affecting the same device.
5. Enter the target device's 8-digit logical address (PPCCDDDD).
6. If prompted, enter a valid user access level password.

Creating reports

The Reports command generates a report that you can view on the LCD module (either 3-LCD or 3-LCDXL1) or print on the local printer. Three types of report are available:

- Device Maintenance
- History
- Revisions
- Modcom Compliance

Device Maintenance: a list of detectors and the amount of environmental compensation they have used. You can choose to list devices in several ways.

History: a chronological list of events that have occurred on a panel since the panel was placed into service or since the last time the history was cleared.

Two versions of the History report are available: History With Text, and History Without Text. History With Text only includes devices for the targeted panel in the report. History Without Text includes devices for all panels in the report.

Revisions: a list of all the hardware and software components installed in a panel and their revision levels.

Modcom Compliance: lists the NFPA 72 compliance level of all 3-MODCOM modules in a given panel.

To create a Device Maintenance report:

1. Press the Command Menus button, then choose Report.
2. Choose device maintenance.
3. Do one of the following:

- Choose Dirty Devices >80% then enter the target panel address (PP).
- Choose Dirty Devices >20% then enter the target panel address (PP).
- Choose Single Device then enter the target device address (PPCCDDDD).
- Choose Devices On A Card to get the compensation level for all the detectors on a single loop then enter the target loop's logical address (PPCCL).

4. Send the list to the display or to the printer. If you choose to send the list to the printer, choose Printer 1 if the printer is connected to port 1 or Printer 2 if connected to port 2.

Note: If the device maintenance report is being run on a Addressable Analog Driver Controller, use the following table to determine sensitivity levels.

Addressable Analog Driver Controller device maintenance report sensitivity levels

Type	Trouble	Normal	Alarm level 1	Alarm level 2	Alarm level 3	Trouble short
Photo	400	520 - 1610	1710	2050	2390	N/A
Ion	400	600 - 1710	1810	1960	2110	N/A
Thermal	400	500 - 1900	N/A	N/A	2000	N/A
Monitor	600	750 - 1300	N/A	N/A	1400	1800
Control	600	750 - 1300	N/A	N/A	N/A	1400

For additional information, refer to the device's installation sheet.

To create a History report:

1. Press the Command Menus button, then choose Report.
2. Choose History.
3. Choose History With Text or History Without Text.
4. Enter the target panel's 2-digit address (PP).
5. Send the list to the display or to the printer. If you choose to send the list to the printer, choose Printer 1 if the printer is connected to port 1 or Printer 2 if connected to port 2.

To create a Revisions report:

1. Press the Command Menus button, then choose Report.
2. Choose Revision Levels.
3. Enter the target panel's 2-digit address (PP).
4. Send the list to the display or to the printer. If you choose to send the list to the printer, choose Printer 1 if the printer is connected to port 1 or Printer 2 if connected to port 2.

To create a Modcom Compliance report:

1. Press the Command Menus button, then choose Report.
2. Choose Modcom Compliance.
3. Enter the target panel's 2-digit address (PP).
4. Send the list to the display or to the printer. If you choose to send the list to the printer, choose Printer 1 if the printer is connected to port 1 or Printer 2 if connected to port 2.

Setting the system time and date

Set the system time and date to configure the panel's time of day and date reference. Set the system time and date when the panel is first placed in service.

The system time of day is set in 24-hour format (HHMMSS), where: HH is the hour, MM is the minutes, and SS is the seconds.

For example:

Enter this value (HHMMSS)	To set this time
000000	12 midnight
010000	1 a.m.
115900	11:59 a.m.
120000	12 noon
130000	1 p.m.
235930	11:59:30 p.m.

To set the system time of day reference:

1. Press the Command Menus button, then choose Program.
2. Choose Change Time.
3. Enter the time in 24-hour format (HHMMSS)
4. If prompted, enter a valid user access level password.

The system date is set in a month/date/year format (MMDDYYYY), where: MM is the month number, DD is the date, and YYYY is the year. For example, to set the date for January 1, 1999, enter 01011999.

To change the system date reference:

1. Press the Command Menus button, then choose Program.
2. Choose Change Date.
3. Enter the date (MMDDYYYY).
4. If prompted, enter a valid user access level password.

Changing user access level passwords

You should change the access level passwords from their default values to prevent unauthorized access to system. You may not use the same password for more than one access level. The system default passwords are as follows:

Access Level	Default password	Access level required to change
Level 1	1111	Level 2
Level 2	2222	Level 3
Level 3	3333	Level 4
Level 4	4444	Level 5

Caution: Before changing a password, be sure to write it down on a sheet of paper and store it in a safe place.

To change a user access level password:

1. Press the Command Menus button, then choose Program.
2. Choose Edit Password.
3. Select the user access level password you want to change.
4. Enter the new 4-digit password.
5. If prompted, enter a valid user access level password.

Restarting a panel

Restarting a panel initiates the panel's start up processes without first turning off the operating power.

To restart a panel:

1. Press the Command Menus button, then choose Program.
2. Choose Restart.
3. Choose whether to restart a single panel or all panels on the network. If you choose to restart a single panel, then enter the target panel's 2-digit address (PP).
4. If prompted, enter a valid user access level password.

Scheduling holidays

Holidays vary from installation to installation and may change from year to year. By scheduling holidays, a panel can activate a time-controlled event based on whether the day is a scheduled holiday.

Note: Each panel can store up to 255 holidays.

To schedule a holiday:

1. Press the Command Menus button, then choose Program.
2. Choose Edit Holiday List.
3. Choose Add Holiday.
4. Enter the holiday's month and date (MMDD).
5. If prompted, enter a valid user access level password.

To delete a holiday from the list:

1. Press the Command Menus button, then choose Program.
2. Choose Edit Holiday List.
3. Select Delete Holiday.
4. Select the holiday from the list.
5. If prompted, enter a valid user access level password.

To change a holiday:

1. Press the Command Menus button, then choose Program.
2. Choose Edit Holiday List.
3. Choose Edit Holiday.
4. Select a holiday from the list.
5. Enter the new month and date (MMDD).
6. If prompted, enter a valid user access level password.

Clearing the panel history file

Clearing the panel's history file:

- Resets the alarm history counter on the LCD module
- Erases the list of events that occurred on the panel since the panel was placed into service or the last time the history file was cleared.

Caution: Clearing the panel history file means that all history data for the panel is permanently deleted. Entering panel 99 clears history on *all* panels in the network. This command requires a level 4 password, and is for use by an authorized service technician only.

To clear the alarm history:

1. Press the Command Menus button.
2. Choose Program, then choose Clear History.
3. Enter the panel number.
4. If prompted, enter a valid user access level password.

Testing alarm input devices

In order to test an alarm input device, the device must be part of a service group. Service groups allow alarm input devices to be activated without placing the system into alarm. The protected premises may be divided into more than one service group to make testing possible without leaving the entire premises unprotected.

Without any additional programming, you can test alarm input devices by:

- Putting the service group into test
- Activating each of the devices in the service group
- Verifying each of the devices show up on the active points list
- Canceling the test

Note: Putting a service group into test introduces a Service Group Active event in the trouble queue. You can press the Details button to verify which service group is in test.

To put a service group into test:

1. Press the Command Menus button, then choose Test.
2. Choose Start Test.
3. Select the service group.
4. If prompted, enter a valid user access level password.

To cancel the test:

1. Press the Command Menus button, then choose Test.
2. Choose Cancel Test.
3. Select the service group that is in test.
4. If prompted, enter a valid user access level password.

Note: A service group will automatically time-out and cancel after approximately 1 hour of inactivity.

Testing security input devices

The information provided in section “Testing alarm input devices” applies equally to all security input devices. However, there are certain nuances that apply to security devices only.

With the service group activated, security devices will generate Test Events only in accordance with their expected operation relative to their armed conditions.

The following example applies equally for all security device types:

For Security Interior devices, if the partition is disarmed or armed stay, Test Events will not be generated on the activation of the device. If the partition is armed away, Test Events will be generated on the activation of the device. However, there is a slight exception. If, after activating the Service Group, the Security Interior device is activated (and not restored) while the partition is disarmed, a Test Event will be generated immediately when the partition is armed even if the armed state is stay.

The exception in the above example happens as a result of a status update that occurs for all partition devices when partitions are armed. On evaluating the results of the status update, EST3 generates the Test Events after recognizing the active state of the security device with respect to the active state of the Service Group irrespective of the device type and armed conditions. This applies to all security device types.

Another rule that applies for security devices is that partitions must be disarmed and reset in order to clear all security Test Events from the Monitor queues in both EST3 and FireWorks. Canceling the service group test is not sufficient.

Testing Signature devices

From the LCD module you can place a Signature device into the alarm, prealarm, or trouble condition for testing. Signature devices include all sensors, modules, and security devices. To test a Signature device, the device must be connected to a 3-SSDC1 or 3-SDDC1.

For latching devices, you must reset the panel to restore the tested device to its normal state. Nonlatching devices restore automatically without resetting the panel.

WARNING: The AlarmTest command puts the device into alarm condition and activates its programmed alarm responses.

To test a Signature device:

1. Press the Command Menus button, then choose Test.
2. Choose Signature Device Test.
3. Choose Alarm, etc, Prealarm, etc, or Trouble.
4. Enter the device address and press the enter button.
5. When prompted, enter a valid user access level password.

Testing the panel lamps and panel sounder

From the LCD module you can test all the LEDs on the panel and the panel sounder. Performing a lamp test lights all LEDs on the panel and turns on the panel sounder for 10 seconds. After the test is finished, the LCD returns to its normal state display.

To perform a lamp teat:

1. Press the Command Menus button, then choose Test.
2. Choose Lamp Test.

Chapter 3

3-ASU operating instructions

Summary

This chapter provides a functional description of the controls and indicators provided on the 3-ASU Audio Source Unit. The 3-ASU is the control point for all the audio signals distributed by the system.

Content

Controls and indicators

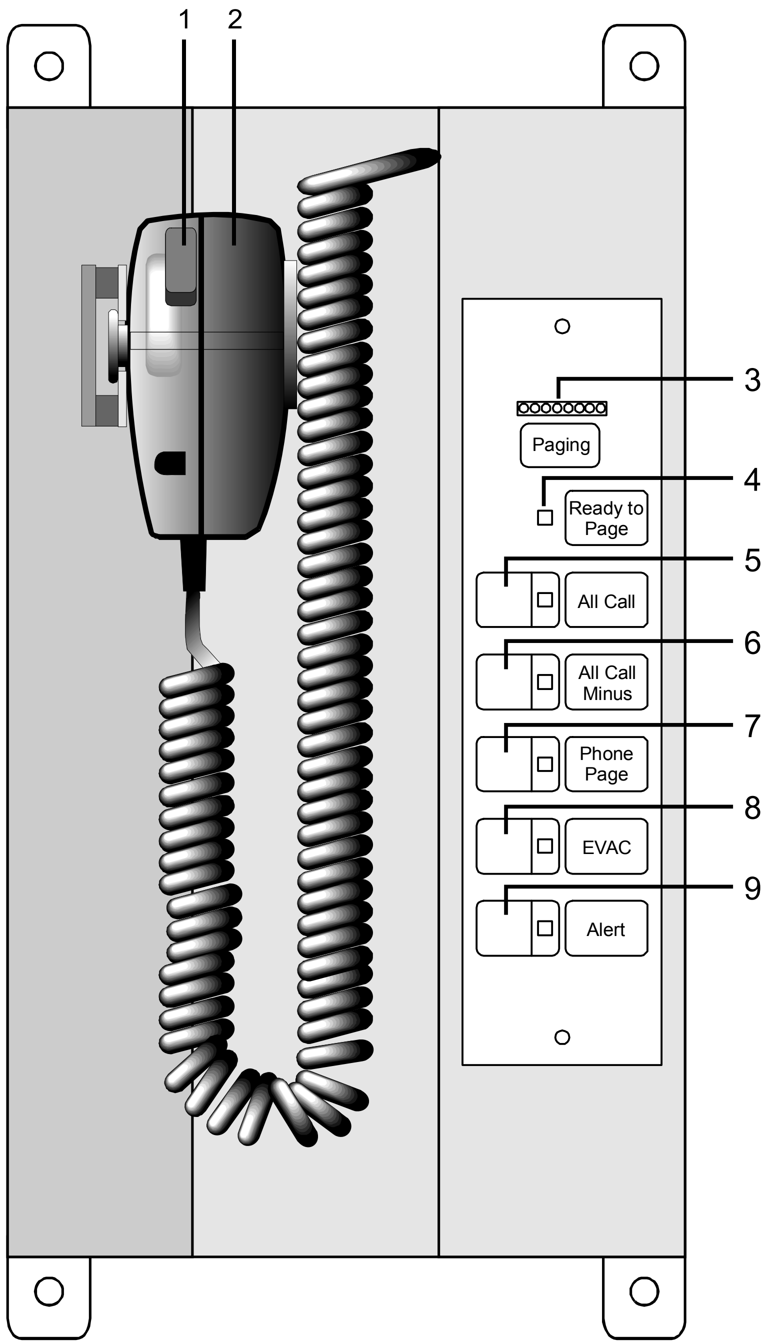


Figure 3-1: 3-ASU controls and indicators

3-ASU controls and indicators (see Figure 3-1)

Index	Control or Indicator	Functional Description
1	Push-To-Talk (PTT) Switch	Push the PTT switch and wait for the Ready to Page LED (item 4) to light steadily before making an announcement.
2	Paging Microphone	Speak into the microphone to make an announcement.
3	Page Level Meter	Indicates paging volume. When paging, speak at a level that causes the far right LED to only flicker occasionally.
4	Ready to Page LED	Green LED flashes during pre-announcement tone, then is on steady when the system is ready to page.
5	All Call Switch/LED	Green LED on indicates the 3-ASU is in the All Call mode. Pressing the All Call switch directs the page to all areas of the facility. To exit the All Call mode, press the switch a second time or press the All Call Minus, EVAC, or Alert switches.
6	All Call Minus Switch/LED	Green LED on indicates the 3-ASU is in the All Call Minus mode. Pressing the All Call Minus switch directs the page to the areas of the facility which have not been automatically selected to receive the EVAC or Alert tone/message. To exit the All Call Minus mode, press the switch a second time or press the All Call, EVAC, or Alert switches.
7	Phone Page Switch/LED	Green LED on indicates the 3-ASU is in the Phone Page mode. Pressing the Phone Page switch replaces the paging microphone (item 2) with the firefighter’s telephone system. Individuals in remote areas of the facility can then issue a page via the firefighter’s telephone system. All phone paging is under the direct control of the 3-ASU operator. Press the switch a second time to disconnect the Phone Page mode.
8	EVAC Switch/LED	Green LED on indicates the 3-ASU is in the EVAC mode. Pressing the EVAC switch directs the page to areas of the facility which are automatically receiving the evacuation tone/message. To exit the EVAC mode, press the switch a second time or press the All Call, All Call Minus, or Alert switches.
9	Alert Switch/LED	Green LED on indicates the 3-ASU is in the Alert mode. Pressing the Alert switch directs the page to areas of the facility which are automatically receiving the Alert tone/message. To exit the Alert mode, press the switch a second time or press the All Call, All Call Minus, or EVAC switches.

Operation the Audio Source Unit

The function of a life safety system is to alert people occupying a facility of an emergency. The Audio Source Unit is designed to permit rapid selection and paging to the affected areas of the facility. For example, the page signal automatically overrides any other signals.

Event signaling

In large facilities, the people most effected by an emergency should be instructed to evacuate the area immediately, and people not in immediate danger should receive an alert signal. Since most large facilities have a significant number of transient occupants, the most effective signaling is a combination of attention getting tones, followed by instructional messages.

The information provided here is general in nature. Each facility is unique. The life safety system in your facility has been designed by fire safety professionals to meet the specific requirements of the fire codes in your location. Please refer to the site-specific instructions provider by the installer to determine the exact operation of your system.

Evacuation (EVAC) Signaling

The evacuation signal notifies facility occupants that they are in immediate danger, and must evacuate the area. Evacuation signals can take the form of bells, horns, tones, and audio messages. Accompanying the audio message is a visual notification appliance, typically a flashing strobe light.

The system automatically activates all the evacuation signals in the affected areas of the facility.

Alert Signaling (optional)

The alert signal notifies the occupants of a facility that: an emergency event is in progress; they are not in immediate danger; and they should prepare to evacuate, but not to evacuate at this time. Alert signals are typically tones or audio messages.

The system automatically activates the alert signals (if programmed in your system) in the affected areas of the facility.

Page Messages

The most reliable source of information about an emergency event comes from the individual who is in charge of the facility during the emergency. This individual is typically the fire chief or facility manager. The page function permits the individual in charge to make announcements to selected portions of the building, advising occupants of what actions to take for safe egress, etc.

Basic response tasks

The basic tasks in responding to an emergency event are:

1. Use the All Call function to announce the arrival of the fire department, making any necessary announcements.
2. Use the Page to Evac function to reinforce the evacuation of the occupants in areas receiving the evacuation signal. As an example, occupants may be directed to follow the evacuation plan, not to use the elevators, etc.
3. Use the Page to Alert function to notify the areas not in immediate danger to prepare to evacuate, or that people in the evacuation area may be entering their area as an area of refuge.
4. Use the All Call Minus switch to make announcements to areas of the facility not receiving the Evac or Alert signals, as required. Stairwells are typical areas accessed using the All Call Minus page function.
5. The zone page controls may be used to manually select paging areas.

Paging sequence

Select the areas to receive the page by pressing the appropriate page function switch(s). The switch's integral LED will be on steady when the system is ready to receive the page.

Press the PTT switch on the microphone. The Ready to Page LED will flash while the pre-announcement tone is sounding. Begin the announcement once the Ready to Page LED is on steady. Adjust your voice level so that the far right LED on the volume meter only flickers occasionally. Release the PTT switch when the announcement is finished. The system will turn off the page, and return to its pre-page condition after a short delay.

Note: The local microphone has priority over a telephone page, which has priority over a remote microphone page.

Each installation is customized. Please refer to your site-specific documentation to determine which areas of your facility automatically receives the page, or how to select the areas to receive the page.

Phone page

If your system is equipped with a firefighter's telephone circuit, you can connect the telephone circuit to the page function by pressing the Phone Page switch. This permits an individual talking on the firefighter's telephone system to make announcements over the paging system.

Establish the phone connection over the Firefighter's Telephone Control Unit. Select the areas to receive the page the same way as if it were to be originated using the microphone. Instruct the individual who is remote paging to begin speaking after the pre-announcement tone has finished. Press the Phone Page Switch and begin the phone page. The phone page is under complete control of the 3-ASU/FT, and may be interrupted at any time by pressing the Phone Page switch a second time.

Paging with the remote microphone

If your system is equipped with the remote paging microphone, it may be used to issue pages throughout the facility. The remote microphone page is automatically overridden by any pages issued by the local microphone in the Audio Source Unit or a phone page.

Each remote microphone installation is customized. Please refer to your site-specific documentation to determine which areas of your facility automatically receives the page, or how to select the areas to receive the page.

Optional audio zone controls

The system can provide total manual control of the paging signals. This permits the individual in charge to extend the coverage area of the page beyond the pre-programmed areas. Your system may have the option of manually directing the page message using one of the types of control/display modules shown in Figure 3-2. The specific type and location of these displays will vary, however the basic functions are similar.

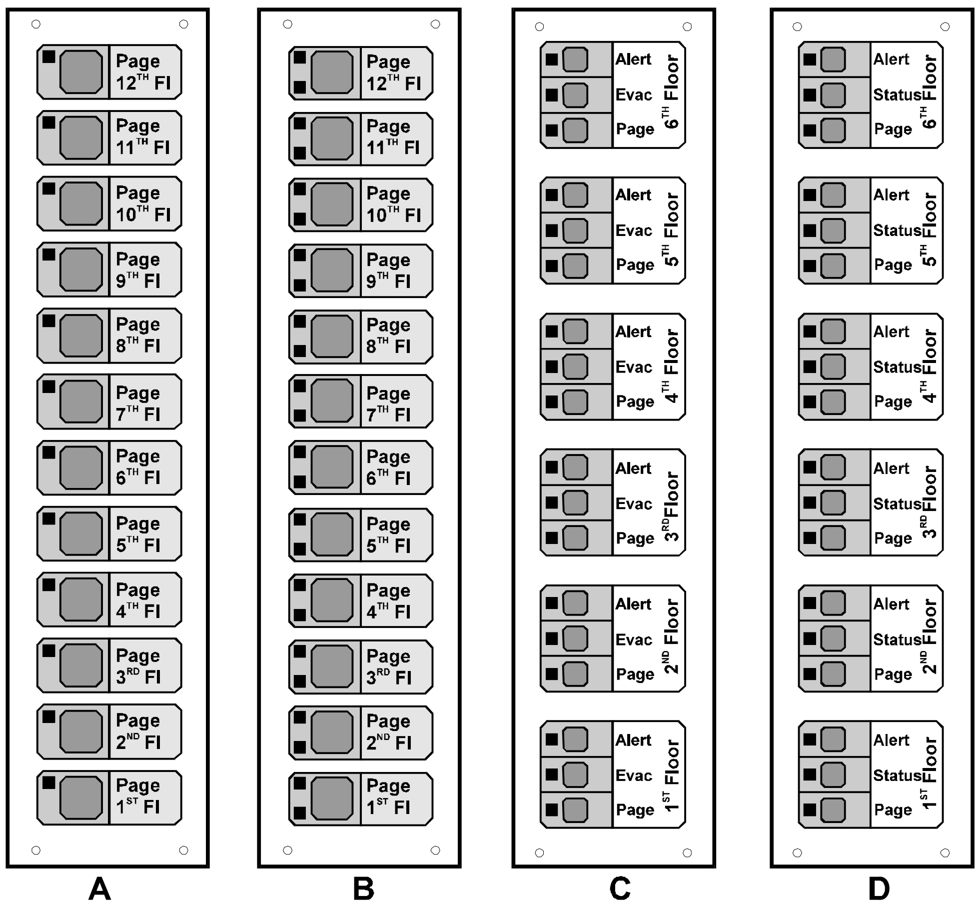


Figure 3-2: Control/display module options

Pressing a zone select switch on the displays shown in Figure 3-2A and Figure 3-2B adds that zone to any zones selected by the page function switches on the Audio Source Unit. The LED in the upper left corner of each floor's control/display module is on when the floor is selected. The LED in the lower left corner on display B is used to annunciate trouble on an amplifier or notification appliance circuit associated with the zone.

The control/display module shown in Figure 3-2C is used to manually direct the Evac and Alert signals as well as the page message to individual areas of the facility. The LEDs can be programmed to follow any automatic system responses as well as manual audio zone selections.

The control/display module shown in Figure 3-2D is used to manually direct the Evac signal and pages to individual areas of the facility. The center switch is inoperative. This configuration is typically used in facilities where the alert signal is automatically sent to all areas not receiving the evacuation signal. The LEDs follow any automatic system responses as well as manual audio zone selections. The Status LED can be programmed to indicate the trouble state of the zone amplifier.

Chapter 4

3-FTCU operating instructions

Summary

This chapter provides a functional description of the controls and indicators provided on the 3-FTCU Firefighter Telephone Control Unit.

Content

Controls and indicators

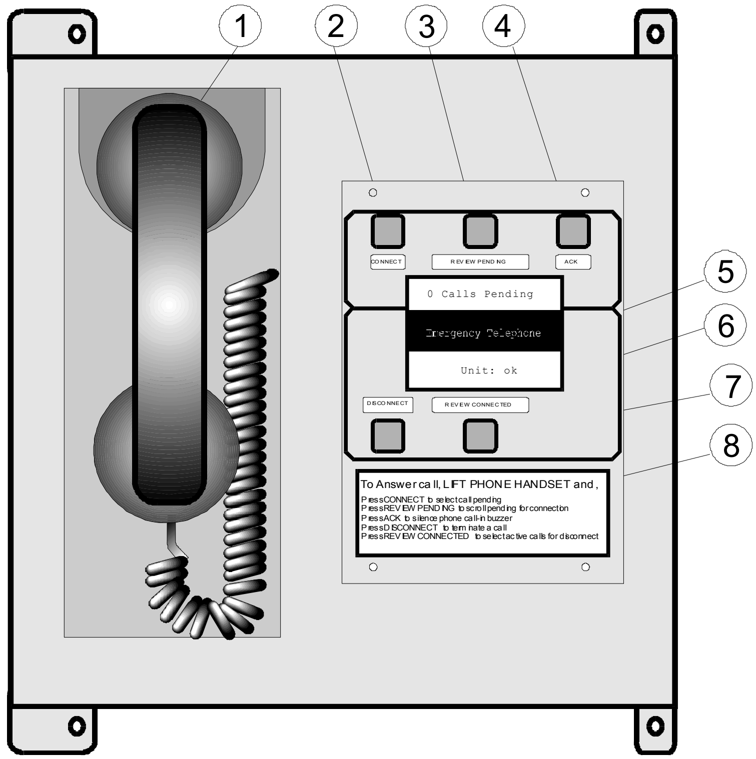


Figure 4-1: 3-FTCU controls and indicators

3-FTCU controls and indicators (see Figure 4-1)

Index	Control or indicator	Functional description
1	Master telephone handset	The master telephone handset permits the operators to communicate with dedicated firefighter telephone stations which are strategically located throughout the facility.
2	Connect switch	The connect switch connects the incoming calls to the master telephone handset.
3	Review pending switch	The review pending switch scrolls the list of pending incoming calls.
4	ACKnowledge switch	The acknowledge switch silences the call-in buzzer.
5	LCD display	The LCD display shows the status of the firefighter telephone system. The display is backlit in the alarm mode and when an incoming call is received.
6	Disconnect switch	The disconnect switch is used to remove the connected phone which is shown in reversed text on the bottom of the display.
7	Review connected switch	The review connected switch scrolls the list of connected calls on the bottom of the display.
8	Instruction placard	This card is a set of phone operating instructions.

Operation

The operational status of the phone system can be determined by using the 3-FTCU LCD display.

Normal condition

When there is no activity on the system the screen appears as shown in Figure 4-2. The top line indicates that there are no incoming calls pending.

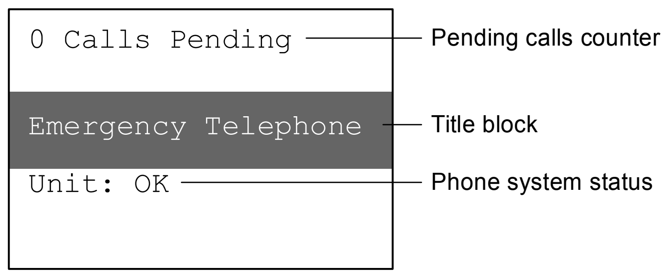


Figure 4-2: Normal display

The bottom line indicates the 3-FTCU unit status. “OK” means that there are no troubles with the phone system.

Trouble condition

When there is a fault on the firefighter telephone system, a fault indication will appear on the bottom of the display, as shown in Figure 4-3. Local faults may appear on the second line of the display. Circuit faults require the use of a 3-LCD or 3-LCDXL1 module to find the specific cause of the problem.

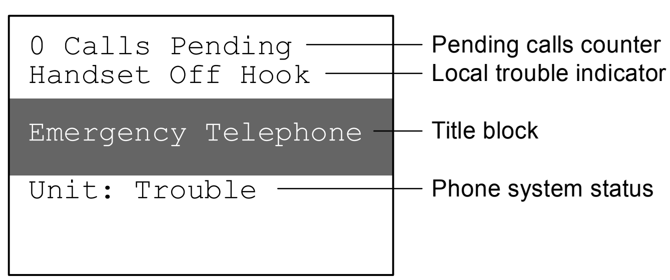


Figure 4-3: Trouble display

Answering incoming calls

An incoming call is initiated when a firefighter telephone is taken off-hook or plugged into a remote telephone jack. The caller hears a tone, indicating the connection is good, and the call-in buzzer is activated at the 3-FTCU.

Display

The number of incoming calls is always listed on the top line of the display. The identification of the incoming call appears in reversed text on the second line of the display, as shown in Figure 4-4. Should multiple calls be pending, the reversed text display will slowly sequence through the incoming calls.

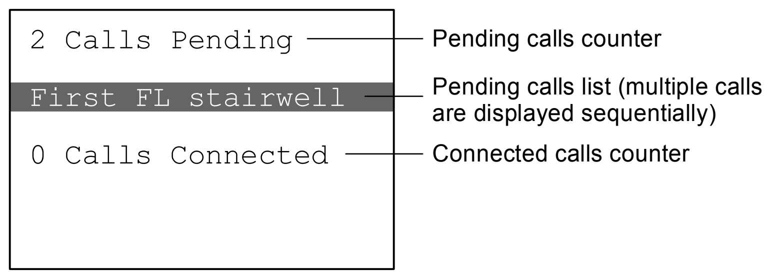


Figure 4-4: Incoming call display

To answer an incoming call

1. Silence the call-in buzzer by pressing the ACK (acknowledge) switch. The buzzer will re-sound each time a new incoming call is received.
2. If multiple calls are shown in the display, stop the call identifier sequencing by pressing the Review Pending switch once. Each additional activation of the Review Pending switch manually steps the display through the list of incoming calls. When the desired call appears on the pending calls identification line, stop stepping through the calls.
3. To answer the selected call, press the Connect switch. The call identifier will move from the pending calls identification line of the display to the connected call list at the bottom of the display, as shown in Figure 4-5. Once connected, you may begin your conversation.

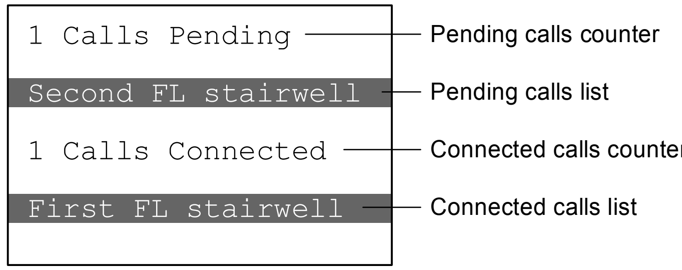


Figure 4-5: One connected call and one pending call

Notice in Figure 4-5 that the calls connected counter indicates one call connected, the first floor stairwell phone, and the pending call counter decremented to show the one remaining incoming call from the second floor stairwell phone.

4. To add the second floor stairwell phone to the conversation, press the Connect switch again. Because there is only one call pending, there is no need to scroll through incoming calls.

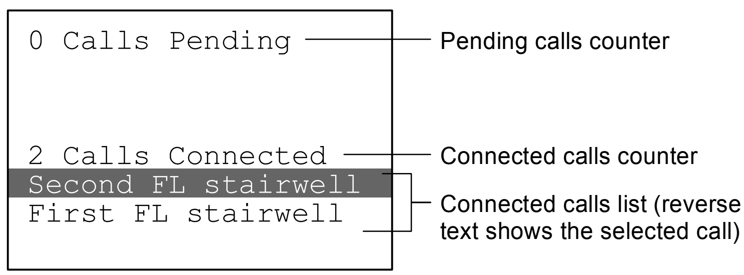


Figure 4-6: Two connected calls

The connected calls counter indicates that two phone circuits are connected, and both calls now appear in the connected calls identification list. The two stairwell phones and the 3-FTCU master handset are connected together in a party line connection, and may communicate with each other.

Up to five phone circuits can be connected in a party line connection. A full complement of connected circuits is shown in Figure 4-7.

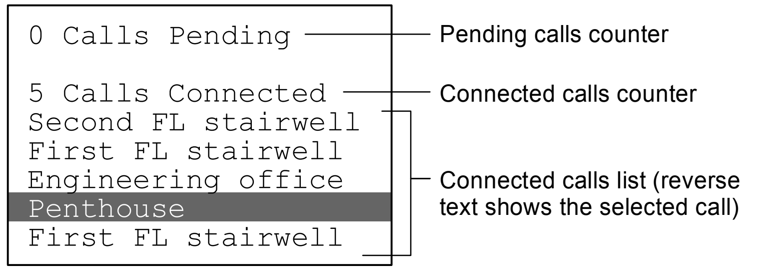


Figure 4-7: Five connected calls

Disconnecting calls

When a calling party is ready to hang up or remove a phone from its jack, the operator should disconnect the call as described below.

To disconnect a call

1. Press the Review Connected switch until the call to be disconnected is displayed in reversed text. In Figure 4-7, the Penthouse phone is selected.
2. Press the Disconnect switch. The call will be removed from the connected calls list and added to the pending calls list as shown in Figure 4-8 below. When the remote phone is hung up or removed from the phone jack, it will be removed from the calls pending list.

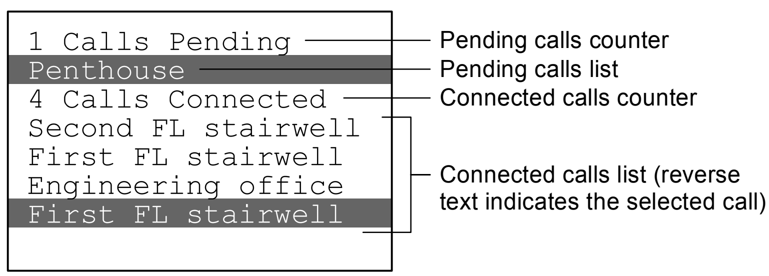


Figure 4-8: One pending call and four connected calls

3. Hanging up the master handset in the 3-FTCU transfers all connected calls to the calls pending list. If the remote phones have not been hung-up within 20 seconds, the call in buzzer will resound.

Paging by phone

The phone page feature of the 3-ASU audio source unit permits individuals with access to a remote firefighter telephone to make announcements over the emergency voice/alarm communications system, under the supervision of the Audio Source Unit operator.

1. Establish a phone connection with the remote phone which is to issue the page.
2. Set up the areas to receive the page using one of the ASU page area functions and/or manual switch selection of additional audio zones.
3. When ready to begin the paging sequence, the ASU operator should press the Phone Page switch.
4. Begin the announcement. The 3-ASU operator can monitor the page using the master handset.

Appendix A

System addresses

Summary

This appendix provides a quick reference for interpreting the mapping of system addresses.

Content

Address format

Tip: To determine a local panel's cabinet number, use the 3-LCD command menu to get the status on all the active points on the panel. When prompted for a panel number, enter 00. The panel returns the startup response point's logical address. The first two numbers of the logical address is the cabinet number.

The system derives the addresses it assigns from the panel's cabinet number and the LRM's location within the panel (see Figure A-1). The basic address format is PPCCDDDD, where:

PP is the panel's cabinet number. The cabinet number is assigned when the installer downloads the CPU database into the panel.

CC is the LRM's slot address. The cabinet number and the slot address make up the LRM's logical address.

DDDD is the device's point address. The LRM's logical address and device's point address make up the device or circuit's logical address.

The CRC Card Reader Controller and KPDISP Keypad Display are devices supported by a 3-SAC module. However, they also act as independent processors, and have their own points and pseudo points. For this reason, their device numbers are further subdivided.

You can think of a SAC device as having this address format: PPCCSSDD: SS is the CRC or KPDISP device number, as assigned during LRM configuration. DD is a point or pseudo point within the device.

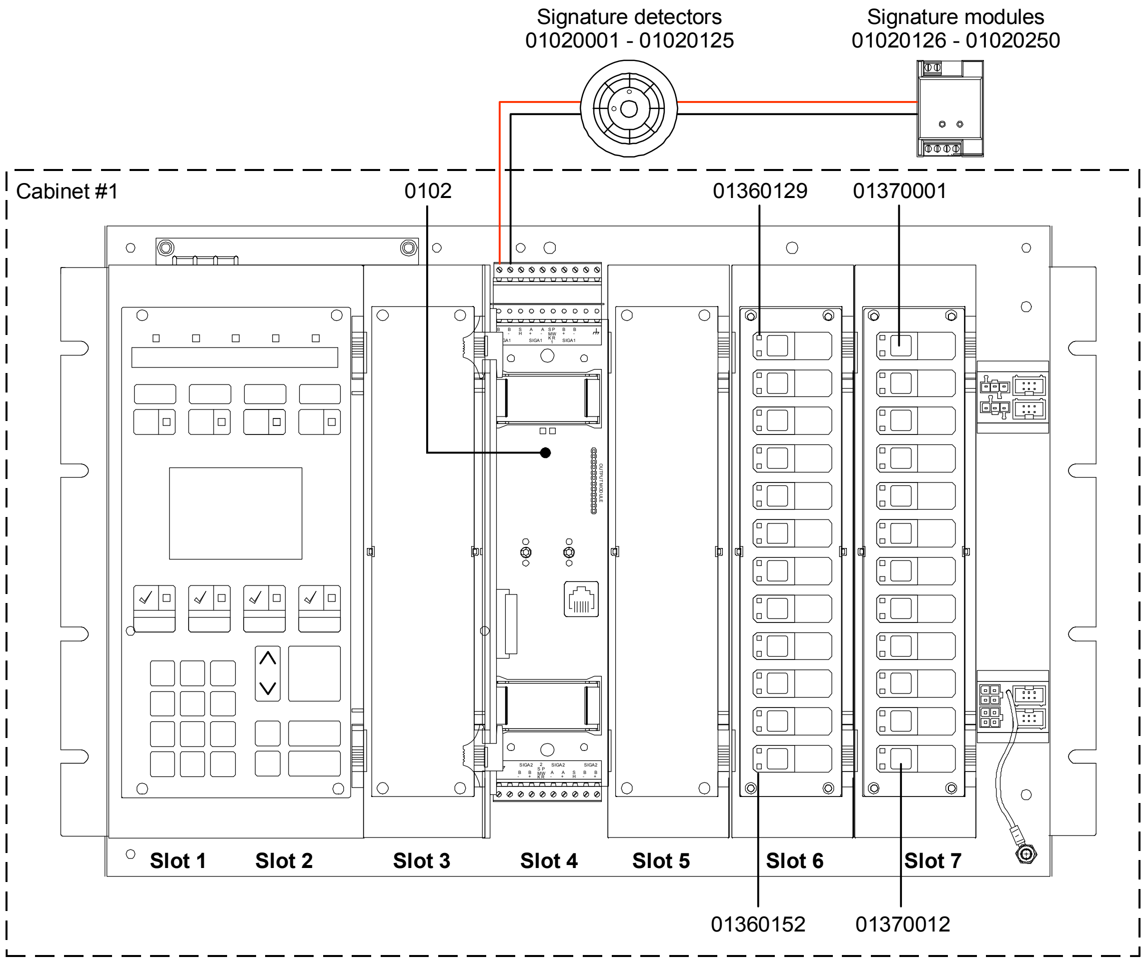


Figure A-1: Addressing example

LRM addresses

Figure A-2, Figure A-3, and Figure A-4 show the logical addresses that the system assigns to LRMs based on the panel configurations.

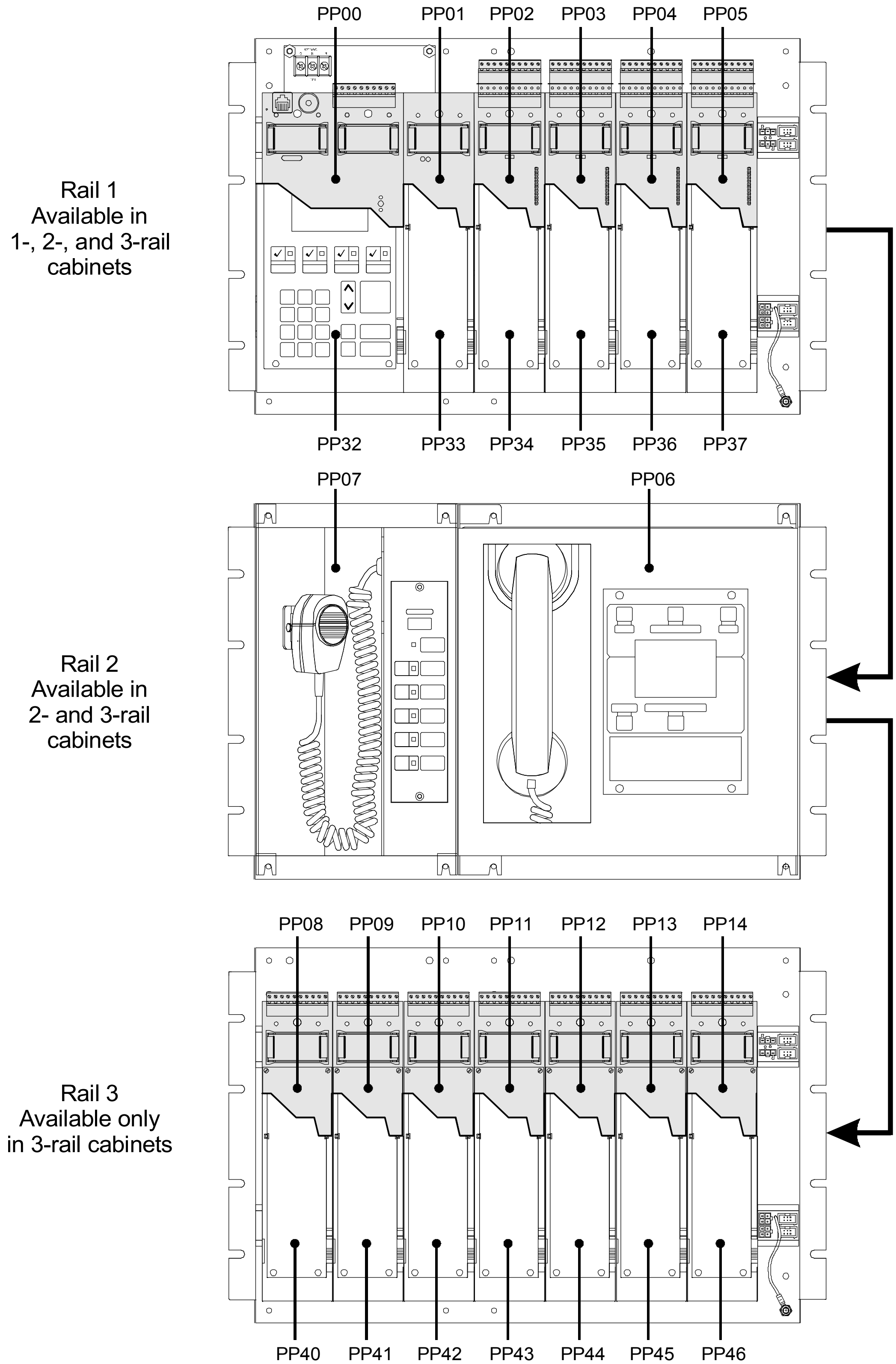


Figure A-2: LRM addresses for 3-CHAS7, 3-ASU/FT, 3-CHAS7 configuration

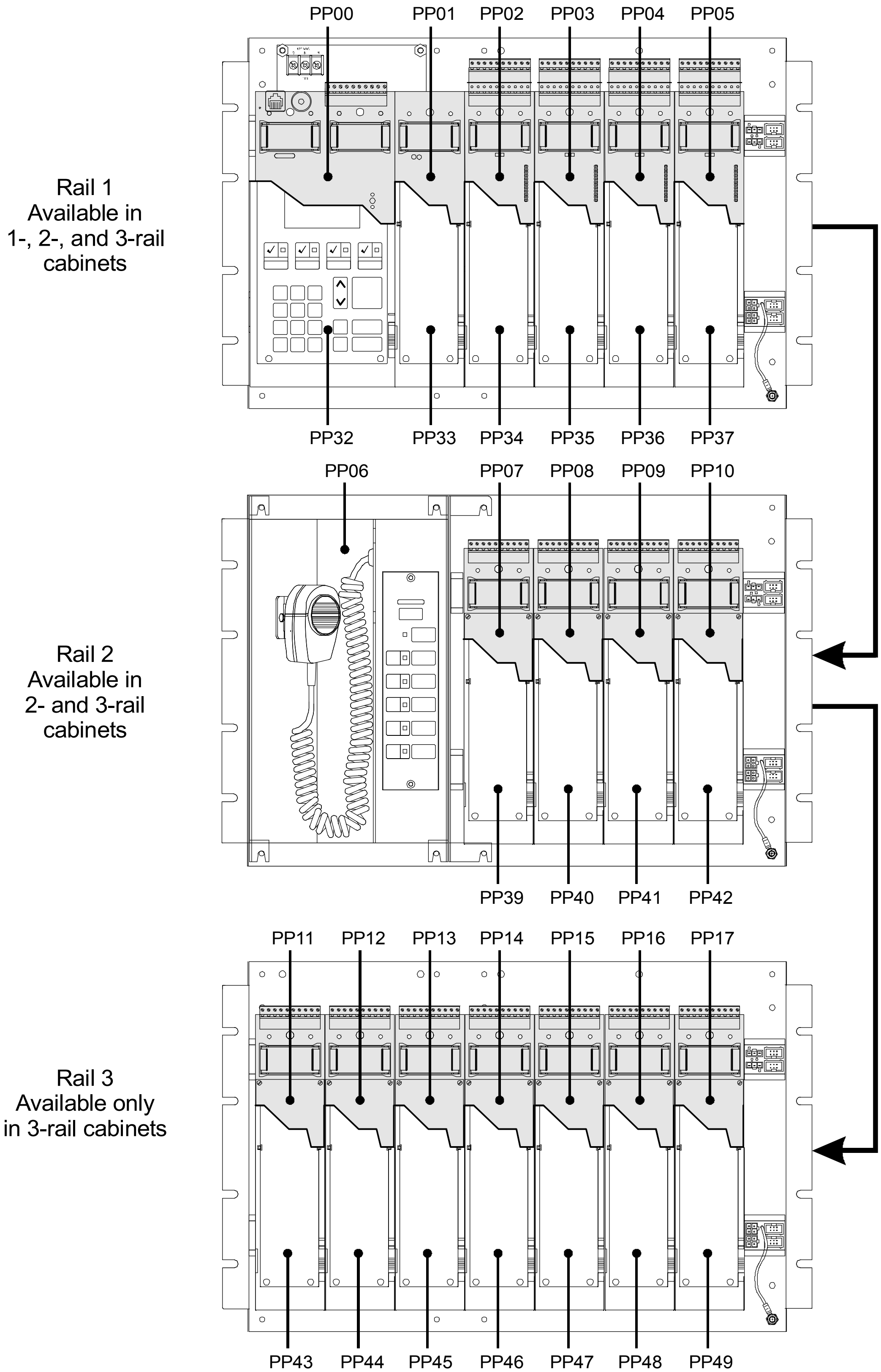


Figure A-3: LRM addresses for 3-CHAS7, 3-ASU/CHAS4, 3-CHAS7 configuration

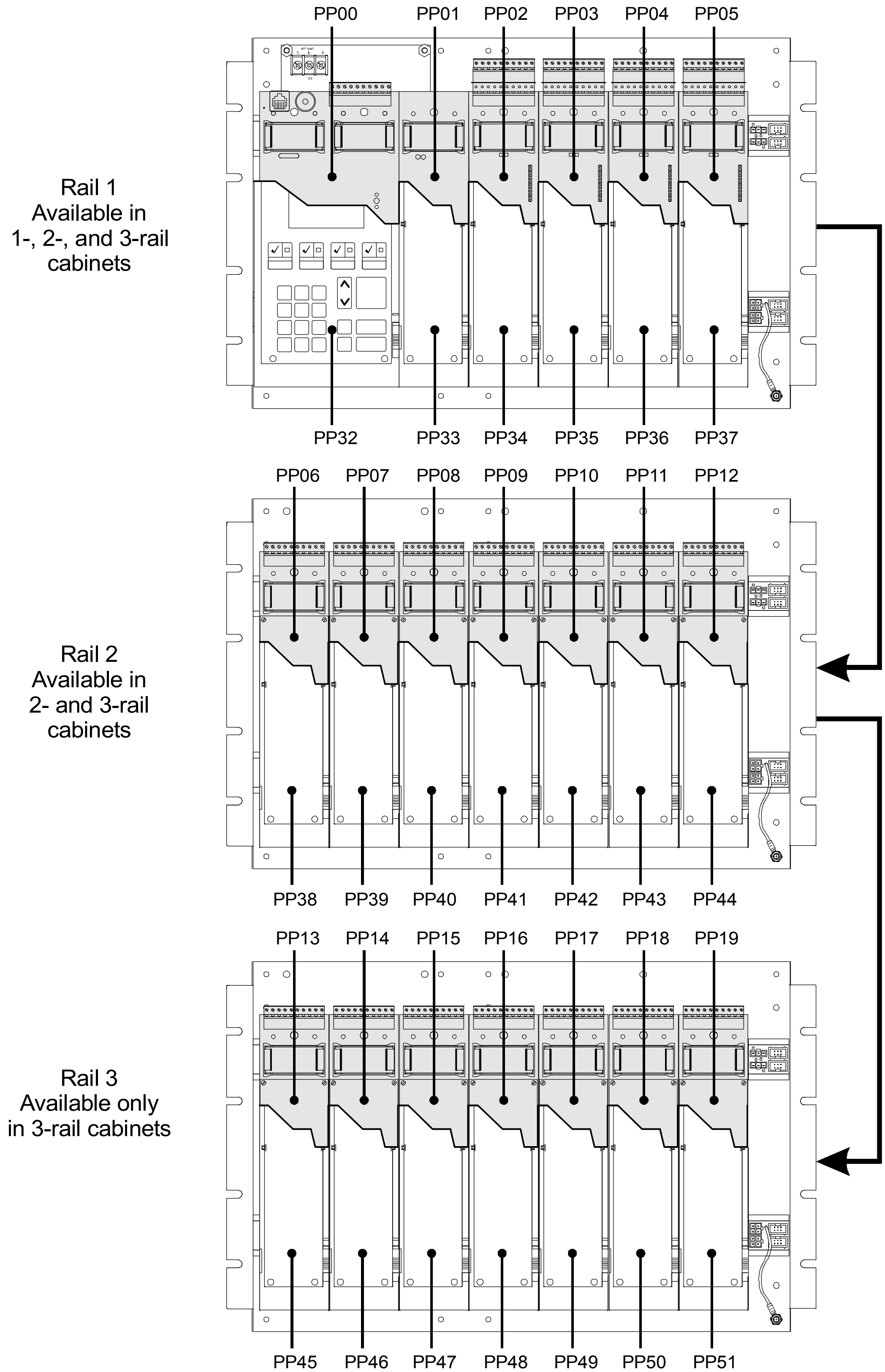


Figure A-4: LRM addresses for 3-CHAS7, 3-CHAS7, 3-CHAS7 configuration

Control / display module addresses

Figure A-5 shows the device logical addresses that the system assigns the control/display modules.

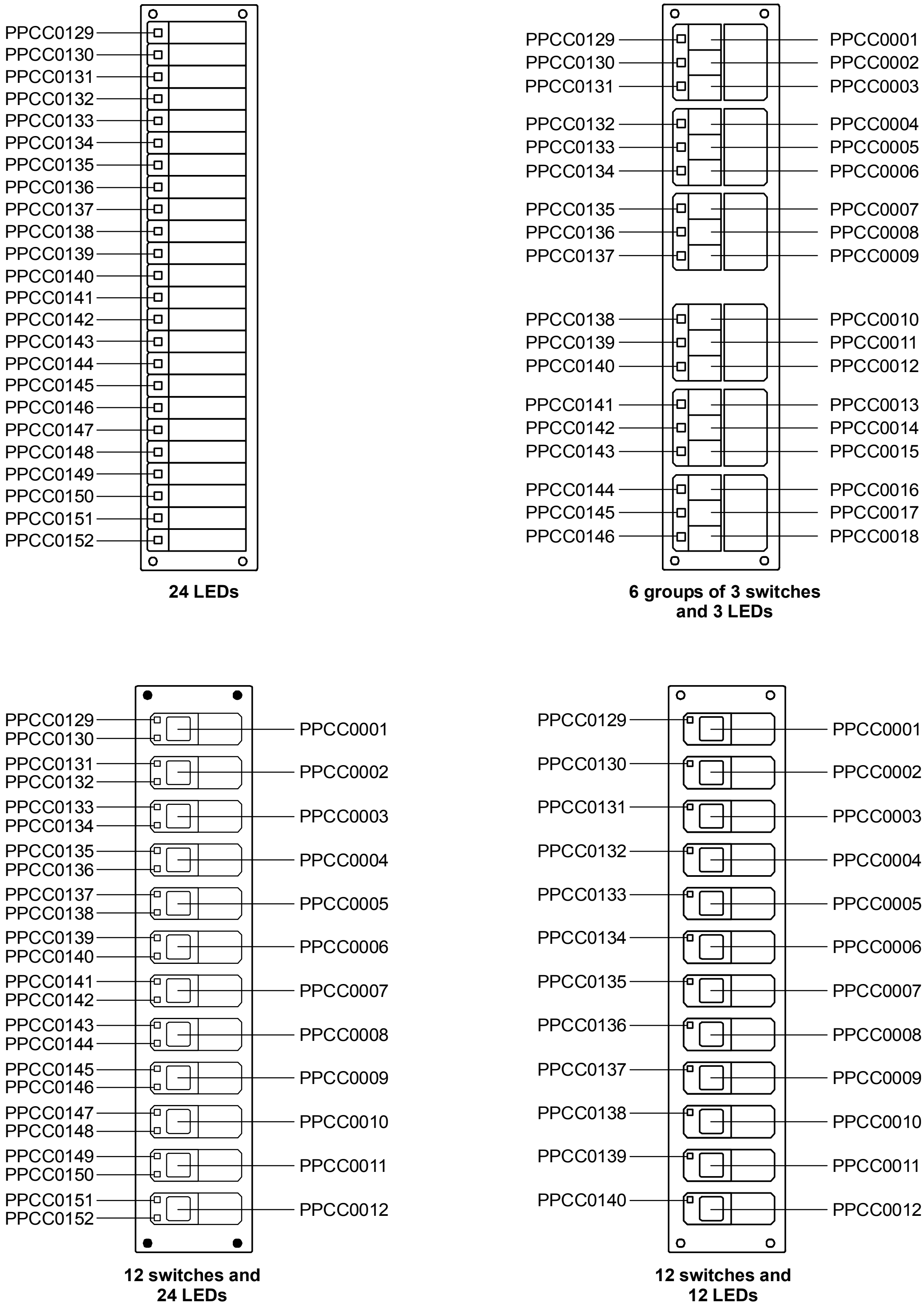


Figure A-5: Control/display module switch and LED device addresses

Device addresses

Figure A-6 shows the device logical addresses that the system assigns to various rail modules.

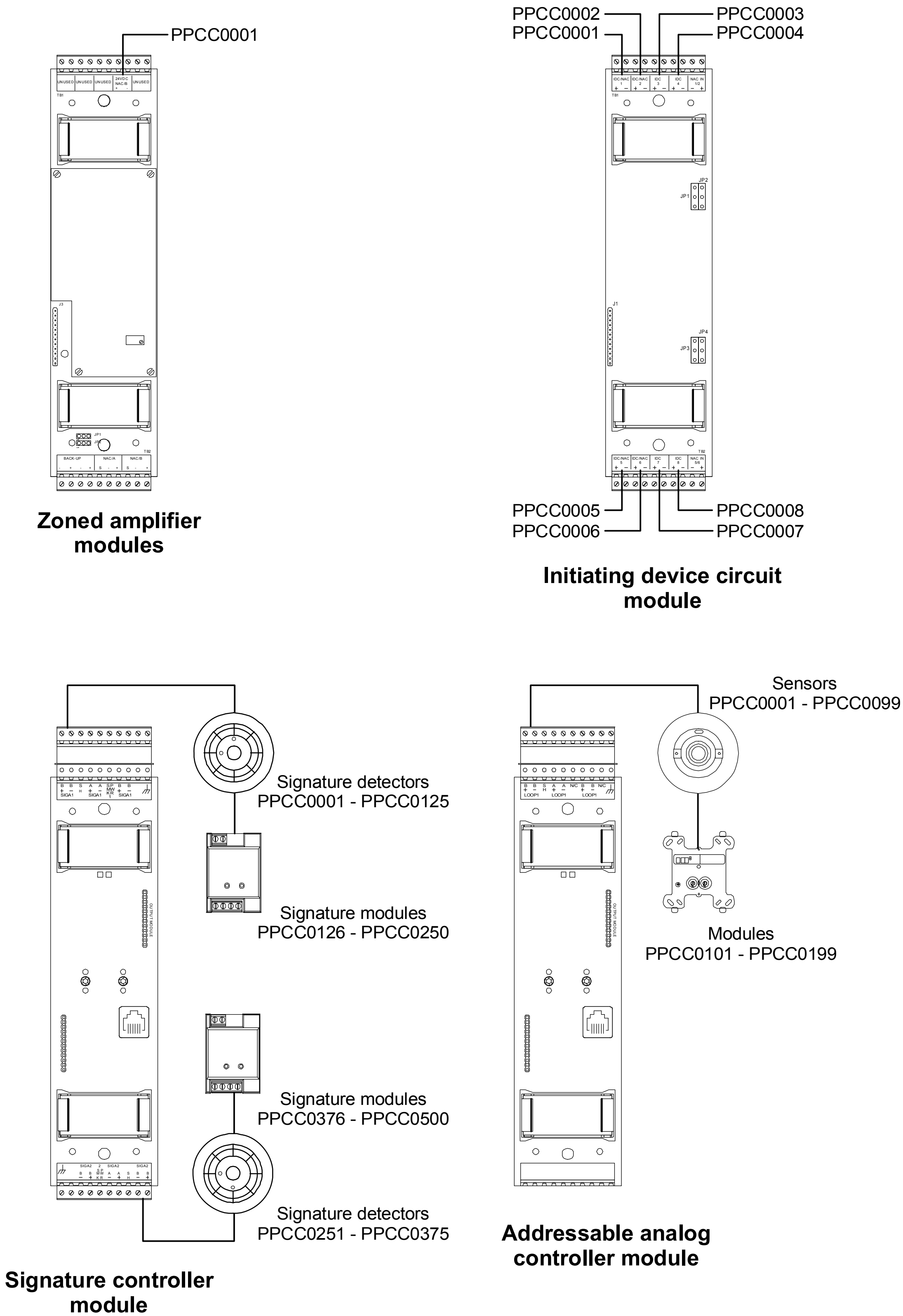


Figure A-6: Rail module device addresses

Appendix B

Operation sequence charts

Summary

This appendix summarizes the operation of the system in a series of convenient charts.

Content

Table B-1: Fire alarm sequence - LCD response

Event▶ LCD display▼	Normal	First alarm	Subsequent alarm	Alarm restore	Reset
Power LED	On	On	On	On	On
Alarm LED	Off	Flashing	Flashing	Flashing	Off
Trouble LED	Off	Off	Off	Off	Off
Panel buzzer	Off	On	On	Off	Off
LCD text display	Title screen	Current event and last window	Updates last event window	No change event latched until reset	Title screen
Alarm counter on LCD	0000	0001	0002	0002	0000
Alarm history counter on LCD	0000	0000	0000	0000	0001
Reset switch	Enabled	Disabled for silence Inhibit period	Enabled after Inhibit period expires	No change	Disabled

Table B-2: Fire alarm sequence - common feature response

Event▶ LCD display▼	Normal	First alarm	Subsequent alarm	Alarm restore	Reset
Alarm silence inhibit timer	Off	Timer starts	Runs until expired	No change	Off
Alarm silence LED	Off	Yellow after silence	Yellow after silenced	No change	Off
Alarm silence timer	Off	Timer starts, alarm silenced if timer expires	Restarts, alarm silenced if timer expires	No change	Off
Page inhibit timer	Off	Timer starts, prohibits paging until timer expires	No change	No change	Off
Auto general alarm signal timer (recycle)	Off	Timer starts, total EVAC if timer expires	No change unless canceled by user	No change	Off

Table B-3: Fire alarm sequence - zone annunciation

Event▶ LCD display▼	Normal	First alarm	Subsequent alarm	Alarm restore	Reset
Panel annunciator	Off	On red	On red	No change	Off
Printers	Ready	Prints event	Prints event	Prints on restoration	Off
History logger	Ready	Logs event	Logs event	Logs restoration	Ready

Table B-4: Fire alarm sequence - notification appliance circuits (default operation)

Event▶ LCD display▼	Normal	First alarm	Subsequent alarm	Alarm restore	Reset
General alarm audible notification circuits	Off	Sounds alarm	No change, resounds alarm if silenced	No change	Off
General alarm visual notification circuits	Off	Displays alarm indication	Displays alarm indication	Displays alarm indication	Off

Table B-5: Fire alarm sequence - off premises connection

Event▶ LCD display▼	Normal	First alarm	Subsequent alarm	Alarm restore	Reset
Reverse polarity alarm output	Off	Reverses polarity	No change	No change	Reverses polarity back to normal
Common alarm relay	Off	On	No change	No change	Off
Auxiliary control relays	Off	On as programmed	On as programmed	No change	Off

Table B-6: Trouble sequence - LCD response [1]

Event▶ LCD display▼	Normal	First trouble - trouble queue	First alarm w/active trouble - alarm queue	Notes
Current event window	Off	Trouble message	Alarm message	Alarm has priority
Last event window	Off	Trouble message	Alarm message	Alarm has priority
Queue LED	Off	Flashes yellow	Flashes red	
[1] 3-LCD and 3-LCDXL1 modules				

Table B-7: Trouble sequence - common feature response

Event▶ LCD display▼	Normal	First trouble	First alarm w/active trouble	Notes
Panel buzzer	Off	Sounds trouble	Sounds alarm	Alarm has priority
Panel Silenced LED	Off	Off	Off	Yellow when local buzzer silenced
3-CPU3 Trouble Relay	On	Off	Off	Relay powered in normal state
3-CPU3 Alarm Relay	Off	Off	On	Remains on until panel reset

Table B-8: Trouble sequence - annunciation

Event▶ LCD Display▼	Normal	First trouble	First Alarm w/Active trouble	Notes
Panel zone LED	Off	On yellow	On red	
Remote annunciator alarm zone LED	Off	On yellow	Steady red	Alarm has priority if same LED is also used to annunciate trouble
Printers	Ready	Prints trouble message	Prints alarm message	Time, date, event message, & device data
History logger	Ready	Logs event	Logs event	Time, date, event message, & device data

Table B-9: Trouble sequence - annunciation

Event▶ LCD display▼	Normal	First trouble	First Alarm w/active trouble	Notes
Off premises module (3-OPS) 3 circuit configuration	All circuits normal polarity	Trouble circuit reverses polarity, module trouble relay operates	Alarm and trouble circuits reverse polarity	
Off premises module 1 circuit configuration	Normal polarity	Circuit opens, (module trouble relay operates)	Circuit reverses polarity (trouble relay restores)	Alarm has priority
Auxiliary control relays	Off	On as programmed	On as programmed	

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EST3 CHASSIS ASSEMBLY

Operations & Maintenance Manual
December 2015

EST3 Cabinets and Chassis

3-CAB series, 3-RCC series, 3-CHAS7 series, BC-1

3-CAB Series

3-RCC Series

S3000

7165-1657: 0186

FDNY COA 6086

EN54-2:1997+A1 and EN54-4:1997+A1:2002+A2 pending

Overview

EST3 has a wide selection of cabinet arrangements allowing the greatest use of EST3's flexible modular design. Lobby enclosure wallboxes are manufactured from #14 AWG cold rolled steel with a gray baked enamel finish. Lobby enclosure doors are manufactured from #14 AWG cold rolled steel and have a modern contoured door design with integral viewing window. The exception is the small lobby enclosure 3-CAB5. The 3-CAB5 wallbox and non-contoured door are #16 AWG cold rolled steel. Lobby enclosure doors come with gray baked enamel or optional red baked enamel finishes. The EST3 lobby enclosures back boxes, doors and chassis units are ordered and shipped separately. The 3-CAB5 lobby enclosure comes complete with door and back box providing space to mount five local rail modules.

The EST3 remote closet cabinet design allows the installation of control panel electronics in electrical closets. The remote closet cabinets have left hand hinged doors and are available with red finish only. Optional display modules used for system diagnostics display, mount behind the closet cabinet door and are not visible with the door closed.

Standard Features

- Right or left hand hinging of doors
- Lag and Keyway holes for quick mounting
- Attack rated door for security applications
- Knockouts for 3/4 inch conduit
- Attractive contour door design on lobby enclosures
- Combination flush or surface mounting lobby enclosure design
- Remote closet cabinets for electrical closet mounting support up to 65 AMP hour batteries
- Optional earthquake hardening: OSHPD seismic pre-approval for component Importance Factor 1.5

Application

Lobby Enclosures

EST3 lobby enclosures provide space for control, monitoring and display modules where they remain visible even with the door closed and secure. Ideal for mounting in lobby's where appearance is important, maximum mounting flexibility is provided with doors that will mount for right or left hand opening. Lobby enclosures come in several sizes to match individual project requirements.

The **3-CAB5 series** semi-flush or surface mounts. A built in rail assembly provides space for up to five local rail modules, no chassis assembly needed. Back space for 1-1/2 footprints gives room for a power supply and a 1/2 footprint module and 10 AH batteries. The local rail module spaces provide room for amplifiers, common control and annunciation modules.

The **3-CAB7** semi-flush or surface mounts and has a contoured front door with viewing window. Space is provided for two 17 AH batteries and one chassis assembly providing seven local rail module spaces.

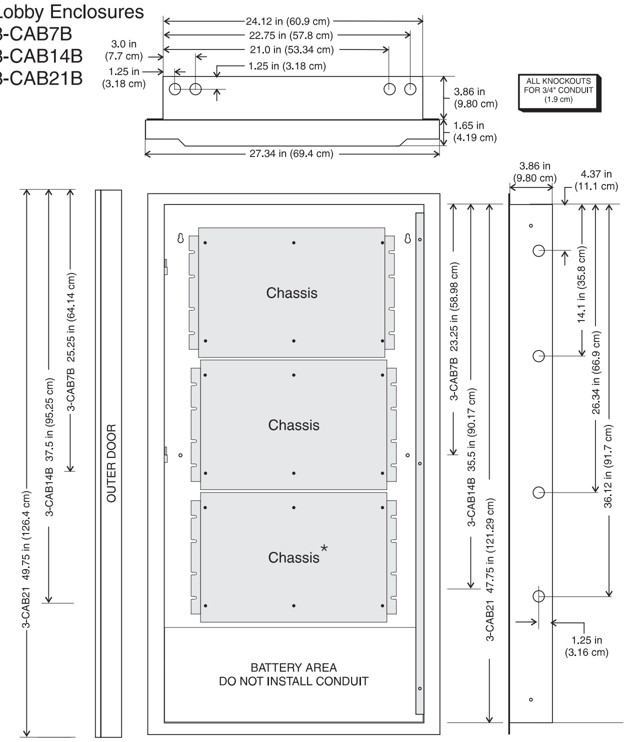
The **3-CAB14** semi-flush or surface mounting and has a contoured front door with viewing window. Space is provided for two 17AH batteries and two chassis assemblies each providing seven local rail module spaces.

The **3-CAB21** semi-flush or surface mounts and has a contoured front door with viewing window. Space is provided for two 17AH batteries and three chassis assemblies each providing seven local rail module spaces.

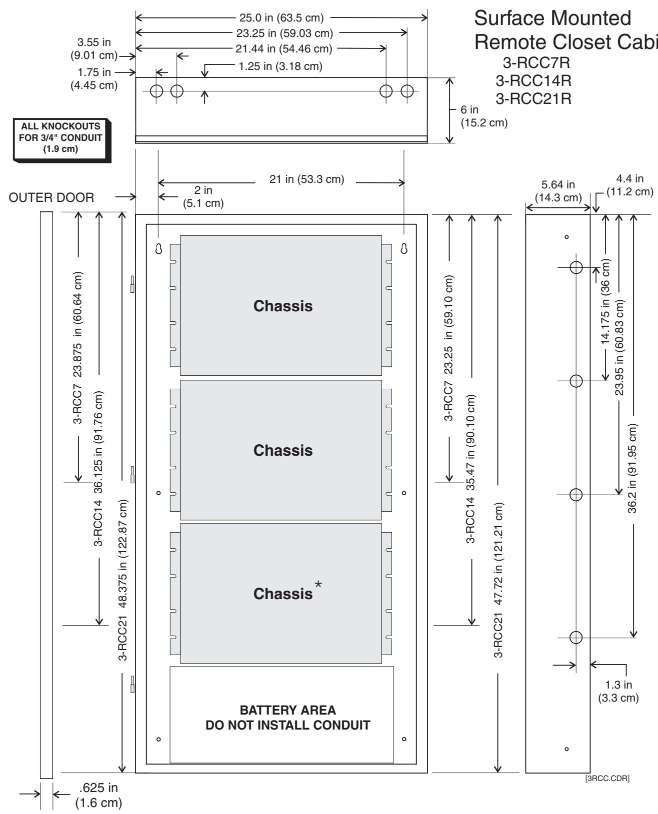
Remote Closet Cabinets

Remote closet cabinets provide an economical way of installing equipment in locations where esthetics are not paramount, like electrical closets. You can have optional display modules used for system diagnostics display mounted behind the front door. These display modules will not be visible with the door closed. Remote closet cabinets are surface mounting and come in sizes providing space for one to three chassis with room for standby batteries. A UL Listed attack rated door having a 2-minute rating is available for the 3-RCC7R cabinet. This door is required for security applications.

Lobby Enclosures
3-CAB7B
3-CAB14B
3-CAB21B

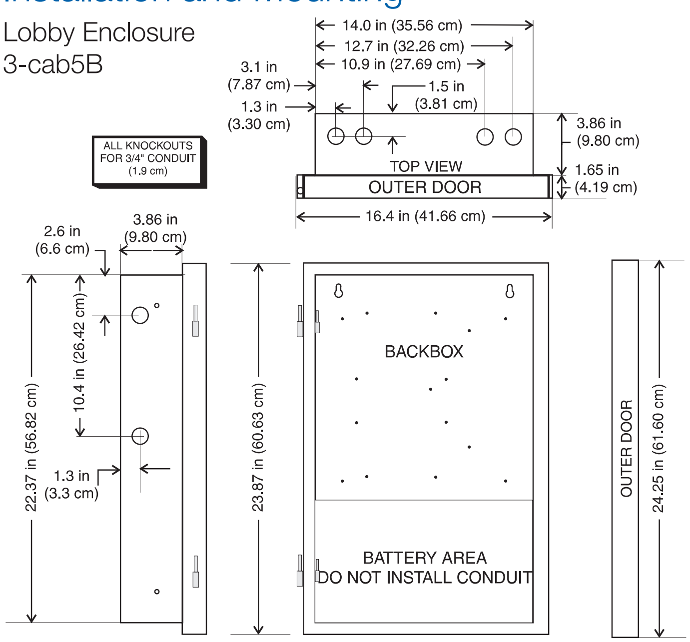


Surface Mounted
Remote Closet Cabinets
3-RCC7R
3-RCC14R
3-RCC21R



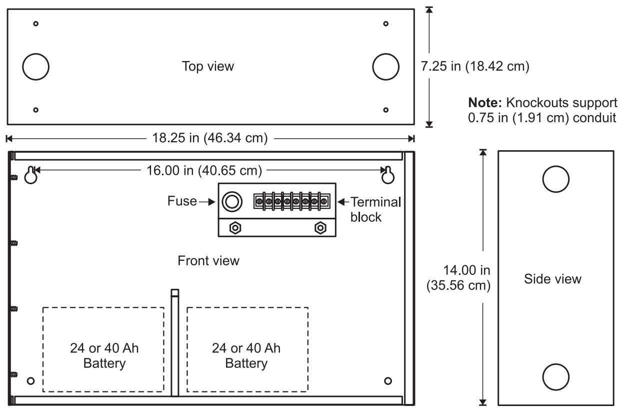
Installation and Mounting

Lobby Enclosure
3-cab5B



* The lower mounting space can be used for an MN-BRKT1 bracket, which holds MNEC interface equipment including an MN-NETSW1 Ethernet network switch, an MN-ABPM Audio bridge, an MN-FVPN VoIP module, and an MN-COM1S Communications module.

BC-1 Dimensions



Ordering Information

Catalog Number	Description	Equipment Mounting Space	Battery Space	Ship Wt. lb. (Kg)
Lobby Enclosures — Outer doors with viewing window				
3-CAB5	Cabinet w/Wallbox, door and chassis	Five local rail modules One footprint and ½ footprint module	Two - 12V10A	30 (13.6)
3-CAB7B	Wallbox only	One Chassis	Four - 6V8A Two - 12V10A Two - 12V17A	30 (13.6)
3-CAB7B-E	Wallbox only, EN54* certified CE	1 Chassis		30 (13.6)
3-CAB7D(R)	Inner and outer doors for 3-CAB7B	N/A		10 (4.5)
3-CAB7D(R)-E	Inner & outer doors for 3-CAB7B, EN54*, CE			10 (4.5)
3-CAB14B	Wallbox only	Two Chassis	Four - 6V8A Two - 12V10A Two - 12V17A	42 (19.1)
3-CAB14B-E	Wallbox only, EN54* certified CE	2 Chassis		42 (19.1)
3-CAB14D(R)	Inner and outer doors for 3-CAB14B	N/A		15 (6.8)
3-CAB14D(R)-E	Inner & outer doors for 3-CAB14B, EN54*, CE			15 (6.8)
3-CAB21B	Wallbox only	Three Chassis	Four - 6V8A Two - 12V10A Two - 12V17A	55 (25)
3-CAB21B-E	Wallbox only, EN54* certified CE	3 Chassis		55 (25)
3-CAB21D(R)	Inner and outer doors for 3-CAB21B	N/A		20 (9.1)
3-CAB21D(R)-E	Inner & outer doors for 3-CAB21B, EN54*, CE			20 (9.1)
Remote Closet Enclosure — No viewing window				
3-RCC7R	Red wallbox and door	One Chassis	Four - 6V8A, Two - 12V10A Two - 12V17A, Two - 12V50A	37.5 (17)
3-RCC7R-E	Red wallbox and door, EN54* certified CE			37.5 (17)
ATCK	Attack rated door for 3-RCC7R	N/A		26 (11.8)
3-RCC14R	Red wallbox and door	Two Chassis	Four - 6V8A Two - 12V10A, Two - 12V17A Two - 12V50A, Two - 12V65²	53 (24)
3-RCC14R-E	Red wallbox and door, EN54* certified CE			53(24)
3-RCC21R	Red wallbox and door	Three Chassis		70 (31.8)
3-RCC21R-E	Red wallbox and door, EN54* certified CE			70 (31.8)

Catalog Number	Description	Ship Wt. lb. (Kg)
Chassis Assemblies		
3-CHAS7	Takes one chassis space in wallbox, provides space for 7 local rail modules, up to two power supplies, and a ½ footprint module.	8.4 (3.8)
3-ASU**	Takes one chassis space in wallbox, provides an audio source unit /w microphone and an inner door filler plate.	15 (6.8)
3-ASU/4**	Takes one chassis space in wallbox, provides an audio source unit /w microphone and four local rail module spaces.	15 (6.8)
3-ASU/FT**	Takes one chassis space in wallbox, provides an audio source unit /w microphone and Firefighters Telephone	20 (9.1)
3-FTCU**	Takes one chassis space in wallbox, provides Firefighters Telephone Control unit and inner door filler plate.	15 (6.8)
MN-BRKT1	Takes one chassis space in wallbox, provides mounting for MNEC interface equipment	4.0 (1.8)
FSB-BRKT	Mounting bracket for FSB-PC communications bridge. Allows FSB-PC to mount on the side of a Chass7	1.0 (0.45)

more...

Notes:

1. All lobby enclosures, wallboxes and doors have a textured gray enamel finish; outer doors are available in red by adding the suffix "R" to the catalog number, i.e. 3-CAB7DR.
2. Remote closet cabinets will support 65 AH batteries with the use of the 3-BATS Battery Shelf, which reduces the enclosure's chassis capacity by one chassis.
3. The EST3 is modularly listed under the following standards:
   UL 864 categories: UOJZ, UOXX, UUKL and SYZV, UL 2572, UL 294 category ALVY, UL 609 category AOTX, UL 636 category ANET, UL 1076 category APOU, UL 365 category APAW, UL 1610 category AMCX, UL 1635 category AMCX ULC-S527, ULC-S301, ULC-S302, ULC-S303, ULC-S306, ULC/ORD-C1076, ULC/ORD-C693
   Please refer to EST3 Installation and Service Manual for complete system requirements.

** EN54-2:1997+A1 and EN54-4:1997+A1:2002+A2 pending*

*** Add "-CC" for City of Chicago.*

Contact us...

Email: edwards.fire@fs.utc.com
Web: www.est-fire.com

EST is an EDWARDS brand.

1016 Corporate Park Drive
Mebane, NC 27302

In Canada, contact Chubb Edwards...
Email: inquiries@chubbedwards.com
Web: www.chubbedwards.com

Accessories

3-BATS	Battery Shelf for RCC Enclosures. Takes one chassis space. Room for up to one 65 AH or two 50 AH batteries.	3 (1.36)
BC-1	Battery Cabinet - supports up to two 40 amp hour batteries.	
3-BTSEN	Battery sensor/distribution module	0.5 (.2)
BC-1EQ	BC-1 - Seismic Battery hold down for BC-1. Supports up to two 40 Ahr batteries. Order BC-1 Separately.	
3-CABEQ	3-CAB - Seismic Battery hold-down for 3-CAB 7, 14 or 21. Supports two 1 2V batteries from 10 Ah up to 18 Ah. Comes with EST3 Chassis hardening hardware and instructions. Order 3-CAB7, 3-CAB14 or 3-CAB21 separately. See note 1.	
3-RCCEQ50	3-RCC series - Seismic Battery hold-down. Supports one set of two 50 Ah batteries. Comes with EST3 Chassis hardening hardware and instructions. Order 3-RCCxxR separately. See note 1.	
3-RCCEQ65	3-RCC series cabinet - Seismic Battery hold-down. Supports one set of two 65 Ah batteries (one battery in bottom of cabinet, one battery mounted on 3-BATS). Order 3-RCCxxR cabinet and 3-BATS separately. See note 1.	
3-TAMP	Tamper switch for 3-CAB7, 3-CAB14 and 3-CAB21 cabinets. Mounts to side of cabinet.	0.5 (.2)
3-TAMP5	Tamper switch for 3-CAB5. Mounts to side of cabinet.	0.5 (.2)
3-TAMPRCC	3-TAMPRCC Tamper Switch for RCC series cabinets. Mounts to side of cabinet.	0.5 (.2)

1. For earthquake anchorage, including detailed mounting weights and center of gravity detail, please refer to *Seismic Application Guide 3101676*. Approval of panel anchorage to site structure may require local AHJ, structural, or civil engineer review.

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PRODUCT DESCRIPTION

The 3-CAB series of equipment enclosure backboxes are made of 14-gauge steel and finished with a textured baked grey enamel. The backboxes are designed for semi-flush or surface mounting. Conduit and nail knockouts, keyhole style mounting holes, and wide wiring troughs facilitate quick installation.

Chassis assembly design facilitates separation of power-limited and nonpower-limited circuits inside the backbox by locating power-limited wiring towards the front of the cabinet and nonpower-limited wiring towards the rear.

SPECIFICATIONS

3-CAB7B Dimensions (H x W x D)

Rough-In (See note 1)	23.2 in x 24.0 in x 3.86 in (58.98 cm x 60.9 cm x 9.8 cm)
Finished	
Surface Mounted	25.5 in x 27.34 in x 5.5 in (64.77 cm x 69.4 cm x 14.0 cm)
Semi-Flush Mounted	25.5 in x 27.34 in x1.65 in (64.77 cm x 69.4 cm x 4.19 cm)

3-CAB14B Dimensions (H x W x D)

Rough-In (See note 1)	35.5 in x 24.0 in x 3.86 in (90.17 cm x 60.9 cm x 9.8 cm)
Finished	
Surface Mounted	37.75 in x 27.34 in x 5.5 in (95.89 cm x 69.4 cm x 14.0 cm)
Semi-Flush Mounted	37.75 in x 27.34 in x 1.65 in (95.89 cm x 69.4 cm x 4.19 cm)

3-CAB21B Dimensions (H x W x D)

Rough-In (See note 1)	47.75 in x 24.0 in x 3.86 in (121.29 cm x 60.9 cm x 9.80 cm)
Finished	
Surface Mounted	50.0 in x 27.34 in x 5.5 in (127.0 cm x 69.4 cm x 14.0 cm)
Semi-Flush Mounted	50.0 in x 27.34 in x 1.65 in (127.0 cm x 69.4 cm x 4.19 cm)

Note:

1) Add 1/4" to height and width to allow for knockouts when framing in backbox for semi-flush mounting.

Equipment Capacity

3-CAB7B

Chassis	1 chassis assembly
Batteries	
Model 6V8A	4 max.
Model 12V10A	2 max.
Model 12V17A	2 max.

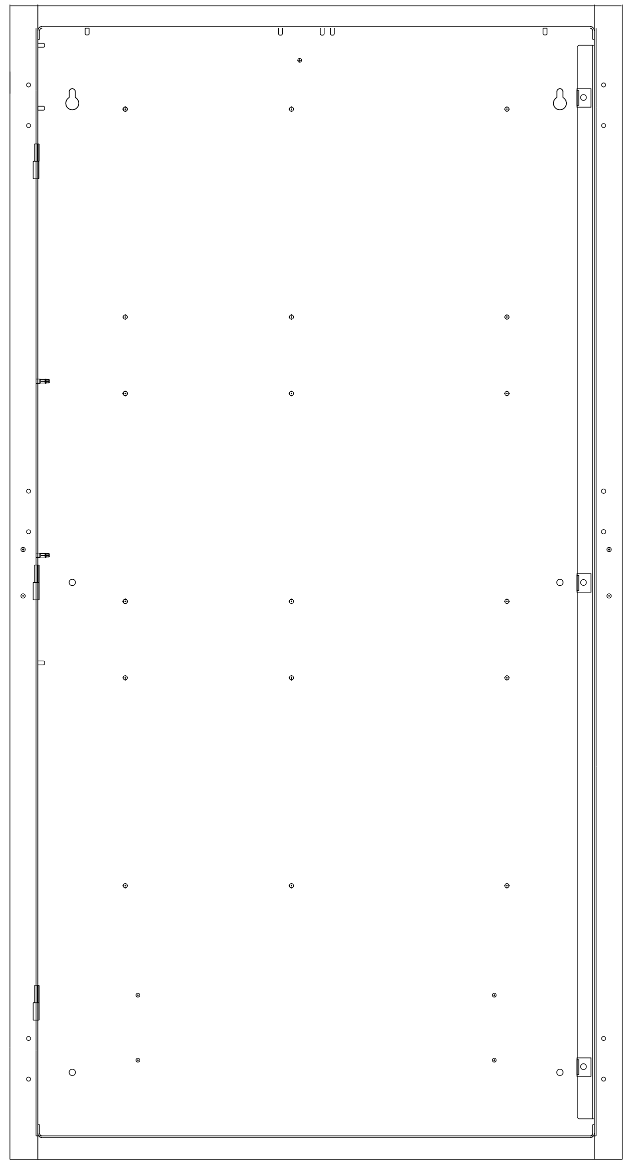
3-CAB14B

Chassis	2 chassis assemblies
Batteries	
Model 6V8A	4 max.
Model 12V10A	2 max.
Model 12V17A	2 max.

3-CAB21B

Chassis	3 chassis assemblies
Batteries	
Model 6V8A	4 max.
Model 12V10A	2 max.
Model 12V17A	2 max.

PRODUCT DIAGRAM



3-CAB21B shown

INSTALLATION SHEET:

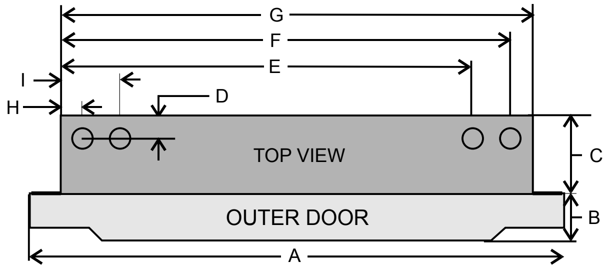
3-CAB Series Equipment Enclosure Backboxes

INSTALLATION SHEET P/N: 387557 FILE NAME: 387557.CDR

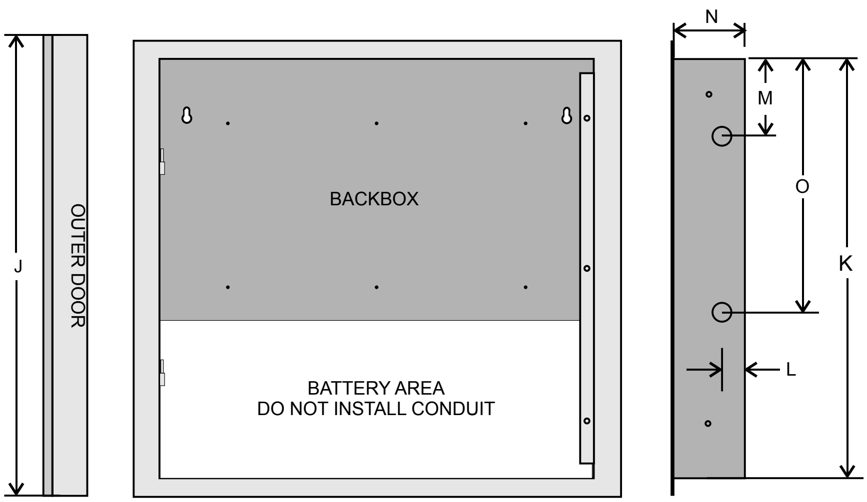
REVISION LEVEL: 2.0

DATE: 15AUG06

CABINET INSTALLATION DIMENSIONS



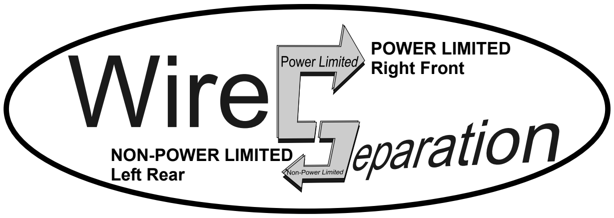
ALL KNOCKOUTS
FOR 3/4-INCH CONDUIT
(1.9 cm)

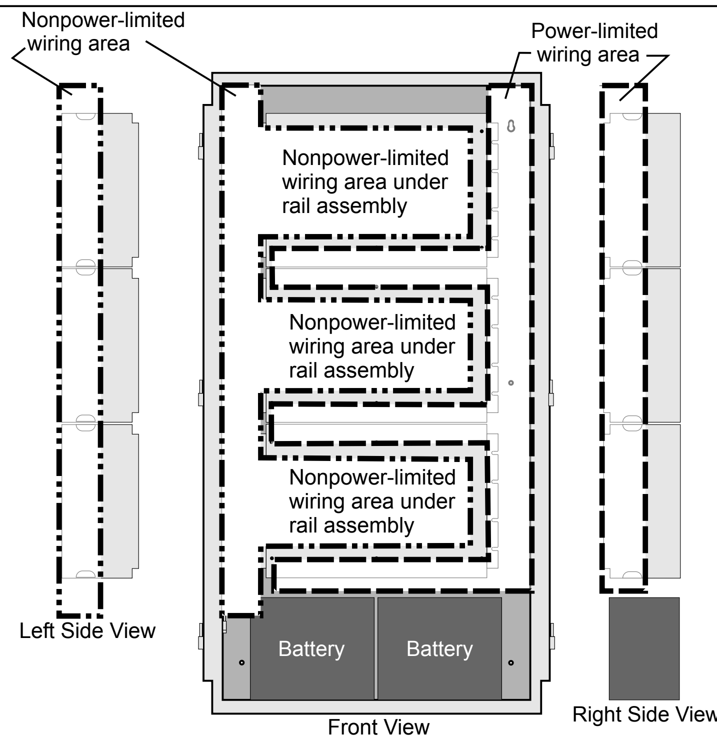


	3-CAB7B	3-CAB14B	3-CAB21B
A	27.34 in (69.40 cm)	27.34 in (69.40 cm)	27.34 in (69.40 cm)
B	1.65 in (4.19 cm)	1.65 in (4.19 cm)	1.65 in (4.19 cm)
C	3.86 in (9.80 cm)	3.86 in (9.80 cm)	3.86 in (9.80 cm)
D	1.25 in (3.18 cm)	1.25 in (3.18 cm)	1.25 in (3.18 cm)
E	21.0 in (53.34 cm)	21.0 in (53.34 cm)	21.0 in (53.34 cm)
F	22.75 in (57.8 cm)	22.75 in (57.8 cm)	22.75 in (57.8 cm)
G	24.0 in (60.9 cm)	24.0 in (60.9 cm)	24.0 in (60.9 cm)
H	1.25 in (3.18 cm)	1.25 in (3.18 cm)	1.25 in (3.18 cm)
I	3.0 in (7.7 cm)	3.0 in (7.7 cm)	3.0 in (7.7 cm)
J	25.5 in (64.77 cm)	37.75 in (95.89 cm)	50.0 in (127.0 cm)
K	23.2 in (58.98 cm)	35.5 in (90.17 cm)	47.75 in (121.3 cm)
L	1.25 in (3.16 cm)	1.25 in (3.16 cm)	1.25 in (3.16 cm)
M	4.37 in (11.1 cm)	4.37 in (11.1 cm)	4.37 in (11.1 cm)
N	3.86 in (9.80 cm)	3.86 in (9.80 cm)	3.86 in (9.80 cm)
O	14.1 in (35.8 cm)	14.1 in (35.8 cm)	14.1 in (35.8 cm)

POWER-LIMITED AND NONPOWER-LIMITED WIRING REQUIREMENTS

Fire Alarm System wiring is classified as either power-limited or nonpower-limited per NEC Article 760. All power-limited wiring must be separated from all nonpower-limited wiring by a minimum distance of 1/4 in (6 mm). The system enclosures and chassis assemblies are designed such that nonpower-limited wiring is at the left rear of the cabinet and the power-limited wiring is at the front of the cabinet. When installing nonpower-limited wiring, use the feed through notches at the left rear of the chassis. When installing power-limited wiring, use the feed through notches at the right front of the chassis.





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INSTALLATION INSTRUCTIONS

These instructions are for right-hand swing open operation of the outer door. For left-hand swing open operation, attach the enclosure hardware to the opposite side.

STEP1: Installing the enclosure hardware

1. With the back box securely mounted, attach the outer door hinge pins to the mounting studs on the back box left flange.
2. Attach the door stops to the top and bottom mounting studs on the back box right flange.
3. Attach the lock striker plate to the middle mounting studs on the back box right flange.

STEP 2: Assembling the outer door

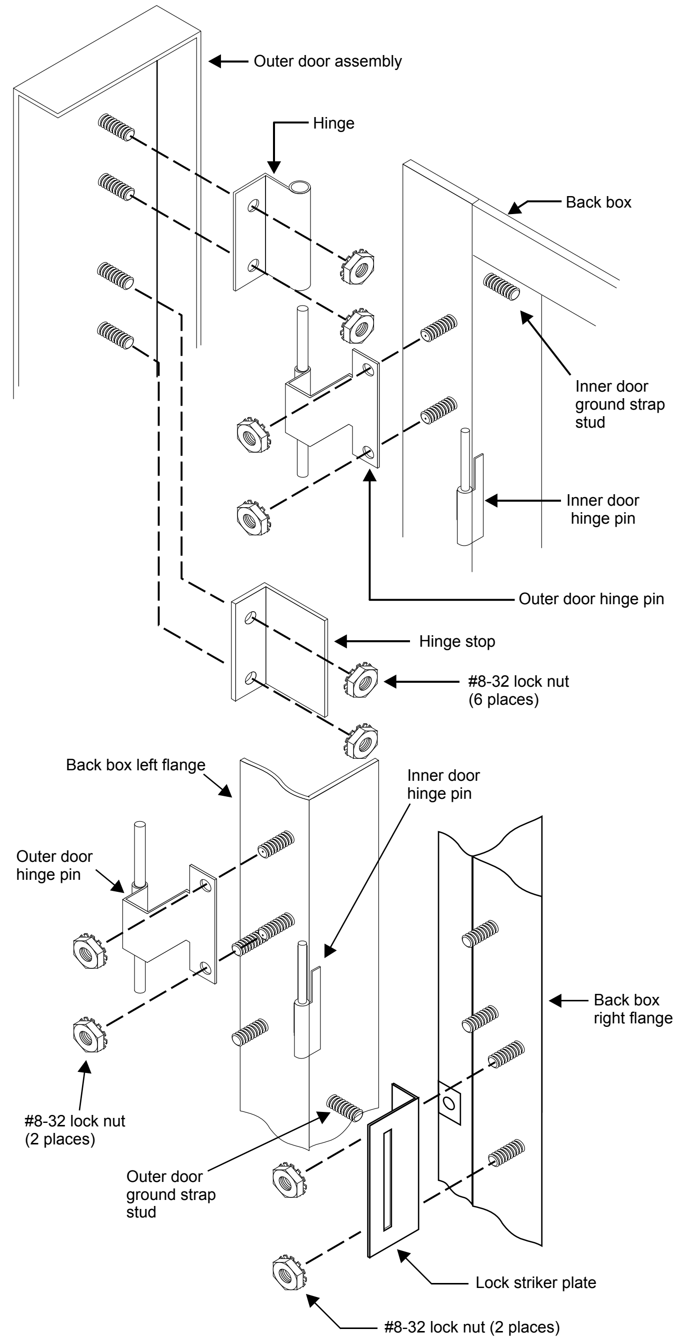
1. Place the outer door on a flat surface with the inside facing up.
2. Attach hinges to right mounting studs.
3. Insert the door lock through the opening opposite the hinges and with the latch pointing towards top of the door. See figure on other side.
4. Secure lock with the retaining clip.
5. Insert the plastic hole plug in the door opening closest to the hinges.

STEP 3: Mounting the outer door assembly

1. Set the outer door assembly onto the outer door hinge pins.
2. Attach the hinge stop to the outer door assembly.
3. Attach a grounding strap from the outer door ground strap stud on the back box to the outer door.

STEP 4: Mounting the inner door

1. Set the inner door onto the inner door hinge pins.
2. Attach a grounding strap from the inner door ground strap stud on the back box to the inner door.



PRODUCT DESCRIPTION

The 3-CAB series of equipment enclosure doors consists of an inner and outer door. The outer door may be mounted to either side of the back box for left-open or right-open operation, has a viewing window, and is secured with a key lock. A hinged interior door panel isolates the operator from the panel electronics and wiring, yet easily opens for maintenance.

The 3-CAB series of equipment enclosure doors include:

3-CAB7D	Grey door w/window for CAB7B back boxes
3-CAB7DR	Red door w/window for CAB7B back boxes
3-CAB14D	Grey door w/window for CAB14B back boxes
3-CAB14DR	Red door w/window for CAB14B back boxes
3-CAB14D	Grey door w/window for CAB21B back boxes
3-CAB14DR	Red door w/window for CAB21B back boxes

INSTALLATION SHEET:

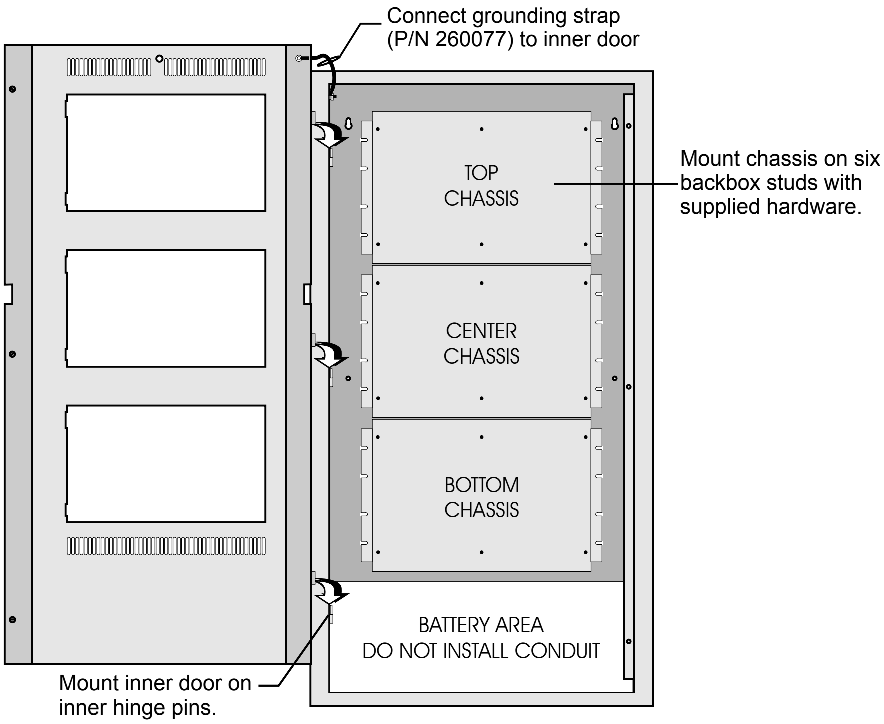
3-CAB Series Equipment Enclosure Doors

INSTALLATION SHEET P/N: 270488 FILE NAME: 270488.CDR

REVISION LEVEL: 3.0

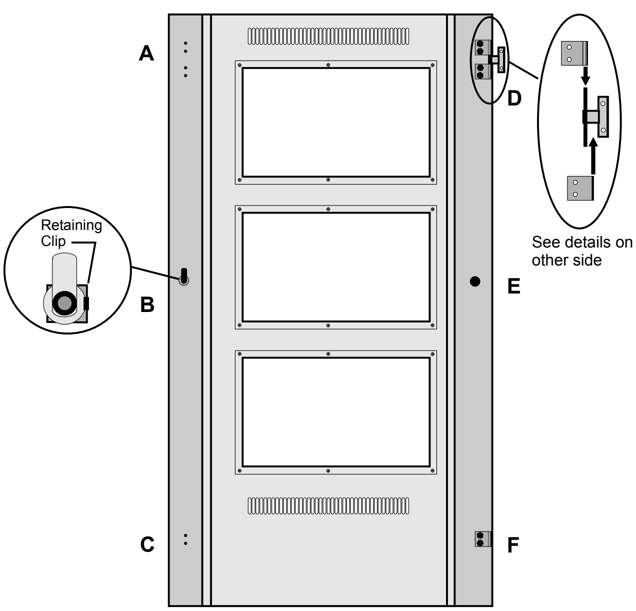
DATE: 15AUG06

Inner Door Assembly

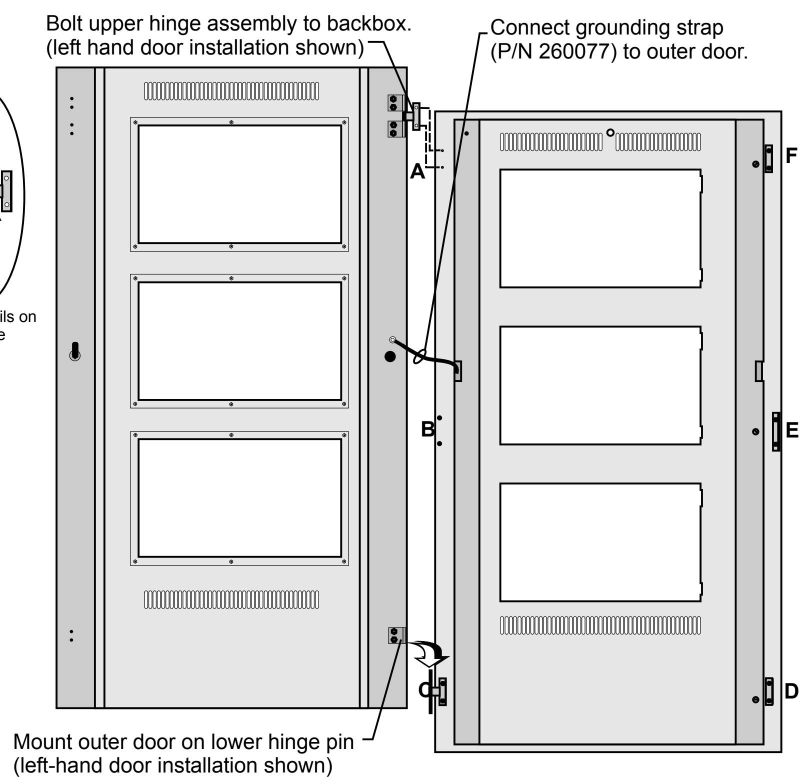


Outer Door Installation

Outer Door Assembly



OUTER DOOR - INSIDE VIEW
(Left-hand mounting shown)



	Female Hinges	Double Male Hinge	Lock	Plug
Left-hand Mounting	D & F	D	B Latch Up	E
Right-hand Mounting	A & C	A	E Latch Down	B

	Bumpers Plates	Lock Strike	Double Male Hinge Pin
Left-hand Mounting	D & F	E	C
Right-hand Mounting	A & C	B	F

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PRODUCT INFORMATION

The 3-CAB5(R) cabinet provides 5 local rail module (LRM) spaces and up to 10 amp-hour standby batteries. The 3-CAB5(R) cabinet is made of 14 gauge steel and finished with a textured baked enamel. The enclosure is suitable for semi-flush or surface mounting. Conduit and nail knockout keyhole style mounting holes and wide wiring troughs facilitate quick installation. Cabinet design facilitates separation of power limited and non-power limited circuits by locating power limited circuitry toward the front of the cabinet and non-power limited wiring at the rear of the cabinet. The removable exterior door mounts on the left side of the cabinet, has a Lexan™ viewing window, and is secured with a key lock. A hinged interior door panel isolates the operator from the internal electronics and wiring, yet easily opens to reveal the system components for maintenance.

SPECIFICATIONS

Dimensions (HWD)

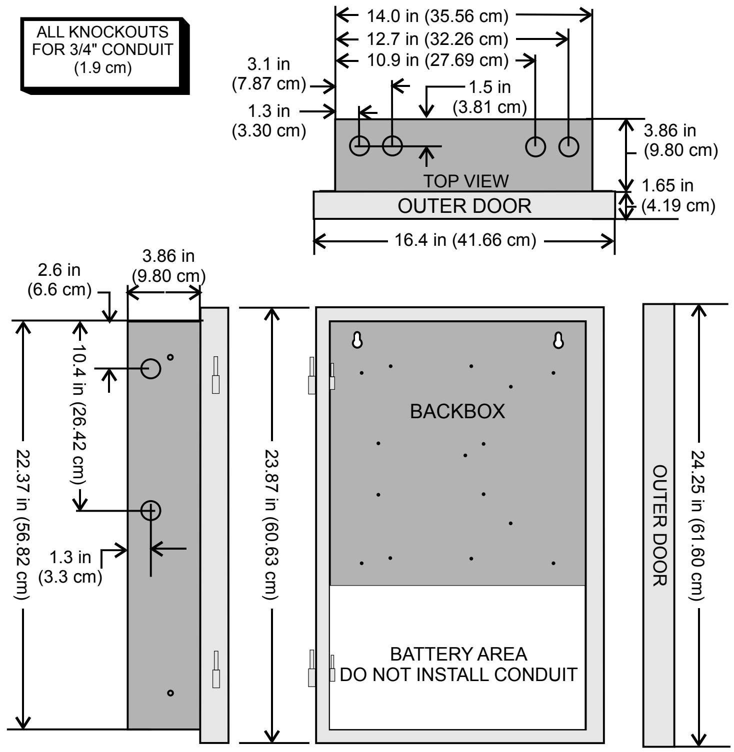
3-CAB5B Back Box

Rough-In	22.37 in x 14.0 in x 3.86 in (56.82 cm x 35.56 cm x 9.80 cm) NOTE: Add 1/4" to height and width to allow for knockouts when framing in backbox for semi-flush mounting.
Finished	
Surface Mounted	24.25 in x 16.4 in x 5.5 in (61.60 cm x 16.4 cm x 14.0 cm)
Semi-Flush Mounted	24.25 in x 16.4 in x 1.65 in (61.60 cm x 16.4 cm x 4.19 cm)
Capacity	
Modules	Five module spaces
Battery	Two 10 AH @ 12 VDC
Finish	
3-CAB5	Gray textured enamel
3-CAB5R	Red textured enamel

CABINET INSTALLATION

1. Mount the backbox at the required location. A dedicated 120 VAC (for systems using model 3-PPS/M power supplies), or 230 VAC (for systems using model 3-PPS/M-230 power supplies) 50/60 Hz circuit is required for each cabinet. Install all conduit and pull all wiring into the backbox before proceeding to the next step.
2. Install the outer door at this time.
3. Install the 3-TAMP5 Tamper Switch, if used.
4. Install the equipment chassis. After all chassis assemblies have been installed, mount the inner door on the inside hinge pins.
5. Connect the ground strap between the stud on the inner door and the backbox, using the hardware provided.
6. Install the ground strap between the stud on the exterior door and the stud on the backbox.

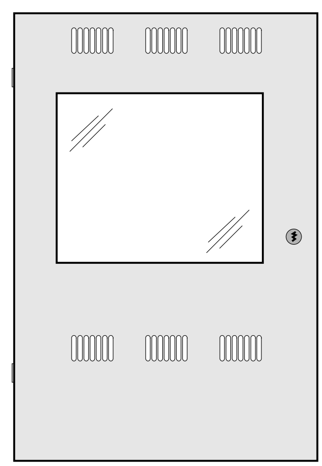
CABINET INSTALLATION DIMENSIONS



MODEL DEFINITIONS

3-CAB5	Cabinet with Door, Gray
3-CAB5R	Cabinet with Door, Red

3-CAB5 / 3-CAB5-R



INSTALLATION SHEET: 3-CAB5 3-CAB5R	
INSTALLATION SHEET P/N: 270487	FILE NAME: 270487.CDR
REVISION LEVEL: 3.0	
DATE: 15AUG06	

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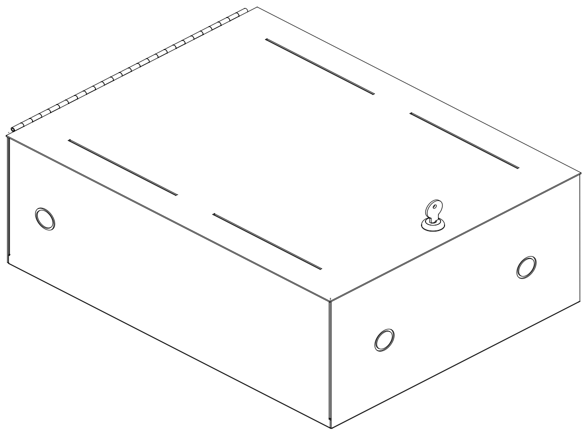
BC-1 and BC-1R Battery Cabinet Installation Sheet

EN ES FR PT



EN: Installation Sheet

Description

The BC-1(R) Battery Cabinet consists of a surface mount wallbox and a front door. The cabinet provides terminals for wiring the batteries to the charging circuits of a fire alarm control panel.

Use the battery cabinet when the system requires a battery rated above 17 Ah. The BC-1(R) provides room for two 24 Ah or two 40 Ah batteries.

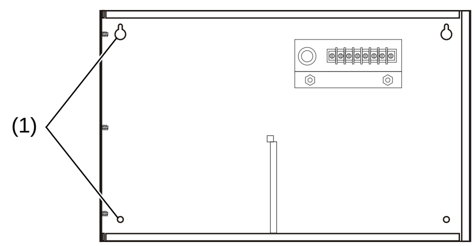
Installation

Note: Install the battery cabinet in accordance with CAN/ULC-S524 (*Installation of Fire Alarm Systems*).

To install the battery cabinet:

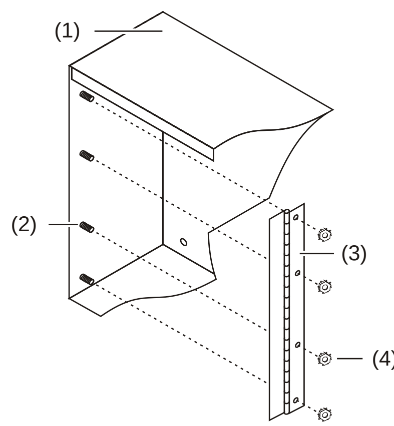
1. Install the BC-1(R) battery cabinet and the fire alarm control panel in the same room. We recommend the space between the cabinet and the panel be 3 in. (7.6 cm) minimum and 10 ft. (3.4 m) maximum. Install all wiring in conduit or equivalent protection against mechanical injury.
2. Use the mounting holes to secure the battery cabinet to the designated place on the wall. See Figures 1 and 4. Use fasteners that can support the full weight of the cabinet, including the batteries.
3. Align the holes in the door hinge to the cabinet PEM studs. See Figure 2.
4. Mount the door on the cabinet with the #6-32 locknuts provided.

Figure 1: Mounting the cabinet



(1) Mounting holes

Figure 2: Attaching the door



(1) Battery cabinet
(2) PEM stud
(3) Hinge
(4) #6-32 locknut

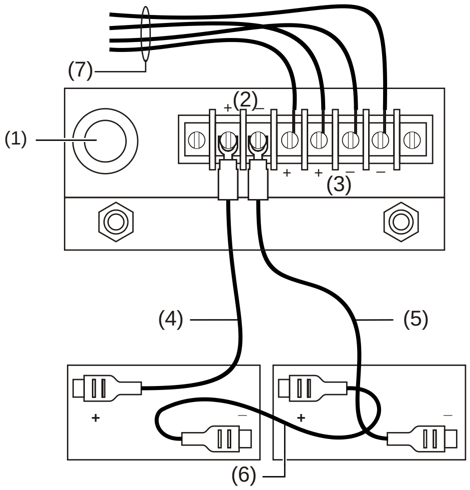
Wiring

WARNING: Electrocution hazard. To avoid personal injury or death from electrocution, remove all sources of power and allow stored energy to discharge before installing or removing components.

To connect the wiring:

1. Place the batteries inside the cabinet.
2. Wire the batteries as shown in Figure 3.

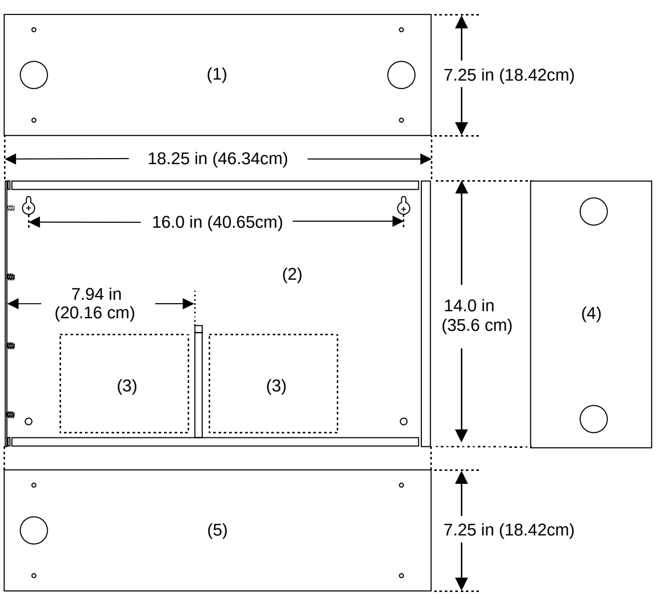
Figure 3: Internal wiring



(1) Fuse
(2) Battery IN terminals
(3) Battery OUT terminals (fused)
(4) Positive lead (red wire)
(5) Negative lead (black wire)
(6) Jumper (blue wire)
(7) To fire alarm control panel battery charging circuits

Note: Positive and negative lead arrangements vary between manufacturers.

Figure 4: Views and dimensions

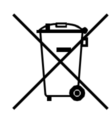


(1) Top view
(2) Front view
(3) Battery area
(4) Side view
(5) Bottom view

Specifications

Fuse rating	8 A, 32 V
Battery type	12 V, 24 to 40 Ah, lead acid
Wire size	16 to 12 AWG (1.5 to 4.0 mm²)
Dimensions (W × H × D)	18.25 × 14.0 × 7.25 in. (46.34 × 35.6 × 18.42 mm)
Operating environment Temperature Relative humidity	 32 to 120°F (0 to 49°C) 0 to 93% noncondensing

Regulatory information

Manufacturer	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
Year of manufacture	The first two digits of the product serial number (located on the product identification label) are the year of manufacture.
Environmental class	Indoor dry IEC: 3K5
North American Standards	UL 864, CAN/ULC-S527
Certification	CE
CPD certificates	262Z
EN 54	EN 54-2:1997 EN 54-4:1997
European Union directives	1999/5/EC (R&TTE directive): Hereby, UTC Fire & Security declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
	2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.
	2006/66/EC (battery directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: www.recyclethis.info.

Contact information

For contact information, see www.utcfireandsecurity.com.

ES: Hoja de instalación

Descripción

El gabinete de baterías BC-1(R) consta de una caja de montaje de montaje de pared y una puerta frontal. El gabinete proporciona terminales para el cableado de las baterías con los circuitos de carga de un panel de control de alarma.

Use el gabinete de baterías cuando el sistema requiera de una batería de alimentación con capacidad nominal superior a 17 Ah. La BC-1(R) ofrece espacio para dos baterías de 24 Ah o dos de 40 Ah.

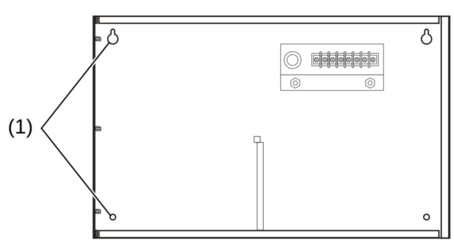
Instalación

Nota: Instale el gabinete de batería de acuerdo con CAN/ULC- S524 (*Instalación de Sistemas de Alarma de Incendio*).

Para instalar el gabinete de batería:

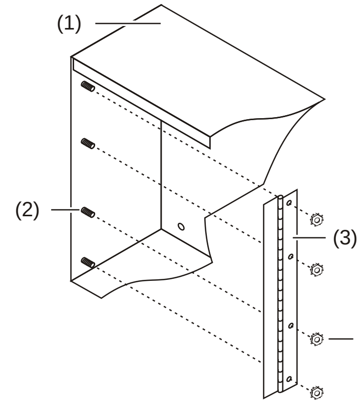
1. Instale el gabinete de batería y el panel de control de alarma de antiincendio en la misma sala. Recomendamos que el espacio entre el gabinete y el panel sea de 3 pulgadas (7,6 cm) como mínimo y de 10 pies (3,4 m) como máximo. Instale todo el cableado en conduit o una protección equivalente contra daños mecánicos.
2. Utilice los orificios de montaje para asegurar el gabinete de batería en el lugar designado en la pared. Vea las Figuras 1 y 4. Use soportes que pueden soportar el peso total del gabinete, incluyendo las baterías.
3. Alinee los orificios de la bisagra de la puerta con los pernos PEM del gabinete. Vea la Figura 2.
4. Monte la puerta en el gabinete con las contratuercas #6-32 proporcionadas.

Figura 1: Montaje del gabinete



(1) Orificios de montaje

Figura 2: Fijación de la puerta



(1) Gabinete de batería
(2) Perno PEM
(3) Bisagra
(4) Contratuerca #6-32

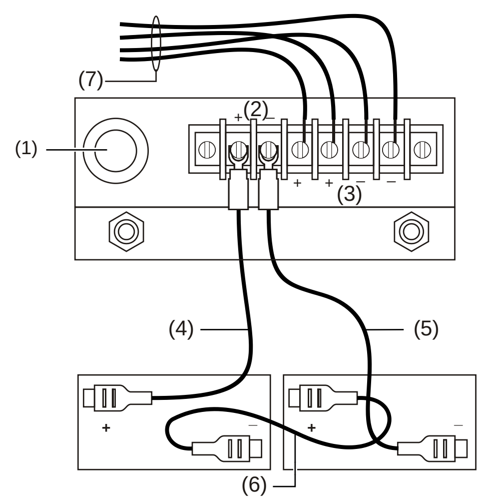
Cableado

ADVERTENCIA: Peligro de electrocución. Para evitar lesiones personales o la muerte por electrocución, retire todas las Fuentes de energía eléctrica y permita que la energía almacenada se descargue antes de instalar o retirar el equipo.

Para conectar el cableado:

1. Coloque las baterías en el interior del gabinete.
2. Realice el cableado de las baterías como se muestra en la Figura 3.

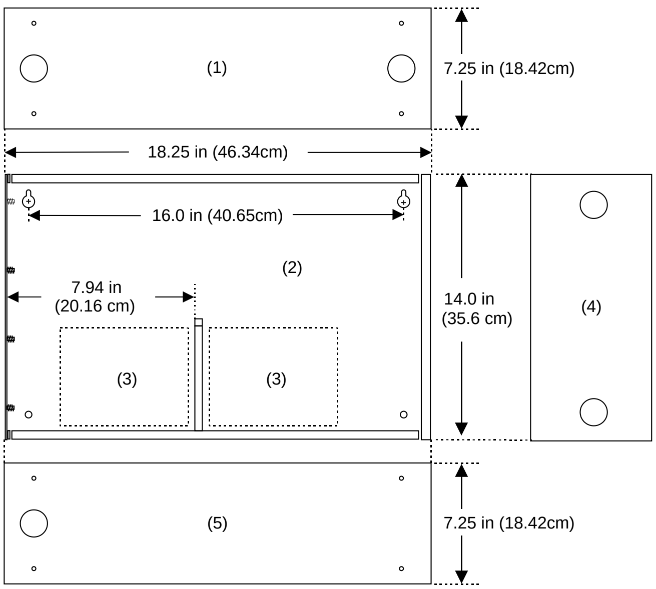
Figura 3: Cableado interno



(1) Fusible
(2) Terminales de entrada de las baterías
(3) Terminales de salida de las baterías (con fusible)
(4) Cable positivo (cable rojo)
(5) Cable negativo (cable negro)
(6) Puente (cable azul)
(7) Hacia los circuitos de carga de la batería del panel de control de alarma contra incendios

Nota: Los arreglos de los cables positivo y negativo varían entre los fabricantes.

Figura 4: Vistas y dimensiones

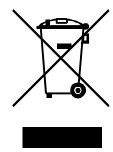
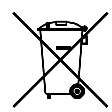


(1) Vista superior
(2) Vista frontal
(3) Área de baterías
(4) Vista lateral
(5) Vista inferior

Especificaciones

Valor nominal del fusible	8 A, 32 V
Tipo de batería	12 V, 24 to 40 Ah, ácido de plomo
Tamaño del cable	16 a 12 AWG (1,5 a 4,0 mm²)
Dimensiones (Ancho × Alto × Profundidad)	18.25 × 14.0 × 7.25 plg. (46.34 × 35.6 × 18.42 mm)
Ambiente de operación	
Temperatura	32 a 120°F (0 a 49°C)
Humedad relativa	0 a 93% sin condensación

Información regulatoria

Fabricante	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
Año de fabricación	Los primeros dos dígitos del número de serie del producto (ubicado en la etiqueta de identificación del producto) representan el año de fabricación.
Clase ambiental	Interior seco IEC: 3K5
Normas de Norte América	UL 864, CAN/ULC-S527
Certificación	CE
Certificados CPD	262Z
EN 54	EN 54-2:1997 EN 54-4:1997
Directrices de la Unión Europea	1999/5/EC (Directiva WEEE): Por medio del presente documento, UTC Fire & Security declara que este dispositivo cumple con los requisitos esenciales y otras disposiciones pertinentes de la Directriz 1999/5/CE.
	2002/96/EC (Directiva WEEE): Los productos con este símbolo no se pueden desechar como desperdicios urbanos no clasificados en la Unión Europea. A fin de que se realice un reciclado apropiado, devuelva este producto a su proveedor local al momento de adquirir equipos nuevos equivalentes, o deséchelo en los puntos de recolección designados. Para obtener más información, consulte: www.recyclethis.info.
	2006/66/EC (Directiva WEEE): Los productos con este símbolo no se pueden desechar como desperdicios urbanos no clasificados en la Unión Europea. Consulte la documentación del producto para obtener información específica sobre la batería. La batería está marcada con este símbolo, lo que puede incluir letras para indicar cadmio (Cd), plomo (Pb), o el mercurio (Hg). Para su correcto reciclaje, devuelva la batería a su proveedor o a un punto de recolección estipulado int. Para obtener más información, consulte: www.recyclethis.info.

Información de contacto

Para información de contacto, véase www.utcfireandsecurity.com.

FR : Fiche d’installation

Description

L’armoire de batterie BC-1(R) est composée d’un boîtier mural, monté en surface, et d’une porte avant. L’armoire est dotée de bornes permettant de brancher les batteries aux circuits de charge d’un panneau de commande de l’alarme-incendie.

Utilisez une armoire de batterie lorsque le système a besoin d’une batterie de plus de 17 Ah. Le BC-1(R) peut accueillir deux batteries de 24 Ah ou deux de 40 Ah.

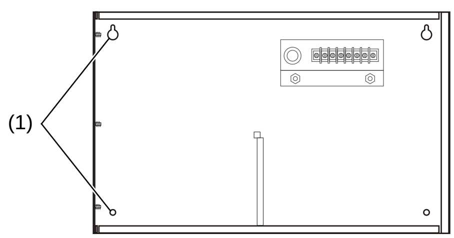
Installation

Note : Installez l'armoire de batterie en conformité avec la norme CAN/ULC-S524 (*Installation de systèmes d'alarme incendie*).

Pour installer l’armoire de batterie :

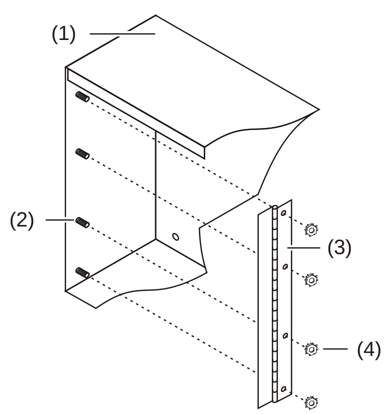
1. Installez l’armoire de batterie et le panneau de commande de l’alarme-incendie dans la même pièce. Nous vous recommandons de laisser un espace minimum de 7,6 cm (3 po) et maximum de 3,4 m (10 pieds) entre l’armoire et le panneau. Installez tous les câblages dans le conduit ou dans un dispositif de protection équivalent contre les dommages mécaniques.
2. Utilisez les trous de montage pour fixer l’armoire à batterie à l’endroit prévu sur le mur. Voir les figures 1 et 4. Utilisez des pièces de fixation qui peuvent supporter le poids total de l’armoire, batteries incluses.
3. Alignez les trous de l’articulation de la porte aux goujons PEM de l’armoire. Voir la figure 2.
4. Montez la porte sur l’armoire avec les contre-écrous n° 6-32 fournis.

Figure 1 : Montage de l’armoire



(1) Trous de montage

Figure 2 : Fixation de la porte



(1) Armoire de batterie
(2) Goujon PEM
(3) Articulation
(4) Contre-écrou n° 6-32

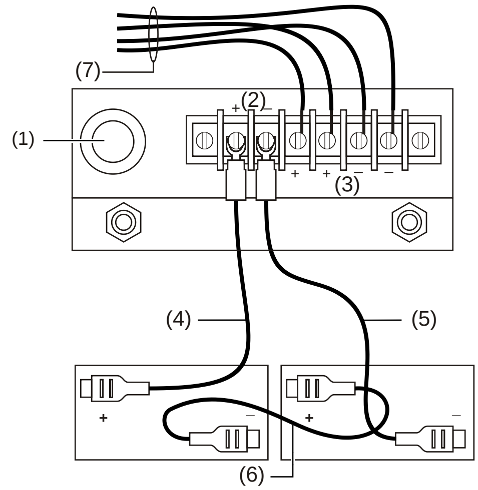
Câblage

AVERTISSEMENT : Risque d’électrocution. Pour éviter tout dommage corporel ou danger de mort par électrocution, retirez toutes les sources d’alimentation et laissez l’énergie emmagasinée se décharger avant d’installer ou de retirer l’équipement.

Pour brancher le câblage :

1. Placez les batteries à l’intérieur de l’armoire.
2. Branchez les batteries comme indiqué sur la figure 3.

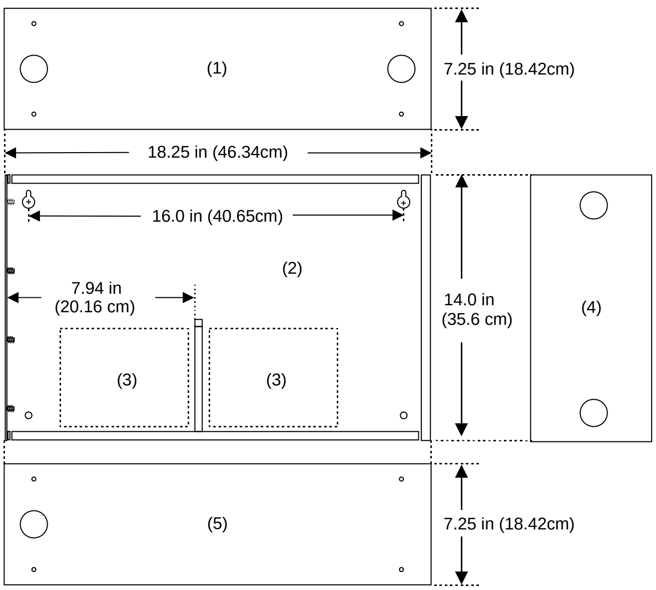
Figure 3 : Câblage interne



(1) Fusible
(2) Bornes d’entrée de la batterie
(3) Bornes de sortie de la batterie (fusible)
(4) Fil positif (câble rouge)
(5) Fil négatif (câble noir)
(6) Cavalier (câble bleu)
(7) Vers les circuits de charge de la batterie du panneau de commande de l’alarme-incendie

Remarque : Le positionnement des fils négatifs et positifs varie selon les fabricants.

Figure 4 : Vues et dimensions

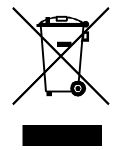
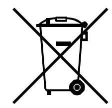


(1) Vue de dessus
(2) Vue de devant
(3) Zone pour la batterie
(4) Vue de côté
(5) Vue de dessous

Caractéristiques techniques

Capacité du fusible	8 A, 32 V
Type de batterie	12 V, 24 à 40 Ah, plomb-acide
Taille de câble	16 à 12 AWG (1,5 à 4 mm²)
Dimensions (l × H × P)	46,34 × 35,6 × 18,42 mm (18,25 × 14 × 7,25 po)
Environnement de fonctionnement	
Température	0 à 49 °C (32 à 120 °F)
Humidité relative	0 à 93 % sans condensation

Renseignements sur la réglementation

Fabricant	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
Année de fabrication	Les deux premiers chiffres du numéro de série du produit (sur l'étiquette d'identification du produit) correspondent à l'année de fabrication.
Classe de service	Intérieur sec CEI : 3K5
Normes nord-américaines	UL 864, CAN/ULC-S527
Certification	CE
Certicats CPD	262Z
EN 54	EN 54-2 : 1997 EN 54-4 : 1997
Directives de l'Union européenne	1999/5/EC (directive R&TTE) : Par la présente, UTC Fire & Security déclare que cet appareil est conforme aux exigences essentielles et aux autres dispositions de la directive 1999/5/EC.
	2002/96/EC (directive WEEE) : Les produits marqués par ce symbole ne peuvent pas être jetés comme des déchets municipaux non triés dans l'Union européenne. Pour un recyclage approprié, renvoyez ce produit à votre fournisseur local en échange de l'achat d'un nouvel équipement similaire ou jetez-le dans les points de collecte prévus à cet effet. Pour plus de renseignements, consultez le site Web : www.recyclethis.info.
	2006/66/EC (directive sur les batteries) : Ce produit contient une batterie qui ne peut pas être jetée comme les déchets municipaux non triés dans l'Union européenne. Consultez la documentation du produit pour obtenir des renseignements spécifiques sur la batterie. La batterie est marquée par ce symbole, qui peut inclure un sigle pour indiquer le cadmium (Cd), le plomb (Pb) ou le mercure (Hg). Pour un recyclage approprié, renvoyez cette batterie à votre fournisseur ou à un point de collecte prévu à cet effet. Pour plus de renseignements, consultez le site Web : www.recyclethis.info.

Coordonnées

Pour obtenir nos coordonnées, consultez le site Web www.utcfireandsecurity.com.

PT: Manual de instalação

Descrição

O gabinete de bateria é composto por uma caixa de parede para montagem de superfície e uma porta frontal. O gabinete fornece terminais para ligar as baterias aos circuitos de carregamento de um painel de controle de alarme de incêndio.

Use o gabinete de bateria quando o sistema exigir uma bateria acima de 17Ah. O BC-1(R) fornece lugar para duas baterias 24Ah ou duas 40Ah.

Instalação

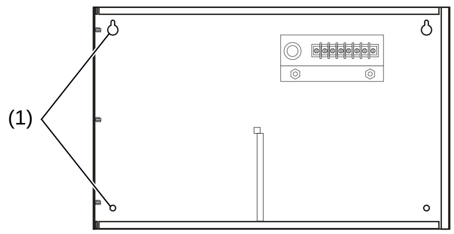
Nota: Instalar o gabinete de bateria de acordo com CAN/ULC-S524 (*Instalação de Sistemas de Alarme de Incêndio*).

Para instalar o gabinete da bateria:

1. Instale o gabinete de bateria e painel de controle de alarme de incêndio na mesma sala. Recomendamos que o espaço entre o gabinete e o painel seja de, no mínimo, 7,6 com (3 pol.) e de, no máximo, 3,4m (10 pés). Instale todos os circuitos em conduítes ou proteção equivalente contra dados mecânicos.

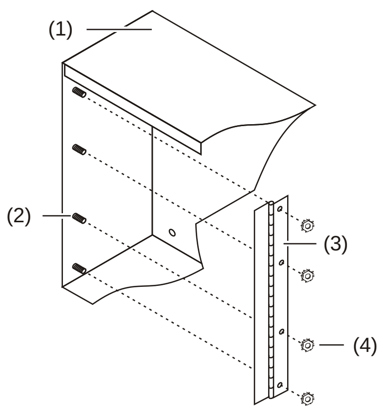
2. Use os orifícios de montagem para prender o gabinete de bateria no local designado da parede. Veja Figuras 1 e 4. Use fixadores que possam suportar o peso total do gabinete, incluindo as baterias.
3. Alinhe os orifícios na dobradiça da porta aos rebites PEM do gabinete. Ver Figura 2.
4. Monte a porta no gabinete com as contraporcas nº6-32.

Figura 1: Como montar o gabinete



(1) Orifícios de montagem

Figura 2: Como fixar a porta



(1) Gabinete de bateria
(2) Rebite PEM
(3) Dobradiça
(4) Contraporcas nº6-32

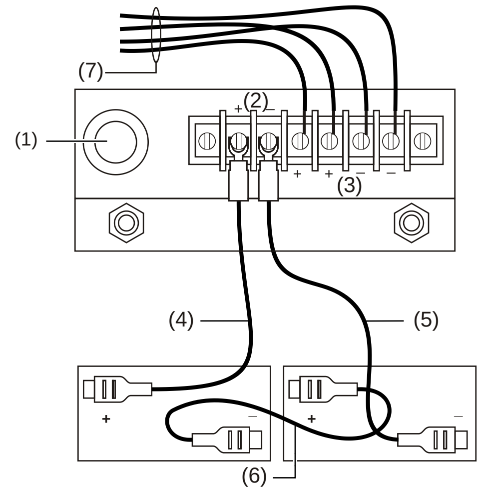
Fiação

AVISO: Perigo de eletrocussão. Para evitar ferimentos ou morte por eletrocussão, remova todas fontes de energia e deixe a energia armazenada descarregar antes de instalar ou remover os componentes.

Para conectar a fiação:

1. Coloque as baterias dentro do gabinete.
2. Faça a ligação das baterias como mostrado na Figura 3.

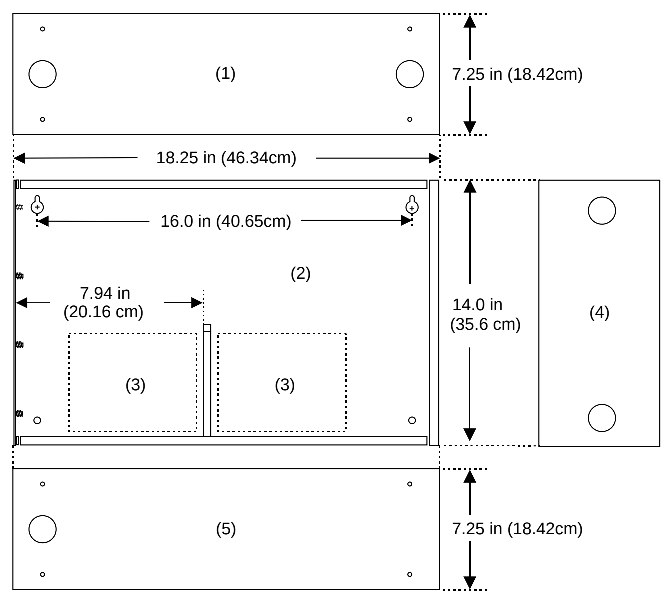
Figura 3: Fiação interna



(1) Fusível
(2) Terminais de entrada da bateria
(3) Terminais de saída da bateria (com fusível)
(4) Pólo positivo (fio vermelho)
(5) Pólo negativo (fio preto)
(6) Jumper (fio azul)
(7) Para circuitos de carregamento de bateria do painel de controle do alarme de incêndio

Observação: Os arranjos de pólos positivo e negativo pode diferir entre fabricantes.

Figura 4: Vistas e dimensões



(1) Vista superior
(2) Vista frontal
(3) Área da bateria
(4) Área lateral
(5) Vista inferior

Especificações

Classificação do fusível	8 A, 32 V
Tipo de bateria	12 V, 24 a 40 Ah, chumbo ácido
Tamanho da fiação	16 a 12 AWG (1,5 a 4,0 mm²)
Dimensões (L × A × P)	46,34 × 35,6 × 18,42 mm (18,25 × 14,0 x 7,25 pol)
Ambiente de operação	
Temperatura	0 a 49°C (32 a 120°F)
Umidade relativa	0 a 93% não condensado

Informações de regulamentação

Fabricante	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
Ano de fabricação	Os dois primeiros dígitos do número de série do produto (localizado na etiqueta de identificação do produto) são o ano de fabricação.
Classe ambiental	Interior seco IEC: 3K5
Padrões norte-americanos	UL 864, CAN/ULC-S527
Certificação	CE
Certificados CPD	262Z
EN 54	EN 54-2:1997 EN 54-4:1997
Diretrizes da União Europeia	1999/5/EC (diretiva R&TTE): Pela presente, a UTC Fire & Security declara que esse dispositivo está em conformidade com as exigências essenciais e outras disposições relevantes da Diretiva 1999/5/EC.
	2002/96/EC (diretiva WEEE): Os produtos marcados com esse símbolo não podem ser descartados como resíduo municipal não triado na União Europeia. Para reciclagem correta, devolva esse produto a seu fornecedor local na compra de um equipamento novo equivalente ou descarte-o em pontos de coleta designados. Para obter informações, consulte: www.recyclethis.info.
	2006/66/EC (diretiva de bateria): Esse produto contém uma bateria que não pode ser descartada como resíduo municipal não triado na União Europeia. Consulte a documentação do produto para obter informações específicas sobre a bateria. A bateria é marcada com esse símbolo, que pode incluir letras para indicar cádmio (Cd), chumbo (Pb) ou mercúrio (Hg). Para reciclagem correta, devolva a bateria ao seu fornecedor ou em um ponto de coleta designado. Para obter informações, consulte: www.recyclethis.info.

Informações de contato

Para obter informações, consulte www.utcfireandsecurity.com.

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PRODUCT INFORMATION

The 3-CHAS7 chassis provides the mounting, internal power, and data distribution for up to seven plug-in local rail modules. Mounting studs for two power supplies and one interface module are provided on each chassis. Chassis design facilitates separation of power limited and non-power limited circuits by locating power limited circuitry toward the front of the chassis and non-power limited wiring at the rear of the chassis.

The 3-CHAS7 chassis mounts to the back wall of 3-CAB7, 3-CAB14, 3-CAB21, RCC-7, RCC-14, and RCC-21 cabinets. Multiple 3-CHAS7 chassis are interconnected within a cabinet using the supplied cables. The chassis are suitable for direct mounting in a standard EIA 19" rack.

SPECIFICATIONS

19" Rack Installation Dimensions (HWD)	12.0" x 19.0" x 5.25" (30.48 cm x 48.26 cm x 13.34 cm)
Capacity	7 Local Rail Modules Spaces 2 Power Supplies 1 Interface Module

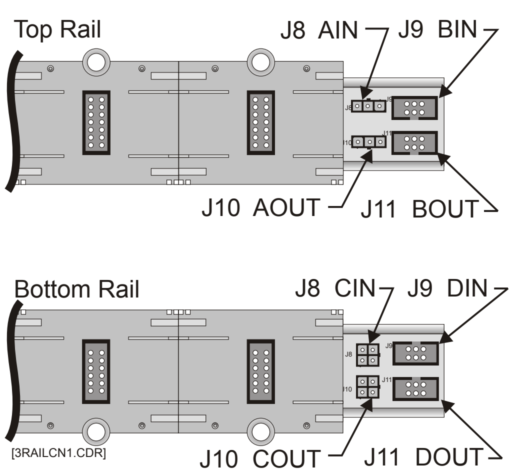
INSTALLATION

Mount the chassis assembly on the six #6-32 studs at the rear of the cabinet. Secure the chassis to the cabinet with the washers and nuts provided. An 11/32" nut driver simplifies chassis installation.

If a primary or booster power supply is used with this chassis, mount the heat sink on the four threaded stand-offs under the rails, then secure the PC board to the four threaded stand-offs.

Connect the DC power cable (P/N 250187) to connector J2 on the power supply. For the 3-PPS, connect the 16 pin data ribbon cable (P/N 250188) to connector P3 on the power supply. For the 3-BPS, connect a 14 pin data ribbon cable (P/N 250189) to connector P3 on the power supply. Route both cables up through the rails for later connection to the power supply/booster monitor module.

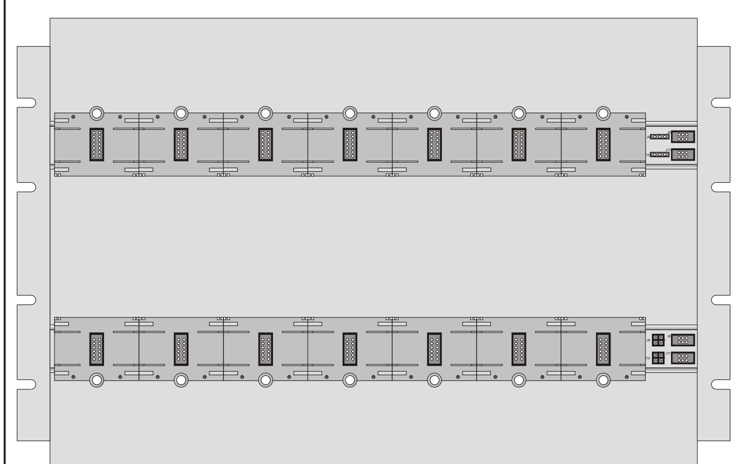
Chassis Power and Data Cables
When more than one chassis is installed within a single cabinet, the chassis power and data circuits must be interconnected. The chassis has four data connectors and four power connectors. The 3-CHAS7 has two power (J8 AIN and J11 AOUT) and two data (J9 BIN and J11 BOUT) connectors on the top rail. Two power (J8 CIN and J10 COUT) and two data (J9 DIN and J11 DOUT) connectors are on the bottom rail, as shown below.



[3RAILCN1.CDR]

Installation instructions are continued on following two pages.

3-CHAS7



[3CHAS7.CDR]

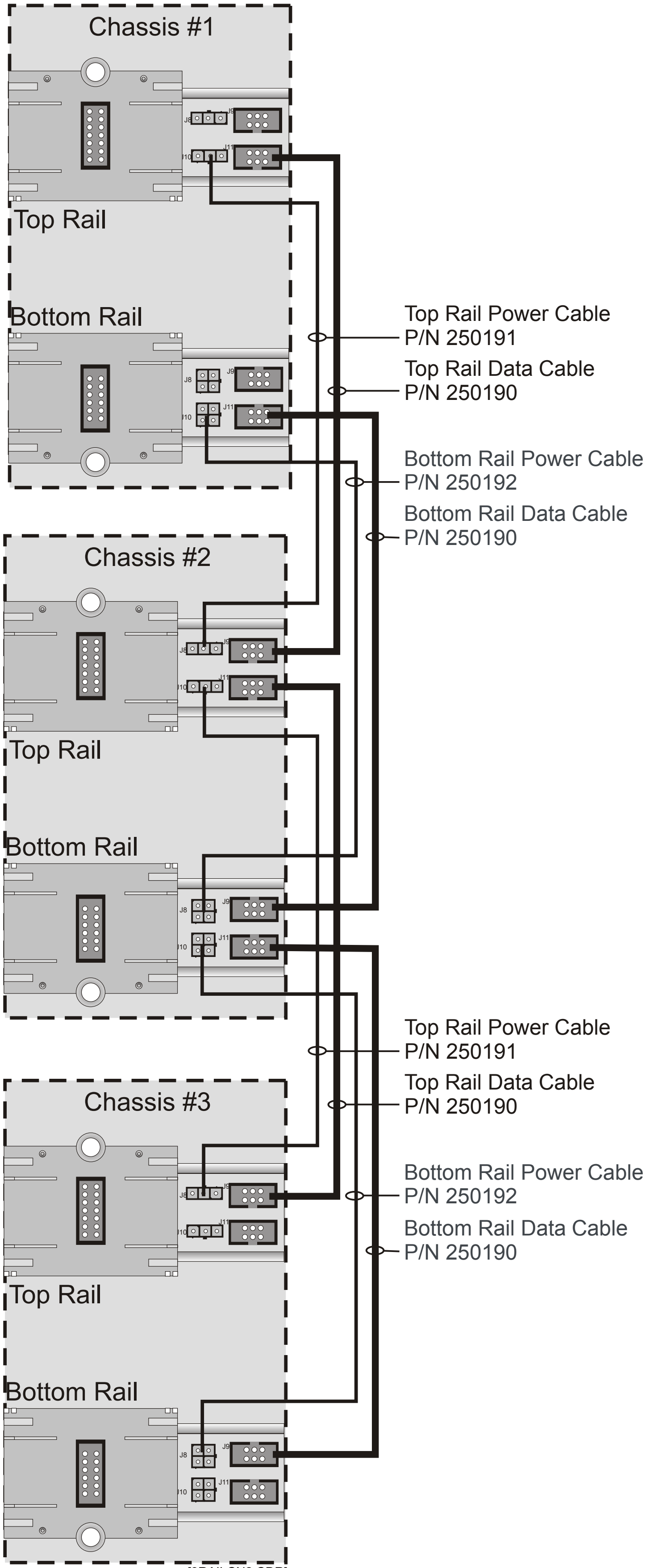
INSTALLATION SHEET:

3-CHAS7
Seven Local Rail Module Chassis

INSTALLATION SHEET P/N: 270484	FILE NAME: 270484.CDR
REVISION LEVEL: 2.0	APPROVED BY: K. Patterson
DATE: 06/14/99	REVISED BY: D. Miner

EDWARDS SYSTEMS TECHNOLOGY, INC.
SARASOTA, FL: 941-739-4300 FAX 941-753-1806
CHESHIRE, CT: 203-699-3000 FAX 203-699-3075
OWEN SOUND, CANADA: 519-376-2430 FAX 519-376-7258
INTERNATIONAL, CANADA: 905-270-1711 FAX 905-270-9553

INSTALLATION (continued)



The figure on the left shows three 3-CHAS7 chassises in a common cabinet. Connect the power and data cables as follows:

1. Connect a top rail power cable (3 pin connector) to connector J10 AOUT on the top rail of chassis #1. Route the cable down to chassis #2, and connect to J8 AIN on the chassis #2 top rail.

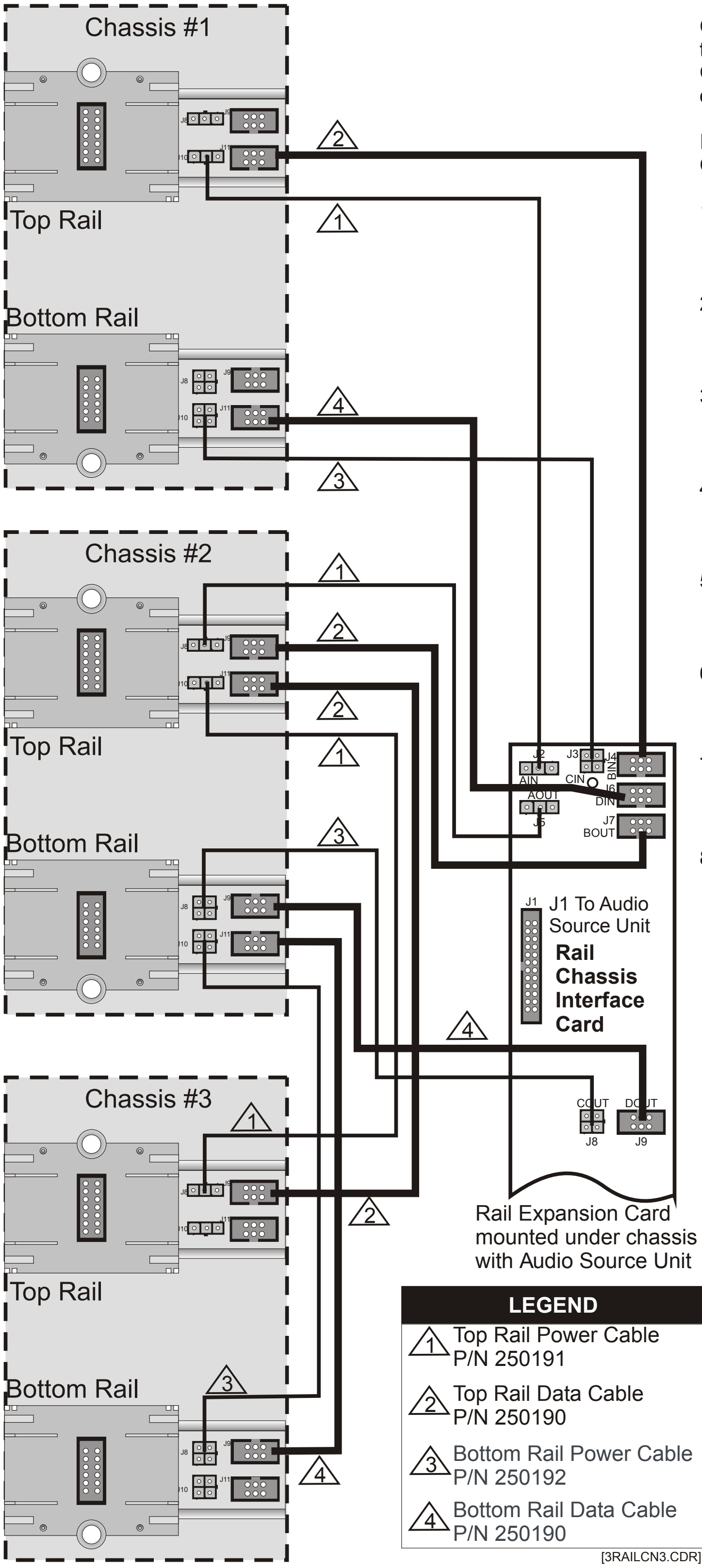
2. Connect a top rail data cable (6 pin ribbon cable connector) to connector J11 BOUT on the top rail of chassis #1. Route the cable down to chassis #2 and connect to J9 BIN on the chassis #2 top rail.

3. Connect a bottom rail power cable (4 pin connector) to connector J10 COUT on the bottom rail of chassis #1. Route the cable down to chassis #2 and connect to J8 CIN on the chassis #2 bottom rail.

4. Connect a bottom rail data cable (6 pin ribbon cable connector) to connector J11 DOUT on the bottom rail of chassis #1. Route the cable down to chassis #2 and connect to J9 DIN on the chassis #2 bottom rail.

5. Repeat this process between chassis #2 and chassis #3.

NOTE: The chassis containing the 3-CPU1 Central Processor can only have chassis power and data connections made to connectors J10 AOUT and J11 BOUT on the top rail and J10 COUT and J11 DOUT on the bottom rail. The chassis containing the 3-CPU can never have connections coming into connectors J8 AIN, J9 BIN, J8 CIN or J9 DIN.



The figure to the left shows an Audio Source Unit (ASU) and two 3-CHAS7 chassis in a common cabinet. The ASU unit is connected to the two rails using a Rail Chassis Interface Card. The Rail Chassis Interface Card is mounted below the rails in the 1/2 footprint IRC-3 module space of the ASU unit chassis.

In this example, the ASU can be either the top or middle chassis. Connect the power and data cables as follows:

1. Connect the top rail power cable (3 pin connector) to connector J10 AOUT on the top rail of chassis #1. Route the cable down to the Rail Chassis Interface Card and connect to J28 AIN.

2. Connect the top rail data cable (4 pin connector) to connector J11 COUT on the top on bottom rail of chassis #1. Route the cable down to the Rail Chassis Interface Card and connect to J4 BIN.

3. Connect the bottom rail power cable (4 pin connector) to connector J10 COUT on the bottom rail of chassis #1. Route the cable down to the Rail Chassis Interface Card and connect to J3 CIN.

4. Connect the bottom rail data cable (6 pin ribbon cable connector) to connector J11 DOUT on the bottom rail of chassis #1. Route the cable down to the Rail Chassis Interface Card and connect to J6 DIN.

5. Connect a top rail power data cable to connector J5 AOUT on upper left side of the Rail Chassis Interface Card. Route the cable up to connector J8 AIN on the top rail of chassis #2.

6. Connect a top rail data cable to connector J7 BOUT on the upper right side of the Rail Chassis Interface Card. Route the cable up to connector J9 BIN on the top rail of chassis #2.

7. Connect a bottom rail power cable to connector J8 COUT on the left center of the Rail Chassis Interface Card. Route the cable up to connector J8 CIN on the bottom rail of chassis #2.

8. Connect a bottom rail data cable to connector J9 DOUT on the right center of the Rail Chassis Interface Card. Route the cable up to connector J9 DIN on the bottom rail of chassis #2.

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EST3 LCD DISPLAY MODULE

Operations & Maintenance Manual
December 2015

EST
Life Safety & Communications

Liquid Crystal Display Module
3-LCD

7165-1657: 0186

S3000

MEA FDNY COA 6086

EN54-2:1997+A1 and
EN54-4:1997+A1:2002+A2
pending

Overview

The Main Display interface is the primary user interface in the EST3 Life Safety System. The main display interface focuses on the emergency user by putting information important to the user up front. Hands free, the first highest priority event is shown. The display always gives the last highest priority event. Arriving at the panel and without opening the door the first and last alarm is given. Simple to understand lights and switches help the emergency user execute system commands with confidence.

A menu system supports maintenance functions such as disables or reports for use by staff or service personnel.

Standard Features

- Uses simple lights and switches
- Displays information important to user
- Hands free first alarm display
- Last event of highest priority always displays
- Eight lines by 21 character graphic LCD display — 168 characters total
- Multilingual
  Supports English, French, Spanish, and Russian
- Uses queues to sort events
  A queue is a list of messages Alarm, Supervisory, Trouble and Monitor
- Slide in LED and switch labels
  Makes customization for regional language easy

Application

The 3-LCD module mounts to the local rail over the nodes Central Processing Unit Module (3-CPU). The 3-LCD module is optional in any network node.

Ensuring information clarity the 3-LCD uses a backlit high contrast supertwist graphical display. Eight lines of 21 characters provide the room needed to convey emergency information in a useful format.

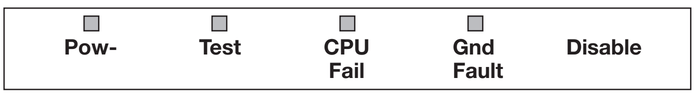
The 3-LCD always displays the last highest priority event even when the user is viewing other message queues. Further message flexibility is provided with EST3's message routing ability. Messages from a node can display at every node on the network or messages can route to specific nodes only. Routing can be initiated at a specific time/shift change. There is no need to have messages display in areas that are not affected by an event.

The 3-LCD can display messages in English, Spanish, French, and Russian. The bilingual display lets the operator select between either of two languages. Consult your representative for available language combinations.

The EST3 system configures for Proprietary, Local or EN54 market operations. The mode of operation is selected through the System Definition Utility (SDU) which may adjust the following operations slightly to fit the system operation selected.

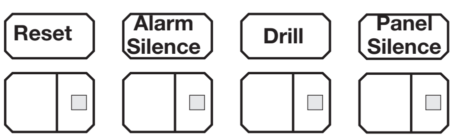
LEDs and Switches

Further enhancing the 3-LCD user interface are easy to read and understand lights and switches. All functions are laid out in a logical order. At the top of the 3-LCD are five system status LEDs. Here determining the general condition of the system is easy.



Power LED: Green, on when AC power is on.

Test LED: Yellow, on when any portion of the system (Group) is under test.



CPU Fail LED: Yellow, on when CPU stops running.

Gnd Fault LED: Yellow, on when a ground exists on the system (group)

Disable LED: Yellow, on when any point or zone is disabled by a user.

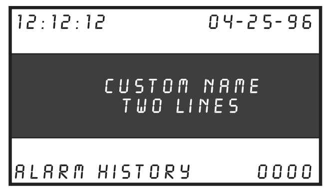
Below the general status LEDs are located four, LED / Switch common controls. The versatility of EST3 allows system designers to define the features as affecting a domain (defined group of nodes) or as global (affects all nodes) across the network. This feature is very useful when configuring systems with multiple buildings on one network. As an example, operating the reset in one building may have adverse effect in other buildings. With EST3 having operational differences between buildings on the same network is not a problem.

Pressing **Reset** starts the system's reset operation. The yellow LED has three flash rates during reset. The LED flashes fast during the smoke power down phase of reset, flashes slow during the restart phase, and turns on steady for the restoral phase. The Reset LED turns off when the system is normal.

Pressing **Alarm Silence** turns off all Notification Appliance Circuits defined as audible. The yellow LED turns on when silence is active via the Alarm Silence switch or via alarm silence software timers.

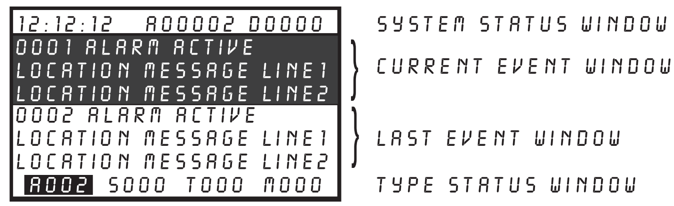
Pressing **Panel Silence** turns off the system's internal audible signal. The yellow LED turns on when panel silence is active. The EST3 panel buzzer has user programmable signal rates for alarm, supervisory, trouble and monitor conditions.

Pressing **Drill** turns on the drill LED and all signals sound evacuation. Drill does not activate city tie connections. Auxiliary relays will not activate unless programmed to do so with drill.



In the center of the 3-LCD is the Liquid Crystal Display. In the normal condition the date and time plus a definable system title display on the LCD. The last line of the display gives an alarm history. This total equals the number of times the system has entered the alarm state from the normal state.

When active events are on display, the LCD formats into four logical windows.

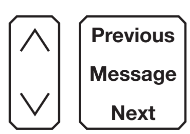


In the system status window, the display shows the time and the status of active and disabled points.

The current event window, lines 2, 3, 4 automatically display the first active event of the highest priority if the user has not taken control of the system. Once the emergency user takes control, this window displays user message selections.

The second line of the display shows system event information. In the example above the display shows the chronological number of the event (0001 is the first alarm) followed by the event type (Alarm Active). EST3 supports over 45 event type messages from which system designers choose. The last two lines of the current event window are custom programmable location message lines with space for 42 characters.

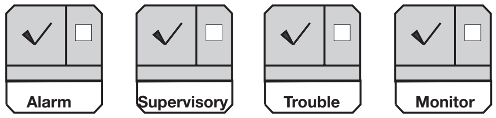
The last event window shows the last highest priority event. This window is always displayed and updated automatically by the system. Here the emergency user can monitor the progress of a fire.



When EST3 is configured for a local mode system viewing the second alarm message is easy, just press the NEXT key. The next message scrolls into the current event window. The last highest priority event always remains on view. No matter what queue the user selects for viewing, the LCD always displays the most recent alarm. A new alarm event resounds the panel audible signal and appears immediately on display without overwriting information the user selected for view.

The final window of the LCD the type status window shows the total number of active events by queue type. A is alarm, S is supervisory, T is trouble, and M is monitor. The number following each letter is the number of active events existing in each queue.

EST3 breaks down event types into queues and automatically displays the first event of the highest priority type.



Priority order is alarm, supervisory, trouble, monitor. By using queues an emergency user does not waste time scrolling through a mixed event list looking for alarms or confusing an alarm message with other message types.

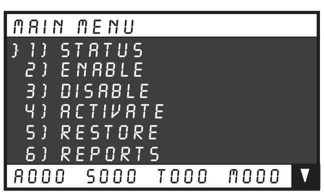
EST3 configures for **Remote proprietary** system operation where every event must be acknowledged by viewing them before the internal buzzer will silence. Or the EST3 will configure for **Local** operation. Here the internal buzzer silences by pressing panel silence. If any events exist in queues that have not been viewed the queue LED continues to flash informing the user of un-seen events.

When all events in a queue are acknowledged or 'seen', the LED associated with the queue turns on steady. If a new event is added to the queue, the EST3 internal buzzer resounds and the queue LED flashes.

EST3 allows device grouping into logical group zones. Here two or more alarm devices (such as detectors or pull stations) make up the zone. When a device in the zone activates, the LCD displays the zone description. Each zone only displays once, regardless of the number of devices active within the zone.

To display device information the user presses the Details key. The device with the lowest address displays in the first window.

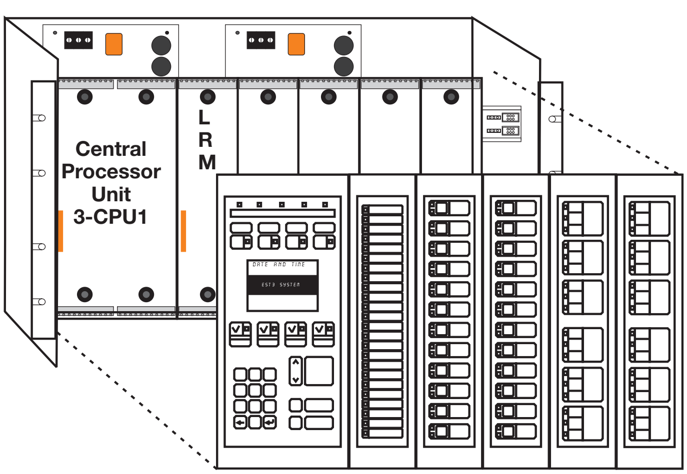
If multiple devices are active each is available for viewing by using the arrow associated with the Previous Message Next key and scrolling through the device list.



The common controls easily expand beyond the Main Display interface by adding a Control Display Module and assigning features to its switch controls.

For Maintenance users, the EST3 provides a smooth operating menu system providing powerful tools for system management, reports, and trouble shooting.

Installation and Mounting

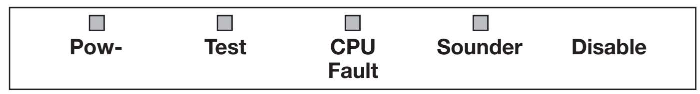


EN54 Compliance

In 1998 the British-based Loss Prevention Certification Board (LPCB) certified EST3 control panels and power supplies as having surpassed the requirements of the pivotal EN54 standard, parts two and four. LPCB Certificate #257c for EST3 fire alarm control panels marked the first such certification since the stringent EN54-2 : 1997 and EN54-4 : 1997 were published by the European Committee for Standardization (CEN). In order to meet these standards, display and control functions have undergone slight modifications for the EN54 marketplace. These differences are highlighted below. All other control and annunciation features remain unchanged.

Note: EN54-2:1997+A1 and EN54-4:1997+A1:2002+A2 approval is pending.

System Status LEDs



Power LED (Green): on when DC power is on.

Test LED (Yellow): on when any portion of the system (Group) is under test.

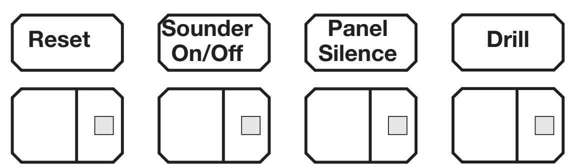
CPU Fault LED (Yellow): on when CPU stops running (processor failures must be manually reset).

Gnd Fault LED: Not available.

Sounder LED (Yellow): flashing indicates fault on sounder circuit. Steady indicates a disabled sounder circuit.

Disable LED (Yellow): on when any point or zone is disabled by a user (disabled conditions have priority over fault conditions).

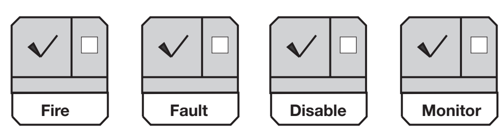
Switch Functions



Pressing **Sounder On/Off** turns off all sounder circuits defined as audible. The yellow LED turns on when silence is activated via the Sounder On/Off or via the alarm silence software timers.

See Page 2 for descriptions of Reset, Panel Silence, and Drill functions.

Event Queues



For EN54 compliance, EST3 configures for remote proprietary system operation. This requires that every event must be acknowledged by viewing them before the internal buzzer will silence. The priority order is Fire, Fault, Disable, Monitor. EN54-2:1997+A1 and EN54-4:1997+A1:2002+A2 approval is pending.

EDWARDS
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Web: www.chubbedwards.com

Engineering Specification

The system shall provide a user interface that displays system events in a text format, and supports basic common control LEDs and switches. The Common Control Switches and LEDs provided as minimum will be; Reset switch and LED, Alarm Silence switch and LED, Panel Silence switch and LED, Drill switch and LED. It must be possible to add additional common controls as required through the use of modular display units. The user interface must provide an LCD that will allow custom event messages of up to 42 characters. The interface must provide a minimum of eight lines by 21 characters and provide the emergency user, hands free viewing of the first and last highest priority event. The last highest priority event must always display and update automatically. Events shall be automatically placed in easy to access queues. It shall be possible to view specific event types separately. Having to scroll through a mixed list of event types is not acceptable. The total number of active events by type must be displayed. Visual indication must be provided of any event type which has not been acknowledged or viewed. It must be possible to customize the designation of all user interface LEDs and Switches for local language requirements. It shall be possible to have a custom message for each device in addition to zone messages. Custom device messages must support a minimum of 42 characters each. Instructional text messages support a maximum of 1,000 characters each. The display shall be capable of displaying English, Spanish, French, or Russian messages.

Technical Specifications

Catalog Number	3-LCD
Agency Listings	UL, ULC, FM, CE, LPCB EN54* pending.
LCD Display	Eight lines by 21 characters backlit LCD
Mounting	Two local rail spaces on top of 3-CPU
Common Control Switches and LEDs	Reset switch and LED Alarm Silence switch and LED Panel Silence switch and LED Drill Switch and LED
Alarm Current	42mA
Standby Current	40mA

** EN54-2:1997+A1 and EN54-4:1997+A1:2002+A2 pending*

Ordering Information

Catalog Number	Description	Shipping Weight, lb. (kg)
3-LCD	Liquid Crystal Display Module	.8 (.36)
3-LKE	UK English Label Kit	.25 (.11)
3-LKF	French Label Kit	.25 (.11)
3-LKR	Russian Label Kit	.25 (.11)
3-LKS	Spanish Label Kit	.25 (.11)

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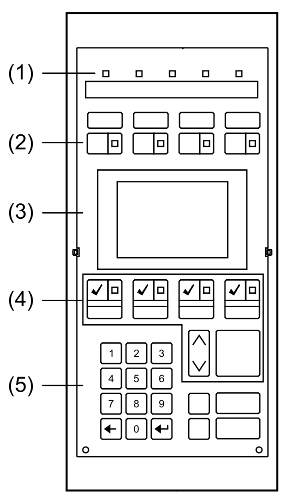
3-LCD Main LCD Display Module Installation Sheet

Description

The 3-LCD Main LCD Display Module provides the controls and indicators that make up the system user interface. See Figure 1.

Figure 1: 3-LCD Main LCD Display Module



(1) System status indicators
(2) Common controls
(3) Display
(4) Event message controls
(5) Keypad

At least one LCD display module is required to provide a point of control for an entire network. Additional LCD display modules can be installed to provide multiple points of control at other locations throughout the protected premises.

The 3-LCD module mounts on a 3-CPUx module or on a 3-ANNCPUx module and occupies two LRM spaces on the panel's operator layer.

Installation

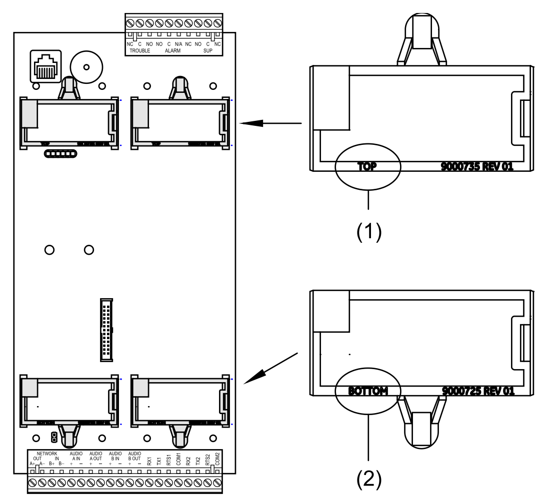
The instructions below are for new installations on a 3-CPUx module. Instructions for installing a 3-LCD module on a 3-ANNCPUx module are similar.

If you are replacing an existing 3-LCD module (one with slide locks), you must remove the display mounting brackets and the rail fasteners on the 3-CPUx module or on the 3-ANNCPUx module before proceeding.

To install the 3-LCD module:

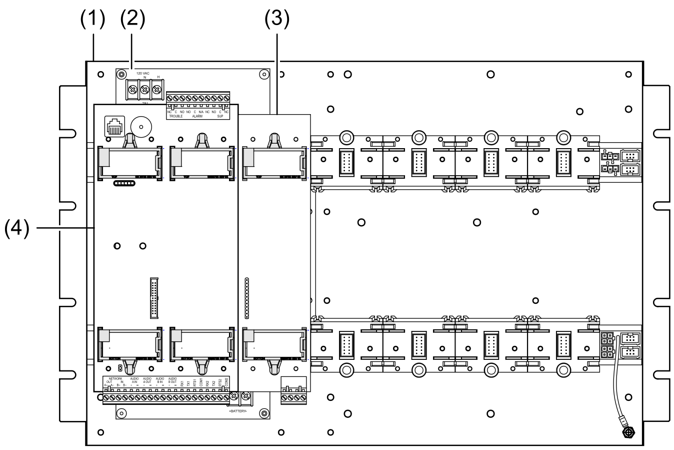
1. Insert the display mounting brackets into the 3-CPUx module. See Figure 2.
2. Plug the 3-CPUx module into the rail, and then push the plungers to lock the module into place. See Figure 3.
3. Position the 3-LCD module in its fully open position, align the hinge pins with the hinges on the left display mounting brackets on the 3-CPUx, and then gently slide the 3-LCD into the brackets.
4. Connect the ribbon cable on the 3-LCD module to J1 on the 3-CPUx module. See Figure 4.
5. Connect the ground cable on the 3-LCD module to the two-pin header on the 3-CPUx module. The two-pin header is located just above the Network B terminals on TB2.
6. Verify the 3-LCD module can open and shut without interference.

Figure 2: Display mounting bracket installation



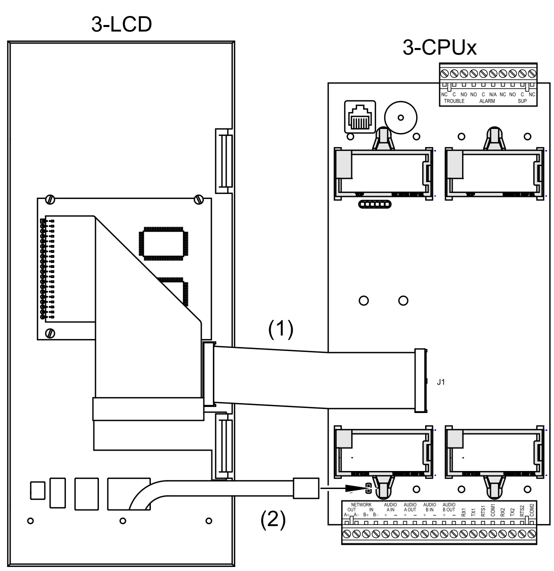
(1) Top
(2) Bottom

Figure 3: Mounting diagram



(1) 3-CHAS7
(2) Primary power supply
(3) Primary power supply monitor card
(4) 3-CPUx

Figure 4: 3-LCD cable connections



(1) Ribbon cable
(2) Ground cable

Specifications

Voltage	24 VDC
Current	See Table 1
Rail requirements	Two slots on the operator layer
LCD display	64 × 128 pixels, backlit liquid crystal
Indicators	Power: Green LED Test: Yellow LED CPU Failure: Yellow LED Ground Fault: Yellow LED Disable: Yellow LED Reset: Yellow LED, integrated with Reset switch Alarm Silence: Yellow LED, integrated with Alarm Silence switch Panel Silence: Yellow LED, integrated with Panel Silence switch Drill: Yellow LED, integrated with Drill switch Alarm: Red LED Supervisory: Yellow LED Trouble: Yellow LED Monitor: Yellow LED
Operator controls	Reset switch Alarm Silence switch Panel Silence switch Drill switch Alarm queue switch Supervisory queue switch Trouble queue switch Monitor queue switch Message scroll switches Ten-digit keypad with Enter and Delete keys Details switch Command Menus switch
Compatible CPU models	See Table 2
Operating environment Temperature Relative humidity	 32 to 120°F (0 to 49°C) 0 to 93% noncondensing

Table 1: Current requirements

Connected to	Standby current	Alarm current
3-CPU, 3-CPU1, 3-ANNCPU1	59 mA	59 mA
3-CPU3, 3-ANNCPU3	43 mA	43 mA

Table 2: Compatible CPU models

Model	Permitted in UL 864 8th edition	Permitted in UL 864 9th edition
3-CPU, 3-CPU1, 3-ANNCPU1	Yes	No
3-CPU3, 3-ANNCPU3	Yes	Yes

Contact information

For contact information, see www.edwardsutcfs.com.

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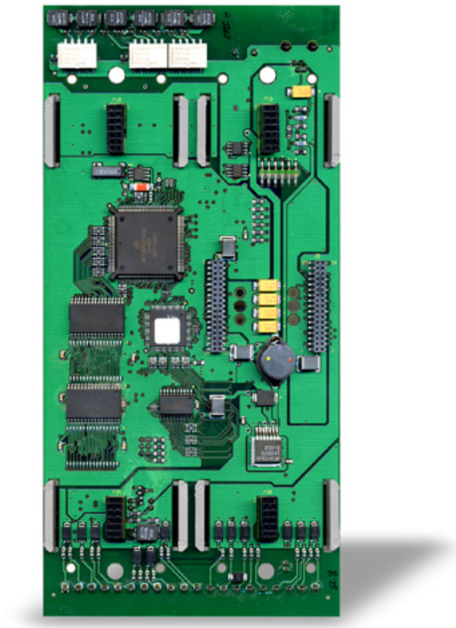
EST3 CPU CENTRAL PROCESSOR MODULE

Operations & Maintenance Manual
December 2015

EST Life Safety & Communications

EST3 Central Processor Unit

3-CPU3, 3-RS485A, 3-RS485B, 3-RS232



FM APPROVED

S3000

7165-1657: 0186

FDNY COA 6086

EN54-2:1997+A1 and EN54-4:1997+A1:2002+A2 pending.

Overview

The 3-CPU3 is the Central Processing Unit Module monitoring the status of all modules and providing the link for network communications. Although each local rail card contains their own microprocessor, the 3-CPU3 provides all inter-module communication and has the ability to download rail module operating parameters. Upon power up the 3-CPU3 automatically learns all local rail module attributes and locations. Site specific software is loaded into the 3-CPU3 which then downloads data to each local rail module. Firmware upgrades are also done from the 3-CPU3 eliminating the need to unplug chips on rail modules.

Mounting must be in the first two local rail spaces of the upper 3-CHAS7 (module chassis). Options for the 3-CPU3 include the addition of an LCD display and User Interface, RS-232 Communication Card, and RS-485 Series Network Communication Cards.

The 3-CPU3 is fully compatible on the same network with the 3-CPU and 3-CPU1 modules.

Standard Features

- Up to 1,000 history events
- RS-485 local rail communications
- Multiplexed audio channels
- Network communication media can consist of twisted copper RS485, short-haul modems and/or single or multimode fiber optic cables
- RS-232 communication card
- Form 'C' contacts for: Alarm, Supervisory and Trouble
- Low voltage memory write protection
- Non-volatile memory

Application

The 3-CPU3 helps make EST3 an extremely powerful and flexible system. As a single node, stand alone system a single 3-CPU3 controls 1 to 19 additional local rail modules. For larger systems, up to 64 nodes interconnect on a peer-to-peer multi-priority token ring protocol network.

The 3-CPU3 controls all local panel responses to automatic, user initiated, or network reported events. As a network node, it is an equal among peers, there is no master on the network. This gives exceptional response times over the network, less than three seconds.

Each 3-CPU3 provides slots at the back for mounting Network, and RS-232, cards. Removable terminal blocks on the 3-CPU3 support connection of network and audio data wiring. On board common relays also terminate at the 3-CPU3 terminals. To aid in trouble shooting and service, status LEDs monitor local rail, network, RS232 and audio data communications.

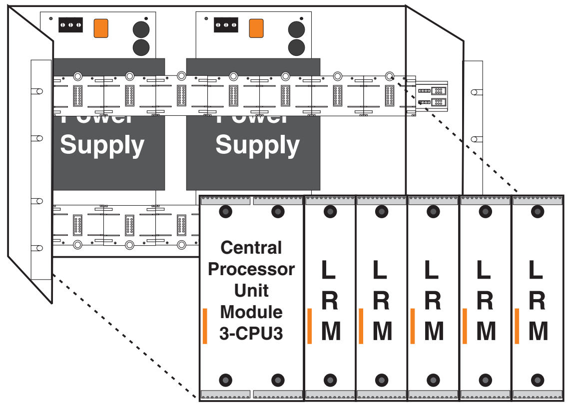
The **Network Communications** card mounts to the back of the Central Processor Unit. The 3-RS485A card provides a Class A (Style 7) or Class B (Style 4) circuit for network communications signals and support for a Class B (Style 4) or Class A (Style 7 - dual Style 4) circuit for the digitized audio signals. The 3-RS485B card provides a Class B (Style 4) or Class A (Style 7) circuit for network communications signals and a second Class B (Style 4) circuit for the digitized audio signals. Network messages received by the Network Communications card are re-transmitted to the next network node. Re-transmission maximizes the wire run lengths between nodes. With 64 nodes miles of network length is possible. Fail safe mechanisms built into the card direct connect the data input and output ports should the network card or its related Central Processor fail. Network communications may be configured via copper or fiber media using the 3-FIBMB.

The **3-RS232 Communication Card** mounts to the back of the 3-CPU3. The 3-RS232 has two optically isolated RS-232 ports. The ports support connection of a printer and/or an external command center. Entire network downloading from one location (to all 64 nodes) is available through the RS-232 card.

Engineering Specification

It must be possible to support a single stand alone node or up to 64 nodes communicating on a peer-to-peer token ring protocol network. Network and digitized audio wiring shall be run in a [choose one: Class A (Style 7) or Class B (Style 4)] configuration. Network alarm response from alarm input to signal activation must be under 3 seconds. All field wiring must be to removable terminal blocks. Status LEDs must be provided for communications of network and internal rail communications. Inter-node communication speed must be programmable. Internal rail communications speed must be programmable.

Installation and Mounting



Data

Maximum resistance between any 3 panels	90 Ohms
Maximum capacitance between any 3 panels	0.3 µF
Maximum distance between any 3 panels via RS485	5,000 ft. (1,524 m)

Capacitance, entire network

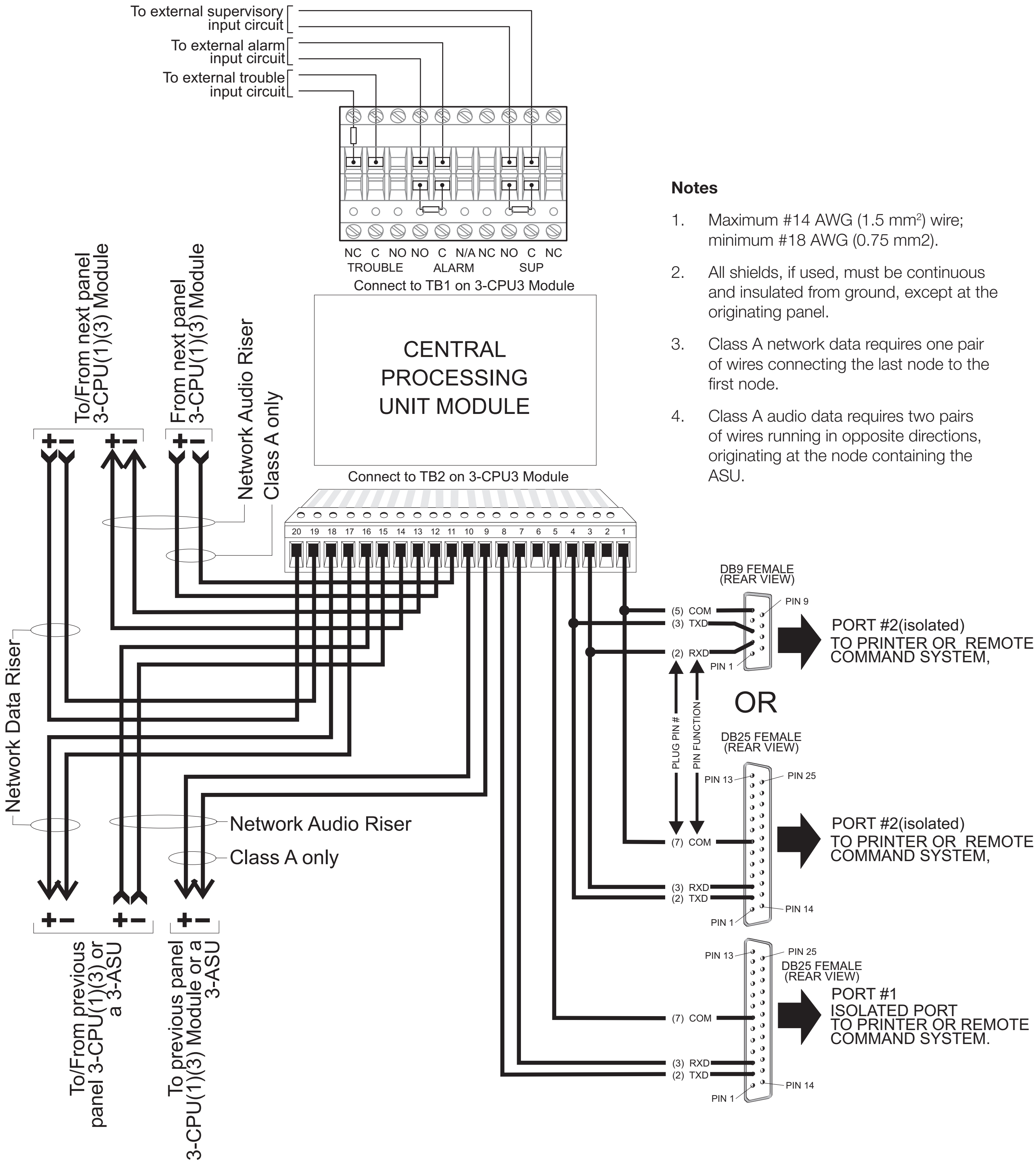
Maximum Accumulative Capacitance

Wire Size	38.4K Baud	19.2K Baud
18 AWG	1.4 µF	2.8 µF
16 AWG	1.8 µF	3.6 µF
14 AWG	2.1 µF	4.2 µF

Audio

Maximum resistance between any 3 panels	90 Ohms
Maximum capacitance between any 3 panels	0.09 µF
Maximum distance between any 3 panels via copper RS485	5,000 ft. (1,524 m)

Typical Wiring



Notes

1. Maximum #14 AWG (1.5 mm²) wire; minimum #18 AWG (0.75 mm2).
2. All shields, if used, must be continuous and insulated from ground, except at the originating panel.
3. Class A network data requires one pair of wires connecting the last node to the first node.
4. Class A audio data requires two pairs of wires running in opposite directions, originating at the node containing the ASU.

Contact us...

Email: edwards.fire@fs.utc.com
Web: www.est-fire.com

EST is an EDWARDS brand.

1016 Corporate Park Drive
Mebane, NC 27302

In Canada, contact Chubb Edwards...
Email: inquiries@chubbedwards.com
Web: www.chubbedwards.com

Specifications

3-CPU3

Agency Listings	UL, ULC, CSFM, CE, LPCB EN54* pending.
Mounting	2 - Left most local rail spaces
Terminal Size	18-12 AWG (1.0mm² to 2.5mm²)
Standby Current	155 mA
Alarm Current	165 mA
Contact Ratings	Nonbypassable Alarm, Supervisory and Trouble Form 'C' 1A at 30 Vdc
Data Down Loading	RJ14 Jack
Operating Environment	0°C - 49°C (32° F - 120° F); 93% at 40° C Non-Condensing

**EN54-2:1997+A1 and EN54-4:1997+A1:2002+A2 pending*

Note: CPU current includes the main power supply, since the CPU and PPS cannot be measured separately.

Option Cards

Catalog number	3-RS232	3-RS485A	3-RS485B
Standby Current	58 mA	98 mA	98 mA
Alarm Current	58 mA	98 mA	98 mA
Communication Ports	Two optically isolated RS-232	Three RS-485 Class A (Style 7)	One Class B (Style 4) or Class A (Style 7) network data circuit and one Class B (Style 4) audio data circuit
Agency Listings	UL, ULC. CSFM, CE, LPCB. EN54 pending*.		
Mounting	Back of 3-CPU3		
Operating Environment	0° C - 49° C (32° F - 120° F); 93% at 40° C Non-Condensing		

*EN54-2:1997+A1 and EN54-4:1997+A1:2002+A2 pending

Ordering Information

Catalog Number	Description	Ship Wt. lb (kg)
3-CPU3	Central Processor Unit Module	0.7lb (0.32kg)
3-RS485A	Network Communications Card, Class A (Style 7)	0.33lb (0.15kg)
3-RS485B	One Class A/B network data circuit and one Class B audio data circuit	0.33lb (0.15kg)
3-RS232	RS-232 Communication Card	0.33lb (0.15kg)
3-CPUDR	CPU doors with filler plates. Order separately, one required per CPU where no LCD display is installed.	0.25lb (0.11kg)

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3-CPU3 Central Processor Module Installation Sheet

Description

The 3-CPU3 Central Processor Module is the control element for all rail modules and control/display modules installed in a control panel. The 3-CPU3 module performs the following functions:

- Processes all information from modules installed within the cabinet as well as data received from other panels over the network data circuit
- Identifies and supervises all modules installed on the rail chassis and uses an integral watchdog to identify both hardware and software faults
- Supervises all traffic on the rail bus and implements ground fault detection
- Date-time stamps events and initiates timed events using an internal clock with leap year function
- Communicates with other 3-CPUx and 3-ANNCPUx modules over a Class A or Class B network data circuit (requires an optional Network Communications card)
- Distributes audio messages across a Class A or Class B network audio circuit (requires an optional Network Communications card)

In addition, the 3-CPU3 module:

- Provides connections for two optically isolated RS-232 serial ports (requires an optional 3-RS232 card)
- Provides command and control functions for the eight-channel digital audio subsystem installed on the rail
- Provides an optically isolated RS-232 port for data uploads, downloads, and system maintenance
- Provides a Form C common alarm, common trouble, and common supervisory relay

All field wiring connections to the 3-CPU3 module are made using plug-in connectors.

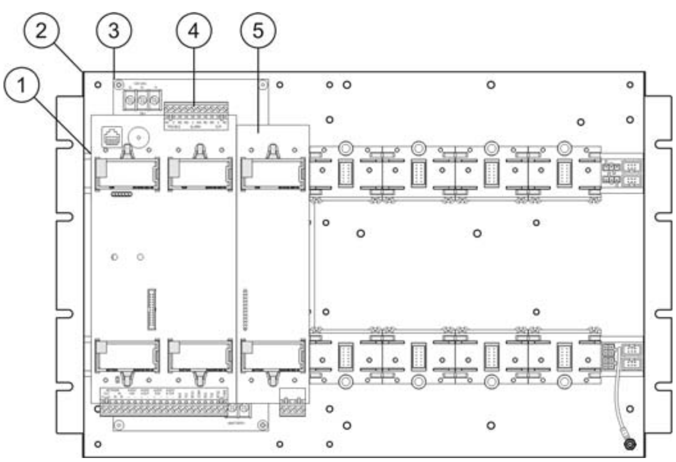
The 3-CPU3 module occupies the two leftmost positions on the rail chassis assembly (logical address 0). The 3-CPU3 ships without plastic doors and mounting brackets. Before you can install a 3-CPU3 you must attach the mounting brackets supplied with an LCD main display module or a 3-CPUDR, both ordered separately.

Note: The 3-CPU3 is a replacement for the 3-CPU module and the 3-CPU1 module.

Installation

1. Attach the mounting brackets from the LCD main display module or the 3-CPUDR to the 3-CPU3 module. For detailed instructions, see their respective installation sheets.
2. Install the network communications option cards, if required. For detailed instructions, see their installation sheets.
3. Align the option cards to the card guides, and then slide the 3-CPU3 into the first two rail slots on the rail chassis assembly. See Figure 1.
4. Gently push the 3-CPU3 until it is firmly seated into the rail connectors.
5. Secure the module to the rail by pushing in the plungers on the top and bottom display mounting brackets.

Figure 1: Mounting diagram



1. Display mounting brackets (supplied separately)
2. 3-CHAS7
3. Primary power supply
4. 3-CPU3
5. Primary power supply monitor card

Wiring

Wire the 3-CPU3 as shown in Figure 2 through Figure 6.

Notes

- Network data circuit wiring and network audio circuit wiring is supervised and power-limited.
- When connecting a network data circuit, always wire the Network B (isolated) terminals on one CPU module to the Network A (nonisolated) terminals of another. See Figure 2.

  On Class B network data circuits, the control panel designated as the service panel must be the first panel on the network. On Class A network data circuits, any control panel can be the service panel.
- Common relay wiring is unsupervised and power-limited only when connected to a power-limited source.Maintenance / Maintenance and testing / Testing

Figure 2: Network data circuit wiring

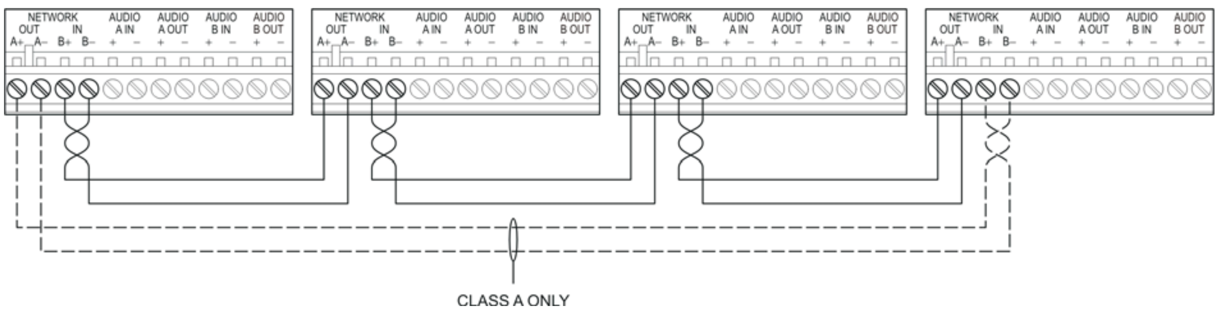


Figure 3: Class B network audio circuit wiring

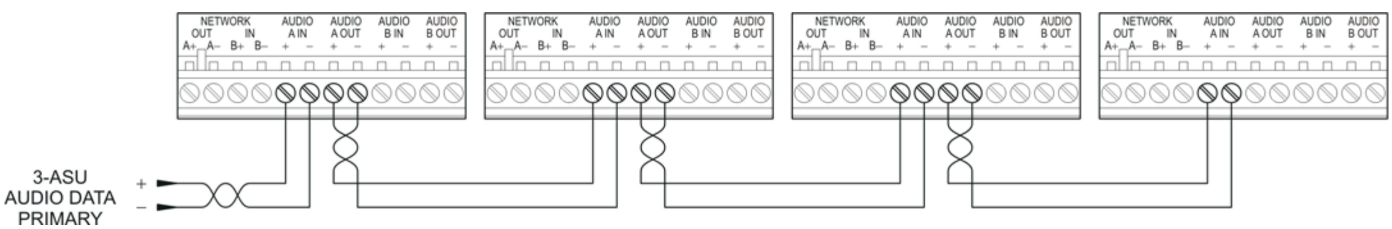


Figure 4: Class A network audio circuit wiring

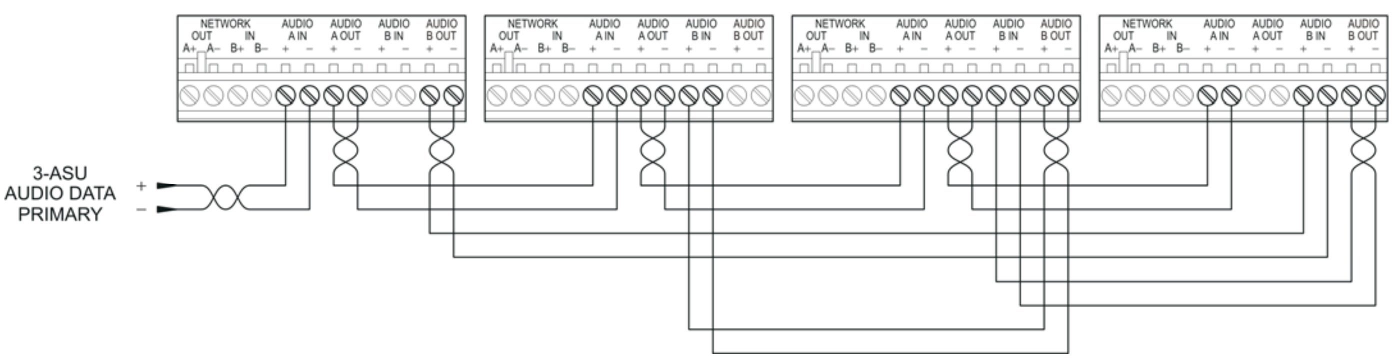


Figure 5: RS-232 port wiring

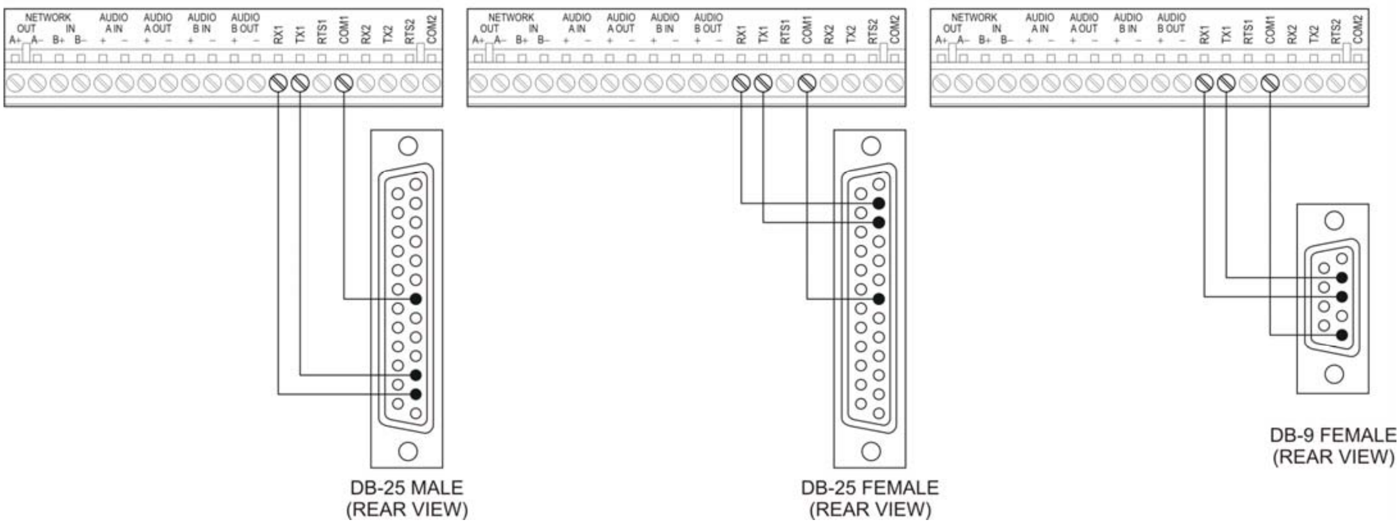
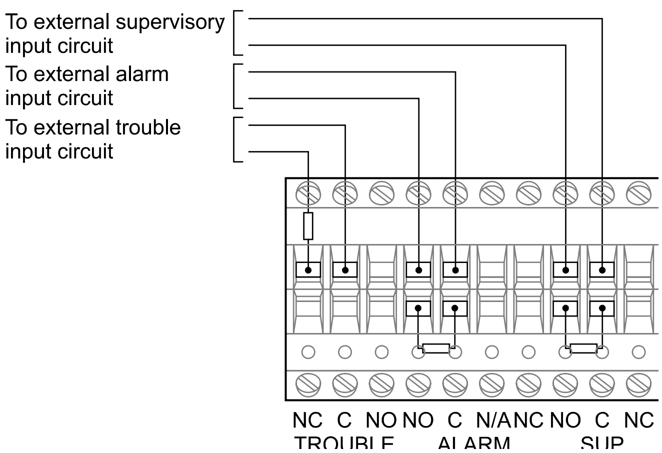


Figure 6: Common relay wiring



Specifications

Voltage	24 VDC
Current	
Standby	155 mA at 24 VDC
Alarm	165 mA at 24 VDC
Ground fault impedance	0.1 Ω
Mounting	Two LRM spaces on the hardware layer
Wire size	
TB1 (top)	12 to 18 AWG (1.0 to 4.0 mm²)
TB2 (bottom)	14 to 18 AWG (1.0 to 2.5 mm²)
Internal RS-232 serial port	
Type	Isolated, Class B
Connector	RJ-11
Common relays	
Quantity	3 (alarm, supervisory, and trouble)
Type	Form C
Rating	30 VDC at 1 A
Operating environment	
Temperature	32 to 120°F (0 to 49°C)
Relative humidity	0 to 93% noncondensing

Notes

- For battery calculations, standby and alarm currents include all listed primary power supplies.
- The common trouble relay operation does not include AC trouble delay functionality and cannot be used for reporting troubles off premises per UL 864 9th edition.
- Required software: 3-CPU3 boot and application code must be version 1.33 or later

Contact information

For contact information, see http://www.edwardsutcfs.com.

3-RS485 and 3-RS232 Option Card Installation Sheet

Description

This document provides installation instructions for the option cards listed below.

Model	Name and description
3-RS485A	Network Communications Card: Uses Class A, Style 6 and Class B, Style 4 configuration for network data and network audio communication.
3-RS485B	Network Communications Card: Uses Class A, Style 6 and Class B, Style 4 configuration for network data communication, and Class B, Style 4 configuration for network audio communication.
3-RS232	Ancillary Communications Card: Enables connection to serial devices and uses Class B configuration.

3-RS485A and 3-RS485B network communication cards

The 3-RS485A and 3-RS485B network communication cards give a panel the ability to network to other panels. Each card provides two independent RS-485 circuits: one for network data communications and one for digital audio communications.

3-RS232 ancillary communication card

The 3-RS232 ancillary communication card gives a panel the ability to connect to serial devices such as printers, modems, and external command and control equipment. The 3-RS232 card provides two RS-232 serial ports.

For CAN/ULC-S559 compliant configurations for fire signal receiving center and proprietary fire signal receiving center applications refer to the *CAN/ULC-S559 Supplement Manual* (P/N 3101563).

Installation

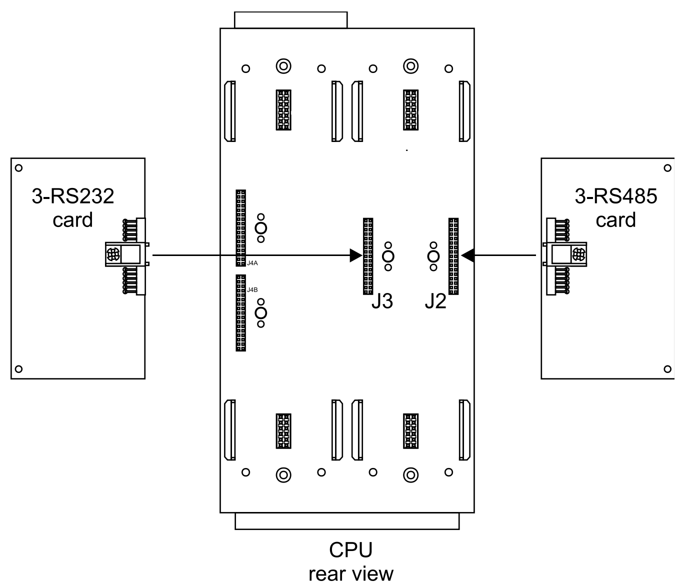
WARNING: Electrocution hazard. To avoid personal injury or death from electrocution, remove all sources of power and allow stored energy to discharge before installing or removing equipment.

Note: Use the 3-RS485A card with a 3-CPU1 module or later. Using the 3-RS485A card with a 3-CPU module causes network system troubles.

To install the option cards:

1. Plug the 3-RS485 A or B option card into connector J2 on the CPU card. See Figure 1.
2. Firmly seat the card and then secure it to the CPU with the #6-32 screw and nut provided.
3. Plug the 3-RS232 option card into connector J3 on the CPU card.
4. Firmly seat the card and then secure it to the CPU with the #6-32 screw and nut provided.
5. Plug the CPU into the rail chassis assembly.

Figure 1: Plugging the option cards into the CPU connectors



Wiring

Connect the field wiring as described in the *3-CPU3 Central Processor Module Installation Sheet* (P/N 3100648).

Specifications

3-RS485A and 3-RS485B network communication cards

Voltage	24 VDC
Current	
Standby	98 mA at 24 VDC
Alarm	98 mA at 24 VDC
Circuit configuration	
Network data	Class A, Style 6 Class B, Style 4
Network audio	Class A, Style 6 [1] Class B, Style 4
Isolation	
Network data	Network A port not isolated Network B port isolated
Network audio	Audio AIN and Audio BIN isolated Audio AOUT and Audio BOUT not isolated
Wire size	Twisted pair [2] 18 AWG (0.75 mm²) min.
Circuit length	5,000 ft. (1,524 m) between any three panels
Circuit resistance	90 Ω max.
Circuit capacitance	
Network data	0.3 µF max.
Network audio	0.09 µF max.
Operating environment	
Temperature	32 to 120°F (0 to 49°C)
Relative humidity	0 to 93% noncondensing

[1] 3-RS485A only
[2] Six twists per foot minimum

3-RS232 ancillary communications card

Voltage	24 VDC
Current	
Standby	58 mA at 24 VDC
Alarm	58 mA at 24 VDC
Circuit configuration	Class B
Circuit type	RS-232 serial, two optically-isolated circuits
Data rate	300, 1200, 2400, 4800, 9600, 19,200, and 38,400 baud
Circuit length	50 ft. (15.2 m) max.
Wire size	18 AWG (0.75 mm²) min.
Operating environment	
Temperature	32 to 120°F (00 to 49°C)
Relative humidity	0 to 93% noncondensing

Regulatory information

Manufacturer	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA Authorized EU manufacturing representative: UTC Fire & Security B.V. Kelvinstraat 7, 6003 DH Weert, Netherlands
Year of manufacture	The first two digits of the product serial number (located on the product identification label) are the year of manufacture.
Certification	CE
CPD certificates	0832-CPD-1283
EN 54	EN 54-4
	2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.
	2006/66/EC (battery directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: www.recyclethis.info.

Contact information

For contact information, see www.edwardsutcfs.com.

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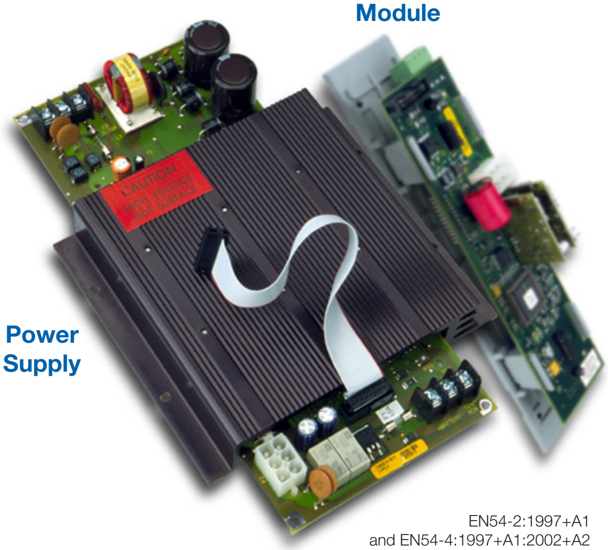
EST3 PRIMARY POWER SUPPLY

Operations & Maintenance Manual
December 2015

EST Life Safety & Communications

EST3 Power Supplies

3-PPS/M series, 3-BPS/M series, 3-BBC/M series



S3000

7165-1657: 0186

FDNY COA 6086

EN54-2:1997+A1 and EN54-4:1997+A1:2002+A2 pending

Overview

EST3 Power supplies consist of two assemblies, a high efficiency switch mode power supply card and a power supply monitor module. The monitor module mounts to the local rail and distributes the power from its supply to the local rail. The local rail distributes power from all power supplies to other local rail modules and user interface cards resulting in “Shared Power” throughout the system. By paralleling the power supplies on a rail maximum utilization of available power is possible, resulting in fewer power supplies. Up to four power supplies combine in a single enclosure providing up to 28 amps of available power. Battery backup is provided using from one to four sets of batteries, depending on standby power requirements.

Power supplies mount to the back of the chassis units or wallboxes. The associated power supply monitor module mounts on the local rail providing system power distribution and mounting space for any control display module. Access to auxiliary power is via easily accessible terminal blocks located on the power supply monitor module. Each power supply produces 7 Amps of filtered and regulated power. With four power supplies located in an enclosure (one primary and three booster power supplies) 28 amps of current is available for local rail modules, control display modules and the eight auxiliary 3.5 amp power outputs (two per supply).

Standard Features

- High efficiency switch mode
- Increased power distribution efficiency
  - power supplies parallel allowing up to 28 amps in a single node
- 120 or 230 Vac operation
- 7 AMP filtered and regulated
- Two 3.5 AMP outputs
- Temperature compensated, dual rated battery charger
- Electronic power limiting
- Automatic load testing of batteries

Application

The primary power supply provides the system with battery charging and voltage regulation. Software configures the charger to either 10-24 AH batteries or 30-65 AH batteries and controls the high/low charge rates. Batteries mounted in the same enclosure as the power supply, have their charge rate monitored and adjusted based on the local enclosure temperature, keeping charging rates within battery specification. For remote batteries a temperature probe is monitored in the remote battery cabinet and charge rates are adjusted automatically. Battery damage is unlikely to occur when environmental short term conditions are outside of normal operating ranges.

The EST3 power supplies automatically load test batteries by shutting down the battery charger and placing a load across the battery. If the battery voltage is outside the specification range the power supply reports a trouble. The trouble clears if the battery is able to recover and pass future load tests.

Battery leads are electronically short circuit protected. If a short occurs in the battery leads the charger automatically disables itself and causes a trouble. The system will constantly look to see if the short has cleared. If the short clears the system automatically restores.

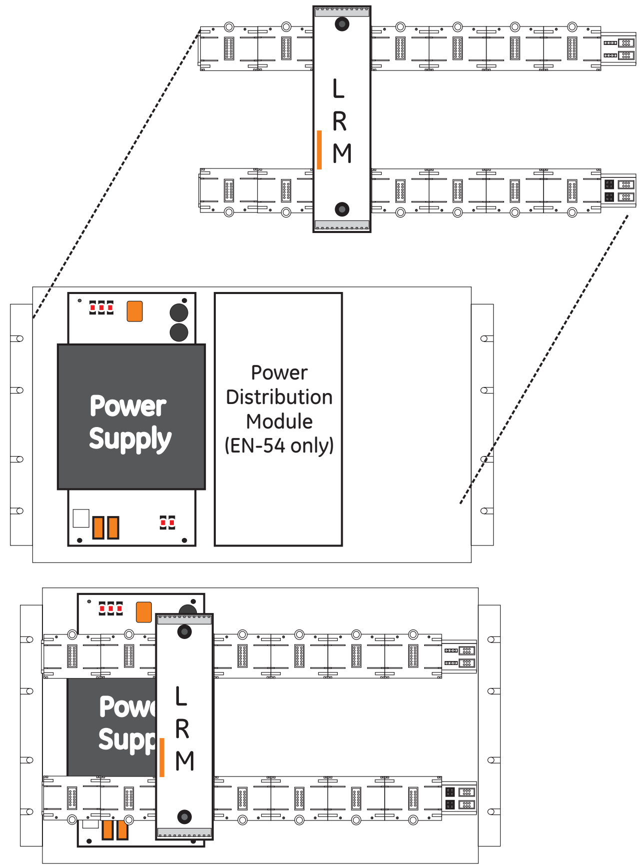
During operation on standby batteries, battery voltage is constantly monitored. A trouble is reported if the battery voltage falls below a specified value.

EST3 power supplies provide specific information back to the 3-CPU(1) designed to help speed trouble shooting of system functions. Should a power supply detect a fault, specific diagnostic codes are available to speed trouble shooting. The 3-LCD will display the power supplies address, a specific trouble code, and a text message describing the specific trouble. Text messages are easy to understand and include items like: Battery Trouble, Aux Power Overload Circuit 1, Aux Power Overload Circuit 2.

Engineering Specification

The fire alarm power supplies must be capable of being paralleled and to load share. Multiple power supplies must be capable of being backed up with a single 24 volt battery set. Each power supply shall be capable of charging up to 65 AH batteries. The power supply must be able to perform an automatic load test of batteries and return a trouble if the batteries fall outside a predetermined range. Power supplies must incorporate the ability to adjust the charge rate of batteries based on ambient temperatures. It shall be possible to adjust for ambient temperature changes in local cabinets as well as remote cabinets.

Installation and Mounting



Power Supply Rules

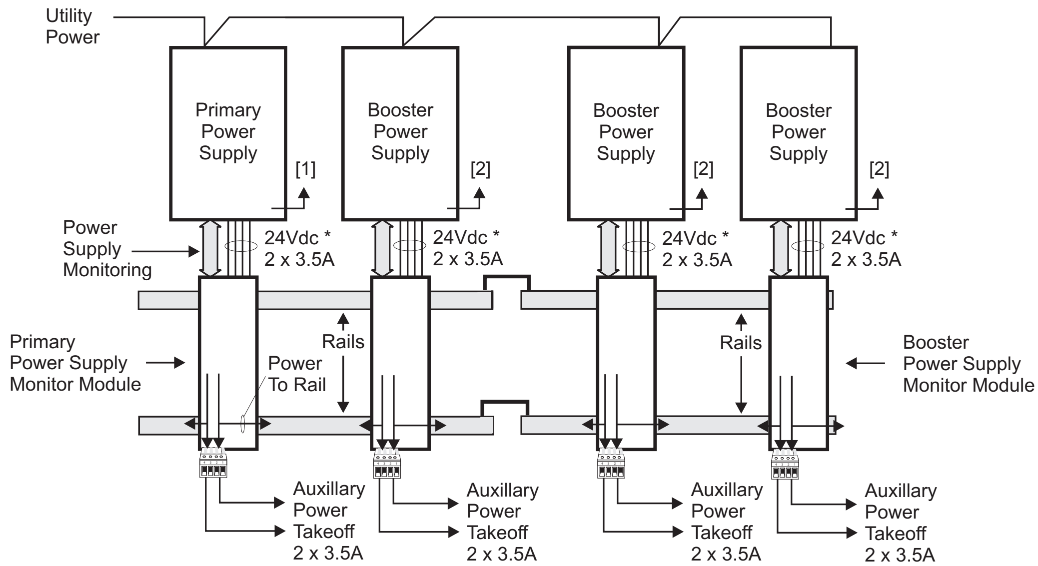
1. Each battery set needs one charger, either a 3-PPS/M or a 3-BBC/M.
2. Each power supply must be connected to a battery set using an identical length and gauge of wire to keep voltage drops identical.
3. Distribute power supplies and loads evenly across rails.
4. **All battery sets for a panel must be the same capacity (AH), same manufacturer, and same manufacturing date code.**

The Table below illustrates the combinations of power supplies and batteries that meet all the power supply rules.

24 VDC Power Supply Output Current

	7A	14A		21A		28A	
Battery Requirements	One Set, 65 AH max	One Set, 65 AH max	Two Identical Sets, 65 AH max	One Set, 65 AH max	Three Identical Sets, 65 AH max	One Set, 65 AH max	Four Identical Sets, 65 AH max
Required Modules	1 3-PPS/M	1 3-PPS/M 1 3-BPS/M	1 3-PPS/M 1 3-BBC/M	1 3-PPS/M 2 3-BPS/M	1 3-PPS/M 2 3-BBC/M	1 3-PPS/M 3 3-BPS/M	1 3-PPS/M 3 3-BBC/M

Typical Wiring



[1] From battery temperature probe terminals.

[2] From battery and from temperature probe terminals if 3-BTSEN-E used.

* Nominal Voltage

Specifications

Catalog Number	**3-PPS/M & 3-BBC/M**	**3-BPS/M**	**3-PPS/M-230 & 3-BBC/M-230**	**3-BPS/M-230**	**3-PPS/M-230-E & 3-BBC/M-230-E**	**3-BPS/M-230-E**
Agency Approvals	UL, ULC	U L, ULC	UL, ULC	UL, ULC	LPCB EN54*, CE	EN54*
Input Voltage	120 Vac (+10%, -15%), 50-60 Hz		230 Vac (+10%, -15%), 50-60 Hz			
Brownout Level	< or = 102 Vac	96 Vac	< or = 195 Vac	184 Vac	< or = 195 Vac	188 Vac
Current Requirements	3-PPS/M included with 3-CPU3 current 3-BBC/M Alarm: 70 mA Standby: 70 mA	Alarm 50mA Standby 50mA	3-PPS/M-230 included with 3-CPU3 current 3-BBC/M-230 Alarm: 70 mA Standby: 70 mA	Alarm: 50 mA Standby: 50 mA	3-PPS/M-230-E included with 3-CPU3 current 3-BBC/M-230-E Alarm: 70 mA Standby: 70 mA	Alarm: 50 mA Standby: 50 mA
Input Current	3.0 A		1.5 A			
Total Output Current	Special Applications: 7.0 Amps					
Battery Charging Capacity	65 AH Sealed Lead-Acid	None	65 AH Sealed Lead-Acid	None	30 AH Sealed Lead-Acid	None
Low Battery Trouble	24 Vdc				22.5 Vdc	
Deep Discharge Cutoff	19.5 Vdc				20.0 Vdc	
Mounting Requirements	1 LRM space, 1 chassis footprint				1 LRM Space + 3-PPS: 2 footprints 3-BBC: 1 footprint	1 LRM space, 1 chassis footprint
Output Voltage	24 Vdc Nominal					
Auxiliary Output Current	Two sources of 3.5 Amps each taken from total output current					
Auxiliary Output Terminal Capacity	18 AWG to 12 AWG (1 mm^2 to 2.5 mm^2)					
Output Protection	Electronic power limiting & heat sink temperature					
Ground Fault Detection	< 10K Ohms					

*EN54-2:1997+A1 and EN54-4:1997+A1:2002+A2 pending

EDWARDS
United Technologies

Contact us...

Email: edwards.fire@fs.utc.com
Web: www.est-fire.com

EST is an EDWARDS brand.

1016 Corporate Park Drive
Mebane, NC 27302

In Canada, contact Chubb Edwards...
Email: inquiries@chubbedwards.com
Web: www.chubbedwards.com

Ordering Information

Catalog Number	Description	Ship Wt., lb. (kg)
3-PPS/M	Primary Power Supply w/ local rail module 120V 50/60 Hz	5 (2.3)
3-BPS/M	Booster Power Supply w/ local rail module 120V 50/60 Hz	5 (2.3)
3-PPS/M-230	Primary Power Supply w/ local rail module 230V 50/60 Hz	5 (2.3)
3-BPS/M-230	Booster Power Supply w/ local rail module 230V 50/60 Hz	5 (2.3)
3-PPS/ M-230-E	Primary Power Supply w/local rail module 230V 50 Hz, EN54* Certified, CE	5 (2.3)
3-BPS/ M-230-E	Booster Power Supply w/local rail module 230V 50 Hz, EN54* Certified, CE	5 (2.3)
3-BBC/M	Booster/Charger Supply w/local rail module 120V 50/60Hz	5 (2.3)
3-BBC/M-230	Booster/Charger Supply w/local rail module 230V 50/60Hz	5 (2.3)
3-BBC/ M-230-E	Booster/Charger Supply w/local rail module, 230V 50/60Hz, EN54* Certified, CE	5 (2.3)
3-BBCMON(-E)	Booster/Charger Monitor Module with charger capability (upgrade 3-BPS/M(-230)(-E) to 3-BBC/M-(230)(-E))	5 (2.3)
3-BTSEN	Distribution Module required when battery installed in remote cabinet	.5 (.22)
3-BTSEN-E	Distribution and Temperature Sensor Module. Required in EN54* Markets when battery installed in a remote cabinet.	.5 (.22)
3-FP	Filler Plate, order separately when no LED or LED/Switch module installed.	0.1 (0.05)

*EN54-2:1997+A1 and EN54-4:1997+A1:2002+A2 pending

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EST3 SIGNATURE DRIVER CONTROLLER MODULE

Operations & Maintenance Manual
December 2015

EST Life Safety & Communications

Signature Driver Controller Modules

3-SSDC1, 3-SDDC1, 3-SDC1

7165-1657: 0186/0306

S3000

FDNY COA 6086

EN54-2:1997+A1: 2006 and EN54-4:1997+2002 +A2 : 2006

Overview

The 3-SSDC1 and 3-SDDC1 Signature Driver Controller modules provide an intelligent interface between the 3-CPU3 module and Signature Series devices. Each module contains its own microprocessor used to coordinate, process and interpret information received from and sent to Signature devices. Power and communications is received directly from the control panel rail assembly. The 3-SSDC1 Single Signature Driver Controller module supports one Signature Data circuit, while the 3-SDDC1 Signature Dual Driver Controller module supports two Signature circuits. Both modules occupy one rail space in the fire alarm control cabinet and provide removable field wiring terminals to aid installation.

Innovative design gives the 3-SSDC1/3-SDDC1 and Signature devices truly “distributed intelligence”. Signature detectors and modules have their own on-board microprocessor communicating with the loop controller in a fully digital communication format. This increases the accuracy of the information coming to and from the loop controller by reducing the effects of capacitance and noise.

With decentralized intelligence much of the decision making moves from the loop controller to the devices. Advanced fire detection algorithms processed within the Signature devices effectively end unwanted alarms. Environmental compensation and multiple sensing element decision making operations are resident in the devices. Intelligent devices allow the Signature Controllers to execute communication and system functions with greater speed and low baud rates, increasing the accuracy of information transmitted between the loop controller and devices.

Standard Features

- One or two circuit versions
- Dedicated microprocessor control
- Full digital communication
- Specialized communication protocol
  – Less sensitive to cable characteristics
  – Utilize existing wiring in most applications
- Loop alarm in under 750 milliseconds
- Device location supervision
  – Unexpected additional device addresses
  – Missing device addresses
  – Switched device locations
  – Programmed device parameters
- Automatic nonvolatile as-built mapping
  – Stores “actual” and “expected” device data
  – Stores physical connection sequence including “T” taps
- Automatic day/night sensitivity
- Supports up to 250 intelligent Signature detectors and 250 Intelligent Signature Modules
- Up to five 3-SDDC1s per node
  – Total of 10 Signature circuits
- Removable field wiring terminal blocks
- Multiple survival modes — stand alone
- Fully backward compatible with 3-SSDC and 3-SDDC
- Supports the full line of Signature II devices, including carbon monixide detection

Application

Up to 125 detectors and 125 modules are supported over a single pair of wires by the 3-SDC1 Signature Cards that plug into the Signature controller modules. Both Class A wiring (style 6 or style 7) and Class B (style 4) wiring are supported. Loop distances over 11,000 feet (3300m) are possible.

The 3-SSDC1 and 3-SDDC1 use advanced communication formats that provide exceptional response. Using a "BROADCAST POLL" the loop controller checks the entire device circuit for any changes of state. Should one or more devices report a change the 3-SSDC1/3-SDDC1 uses "DIRECT ADDRESS SEARCH" to find reporting device(s). Devices that have entered the alarm state or become active are located nearly instantaneously.

The unique use of "BROADCAST POLLING" combined with "DIRECT ADDRESS SEARCH" ensures that only new information is transmitted allowing a reduced baud rate with fast response time. The low baud rate is ideal for retrofit applications since in most applications existing wiring can be used.

To enhance survivability of the system the 3-SSDC1/3-SDDC1 supports a standalone mode for Signature devices. Two catastrophic failure modes are supported. If the 3-CPU(1/3) fails, the loop controller will continue to poll its devices. If an alarm is detected it will be sent on the local rail communication bus and received by other local rail modules. A common alarm condition throughout the panel will result. If the local rail module (3-SSDC1/3-SDDC1) fails, and a device (smoke or module) detects an alarm, specialized circuitry will make the node aware of the alarm condition. The 3-CPU(1/3) will communicate the alarm condition to the rest of the network. Having multiple redundant modes is paramount in a life safety system.

Every time the 3-SSDC1/3-SDDC1 communicates with a detector a green LED on the detector flashes. Normal green LED activity is not disturbing to building occupants, but can be quickly spotted by a maintenance technician. A red LED on the detector turns on only in the alarm condition.

The 3-SSDC1/3-SDDC1 also supervises the device wiring, physical location of each device and the programmed device characteristics. This Edwards/Signature Series unique characteristic is accomplished by "MAPPING" the Signature circuit and committing the map to memory. Upon power up the loop controller will scan device serial numbers and map their physical location sequence on the loop, including "T" taps. After mapping is complete the controller automatically addresses each detector and module through downloading over the loop. There are no switches or dials to set. Each device is assigned a unique soft address generated by the site specific program.

The 3-SSDC1/3-SDDC1 then compares the "Actual" physical device data to the "Expected" site specific program data. If any correlations are different, the loop controller issues a trouble to the CPU identifying the devices which do not match and posting a map fault. Through the 3-CPU3's RS-232 port a graphical map of the loop can be uploaded depicting each device's location on the loop, including branches (T-Taps) and all of the physical attributes associated with the device. This diagnostic information is unparalleled in the fire detection industry and vital for keeping accurate records on how the system was installed.

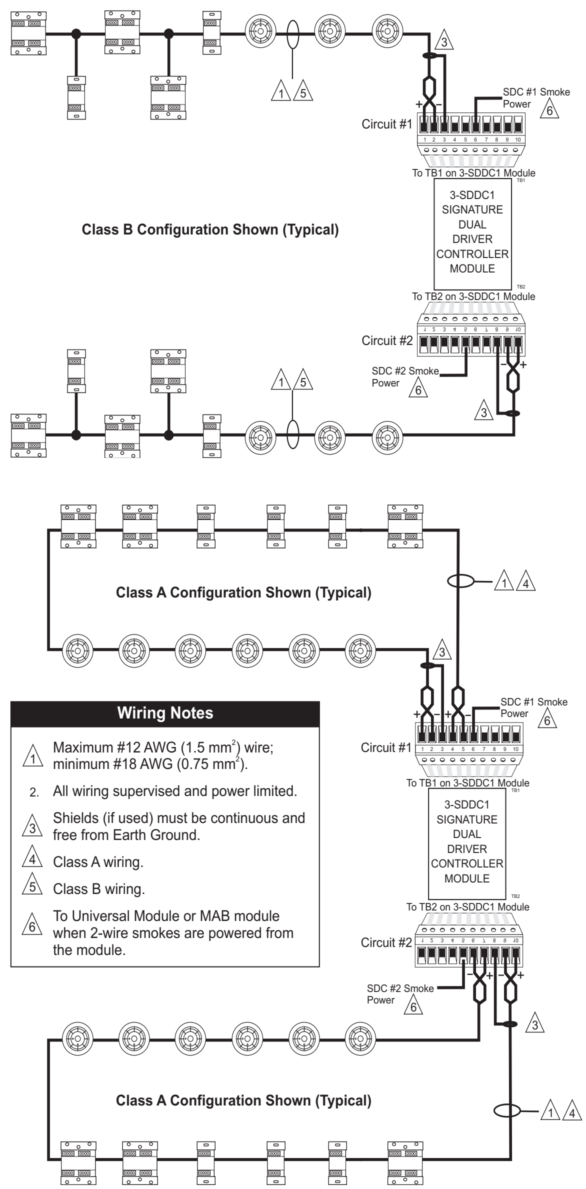
During installation a common problem with analog/ addressable systems is locating ground faults. The 3-SSDC1 and 3-SDDC1 controllers have the ability to locate ground faults by specific module, speeding up the troubleshooting process. Another significant advantage of the 3-SSDC1/3-SDDC1 controllers during commissioning is electronic addressing and mapping. This eliminates duplicate addresses, which are also very difficult for most systems to locate.

During maintenance, should groups of detector heads be removed for service and returned into the wrong smoke detector base (location), the 3-SSDC1/3-SDDC1 will automatically detect the problem. If the attributes of the switched devices are the same, the system will automatically download the correct soft addresses and algorithms to the devices (maintaining location supervision).

If the attributes are not the same the 3-SSDC1/3-SDDC1 will send a map fault indication to the 3-CPU3 and post a trouble indicating the specific devices in fault.

The 3-SSDC1/3-SDDC1 also monitors the Signature Series devices for maintenance and trouble conditions. Each smoke detector contains intelligence to adjust with environmental changes. This expands the amount of time required between cleaning while maintaining a constant alarm threshold. As the detector begins to exhaust the environmental compensation, and reaches the 80% level, the 3-SSDC1/3-SDDC1 will indicate a maintenance alert or dirty condition to the 3-CPU and indicate the specific device requiring cleaning. If cleaning is not performed the detector will continue to operate until all of its environmental compensation is

Typical Wiring



Wiring Notes

1. Maximum #12 AWG (1.5 mm^2) wire; minimum #18 AWG (0.75 mm^2).
2. All wiring supervised and power limited.
3. Shields (if used) must be continuous and free from Earth Ground.
4. Class A wiring.
5. Class B wiring.
6. To Universal Module or MAB module when 2-wire smokes are powered from the module.

utilized. At this point the 3-SSDC1/3-SDDC1 sends a dirty trouble indication to the 3-CPU and posts a trouble condition. If maintenance is still not performed the Signature detector will automatically remove itself from service once the programmed threshold window has been breached (preventing a false alarm).

When a detector includes carbon monoxide (CO) detection, the detector monitors its CO life remaining for the CO sensor element and provides this information automatically to the panel. For maintenance of the system the CO life remaining is also available by simply running a maintenance report at the panel or through the FireWorks graphical interface. A unique CO maintenance signal is automatically generated by the panel when there is 8% (several months) of CO element life remaining. Should the CO sensor element not be replaced after the maintenance signal is reported, an "End of Life" trouble automatically posts on the panel when the CO sensor detection capability is exhausted.

Remote test capability permits devices to be put in alarm, prealarm, supervisory, monitor, or security alarm, or trouble from the panel menu or controls. This facilitates testing of smoke and heat detectors as well as monitor and security devices. Fast test is also provided for CO detectors allowing these devices to be tested quickly in the field.

The 3-SSDC1 and 3-SDDC1 local rail modules modules are fully backwards compatible with the 3-SSDC and 3-SDDC local rail modules. 3-SSDC1 and 3-SDDC1 modules provide additional onboard memory to facilitate future Synergy functions. To upgrade a 3-SSDC/3-SDDC to a 3-SSDC1/3-SDDC1 respectively, replace the 3-SSDC/3-SDDC Local Rail Module with a 3-SDDC1-MB Local Rail Module and reuse the 3-SDC Signature Device Cards and filters.

Specifications (Signature Circuits)

Charts assume wire and devices are evenly distributed over length of circuit

Non-twisted, non shielded wire

Device type	# of Detectors	# of Module Addresses	#14 AWG (20pf/foot) (2.53 Ohm/1000ft)	#16 AWG (20pf/foot) (4.02 Ohm/1000ft)	#18 AWG (20pf/foot) (6.38 Ohm/1000ft)
Detectors only	125	0	14,752 feet (4,497 meters)	9,275 feet (2,827 meters)	5,839 feet (1,780 meters)
Modules only	0	125	12,599 feet (3,840 meters)	7,921 feet (2,414 meters)	4,986 feet (1,520 meters)
Detectors and Modules	125	125	5,738 feet (1,749 meters)	3,608 feet (1,100 meters)	2,271 feet (692 meters)
Detectors and Modules with 2-wire smokes	63	55 + 9 SIGA-UM	7,623 feet (2,324 meters)	4,793 feet (1,461 meters)	3,017 feet (920 meters)
Modules with 2-wire smokes	0	107 + 9 SIGA-UM	3,798 feet (1,158 meters)	2,388 feet (728 meters)	1,503 feet (458 meters)

Twisted pair non shielded wire

Device Type	# of Detectors	# of Module Addresses	#14 AWG (38pf/foot) (2.53 Ohm/1000ft)	1.5mm² (36pf/foot) (3.75 Ohm/1000ft)	#16 AWG (36pf/foot) (4.02 Ohm/1000ft)	1.0mm² (25pf/foot) (5.51 Ohm/1000ft)	#18 AWG (25pf/foot) (6.38 Ohm/1000ft)
Detectors only	125	0	13,157 feet (4,010 m)	9,933 feet (3,028 m)	9,275 feet (2,827 m)	6,760 feet (2,061 m)	5,839 feet (1,780 m)
Modules Only	0	125	12,599 feet (3,840 m)	8,483 feet (2,586 m)	7,921 feet (2,414 m)	5,774 feet (1,760 m)	4,986 feet (1,520 m)
Detectors & Modules	125	125	5,738 feet (1,749 m)	3,864 feet (1,178 m)	3,608 feet (1,100 m)	2,630 feet (802 m)	2,271 feet (692 m)
Detectors and modules with 2-wire smokes	63	55 + 9 SIGA-UM	7,623 feet (2,324 m)	5,133 feet (1,565 m)	4,793 feet (1,461 m)	3,494 feet (1,065 m)	3,017 feet (920 m)
Modules with 2-wire smokes	0	107 + 9 SIGA-UM	3,798 feet (1,158 m)	2,558 feet (780 m)	2,388 feet (728 m)	1,741 feet (531 m)	1,503 feet (458 m)

Twisted pair shielded wire

Device Type	# of Detectors	# of Module Addresses	#14 AWG (84pf/foot) (2.53 Ohm/1,000ft)	#16 AWG (82pf/foot) (4.02 Ohm/1,000ft)	#18 AWG (58pf/foot) (6.38 Ohm/1,000ft)
Detectors only	125	0	5,952 feet (1,814 meters)	6,098 feet (1,859 meters)	5,839 feet (1,780 meters)
Modules Only	0	125	5,952 feet (1,814 meters)	6,098 feet (1,859 meters)	4,986 feet (1,520 meters)
Detectors & Modules	125	125	5,738 feet (1,749 meters)	3,608 feet (1,100 meters)	2,271 feet (692 meters)
Detectors and modules with 2-wire smokes	63	55 + 9 SIGA-UM	5,952 feet (1,814 meters)	4,793 feet (1,461 meters)	3,017 feet (920 meters)
Modules with 2-wire smokes	0	107 + 9 SIGA-UM	2,558 feet (780 meters)	2,388 feet (728 meters)	1,503 feet (458 meters)

Contact us...
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Web: www.est-fire.com

EST is an EDWARDS brand.

1016 Corporate Park Drive
Mebane, NC 27302

In Canada, contact Chubb Edwards...
Email: inquiries@chubbedwards.com
Web: www.chubbedwards.com

Engineering Specification

The communication format between the control panel and analog devices shall be 100% digital.

Loop alarm recognition must be within 750 milliseconds of a device going into the alarm state, with system response time no greater than 3 seconds. All devices shall support remote testing.

It must be possible to wire the circuit as Class A or Class B with non-shielded, non-twisted wire. It must be possible to wire branches (T-taps) with Class B wiring.

The driver controller must be manufactured in accordance with ISO 9001 standards.

The system must have tolerance to multiple failures. There must be a standalone mode of operation that will ensure the system is aware of alarms even if the local rail or main CPU fails.

Specifications (controllers)

Catalog Number	3-SSDC1	3-SDDC1
Installation	1 LRM Space	1 LRM Space
Module Configuration	1 Addressable circuit (3-SDC1 Card) expandable to 2 circuits.	2 Addressable circuits (3-SDC1 Cards)
Operating Current [Note 2]	Standby 144 mA Alarm 204 mA	Standby 264 mA Alarm 336 mA
Operating Voltage	24 Vdc, Nominal	
Address Requirements	Automatic	
Detectors Supported	125 per 3-SDC1 Card	
Modules Supported	125 Module Addresses per 3-SDC1 Card	
2-Wire Smoke Power Output	100 mA per 3-SDC1 Card (not included in *Operating Current* above	
Conventional detectors supported	150 of 100 µA type per circuit.	
Signature Circuit Voltage	20 VDC +/- 5%	
Maximum Signature Circuit Resistance	100 Ohms	
Maximum Signature Circuit Capacitance	0.33 µF	
Communications Format	100% Digital	
Circuit Wiring Styles	Class A or Class B	
Termination	Removable plug-in terminal strip(s) on module	
Permissable Wire Size	18 to 12 AWG (0.75 to 2.5 mm²)	
Agency Listings	UL, ULC, CE (see Note 1), LPCB EN54 (see Note 3).	
Operating Environment	32 °F (0 °C) to 120 °F (49 °C) 93% RH, non-condensing	

Note 1: Other EST3 components are modularly listed under the following standards:
UL 864 categories: UOJZ, UOXX, UUKL and SYZV, UL 294 category ALVY, UL 609 category AOTX, UL 636 category ANET, UL 1076 category APOU, UL 365 category APAW, UL 1610 category AMCX, UL 1635 category AMCX
ULC-S527, ULC-S301, ULC-S302, ULC-S303, ULC-S306, ULC/ORD-C1076, ULC/ORD-C693
Please refer to EST3 Installation and Service Manual for complete system requirements.

Note 2: Current shown Includes full loop of devices.

Note 3: EN54-2:1997+A1: 2006 and EN54-4:1997+2002 +A2 : 2006 (verify device and loop controller compatibility)

Ordering Information

Catalog Number	Description	Shipping Wt. lb (kg)
3-SSDC1	Single Signature Driver Controller. Comes with one 3-SDC1 Device Card. Mounts to Local Rail. *Add suffix "-E" for EN54 complient versions.*	0.5 (0.23)
3-SDDC1	Dual Signature Driver Controller. Comes with two 3-SDC1s. Mounts to Local Rail. *Add suffix "-E" for EN54 complient versions.*	0.5 (0.23)
3-SDC1	Signature Device Card - upgrades a 3-SSDC1 to a 3-SDDC1	0.25 (0.11)
3-FP	Filler Plate, order separately when no LED or LED/Switch module installed.	0.1 (0.05)

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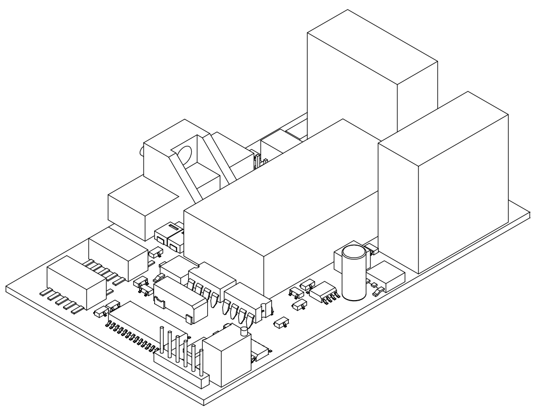
3-SDC1 Signature Data Circuit Card Installation Sheet

EN ES FR PT



Cautions

- Circuit boards are sensitive to electrostatic discharge (ESD). To avoid damage, follow ESD handling procedures.
- If removing an SFS1-CPU main board from the electronics chassis to install the 3-SDC1, first pull out the four plungers securing the main board to the electronics chassis. Failure to do so may result in damage to the main board.

EN: Installation Sheet

Description

This document describes how to install the 3-SDC1 Signature Data Circuit Card on the following equipment.

Model	Description
SFS1-CPU	EST3X fire panel main board that supports two signaling line circuits (Signature loops)
3-SSDC1	Single Signature loop controller module with the option to add a second loop
3-SDDC1	Dual Signature loop controller module

The 3-SDC1 data circuit card provides one Class B or Class A signaling line circuit that supports up to 125 detector and 125 module addresses. The card also provides resettable 24 VDC for powering conventional two-wire smoke detector circuits on Signature Series modules.

Installation

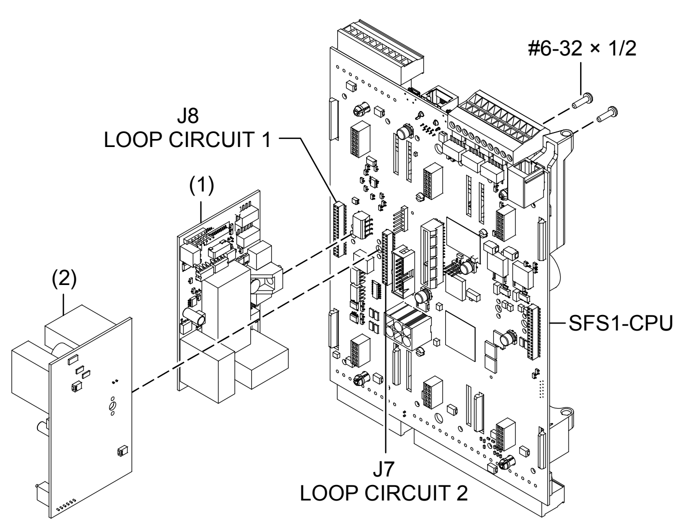
WARNING: Electrocution hazard. To avoid personal injury or death from electrocution, remove all sources of power and allow stored energy to discharge before installing or removing equipment.

Note: The 3-SDC1 card for loop 1 (SLC1) on the SFS1-CPU main board is preinstalled.

To install the 3-SDC1 on an SFS1-CPU main board:

1. If replacing the 3-SDC1 card for SLC1, remove the old card from J8 (LOOP CIRCUIT 1) on the SFS1-CPU main board, and replace it with the new one. See Figure 1.
2. Secure the card using the nylon screw provided.
3. If a second loop is required, plug an additional 3-SDC1 card into J7 (LOOP CIRCUIT 2), and then secure it with the nylon screw provided.

Figure 1: Installing the 3-SDC1 on an SFS1-CPU main board

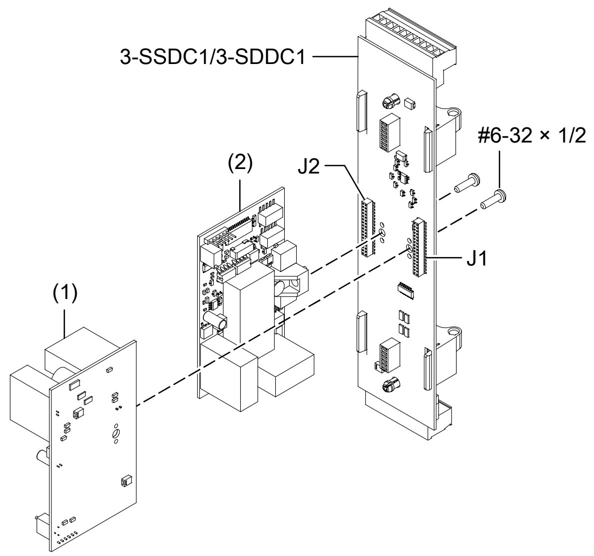


(1) 3-SDC1 for SLC1 (2) 3-SDC1 for SLC2

To install the 3-SDC1 on a Signature loop controller module:

1. Plug the 3-SDC1 for signaling line circuit 1 into J1 on the Signature loop controller module. See Figure 2.
2. Secure the card using the nylon screw provided.
3. If a second loop is required, plug an additional 3-SDC1 card into J2 on a 3-SDDC1 board, and then secure it with the nylon screw provided.

Figure 2: Installing the 3-SDC1 on a Signature loop controller module



(1) 3-SDC1 for SLC 1 (2) 3-SDC1 for SLC 2

Wiring

Connect signaling line circuit field wiring as shown in Figure 3 through Figure 8.

Notes

- Maintain 0.25 in. (6 mm) separation between power-limited and nonpower-limited wiring at all times. Keep nonpower-limited wiring in the shaded area shown in Figure 9. Secure the wiring to the cabinet using nylon cable ties.
- Wiring is supervised and power-limited.
- SLC 2 (TB2) is wired the same as SLC1 (TB1).
- If shielding is used it must be continuous, free from earth ground, terminated at the shield terminal only, and taped throughout the entire circuit.
- If notification appliances are used on the data line for more than one zone, each zone must have isolation so that a break, ground, or wire-to-wire fault does not affect more than one zone.

Figure 3: SFS1-CPU Class B wiring

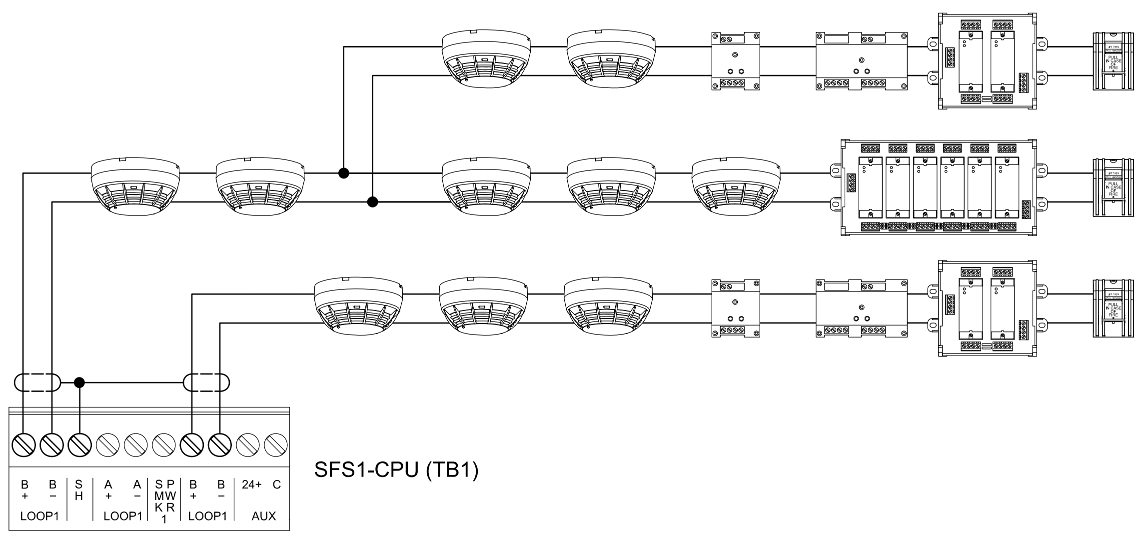


Figure 4: SFS1-CPU Class A wiring

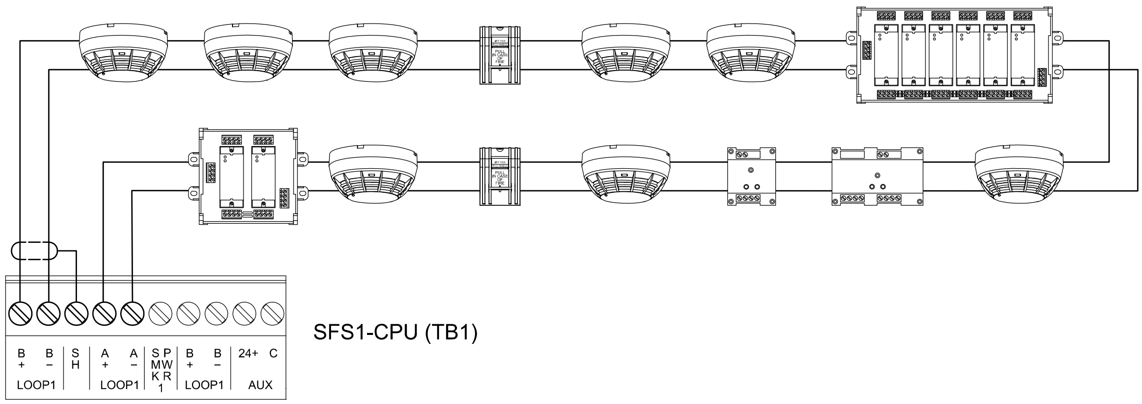
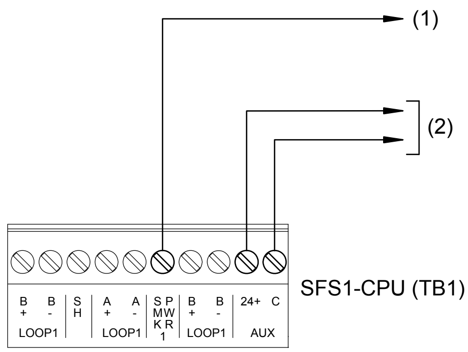


Figure 5: SFS1-CPU smoke power and AUX wiring



Legend

(1) Smoke power to SIGA-UM or SIGA-MAB for a two-wire smoke detector
(2) To external equipment with compatible ratings

Notes

- AUX power on loops 1 and 2 on the SFS1-CPU is nonisolated and not used for loop smoke power.
- AUX power on loop 2 (TB2) on the SFS1-CPU is available whether or not a second 3-SDC1 card is installed.
- Smoke power on loop 2 (TB2) on the SFS1-CPU is not available unless a second 3-SDC1 card is installed.

Figure 6: 3-SSDC1 and 3-SDDC1 Class B wiring

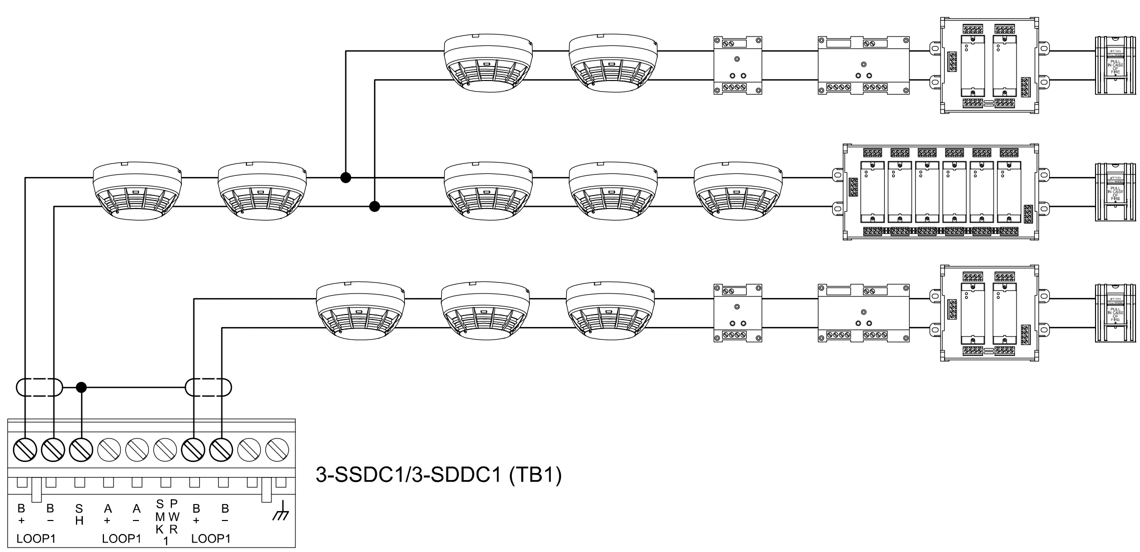


Figure 7: 3-SSDC1 and 3-SDDC1 Class A wiring

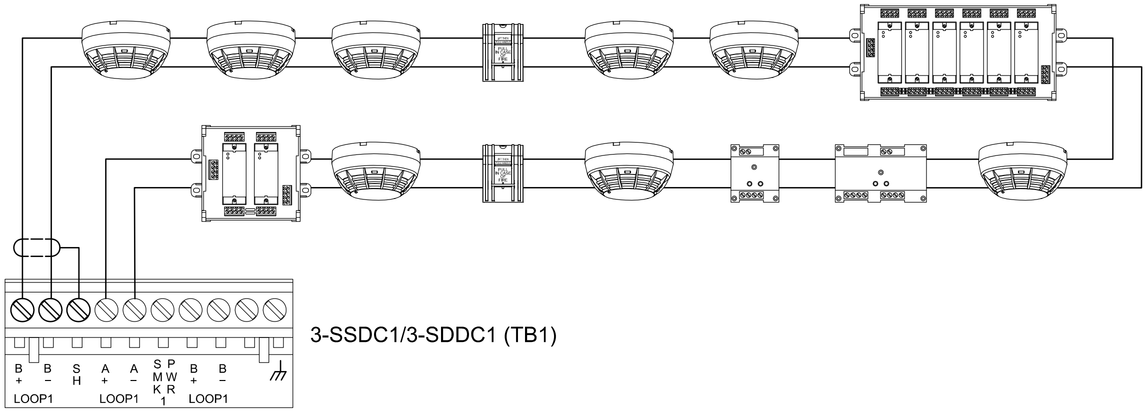
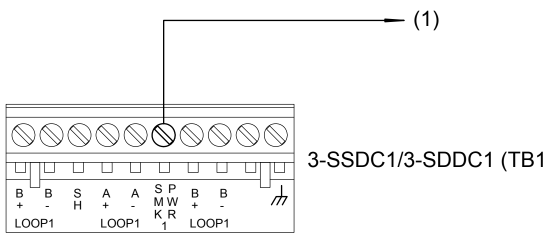
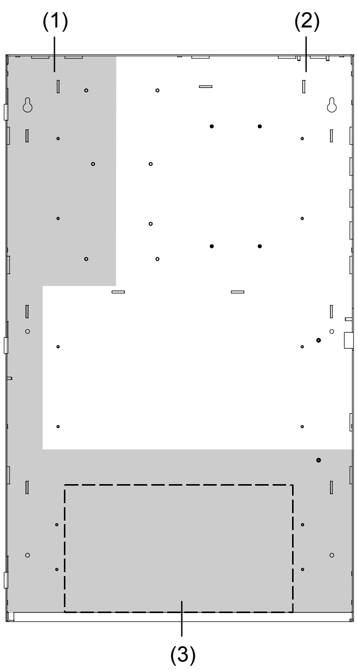


Figure 8: 3-SSDC1 and 3-SDDC1 smoke power wiring



(1) Smoke power to SIGA-UM or SIGA-MAB for a two-wire smoke detector

Figure 9: Power-limited and nonpower-limited wiring



(1) Nonpower-limited wiring area
(2) Power-limited wiring area
(3) Battery area

Specifications

3-SDC1 for an SFS1-CPU main board

Quantity	2 [1]
Voltage	19.0 VDC nom., 24 VDC max.
Current with full loop of devices	
Standby	120 mA at 24 VDC
Alarm	132 mA at 24 VDC
Circuit	
Designation	Class B (Style 4), Class A (Style 6)
Capacity	125 detector and 125 module addresses per circuit, Signature Series
Resistance	100 Ω max.
Capacitance	0.5 µF max.
Smoke power output	
Voltage	24 VDC max.
Current	85 mA
AUX power output	24 VDC, resettable or continuous 1.0 A each circuit, 1.0 A total
Wire size	12 to 18 AWG (1.0 to 4.0 mm²) max.
Operating environment	
Temperature	32 to 120°F (0 to 49°C)
Relative humidity	0 to 93% noncondensing

[1] One 3-SDC1 is preinstalled. A second card is optional.

3-SDC1 for 3-SSDC1 and 3-SDDC1 controllers

Quantity	
3-SSDC1	One 3-SDC1 card
3-SDDC1	Two 3-SDC1cards
Voltage	19.0 VDC nom., 24 VDC max.

Current with full loop of devices for one circuit	
Standby	144 mA at 24 VDC
Alarm	204 at 24 VDC
Current with full loop of devices for two circuits	
Standby	264 mA at 24 VDC
Alarm	336 mA at 24 VDC
Smoke power	
Voltage	24 VDC max.
Current	19.95 mA
Circuit	
Designation	Class B (Style 4) or Class A (Style 6)
Capacity	125 detector and 125 module addresses per circuit, Signature Series
Resistance	100 Ω max.
Capacitance	0.5 μF max.
Wire size	12 to 18 AWG (1.0 to 4.0 mm²) max.
Operating environment	
Temperature	32 to 120°F (0 to 49°C)
Relative humidity	0 to 93% noncondensing

Regulatory information

Manufacturer	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
Year of manufacture	The first two digits of the date of manufacture (located on the product identification label) are the year of manufacture.
Environmental class	UL: Indoor dry

Contact information

For contact information, see www.utcfireandsecurity.com.

ES: Hoja de instalación

Descripción

Este documento describe la manera de instalar la Tarjeta de Circuito de Datos 3-SDC1 Signature en los siguientes equipos.

Modelo	Descripción
SFS1-CPU	Tarjeta principal del panel contra incendios EST3X con capacidad para dos circuitos de señalización
3-SSDC1	Módulo Signature de controlador de bucle único con la opción de agregar un segundo bucle (SLC)
3-SDDC1	Módulo Signature de controlador de bucle doble

La tarjeta de circuito de datos 3-SDC1 proporciona un circuito de línea de señalización (bucle) Clase B o Clase A que tiene capacidad para un máximo de 125 direcciones de detectores y 125 direcciones de módulos. La tarjeta también suministra 24 VCC reposicionable para la alimentación de circuitos convencionales de detección de humo a dos hilos en módulos de la Serie Signature.

Instalación

ADVERTENCIA: Peligro de electrocución. Para evitar lesiones personales o la muerte por electrocución, retire todas las Fuentes de energía eléctrica y permita que la energía almacenada se descargue antes de instalar o retirar el equipo.

Precauciones

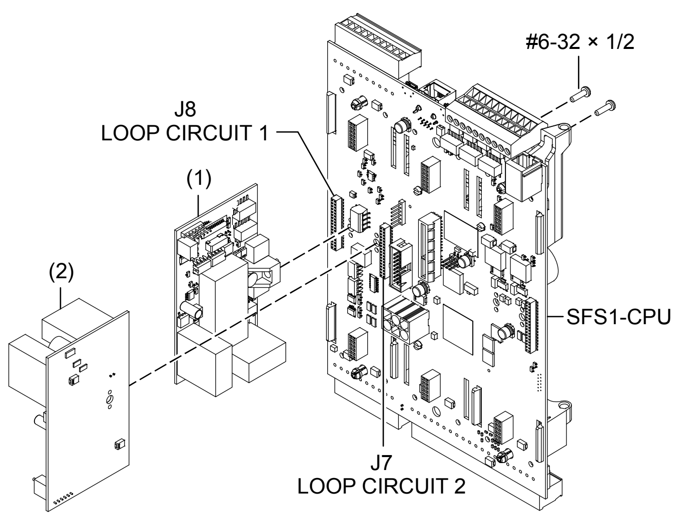
- Las tarjetas de circuitos son sensibles a descargas electrostáticas (ESD). Para evitar daños, siga los procedimientos de manejo de ESD.
- Si está retirando una tarjeta principal SFS1-CPU del chasis de electrónica para instalar la 3-SDC1, primero retire los cuatro émbolos que aseguran la tarjeta principal al chasis de electrónica. No hacerlo podría ocasionar daños a la tarjeta principal.

Nota: La tarjeta 3-SDC1 para circuito de bucle 1 (SLC1), que se encuentra en la tarjeta principal del
SFS1-CPU está preinstalada.

Para instalar la 3-SDC1 en una tarjeta principal SFS1-CPU:

1. Para reemplazar la tarjeta del 3-SDC1 para SLC1, retire la tarjeta antigua del J8 (LOOP CIRCUIT 1), que se encuentra en la tarjeta principal del 3-SDC1 y reemplácela con la nueva. Véase Figura 1.
2. Asegure la tarjeta utilizando el tornillo de nylon suministrado.
3. Si se requiere un segundo bucle, enchufe una tarjeta 3-SDC1 adicional en J7 (LOOP CIRCUIT 2) y, a continuación, asegúrela con el tornillo de nylon suministrado.

Figura 1: Instalación de la 3-SDC1 en una tarjeta principal SFS1-CPU



(1) 3-SDC1 para SLC1 (2) 3-SDC1 para SLC2

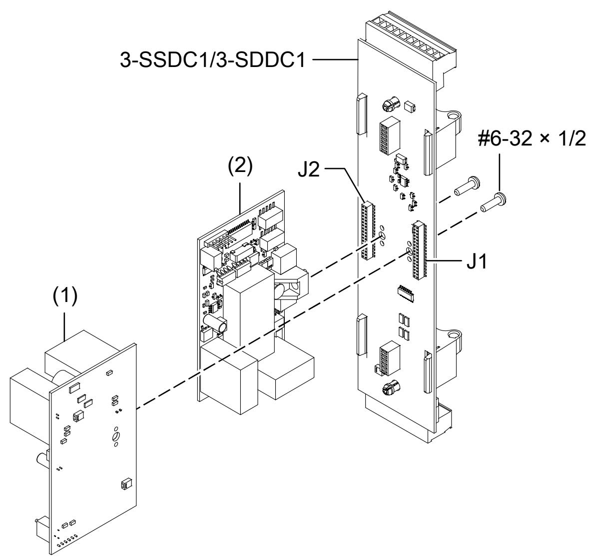
Para instalar la 3-SDC1 en un módulo de controlador de bucle Signature:

1. Conecte la 3-SDC1 para el circuito de línea de señalización 1 en el conector J1, que se encuentra en el

módulo de controlador de bucle Signature. Véase Figura 2.

2. Asegure la tarjeta utilizando el tornillo de nylon suministrado.
3. Si se requiere un segundo bucle, conecte una tarjeta 3-SDC1 adicional en el conector J2 de una tarjeta 3-SDDC1 y luego asegúrela con el tornillo de nailon suministrado.

Figura 2: Instalación de la 3-SDC1 en un Módulo de controlador de bucle Signature



(1) 3-SDC1 para SLC 1 (2) 3-SDC1 para SLC 2

Cableado

Conecte el cableado de campo del circuito de la línea de señalización tal como se muestra en Figura 4 a Figura 9.

Notas

- Mantenga una separación de 0,25 pulgadas (6 mm) entre el cableado que tiene limitación de potencia y el cableado que no tiene limitación de potencia todo el tiempo. Mantenga el cableado que no tiene limitación de potencia en el área sombreada que se muestra en Figura 9. Asegure el cableado del gabinete utilizando sujetadores de cable.
- El cableado es supervisado y con limitación de potencia.
- SLC 2 (TB2) se cablea de la misma manera que SLC1 (TB1).
- Si se utiliza blindaje, éste debe ser continuo, terminado sólo en el terminal de blindaje, protegido con cinta en todo el circuito y sin tierra física.
- Si se utilizan dispositivos de notificación en la línea de datos para más de una zona, cada zona debe tener aislamiento, de manera que una falla de falta de continuidad, tierra y "hilo a hilo" no afecte a más de una zona.

Especificaciones

3-SDC1 para una tarjeta principal SFS1-CPU

Cantidad	2 [1]
Voltaje	19,0 VDC nom., 24 VDC máx.
Corriente con bucle con todos los dispositivos	
En espera	120 mA a 24 VCC
Alarma	132 mA a 24 VCC
Circuito	
Designación	Clase B (Estilo 4), Clase A (Estilo 6)
Capacidad	Direcciones para 125 detectores y 125 módulos por circuito Serie Signature
Resistencia	100 Ω máx.
Capacitancia	0,5 µF máx.
Salida de potencia de humo	
Voltaje	24 VDC máx.
Corriente	85 mA
Salida de potencia AUX	24 VCC, con reposición o continua 1,0 A cada circuito, 1,0 A total
Tamaño del cable	12 a 18 AWG (1,0 a 4,0 mm²) máx.
Ambiente de operación	
Temperatura	32 a 120°F (0 a 49°C)
Humedad relativa	0 a 93% sin condensación

[1] Una tarjeta 3-SDC1 viene preinstalada. Una segunda tarjeta es opcional.

3-SDC1 para controladores 3-SSDC1 y 3-SDDC1

Cantidad	
3-SSDC1	Una tarjeta 3-SDC1
3-SDDC1	Dos tarjetas 3-SDC1
Voltaje	19,0 VDC nom., 24 VDC máx.
Corriente con bucle con todos los dispositivos para dos circuitos	
En espera	144 mA a 24 VCC
Alarma	204 a 24 VCC
Corriente con bucle con todos los dispositivos para dos circuitos	
En espera	264 mA a 24 VCC
Alarma	336 mA a 24 VCC
Potencia de humo	
Voltaje	24 VDC máx.
Corriente	19,95 mA
Circuito	
Designación	Clase B (Estilo 4), Clase A (Estilo 6)
Capacidad	Direcciones para 125 detectores y 125 módulos por circuito, Serie Signature
Resistencia	100 Ω máx.
Capacitancia	0,5 µF máx.
Tamaño del cable	12 a 18 AWG (1,0 a 4,0 mm²) máx.
Ambiente de operación	
Temperatura	32 a 120°F (0 a 49°C)
Humedad relativa	0 a 93% sin condensación

Figura 3: Cableado de SFS1-CPU Clase B

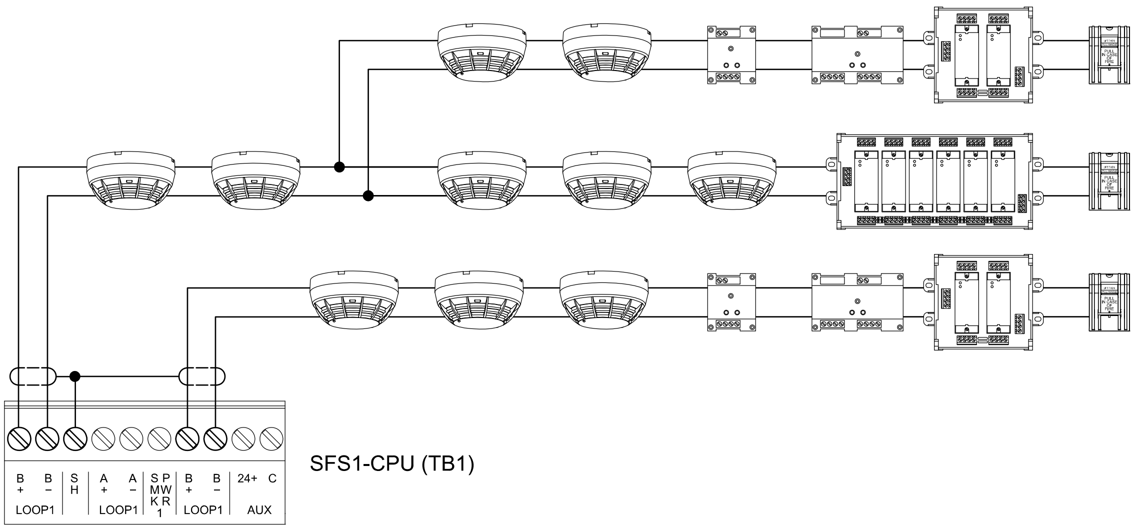


Figura 4: Cableado de SFS1-CPU Clase A

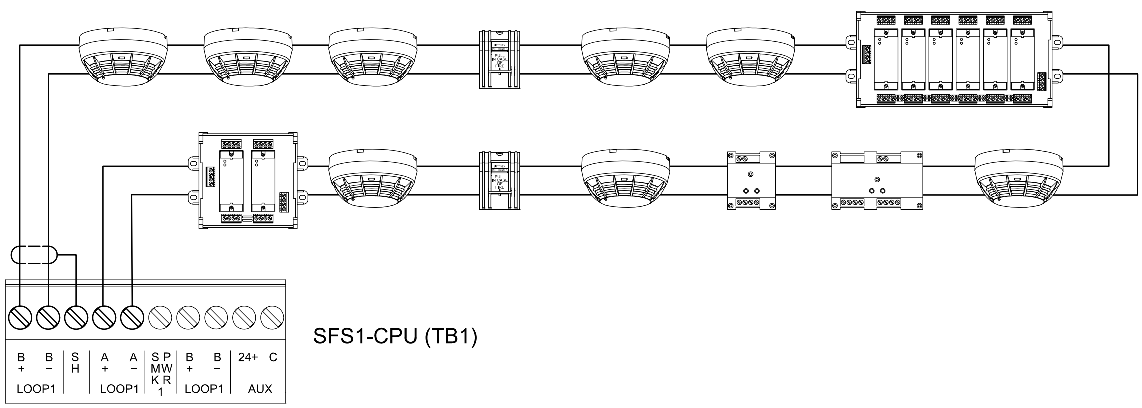
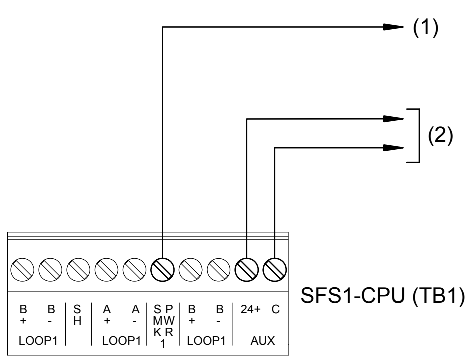


Figura 5: Cableado de potencia de humo SFS1-CPU y AUX



Leyenda

(1) Potencia de humo para SIGA-UM o SIGA-MAB para un detector de humo a dos hilos
(2) A equipos externos con valores nominales compatibles

Notas

- La alimentación AUX en los circuitos de bucle 1 y 2 de SFS1-CPU no está aislada y no se utiliza para potencia de humo del bucle.
- La alimentación AUX en el circuito de bucle 2 (TB2) en SFS1-CPU está disponible independientemente de que se instale o no una segunda tarjeta de 3-SDC1.
- La potencia de humo del circuito de bucle 2 (TB2) del SFS1-CPU no está disponible a menos que se instale una segunda tarjeta de 3-SDC1.

Figura 6: Cableado de 3-SSDC1 y 3-SDDC1 Clase B

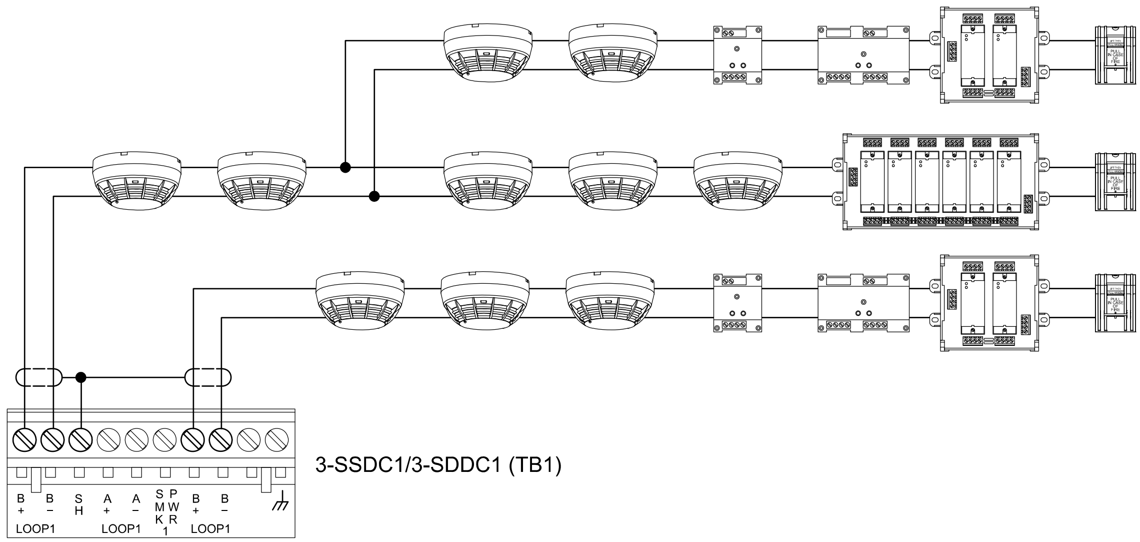


Figura 7: Cableado de 3-SSDC1 y 3-SDDC1 Clase A

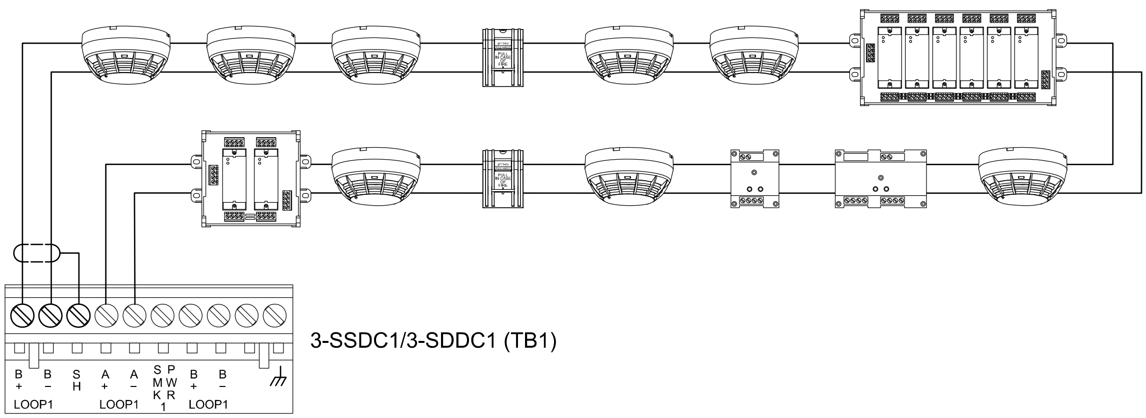
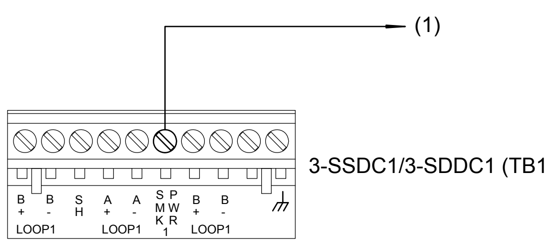
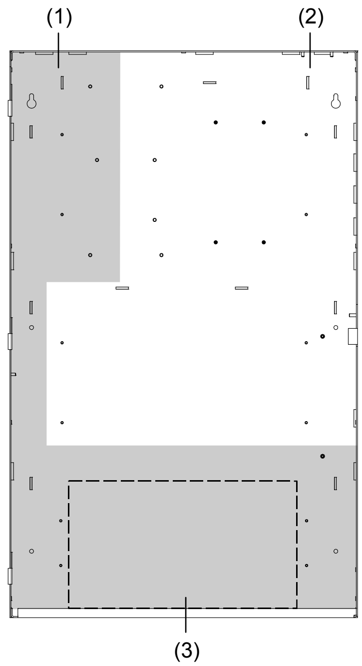


Figura 8: Cableado de potencia de humo 3-SSDC1 y 3-SDDC1



(1) Potencia de humo para SIGA-UM o SIGA-MAB para un detector de humo a dos hilos

Figura 9: Cableado con limitación de potencia y cableado sin limitación de potencia



(1) Área con cableado sin limitación de potencia
(2) Área con cableado con limitación de potencia
(3) Área de la batería

Información regulatoria

Fabricante	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
Año de fabricación	Los primeros dos dígitos de la fecha de fabricación (ubicada en la etiqueta de identificación del producto) representan el año de manufactura.
Clase ambiental	UL: Ambientes interiores secos

Información de contacto

Para información de contacto, véase www.utcfireandsecurity.com.

FR: Fiche d’installation

Description

Ce document décrit l’installation de la carte de circuit de données 3-SDC1 Signature sur l’équipement suivant.

Modèle	Description
SFS1-CPU	Carte mère du panneau d’alarme incendie EST3X, prenant en charge deux circuits de signalisation
3-SSDC1	Module de contrôleur de boucle Signature unique avec possibilité d’ajouter une seconde boucle (SLC)
3-SDDC1	Module de contrôleur de boucle Signature double

La carte de circuit de données 3-SDC1 fournit un circuit de ligne de signalisation (boucle) de classe A ou B, prenant en charge jusqu’à 125 détecteurs et 125 adresses de modules. La carte produit également un courant 24 VCC réinitialisable permettant d’alimenter des circuits de détecteurs de fumée conventionnels à deux câbles sur les modules de la série Signature.

Installation

AVERTISSEMENT : Risque d’électrocution. Pour éviter tout dommage corporel ou danger de mort par électrocution, retirez toutes les sources d’alimentation et laissez l’énergie emmagasinée se décharger avant d’installer ou de retirer l’équipement.

Mises en garde

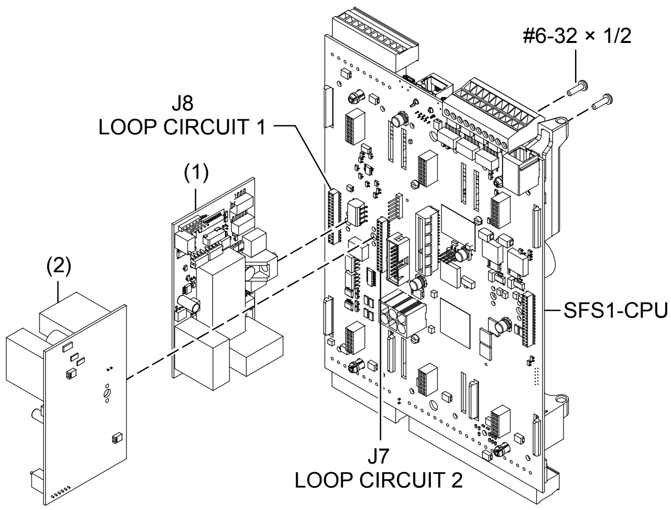
- Les cartes de circuit imprimé sont sensibles aux décharges électrostatiques (ESD). Observez les consignes de sécurité relatives aux ESD pour éviter tout dommage.
- Si vous retirez la carte mère SFS1-CPU pour installer le 3-SDC1, retirez d’abord les quatre plongeurs qui la fixent au châssis électronique. Vous risquez autrement d’endommager la carte mère.

Remarque : La carte 3-SDC1, pour le circuit en boucle 1 (SLC1) sur la carte mère SFS1-CPU, est préinstallée.

Pour installer le 3-SDC1 sur une carte mère SFS1-CPU :

1. Si vous remplacez la carte 3-SDC1 pour SLC1, retirez l’ancienne de J8 [LOOP CIRCUIT 1 (CIRCUIT EN BOUCLE 1)] sur la carte mère SFS1-CPU et remplacez-la par la nouvelle. Voir Figure 1.
2. Fixez la carte à l’aide de la vis en nylon fournie.
3. Si une seconde boucle est nécessaire, branchez une autre carte 3-SDC1 sur J7 [LOOP CIRCUIT 2 (CIRCUIT EN BOUCLE 2)], puis fixez-la à l’aide de la vis en nylon fournie.

Figure 1 : Installation du 3-SDC1 sur une carte mère SFS1-CPU

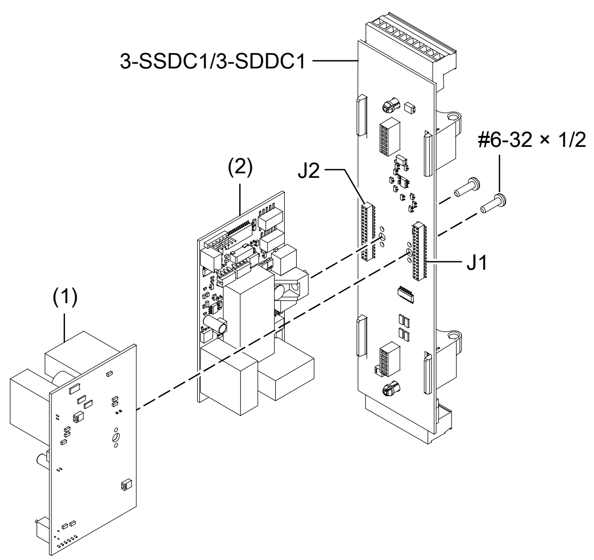


(1) 3-SDC1 pour SLC1 (2) 3-SDC1 pour SLC2

Pour installer le 3-SDC1 sur un module de contrôleur de boucle Signature :

1. Branchez le 3-SDC1 du circuit de ligne de signalisation 1 sur J1 du module du contrôleur de boucle Signature. Voir Figure 2.
2. Fixez la carte à l'aide de la vis en nylon fournie.
3. Si une seconde boucle est nécessaire, branchez une autre carte 3-SDC1 sur J2 de la carte 3-SDDC1, puis fixez-la à l'aide de la vis en nylon fournie.

Figure 2 : Installation du 3-SDC1 sur un module de contrôleur de boucle Signature



(1) 3-SDC1 pour SLC 1 (2) 3-SDC1 pour SLC 2

Câblage

Branchez le câblage in situ de signalisation du circuit de ligne, tel que présenté de Figure 4 à Figure 9.

Remarques

- Maintenez à tout moment une distance de 6 mm (0,25 po) entre le câblage à puissance limitée et celui à puissance non limitée. Maintenez le câblage à puissance non limitée dans la zone hachurée illustrée dans Figure 9. Fixez le câblage à l'armoire à l'aide d'attaches de câble en nylon.
- Les câblages sont à puissance limitée et parcourus par un courant permanent.
- Le câblage du SLC 2 (TB2) est identique à celui du SLC1 (TB1).
- Si un blindage est utilisé, il doit être continu, fixé sur l'ensemble du circuit et non mis à la terre, et ne doit se terminer qu'à la borne blindée.
- Si vous utilisez des applications de notification pour plusieurs zones sur la ligne de données, chacune doit être isolée de façon à ce qu'une coupure, une mise à la terre ou une panne de capacité de boucle n'affecte qu'une seule zone.

Figure 3 : Câblage de classe B de la carte SFS1-CPU

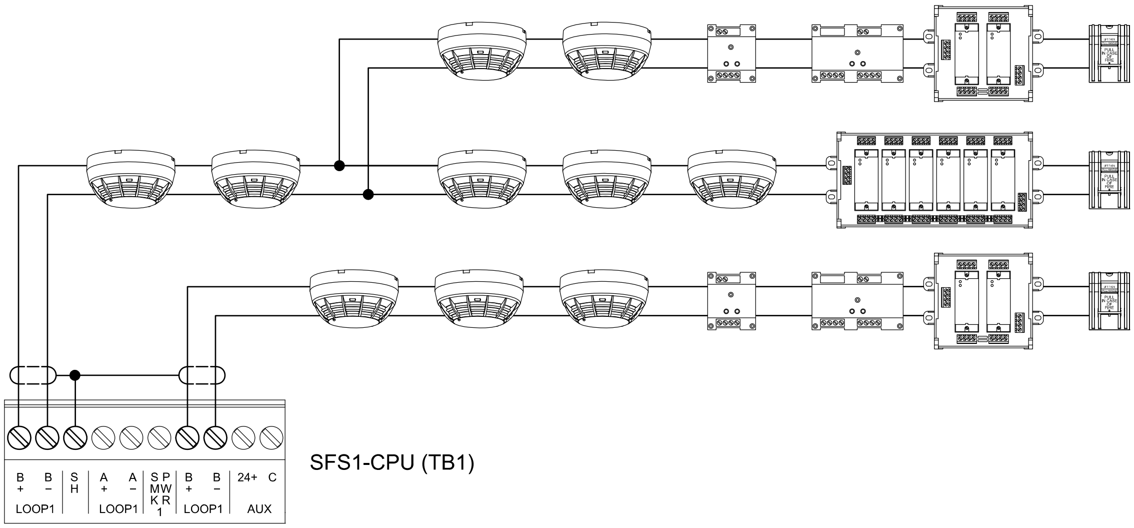


Figure 4 : Câblage de classe A de la carte SFS1-CPU

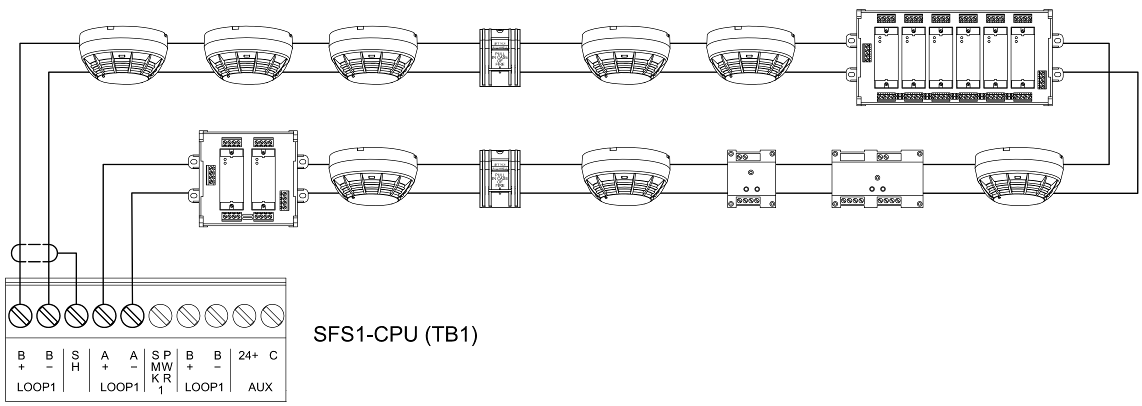
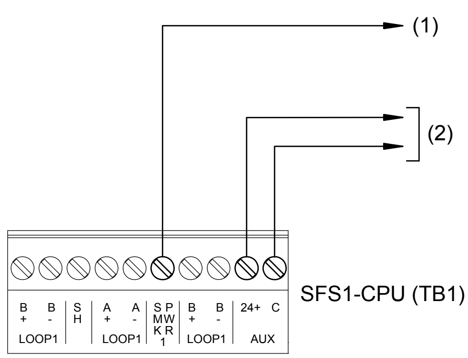


Figure 5 : Câblage de l'alimentation de la détection de fumée et câblage AUX de la carte SFS1-CPU



Légende

(1) Alimentation de la détection de fumée vers SIGA-UM ou SIGA-MAB
(2) Vers un équipement externe avec des caractéristiques nominales compatibles

Remarques

- L'alimentation AUX des circuits en boucle 1 et 2 sur la carte SFS1-CPU n'est pas isolée et ne sert pas pour l'alimentation de la boucle fumée.
- L'alimentation AUX du circuit en boucle 2 (TB2) sur la carte SFS1-CPU est disponible, qu'une seconde carte 3-SDC1 soit installée ou non.
- L'alimentation de la détection de fumée du circuit en boucle 2 (TB2) sur la carte SFS1-CPU n'est pas disponible, à moins qu'une seconde carte 3-SDC1 soit installée.

Figure 6 : Câblage de classe B des cartes 3-SSDC1 et 3-SDDC1

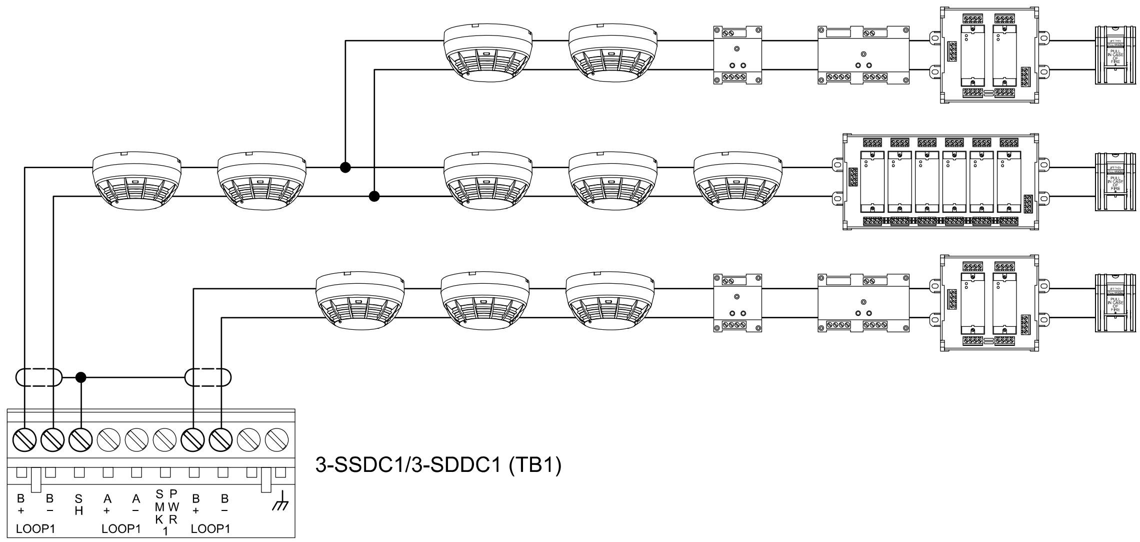


Figure 7 : Câblage de classe A des cartes 3-SSDC1 et 3-SDDC1

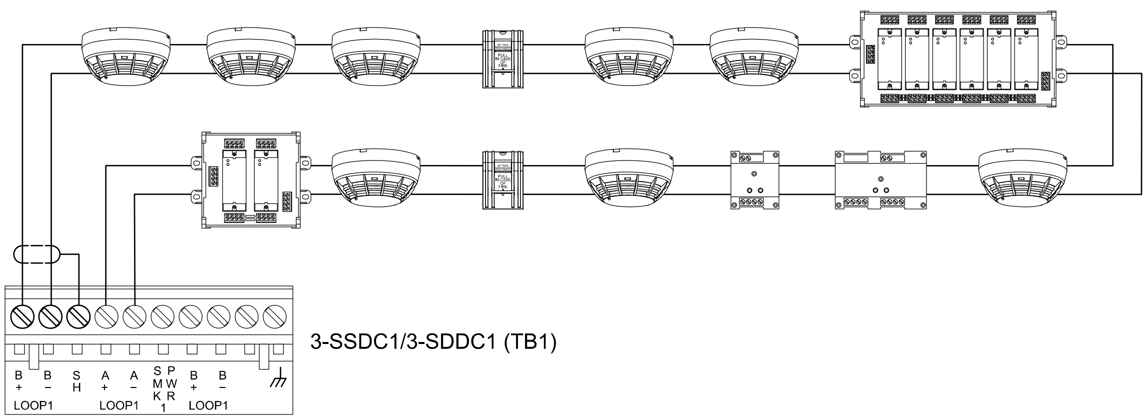
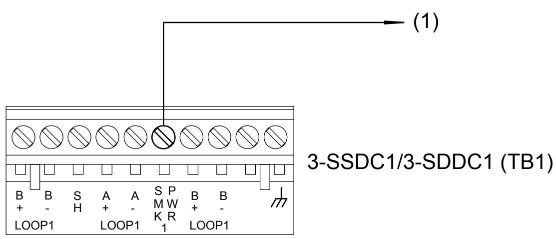
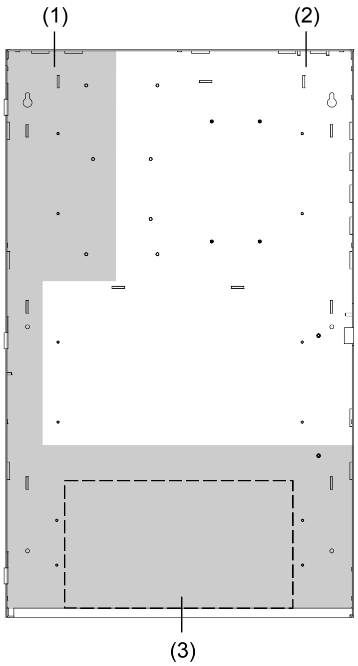


Figure 8 : Câblage de l'alimentation de détection de fumée des cartes 3-SSDC1 et 3-SDDC1



(1) Alimentation de la détection de fumée vers SIGA-UM ou SIGA-MAB pour un détecteur de fumée à deux câbles

Figure 9 : Câblage limité et non limité en puissance



(1) Zone pour le câblage à puissance non limitée
(2) Zone pour le câblage à puissance limitée
(3) Zone pour la batterie

Caractéristiques techniques

3-SDC1 pour une carte mère SFS1-CPU

Quantité	2 [1]
Tension	19,0 VCC nom., 24 VCC max.
Courant avec une boucle complète de dispositifs	
En veille	120 mA à 24 VCC
Alarme	132 mA à 24 VCC
Circuit	
Désignation	Classe B (type 4), Classe A (type 6)
Capacité	125 détecteurs et 125 adresses de modules par circuit, série Signature
Résistance	100 Ω max.
Capacité électrique	0,5 µF max.
Sortie alimentation fumée	
Tension	24 VCC max.
Courant	85 mA
Sortie alimentation AUX	24 VCC, réinitialisable ou continu 1,0 A sur chaque circuit, 1,0 A au total
Câble	12 à 18 AWG (1,0 à 4,0 mm²) max.
Environnement de fonctionnement	
Température	0 à 49 ºC (32 à 120 ºF)
Humidité relative	0 à 93 % sans condensation

[1] Une carte 3-SDC1 est préinstallée. Une seconde carte est disponible en option.

Contrôleurs 3-SDC1 pour 3-SSDC1 et 3-SDDC1

Quantité	
3-SSDC1	Une carte 3-SDC1
3-SDDC1	Deux cartes 3-SDC1
Tension	19,0 VCC nom., 24 VCC max.
Courant avec une boucle complète de dispositifs pour un circuit	
En veille	144 mA à 24 VCC
Alarme	204 mA à 24 VCC
Courant avec une boucle complète de dispositifs pour deux circuits	
En veille	264 mA à 24 VCC
Alarme	336 mA à 24 VCC
Alimentation fumée	
Tension	24 VCC max.
Courant	19,95 mA
Circuit	
Désignation	Classe B (type 4) ou Classe A (type 6)
Capacité	125 détecteurs et 125 adresses de modules par circuit, série Signature
Résistance	100 Ω max.
Capacité électrique	0,5 µF max.
Câble	12 à 18 AWG (1,0 à 4,0 mm²) max.
Environnement de fonctionnement	
Température	0 à 49 °C (32 à 120 °F)
Humidité relative	0 à 93 % sans condensation

Information réglementaire

Fabricant	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
Année de fabrication	Les deux premiers chiffres de la date de fabrication (sur l'étiquette d'identification du produit) correspondent à l'année de fabrication.
Classe de service	UL : milieu intérieur sec

Coordonnées

Pour obtenir nos coordonnées, consultez le site Web www.utcfireandsecurity.com.

PT: Folheto de instalação

Descrição

Esse documento descreve como instalar o Cartão de Circuito de Dados 3-SDC1 Signature nos seguintes equipamentos.

Modelo	Descrição
SFS1-CPU	Placa principal do painel de incêndio EST3X que suporta dois circuitos de sinalização
3-SSDC1	Módulo controlador de circuito Signature simples com a opção de adicionar um segundo circuito (SLC)
3-SDDC1	Módulo controlador de circuito Signature dual

O cartão de circuito de dados 3-SDC1 fornece um circuito de linha de sinalização Classe B or A que suporta até 125 detectores and 125 endereços de módulos. O cartão também fornece 24 VDC que pode ser ressetado para alimentação de circuitos de detectores de fumaça convencionais de dois fios em módulos da série Signature.

Instalação

AVISO: Perigo de eletrocussão. Para evitar ferimentos ou morte por eletrocussão, remova todas fontes de energia e deixe a energia armazenada descarregar antes de instalar ou remover o equipamento.

Cuidados

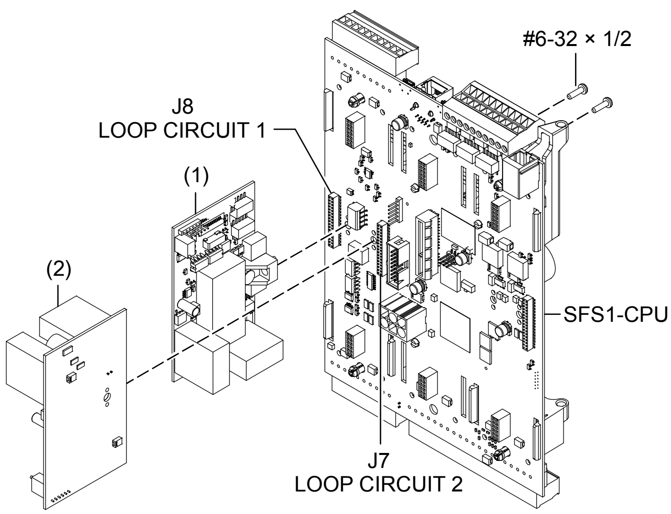
- Placas de circuito são sensíveis a descargas eletrostáticas (ESD). Para evitar danos, siga procedimentos de manuseio ESD.
- Se remover a placa principal SFS1-CPU do chassi eletrônico para instalar o 3-SDC1, primeiro retire os quatro êmbolos que fixam a placa principal ao chassi eletrônico. Caso contrário, poderá danificar a placa principal.

Nota: O cartão 3-SDC1 para circuito fechado (SLC1) na placa principal SFS1-CPU está pré-instalado.

Para instalar o 3-SDC1 numa placa principal SFS1-CPU:

1. Se substituir o cartão 3-SDC1 para SLC1, remova o cartão antigo do J8 (LOOP CIRCUIT 1) na placa principal do SFS1-CPU e substitua-o pelo novo. Ver Figura 1.
2. Fixe o cartão usando o parafuso de nylon fornecido.
3. Se for necessário um segundo circuito, plugue um cartão adicional
   3-SDC1 em J7 (LOOP CIRCUIT 2), e então fixe-o com o parafuso de nylon fornecido.

Figura 1: Instalando o 3-SDC1 numa placa principal SFS1-CPU

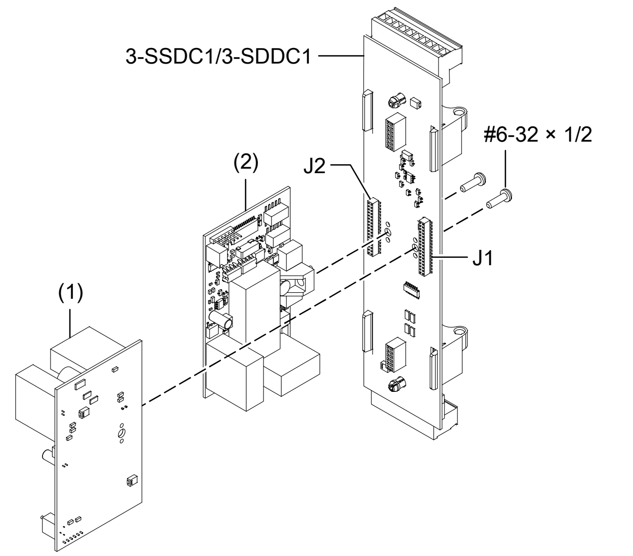


(1) 3-SDC1 para SLC1 (2) 3-SDC1 para SLC2

Para instalar o 3-SDC1 num módulo controlador de circuito Signature:

1. Plugue o 3-SDC1 para circuito de linha de sinalização 1 em J1 no módulo controlador de circuito Signature. Ver Figura 2.
2. Fixe o cartão usando o parafuso de nylon fornecido.
3. Se for necessário um segundo circuito, plugue um cartão adicional 3-SDC1 em J2 numa placa 3-SDDC1, e então fixe-o com o parafuso de nylon fornecido.

Figura 2: Instalando o 3-SDC1 em um módulo controlador de circuito Signature



(1) 3-SDC1 para SLC1 (2) 3-SDC1 para SLC2

Ligação

Conecte a ligação de campo do circuito de linha de sinalização como mostrado na Figura 4 até a Figura 9.

Notas

- Mantenha sempre 6 mm (0,25") de separação entre as fiações com potência limitada e a não-limitada. Mantenha a fiação com potência não-limitada na área sombreada mostrada na Figura 9. Fixe a fiação ao gabinete com abraçadeiras de cabo de nylon.
- A ligação é supervisionada e de potência limitada.
- SLC 2 (TB2) é ligada da mesmo forma que SLC1 (TB1).
- Se for usada blindagem, ela precisa ser contínua, terminada apenas no terminal da blindagem, com fita do começo ao fim do circuito.
- Se dispositivos de notificação forem usados na linha de dados de mais de uma zona, cada zona deve ser isolada, de forma que uma interrupção, aterramento, ou curto-circuito não afete mais de uma zona.

Figura 3: Ligação SFS1-CPU Classe B

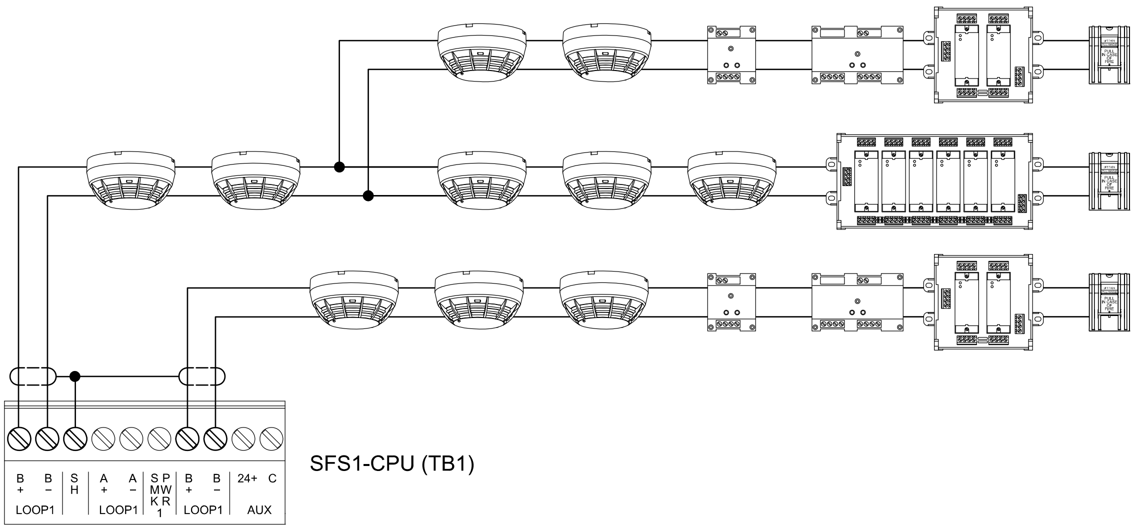


Figura 4: Ligação SFS1-CPU Classe A

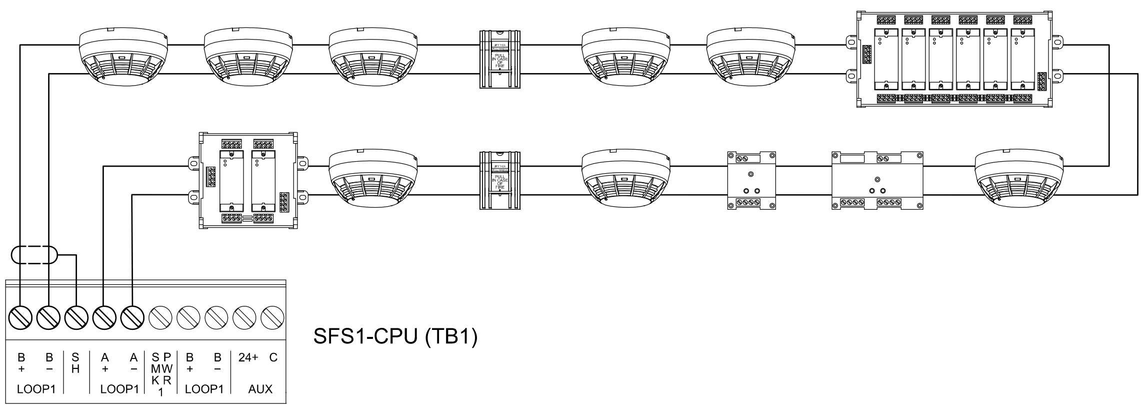
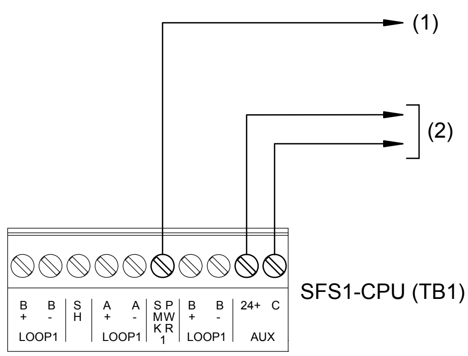


Figura 5: Ligação SFS1-CPU energia de fumaça e AUX



Legenda

(1) Energia de fumaça para SIGA-UM ou SIGA-MAB para um detector de fumaça de dois fios
(2) Para equipamento externo com categorias compatíveis

Notas

- Energia AUX nos circuitos 1 e 2 na SFS1-CPU é não-isolada e não utilizada para energia do circuito de fumaça.
- Energia AUX no circuito 2 (TB2) na SFS1-CPU é disponível, se um segundo cartão VM-SLC está instalado, ou não.
- Energia de fumaça no circuito 2 (TB2) na SFS1-CPU não está disponível a menos que um segundo cartão 3-SDC1 seja instalado.

Figura 6: Ligação 3-SSDC1 e 3-SDDC1 Classe B

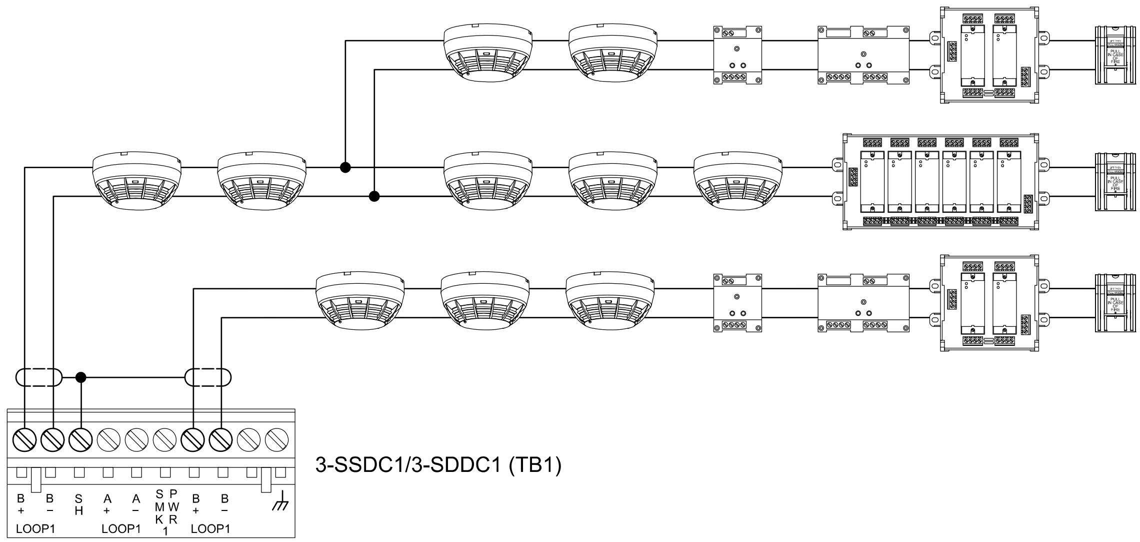


Figura 7: Ligação 3-SSDC1 e 3-SDDC1 Classe A

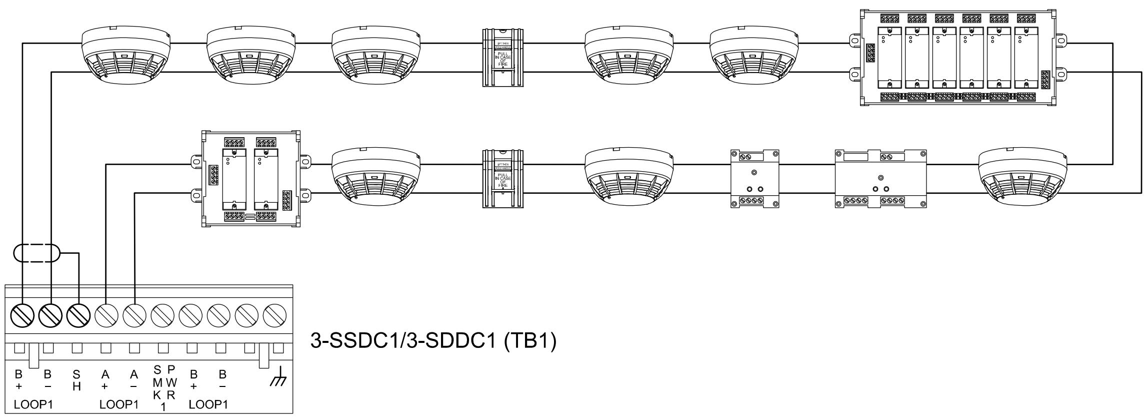
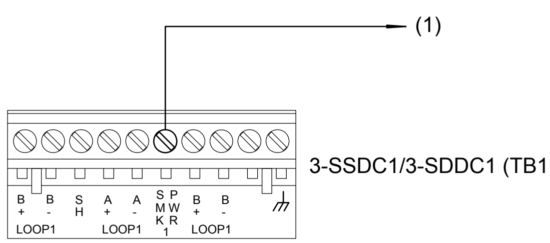
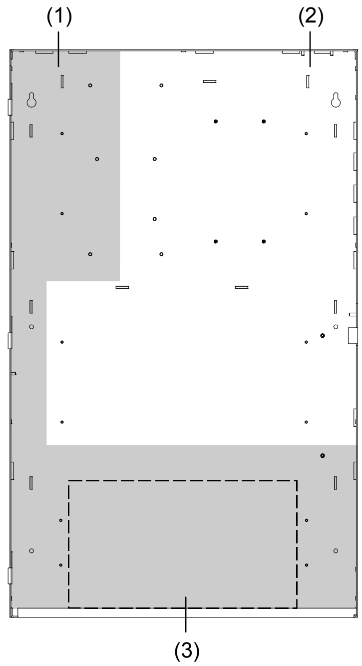


Figura 8: Ligação de energia de fumação 3-SSDC1 e 3-SDDC1



(1) Energia de fumaça para SIGA-UM ou SIGA-MAB para um detector de fumaça de dois fios

Figura 9: Fiação com potência limitada e não-limitada



(1) Área da fiação com potência não-limitada
(2) Área da fiação com potência-limitada
(3) Área de bateria

Especificações

3-SDC1 para uma placa principal SFS1-CPU

Quantidade	2 [1]
Voltagem	19,0 VDC nom., 24 VDC max.
Corrente com circuito completo de aparelhos	
Standby	120 mA em 24 VDC
Alarme	132 mA em 24 VDC
Circuito	
Designação	Classe B (Estilo 4), Classe A (Estilo 6)
Capacidade	125 detectores e 125 endereços de módulos por circuito, Série Signature
Resistência	100 Ω max.
Capacitância	0,5 µF max.
Potência de saída de fumaça	
Voltagem	24 VDC max.
Corrente	85 mA
Potência de saída AUX	24 VDC, ressetável ou contínuo 1,0 A cada circuito, 1,0 A total
Dimensões da fiação	12 a 18 AWG (1,0 a 4,0 mm²) max.
Ambiente de operação	
Temperatura	0 a 49°C (32 a 120°F)
Umidade relativa	0 a 93% não condensado

[1] Um 3-SDC1 está pré-instalado. Um segundo cartão é opcional.

3-SDC1 para controladores 3-SSDC1 e 3-SDDC1

Quantidade	
3-SSDC1	Um cartão 3-SDC1
3-SDDC1	Dois cartões 3-SDC1
Voltagem	19,0 VDC nom., 24 VDC max.
Corrente com circuito completo de aparelhos num circuito	
Standby	144 mA at 24 VDC
Alarme	204 at 24 VDC
Corrente com circuito completo de aparelhos em dois circuitos	
Standby	264 mA em 24 VDC
Alarm	336 mA em 24 VDC
Energia de fumaça	
Voltagem	24 VDC max.
Corrente	19,95 mA
Circuito	
Designação	Classe B (Estilo 4) ou Classe A (Estilo 6)
Capacidade	125 detectores e 125 módulos de endereço por circuito, Série Signature
Resistência	100 Ω max.
Capacitância	0,5 µF max.
Dimensões da fiação	12 a 18 AWG (1,0 a 4,0 mm²) max.
Ambiente de operação	
Temperatura	0 a 49°C (32 a 120°F)
Umidade relativa	0 a 93% não condensado

Informações de regulamentação

Fabricante	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
Ano de fabricação	Os dois primeiros dígitos do número de série do produto (localizado na etiqueta de identificação do produto) são o ano de fabricação.
Classe ambiental	UL: Interior seco

Informação de contato

Para informação de contato, veja www.utcfireandsecurity.com.

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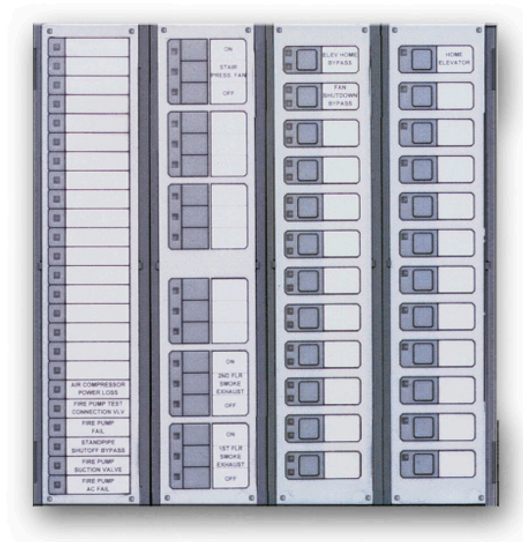
<u>EST3 CONTROL/DISPLAY MODULE, 12 SWITCHES, 12 RED LEDs</u>

Operations & Maintenance Manual
December 2015

Life Safety & Communications

Control Display Modules

3-LDSM, 3-24x series, 3-12xx series, 3-6/3S1xxx series



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7165-1657: 0186/0193

Overview

The EST3 Control Display modules provide the emergency user with the simplest of interfaces, lights and switch control. The Control Display modules install over local rail modules. The local rail modules supply the power and drivers via a ribbon cable connection to the control display modules. The displays mount over any local rail module maximizing the flexibility of design layout. When a display module is required where no local rail module exists, an LED Display Support Module 3-LDSM mounts to the local rail providing support for one Control Display Module.

Surface mount technology used to minimize space, also reduces the power requirements of display modules. Slide-in labels keep the control display modules flexible and allow labeling for local languages.

Module lamp test can be programmed to any spare control switch or a local node lamp test is initiated by simultaneously operating the Alarm Silence and Trouble Silence switches on the 3-CPU.

Standard Features

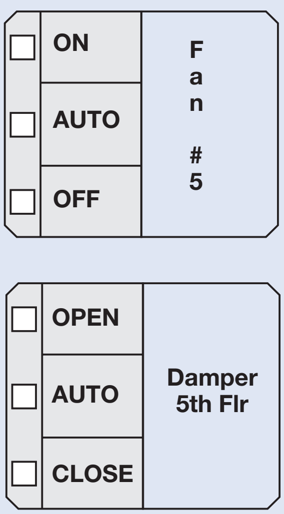
- Programmable LED flash rates
- Membrane style tactile pushbuttons
- Software supported for toggle, and latching interlock switch action
- Slide in labels
- Lamp test

Application Notes

Control Display Modules come in a variety of types providing operational flexibility. There are five types of display modules available with EST3.

Typically alarm zone annunciation appears on any of the first four module types shown. The first module supports simple zone annunciation; the second, zone annunciation with zone disable; the third, alarm and trouble zone annunciation, the fourth alarm and trouble zone annunciation with zone disable. From a simple one LED annunciation point to higher functionality, EST3 fills the requirements.

Simple Control Examples



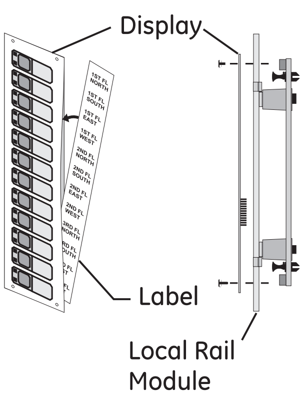
The fifth module is very adaptable to system requirements for audio or remote equipment control. Each module contains 18 LEDs and 18 switches. Each group of three switches has a latching-interlock to support operations that must be kept separated. The interlock is under software control so only one switch is active at a given time. EST3 software makes meeting the wide variety of applications needed with today's codes and building system operations easy.

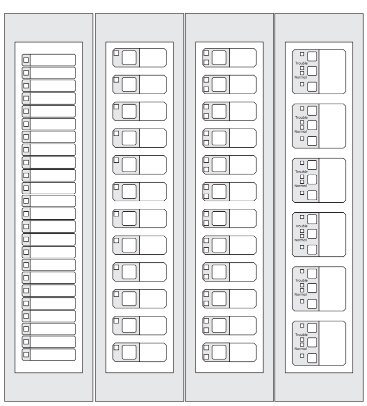
For fan control the emergency user assumes control of the remote device by selecting "On" or "Off." Programming of the switches to multiple relays keeps operational design choices open. The user returns the system control of the remote device to the Life Safety system by simply pressing Auto. The Auto LED programs to its related switch and gives positive feed back to the user by turning on yellow when the system has active control of remote devices.

Individual switch LEDs are also programmable. As an example the "Open" or "On" LED (green) could program to follow its related switch or, program to follow a remote monitor input and provide positive feedback of the remote devices control status. If budget restrictions prevent "sail type" positive feedback, EST's unique command processing satisfy requirements for positive feedback of HVAC control systems. Any switch command will send a signal to the 3-CPU for processing. While in this state the LED associated with the switch will flash. Once the command has been received by a remote Signature Series Module, the module (since it is intelligent with its own microprocessor) will issue a "Processed" command back to the 3-CPU which will latch the LED associated with the switch "ON" steady. This same process is used for all audio speaker selections ensuring the circuit is connected. A variety of switch and associated LED colors are available to meet the demands of the specifiers application.

Life Safety Systems are generally passive requiring only occasional operation. Yet, in an emergency the user must be able to identify system operation and status quickly and easily. LCD displays are excellent for identifying specific information, but even a large LCD can not display overall "system" status as effectively as LEDs and Switches. The EST3 Control Display modules are designed to provide simple identification and operation of system functions for the emergency user. They provide positive feedback of control activity with unrivaled selection of display configurations and mounting location options.

Installation and Mounting



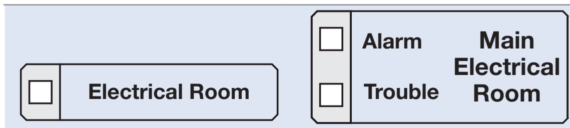


Engineering Specification

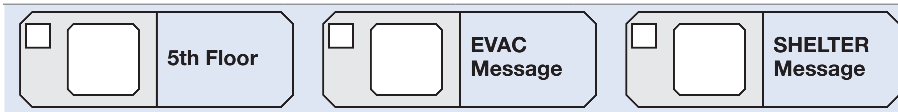
The Life Safety system shall incorporate annunciation of Alarm, Supervisory, Trouble and Monitor operations. Annunciation must be through the use of LED display strips complete with a means to custom label each LED as to its function. Where applicable control of remote smoke control devices must be made available at the control center. Switches with LEDs must provide positive feed back to the operator of remote equipment status. Where voice audio is required a means of paging individual zones must be made. The status of each paging zone must be annunciated. It must be possible to selectively page into specific zones. It shall be possible to manipulate the evacuation of the building from the main control center. It must be possible for the emergency operator to put specific zones into evacuation manually.

Technical Specifications

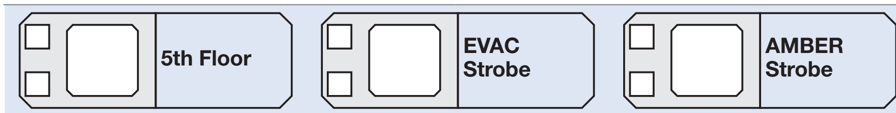
Catalog Number	Number of LEDs	LED Colors	Switches	Applications	Alarm Current
3-LDSM	N/A	N/A	N/A	Provides interface for one Control Display Module	5 mA



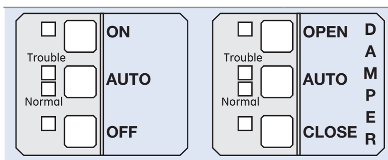
3-24R	24	red	0	Alarm Annunciation	2 mA base + 1.5 mA per active LED
3-24Y		yellow		Supervisory and Trouble Annunciation	
3-24G		green		Monitor Annunciation	
3-12RY		12 red over 12 yellow pairs		Red LEDs Alarm Annunciation Yellow LEDs Supervisory Annunciation	



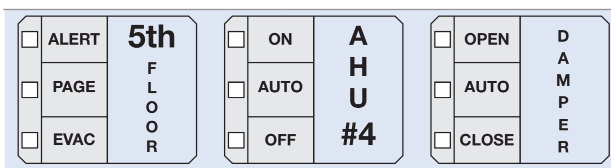
3-12SR	12	red	12	Alarm Annunciation with enable/disable operation	2 mA base + 1.5 mA per active LED
3-12SY		yellow		Supervisory Annunciation with enable/disable operation	
3-12SG		green		Monitor Annunciation, Page select	



3-12/S1GY	12 groups of two w/ switch	green/ yellow	12	Zone Page select with Trouble Annunciation	2 mA base + 1.5 mA per active LED
3-12/S1RY		red/yellow		Alarm and Trouble Annunciation with enable/disable	
3-12/S2Y		yellow/ yellow		Supervisory and Trouble Annunciation with enable/disable	



3-4/3SGYWR	4 LEDs	Green /Yellow and White/Red	1 2 3 switches	On-Auto-Off fan and Open-Auto-Close Damper Control with Trouble and Normal LED indicators	2mA base + 1.5mA per active LED



3-6/3S1G2Y	6 groups of 3 w/switch	green/yellow / yellow	Six groups of three	On-Auto-Off fan and Open-Auto-Close Damper Control	2 mA base + 1.5 mA per active LED
3-6/3S1GYR		green/yellow / red		Page and Evacuation select with zone trouble	

Notes:

1) All Control Display Modules are UL and ULC listed.

2) All Control Display Modules mount over one Local Rail Module. If no local rail module exists the 3-LDSM mounts to local rail and supports one control display module.

Contact us...

Email: edwards.fire@fs.utc.com
Web: www.est-fire.com

EST is an EDWARDS brand.

1016 Corporate Park Drive
Mebane, NC 27302

In Canada, contact Chubb Edwards...
Email: inquiries@chubbedwards.com
Web: www.chubbedwards.com

Ordering Information

Catalog Number	Description	Shipping Weight
3-LDSM	LED Display Support Module	0.45lb (.2kg)
3-24R	24 Red LED Display Module	0.35lb (.12kg)
3-24Y	24 Yellow LED Display Module	
3-24G	24 Green LED Display Module	
3-12SR	12 switches with 12 Red LED Display/Control Module	
3-12SY	12 switches with 12 Yellow LED Display/Control Module	
3-12SG	12 switches with 12 Green LED Display/Control Module	
3-12RY	12 Red LED and 12 Yellow LED Display Module	
3-12/S1GY	12 switches with one Green and one Yellow LED per switch Display/Control Module	
3-12/S1RY	12 switches with one Red and one Yellow LED per switch Display/Control Module	
3-12/S2Y	12 switches with two Yellow LEDs per switch Display/Control Module	
3-6/3S1G2Y	Six groups of three switches. Each switch with one LED. LEDs provided Green, Yellow, Yellow.	
3-4/3SGYWR	12 switches in four groups of three switches, switch one with a green LED, switch two with yellow and white LEDs and switch three with a red LED	
3-6/3S1GYR	Six groups of three switches. Each switch with one LED. LEDs provided Green, Yellow, Red	

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Control-Display Module Installation Sheet

Description

Control-display modules provide additional operator interface capability for the life safety system. They can be mounted on any local rail module, except the 3-CPU3 and 3-ANNCPU3. Inserts are provided for labeling switches and LEDs.

This document provides installation instructions for the control-display modules listed below.

Model	Description
3-24R	Twenty-four red LEDs
3-24Y	Twenty-four yellow LEDs
3-24G	Twenty-four green LEDs
3-12RY	Twelve red-over-yellow pairs of LEDs
3-12SG	Twelve LED-switches with green LEDs
3-12SR	Twelve LED-switches with red LEDs
3-12SY	Twelve LED-switches with yellow LEDs
3-12/S1GY	Twelve LED-switches with green-over-yellow LEDs
3-12/S1RY	Twelve LED-switches with red-over-yellow LEDs
3-12/S2Y	Twelve LED-switches with yellow-over-yellow LEDs
3-6/3S1G2Y	Six groups of three LED-switches with green LEDs (top switch), and yellow LEDs (middle and bottom switch)
3-6/3S1GYR	Six groups of three LED-switches with green LEDs (top switch), yellow LEDs (middle switch), and red LEDs (bottom switch)
3-4/3SGYWR	Four groups of three LED-switches with green LEDs (top switch), yellow-over-white LEDs (middle switch), and red LEDs (bottom switch)

Installation

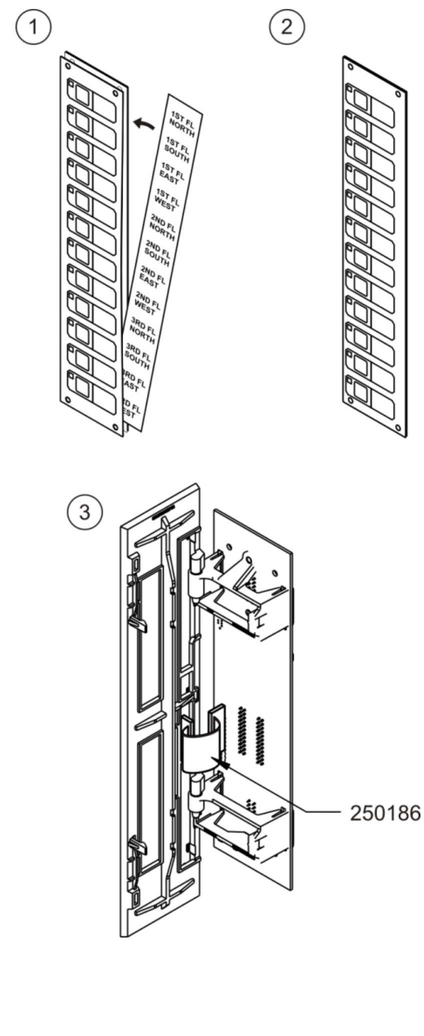
Cautions

- This product contains components that are sensitive to electrostatic discharge (ESD). Handle with care.
- Installing this product with power applied will damage the equipment. Power down the panel before installing.

To install a control-display module:

1. Fill out the label insert. Slip it between the overlay and the circuit board. See Figure 1.
2. Insert the left side of the control-display module into the door frame then push in on the right side until it snaps into place.
3. Connect the ribbon cable (P/N 250186) to the rail module with the red edge of the cable pointed up.

Figure 1: Installation



Specifications

Voltage	24 VDC
Current	
Standby	2.0 mA plus 1.5 mA for each active LED
Alarm	2.0 mA plus 1.5 mA for each active LED
Operating environment	
Temperature	32 to 120°F (0 to 49°C)
Humidity	0 to 93% RH, noncondensing at 90°F (32°C)

Contact information

For contact information, see www.edwardsutcfs.com.

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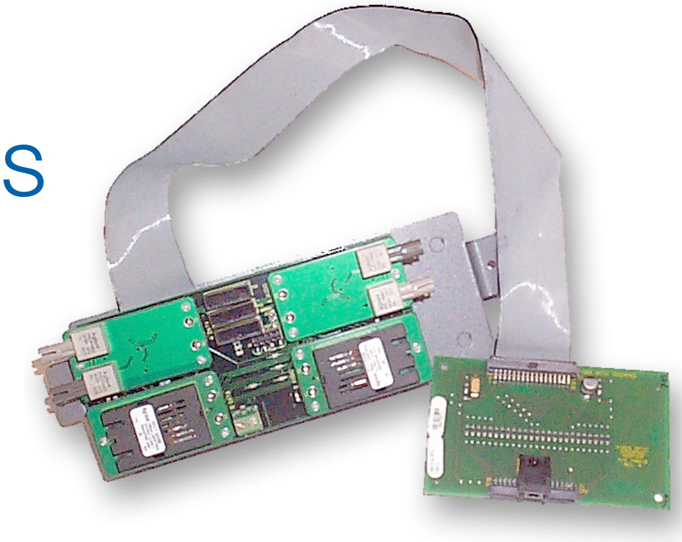
EST3 FIBER OPTIC COMMUNICATIONS INTERFACE

Operations & Maintenance Manual
December 2015

EST Life Safety & Communications

Fiber Optic Communications Interface

3-FIBMB2, SMXLO2, SMXHI2, MMXVR



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Overview

EST3 networks easily configure to single or multi mode fiber optic or combination fiber optic / copper networks using the 3-FIBMB2 Fiber Optic Communications Interface and the appropriate fiber optic transceivers.

The 3-FIBMB2 electronics card plugs right into the CPU. A ribbon cable connects the 3-CPU directly to the 3-FIBMB2 fiber interface card. The interface card mounts in the ½ footprint space in a 3-CHAS7 chassis or 3-CAB5 enclosure.

The 3-FIBMB2 supports from one to four single or multi mode transceivers that plug into the interface card. Each transceiver provides the transmission and reception capability for the network data or digital audio data to/from a 3-FIBMB2 located in the next network node using single and/or multi mode fiber optic cables.

The 3-FIBMB2 also supports copper wire connections, permitting network data and audio communications format changes from copper to single mode fiber, copper to multi-mode fiber, and single to multi-mode fiber, as job conditions require. All copper and fiber circuits can be configured as supervised Class A or Class B (Style 7 or Style 4) circuits.

The 3-FIBMB2 has a constant output test signal that simplifies installing and testing multi-mode fiber circuits only, reducing setup and troubleshooting time. Secondary power input terminals and an external 24 Vdc source can be used to provide continuous network and audio data to flow through the 3-FIBMB2, when the panel is powered down for servicing.

Standard Features

- Class A or Class B (Style 7 or Style 4) network data connections
- Class A or Class B (Style 7 or Style 4) audio data connections
- Node to node distances:
  Multi-mode: Up to 8,000 ft. (2.4 km) using multi-mode fiber
  Single-mode high power: Up to 24.85 mi (40 km) using single mode fiber driver - model SMXHI2
  Single-mode low power: Up to 8.7mi (14km) using single mode fiber driver- model SMXLO2
- Built-in test signal
- Secondary power input
- Transition from copper to fiber on same network
- Transition from single to multi-mode fiber on same network

Application

Fiber optics communication links provide a high level of immunity from electrical noise. The circuits are power limited and suitable for use through hazardous atmospheres. Fiber optic circuits also provide a high level of security and are resistant to the effects of moisture. The choice of either single mode or multi mode fiber links is one of cost vs the distances between nodes. System performance is identical with either single or multi mode fiber. *NOTE: The 3-FIBMB2/MMXVR is compatible with 3-FIB(A) multi mode fiber modules.*

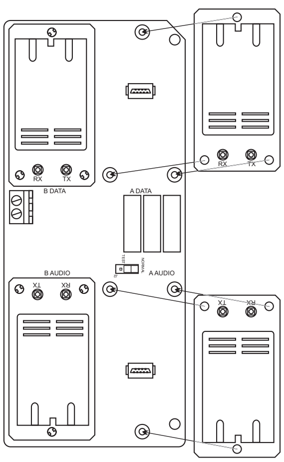
The SMXLO2 standard output single mode transceiver is suitable for distances up to approximately 8.7 miles (14km). The SMXHI2 high output single mode transceiver is available to span distances up to approximately 24 miles (40km).

For multi mode applications, the MMXVR transceiver is suitable for distances up to approximately 8,000ft (2,400m) Actual distances are dependent on the losses in each fiber optic circuit, and should be calculated for each installation. One transceiver is required for each fiber side of both network and audio links. Simply order the required type and number and type of transceiver(s) for your application.

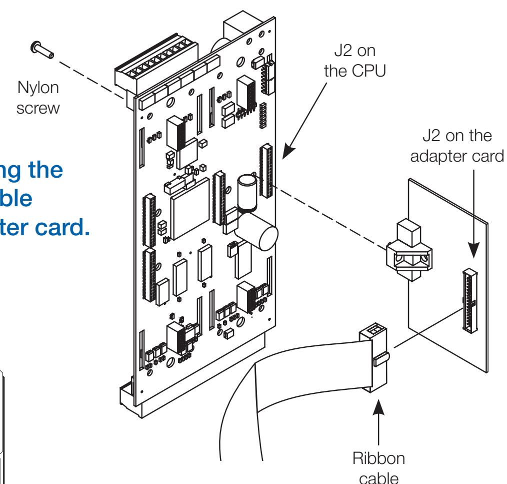
Engineering Specification

The intra-node communications links for network and digital audio data shall utilize copper and/or fiber optic connections. The fiber optics interface card shall provide Class B (Style 4) or Class A (Style 7) connections. It shall be possible to convert from fiber optic cable to copper wiring or from copper wiring to fiber optic cable at any network panel node. The fiber optics interface card shall have provisions for an external power source input to permit continuous network and audio data to flow through a network node while primary node power is removed for servicing purposes. The fiber optics interface card shall provide a constant output test signal for maintenance and troubleshooting purposes. The fiber optics interface module shall utilize single/multi mode fiber with SC single mode or ST multi-mode connectors.

Installation and Mounting

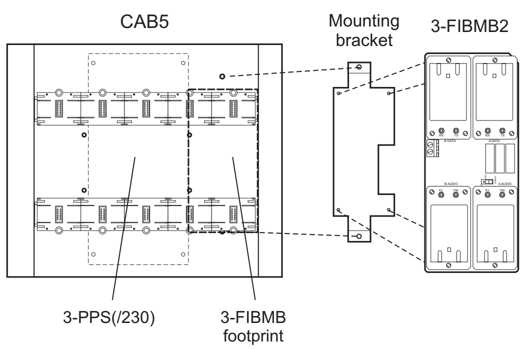


Attaching the transceivers. Any type of transceiver can be mounted in any of the four positions on the board.



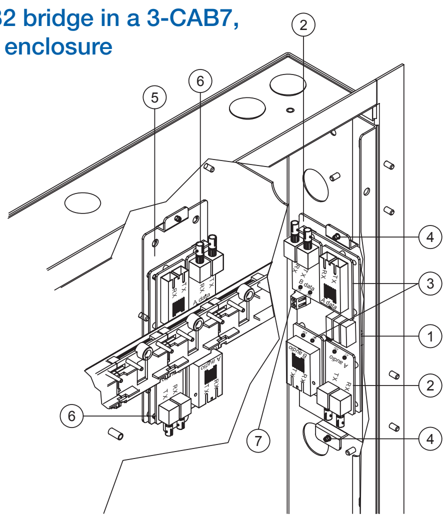
Connecting the ribbon cable and adapter card.

Mounting the bracket and the 3-FIBMB2 to a CAB5 enclosure

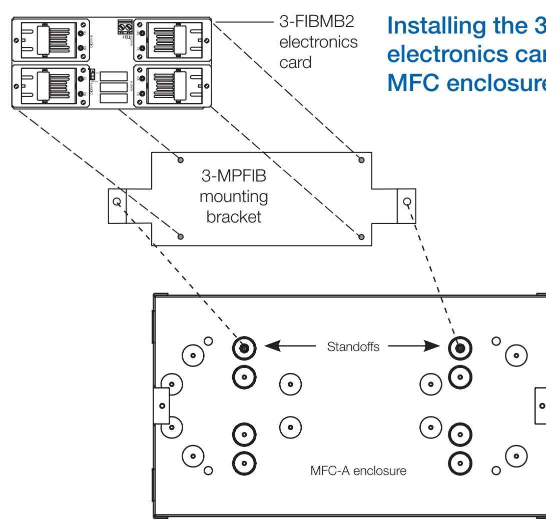


Installing the 3-FIBMB2 bridge in a 3-CAB7, 3-CAB14, or 3-CAB21 enclosure

1. 3-FIBMB2 electronics card on a 3-MPFIB mounting bracket
2. MMXVRs in the B data slot and A audio slot on the 3-FIBMB2
3. SMXLO2/SMXHI2 in the A data slot and B audio slot on the 3-FIBMB2
4. Mounting studs
5. Existing 3-FIBMB
6. MMXVR in the A data slot and B audio slot on the 3-FIBMB
7. 24 VDC

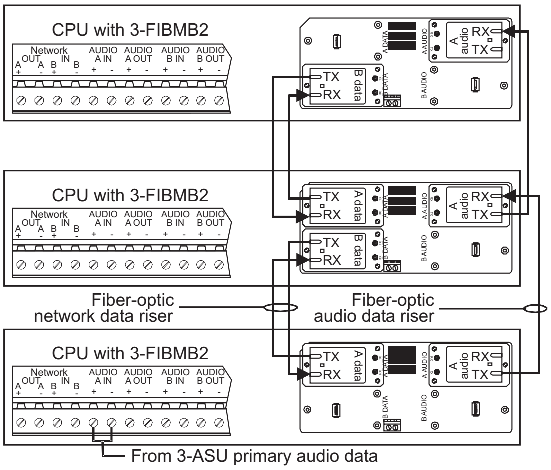


Installing the 3-FIBMB2 electronics card in an MFC enclosure

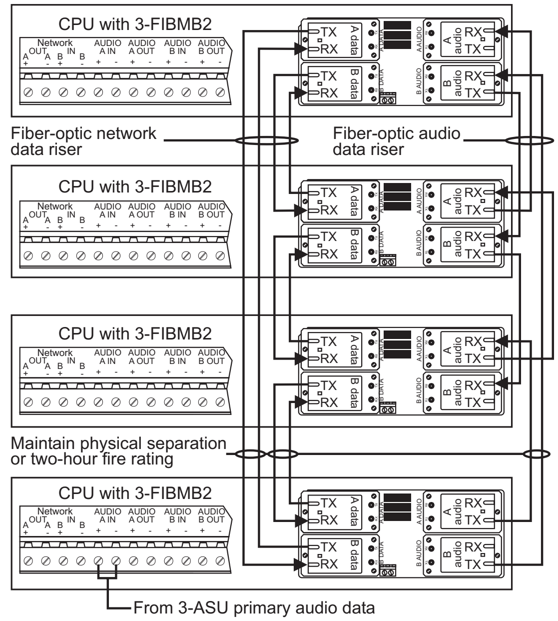


Typical Wiring

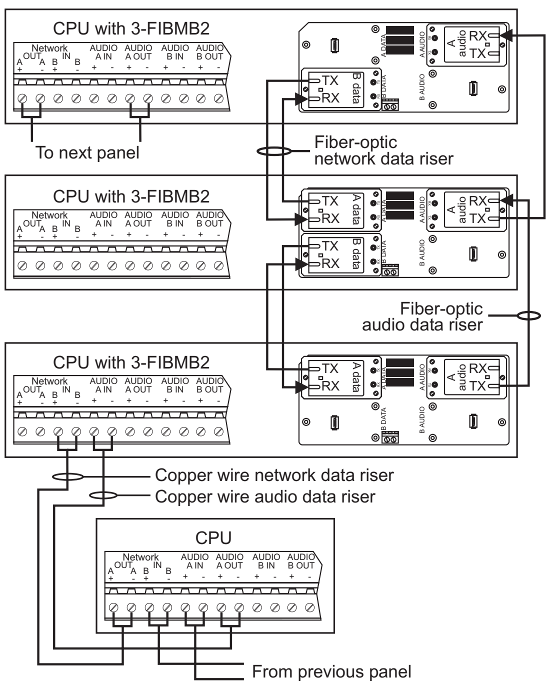
The following wiring diagrams can be used with single or multimode fiber. If using single mode use the SMXLO2 or SMXHI2 transceivers. If using multimode use the MMXVR transceivers.



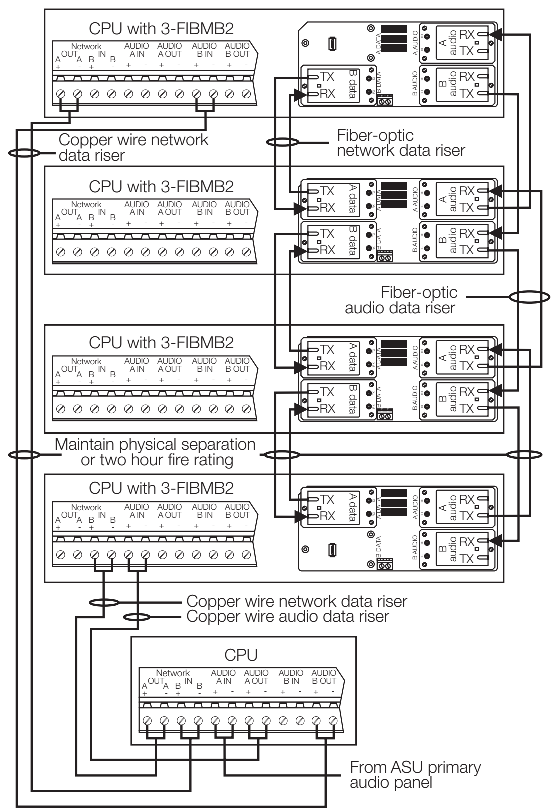
3-FIBMB2 Class B network and audio fiber-optic connections



3-CPU Class A network and audio fiber-optic connections

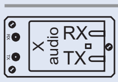


Class B hybrid fiber-optic and copper wire network and audio connections

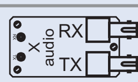


3-CPU hybrid fiber-optic and copper wire network and Class A fiber-optic and copper wire audio connections

Legend



Single mode transceiver

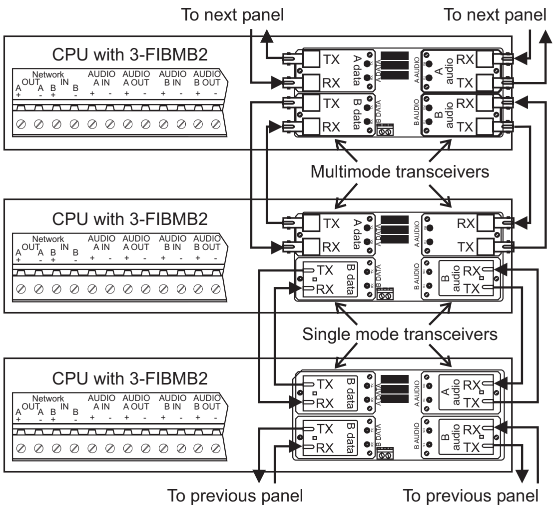


Multimode transceiver

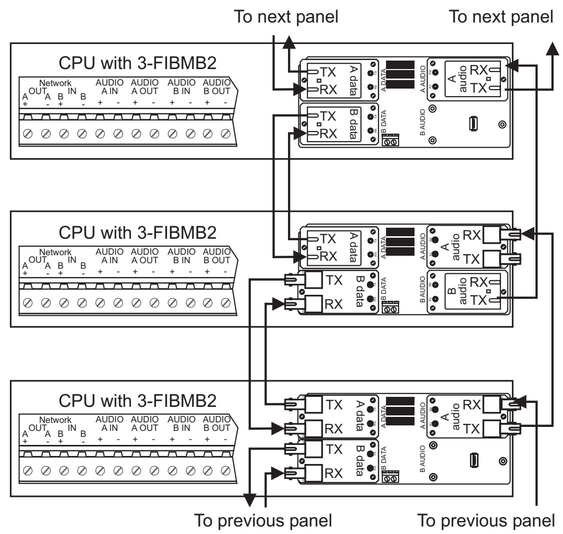
Note: These diagrams are for general information only. For more wiring diagrams and installation details, please refer to *3-FIBMB2 Fiber Optic Interface,* Installation Sheet 3101835.

Using single and multimode transceivers

Transition from single mode fiber to multimode fiber requires special configuration for the audio circuit. The following wiring diagrams show how to wire audio circuits in class B and class A using single mode and multimode fiber.

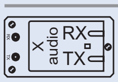


Data and audio circuit for Class A using single mode and multimode fiber

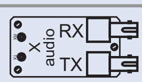


Data and audio circuit for Class B using single mode and multimode fiber

Legend



Single mode transceiver

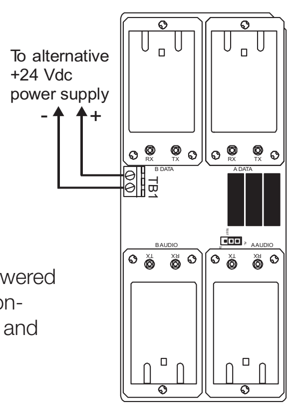


Multimode transceiver

Note: These diagrams are for general information only. For more wiring diagrams and installation details, please refer to *3-FIBMB2 Fiber Optic Interface,* Installation Sheet 3101835.

Wiring alternative power terminals

The 3-FIBMB2 provides a secondary power option, permitting communications to flow through the module, even with panel power disconnected.



Note: In the event a panel needs to be powered down for service; a 24 V battery can be connected to the module to maintain network and audio communications during servicing.

Specifications

Agency Listings		UL, ULC
Installation		Connector J2 of 3-CPU1. Fiber card mounts on ½ footprint 3-CHAS7, 3-CAB5 enclosure, or an MFC-A cabinet.
Compatibility		3-CPU1 and later
Single Mode (network & audio)		
	Budget	15 dBm (approximately
	SMXLO2	8.7mi. [14km] max).
	SMXHI2	25 dBm (approximately 24.85 mi. [40km] max). [1]
	Wavelength	1300nm
	Cable Type	8.3µ Single Mode
	Connector	Duplex SC
Multi mode (network & audio)		
	MMXVR Budget	10 dBm (approximately 8,000 ft [2.4 km] max).
	Wavelength	820nm
	Cable Type	50/125µ , 62.5/125µ or 100/140µ Multi mode
	Connector	ST
Network Data Circuit		
	Circuit Configuration	Class B (Style 4) or Class A (Style7)
	Data Rate	19.2K, or 38.4K Baud
	Isolation	From “previous” 3-CPU using copper, total isolation using fiber optics
Digital Audio Data Circuit		
	Circuit Configuration	Class B (Style 4) or Class A (Style7)
	Data Rate	327K Baud
	Isolation	From “previous” 3-CPU using copper, total isolation using fiber optics
Copper Wired Network Data Circuit Segment		
	Circuit Length	5.000ft (1,524 m) max. between any three panels
	Circuit Resistance	90 Ohms, max.
	Circuit Capacitance	0.3µf max.
	Wire Type	Twisted pair, 18 AWG (0.75 mm^2) min
Copper Wired Audio Data Circuit Segment		
	Circuit Length	5.000 ft (1,524 m) max. between any three panels
	Circuit Resistance	90 Ohms, max.
	Circuit Capacitance	0.09 µf max.
	Wire Type	Twisted pair, 18 AWG (0.75mm^2) min
Eye Safety		Complies with: FDA CDRH 2 -CFR 1040 Class 1 and IEC 825 Issue 1 1993:11 Class 1; CENELEC EN60825 Class 1
Power Consumption Supervisory and/or Alarm		3-FIBMB2: 105 mA @ 24Vdc Add 79 mA for each SMXLO2 and SMXHI2 Add 20 mA for each MMSVR
Operating Environment		Temperature: 32° F - 120° F (0° C - 49° C) Humidity 93% RH, Non-condensing @ 90° F (32° C)

[1] A minimum fiber attenuation of -8dBm is required when using the SMXHI2 in order to prevent overloading the receiver.

Ordering Information

Catalog Number	Description	Shipping Wt., lb (kg)
3-FIBMB2	Fiber Optic Communications Interface (requires one or more transceivers) c/w mounting bracket for 3-CHAS7 or 3-CAB5 enclosure mounting	1.0(.45)
*SMXLO2	Plug-In standard output single mode transceiver for 3-FIBMB2	0.5(.23)
*SMXHI2	Plug-In high output single mode transceiver for 3-FIBMB2	0.5(.23)
*MMXVR	Plug-In standard output multi mode transceiver for 3-FIBMB2	0.5(.23)

** 1 to 4 transceivers required, depending on application.*

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3-FIBMB2 Fiber Optic Interface Module Installation Sheet

Description

This document describes how to install the 3-FIBMB2 fiber optic interface module for typical applications and special applications.

The 3-FIBMB2 gives a fire panel the ability to network with fiber optic cable. Both Class B and Class A connections are supported.

The 3-FIBMB2 module consists of an adapter card and electronics card, and supports the following fiber optic transceivers.

Model	Description
SMXLO	Standard output single mode fiber optic transceiver
SMXLO2 [1]	Standard output single mode fiber optic transceiver
SMXHI	High output single mode fiber optic transceiver
SMXHI2 [1]	High output single mode fiber optic transceiver
MMXVR	Standard output multimode fiber optic transceiver

[1] Not backward compatible with the 3-FIBMB

The 3-FIBMB2 provides terminals for connecting a 24 VDC backup power source to maintain data transmissions in the event the panel is powered down.

Application notes

- A 3-FIBMB2 using SMXLO2 and SMXHI2 single mode fiber transceivers is not backward compatible with the 3-FIBMB.
- In a multimode fiber application, the 3-FIBMB and 3-FIBMB2 are fully backward compatible when using a MMXVR transceiver.
- For service replacement and network expansion in an existing single mode fiber application, all or some of the 3-FIBMB electronics cards may need to be replaced with 3-FIBMB2 electronics cards. See "Special applications installation" on page 3.
- The 3-FIBMB2 does not support annunciator panels.

Typical application installation

Installing the 3-FIBMB2 module for a typical installation consists of the following steps:

1. Installing the adapter card
2. Installing the transceivers
3. Installing the electronics card

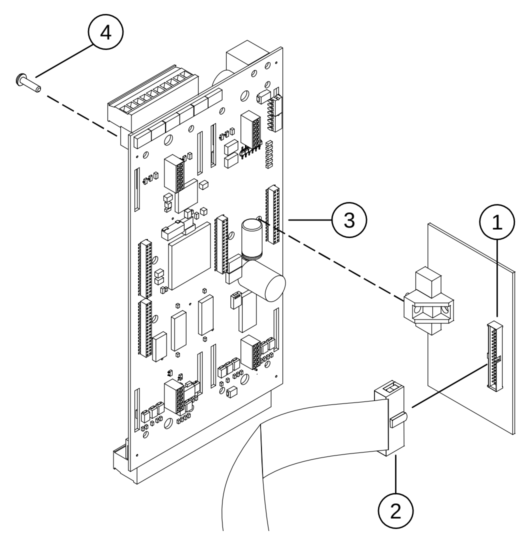
WARNING: Electrocution hazard. To avoid personal injury or death from electrocution, remove all sources of power and allow stored energy to discharge before installing or removing equipment.

Caution: Circuit boards are sensitive to electrostatic discharge (ESD). To avoid damage, follow ESD handling procedures.

Step 1: Installing the adapter card

1. Connect the ribbon cable (P/N 250222) to J2 on the adapter card (see Figure 1 below, items 1 and 2). Use the cable end that allows it to exit at a right angle.
2. Plug the adapter card into J2 on the CPU.
3. Secure the card using the nylon screw provided.
4. Route the ribbon cable to the bottom of the chassis.

Figure 1: Installing the 3-FIBMB2 adapter card



1. J2 on the adapter card
2. Ribbon cable
3. J2 on the CPU
4. Nylon screw

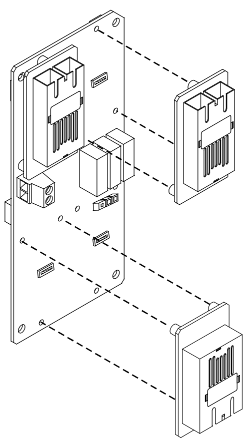
Step 2: Installing the transceivers

Note: Any combination of transceivers can be mounted in any of the four positions on the electronics card.

To install the transceivers:

1. For each transceiver required, align its mounting studs and plug with the position holes and socket on the electronics card. See Figure 2.
2. Snap each transceiver into place. Do not put excessive pressure on a transceiver when installing it.

Figure 2: Installing the transceivers on the electronics card



Step 3: Installing the electronics card

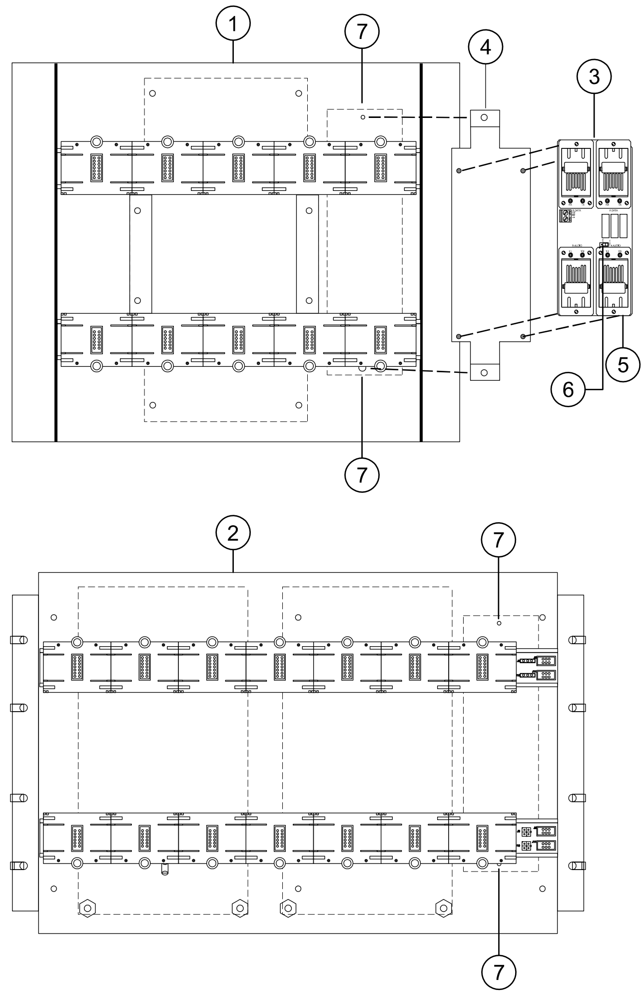
The 3-FIBMB2 electronics card can be mounted in a 3-CAB5, 3-CHAS7, or, when used in standalone and 3-FIBMB conversion applications, an MFC-A enclosure.

Note: When using an MFC-A enclosure, the enclosure must be installed no farther than 3 ft. (with conduit) in the same room as the control panel.

To install the electronics card in a 3-CAB5 or 3-CHAS7:

1. Connect the loose end of the ribbon cable to J1 on the back of the 3-FIBMB2 electronics card. See Figure 3, items 3 and 5.
2. Snap the electronics card (item 3) on the 3-MPFIB mounting bracket studs (item 4).
3. Place JP2 (item 6) in the NORMAL position.
4. Mount the 3-MPFIB bracket on the mounting studs located on the right side and behind the rails (item 7) of the 3-CAB5 backbox (item 1) or 3-CHAS7 back plate (item 2).

Figure 3: Installing the 3-FIBMB2 electronics card in a 3-CAB5 or 3-CHAS7

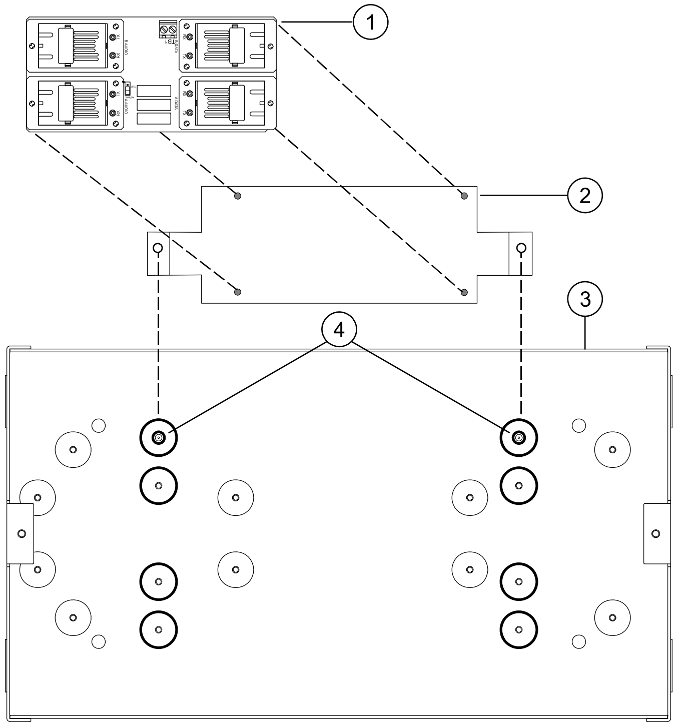


1. 3-CAB5
2. 3-CHAS7
3. 3-FIBMB2 electronics card
4. 3-MPFIB mounting bracket
5. J1 on the electronics card
6. JP2
7. Mounting studs

To install the electronics card in an MFC-A enclosure:

1. Insert two #6-32 1/2 in. standoffs included with the MFC-A enclosure into the selected mounting holes. See Figure 4, item 4. You can select any two parallel mounting holes.
2. Snap the electronics card on the 3-MPFIB mounting bracket studs.
3. Place JP2 on the electronics card in the NORMAL position.
4. Mount the 3-MPFIB bracket on the standoffs.

Figure 4: Installing the 3-FIBMB2 electronics card in an MFC enclosure



1. 3-FIBMB2 electronics card
2. 3-MPFIB mounting bracket
3. MFC-A enclosure
4. Standoffs

Special applications installation

Service replacements

For a multinode, single mode fiber, Class B application, replace the 3-FIBMB electronics card with a 3-FIBMB2 electronics card in all nodes unless a copper or multimode separation exists. If a separation exists between nodes, no replacement is required from that point forward. After replacing the electronics card, you can reuse the existing SMXLO and SMXHI transceivers.

To replace failed SMXLO and SMXHI transceivers:

1. Disconnect the wiring from the transceivers on the 3-FIBMB electronics card.
2. Remove the 3-FIBMB from the 3-MPFIB mounting bracket and disconnect the ribbon cable.
3. Remove all transceivers from the card, discarding the failed ones.
4. Connect the ribbon cable to J1 on the back of a 3-FIBMB2 electronics card.
5. Replace the failed transceivers with new SMXLO2/SMXHI2 transceivers. You can reuse the functioning SMXLO/SMXHI transceivers on the new 3-FIBMB2 electronics card. See Figure 2 on page 2.
6. Snap the 3-FIBMB2 electronics card on the 3-MPFIB mounting bracket studs. See Figure 3 on page 2.
7. For a multinode, single mode fiber application, repeat step 1 to step 6 for all nodes in a Class A configuration or refer to Figure 13 on page 7 to create a bridge. For a Class B configuration, repeat the steps in all nodes unless a copper or multimode separation exists between nodes. In this case, no replacement is required beyond that point.

Network expansions

When adding a new node to an existing multinode, single mode fiber application, there are two options for upgrading to the 3-FIBMB2:

1. Replace all 3-FIBMB electronics cards in the single mode fiber application with 3-FIBMB2 cards. After replacing the electronics card you can reuse existing SMXLO and SMXHI transceivers or install new SMXLO2 and SMXHI2 transceivers.

   For this option, in a Class B application replace the 3-FIBMB electronics card with a 3-FIBMB2 electronics card in all nodes unless a copper or multimode separation exists. If a separation exists between nodes, no replacement is required from that point forward.
2. For a 3-CAB7, 3-CAB14, or 3-CAB21 enclosure using Class B wiring, install a 3-FIBMB2 electronics card in the enclosure to create a bridge with the existing 3-FIBMB. The bridge uses a combination of single mode and multimode transceivers in both electronics cards to cause a separation in the single mode application. In this configuration, the 3-FIBMB2 electronics card is powered by connecting to 24 VDC from the PSMON and is not connected to the 3-CPU.

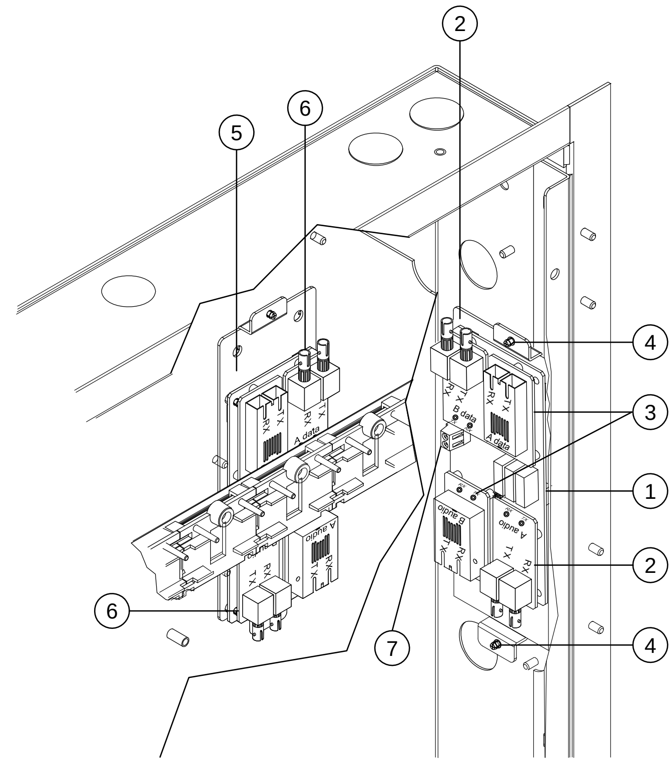
To add a new node to an existing single mode fiber network and replace all 3-FIBMB electronics cards:

1. For the new node, install the 3-FIBMB2 module as described in “Typical application installation” on page 1.
2. For existing nodes, disconnect the wiring from the transceivers on the 3-FIBMB electronics card.
3. Remove the 3-FIBMB from the 3-MPFIB mounting bracket and disconnect the ribbon cable.
4. Connect the ribbon cable to J1 on the back of the replacement 3-FIBMB2 electronics card.
5. Reinstall the SMXLO and SMXHI transceivers or replace them with new SMXLO2 and SMXHI2 transceivers. See Figure 2 on page 2.
6. Snap the 3-FIBMB2 electronics card on the 3-MPFIB mounting bracket studs. See Figure 3 on page 2.
7. For a multinode, single mode fiber application, repeat step 1 to step 6 for all nodes in a Class A configuration. For a Class B configuration, repeat the steps in all nodes unless a copper or multimode separation exists between nodes. In this case, no replacement is required beyond that point.

To add a new node to an existing single mode fiber network and create a bridge in a 3-CAB7, 3-CAB14, or 3-CAB21 enclosure:

1. In the new enclosure, install the 3-FIBMB2 module as described in “Typical application installation” on page 1.
2. In the last cabinet in the network, snap a 3-FIBMB2 electronics card on a 3-MPFIB mounting bracket.
3. Snap the mounting bracket on the two right, side panel mounting studs in the enclosure. See Figure 5, item 4. The short edge of the mounting bracket must be positioned closest to the enclosure door.
4. On the 3-FIBMB2, install an MMXVR multimode transceiver in the B data slot and, if using audio, in the A audio slot (item 2).
5. On the 3-FIBMB2, install an SMXLO2/SMXHI2 single mode transceiver in the A data slot and, if using audio, in the B audio slot (item 3).
6. On the existing 3-FIBMB card (item 5) on the chassis in the enclosure, disconnect the wiring from the A data and B audio SMXLO/SMXHI single mode transceivers and replace them with MMXVR multimode transceivers (item 6).
7. Connect the fiber optic cables and 24 VDC wiring as shown in “Special application wiring ” on page 7.

Figure 5: Installing the 3-FIBMB2 bridge in a 3-CAB7, 3-CAB14, or 3-CAB21 enclosure



1. 3-FIBMB2 electronics card on a 3-MPFIB mounting bracket
2. MMXVRs in the B data slot and A audio slot on the 3-FIBMB2
3. SMXLO2/SMXHI2 in the A data slot and B audio slot on the 3-FIBMB2
4. Mounting studs
5. Existing 3-FIBMB
6. MMXVR in the A data slot and B audio slot on the 3-FIBMB
7. 24 VDC

Wiring

All fiber optic cable and copper wiring is supervised and power-limited.

Notes

- When using an SMXHI or SMXHI2 transceiver, if fiber attenuation is less than 8 dBm between panels, then an attenuator must be used to reduce the level of the received signal.
- The 3-FIBMB2 transmitters are eye-safe laser IEC 825/CDRH Class 1 compliant.

Typical wiring of fiber optic and hybrid connections

If using single mode, use the SMXLO, SMXLO2, SMXHI, or SMXHI2 transceivers. For multimode, use an MMXVR transceiver.

Note: When transitioning from single mode to multimode fiber, a special configuration for the audio circuit is required. See Figure 10 and Figure 11 on page 6 to wire audio circuits in Class B and A when using both single mode and multimode fiber.

Figure 6: Class B network and audio fiber optic connections

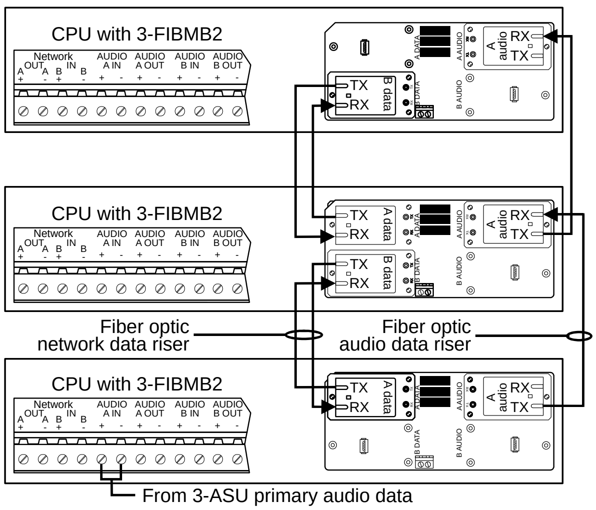


Figure 7: Class B hybrid fiber optic and copper wire network and audio connections

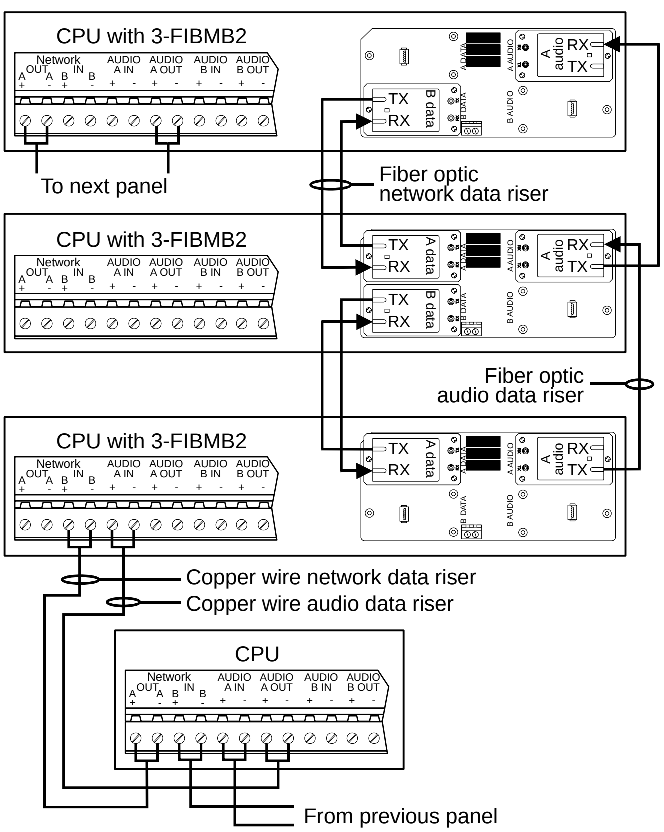


Figure 8: Class A network and audio fiber optic connections

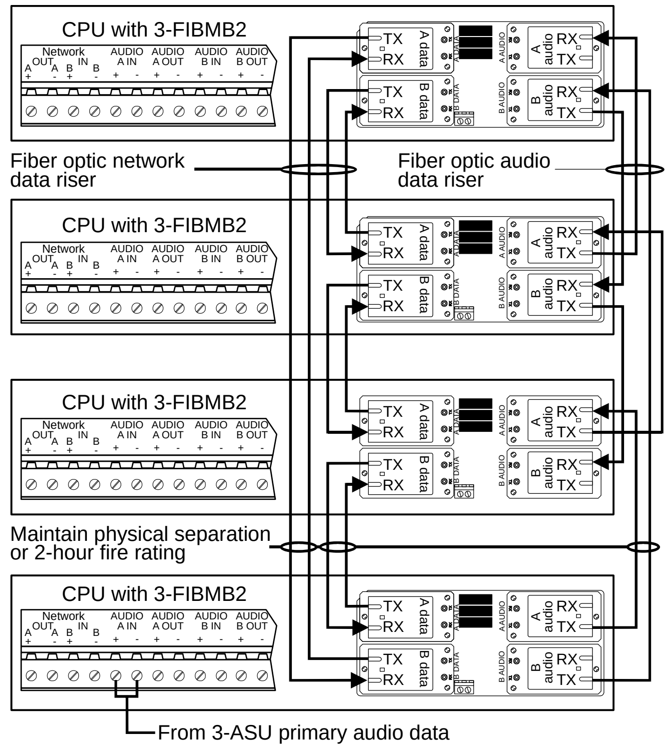


Figure 9: Class A hybrid fiber optic and copper wire network and audio connections

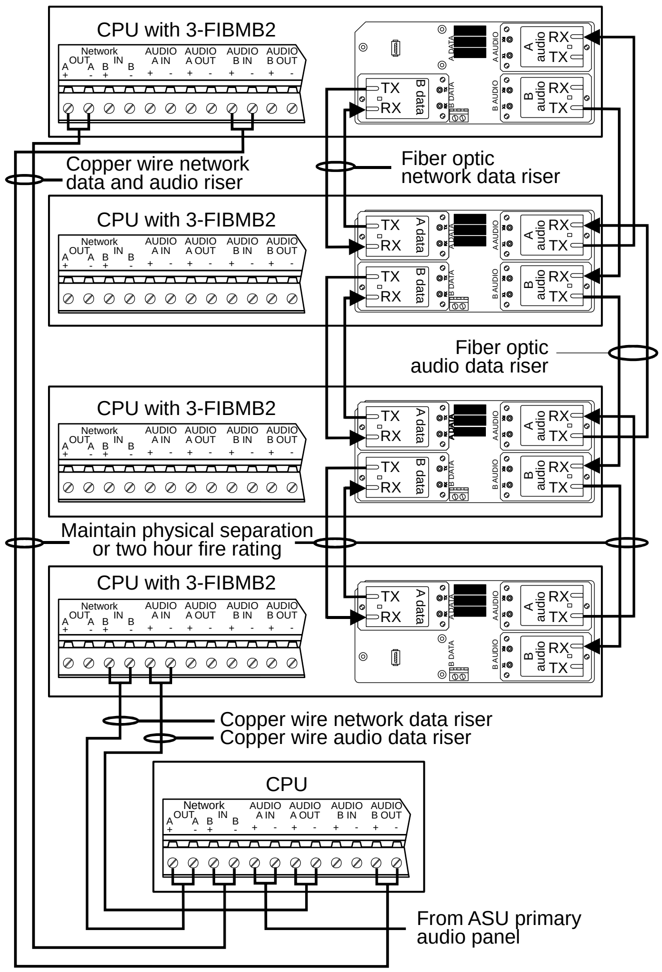


Figure 10: Data and audio circuit for Class B using single mode and multimode fiber

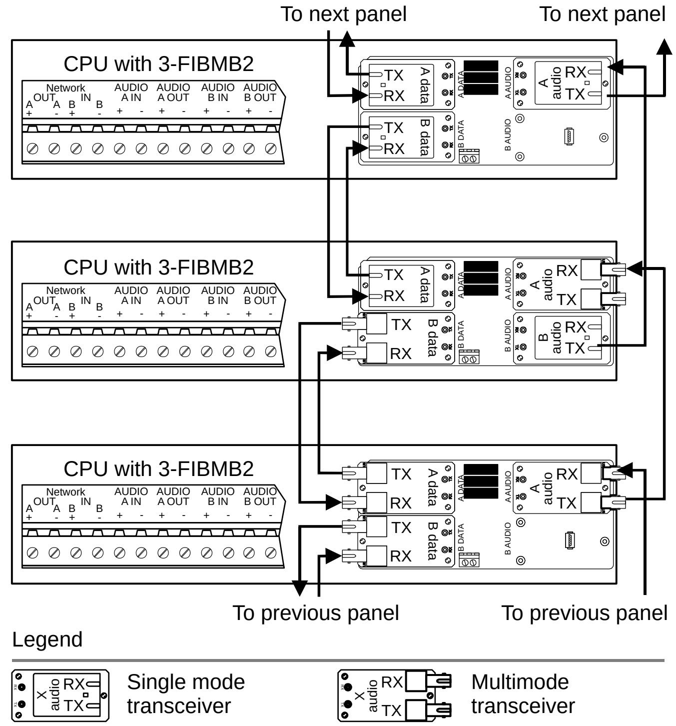
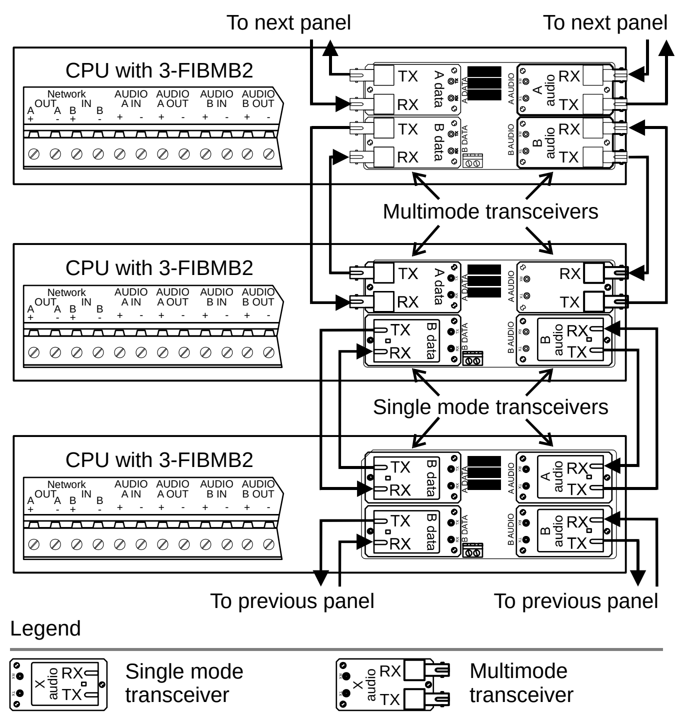


Figure 11: Data and audio circuit for Class A using single mode and multimode fiber



Special application wiring for a 3-FIBMB2 electronics card bridge in a 3-CAB7, 3-CAB14, or 3-CAB21 enclosure

The following diagrams provide wiring details for creating a 3-FIBMB2 bridge in an existing fiber optic network.

Figure 12: 3-FIBMB2 bridge for data and audio connections for a Class B single mode fiber network

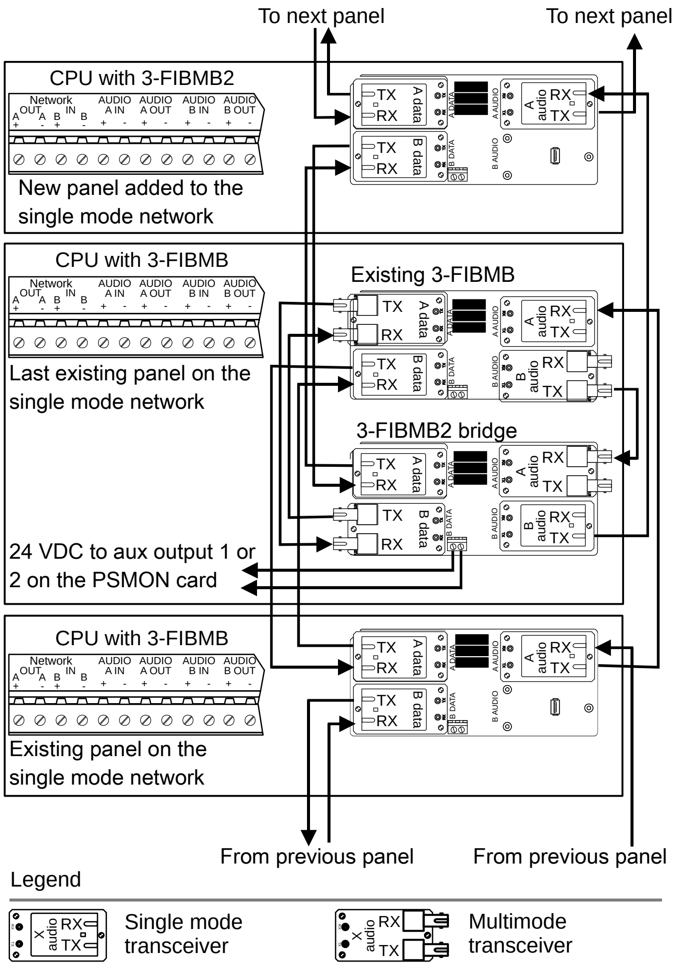


Figure 13: 3-FIBMB2 bridge for data and audio connections for a Class A single mode fiber network

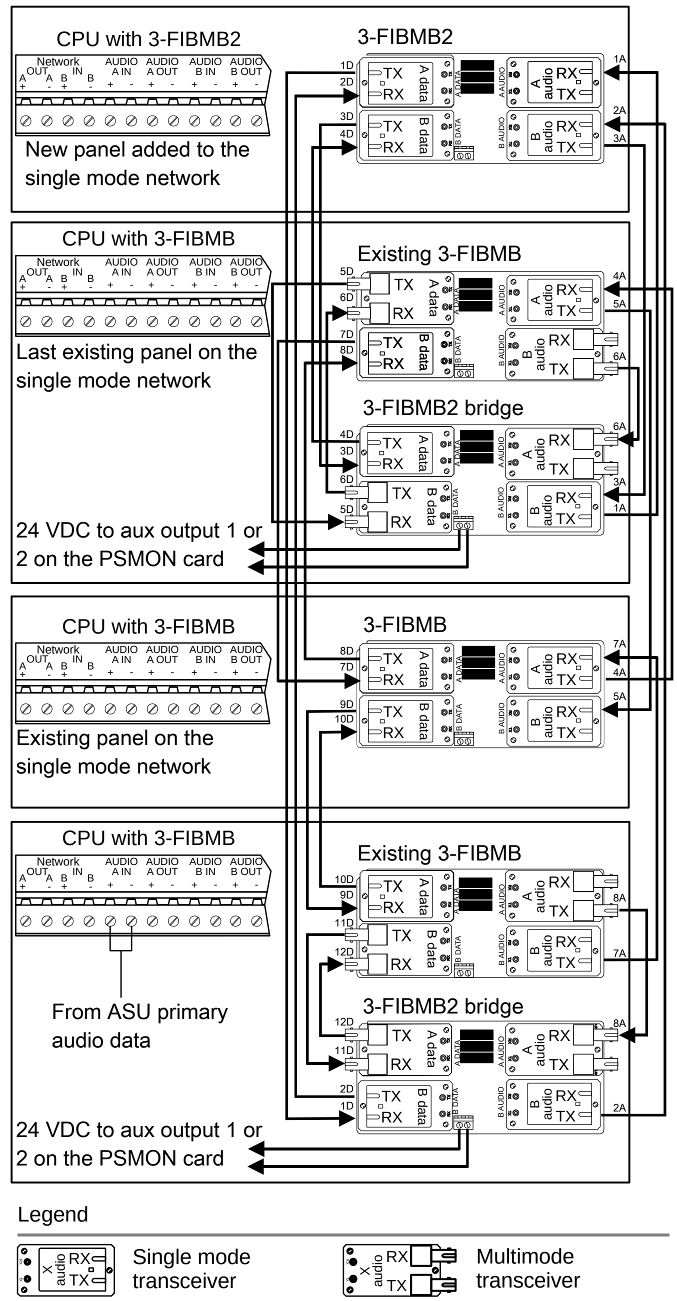
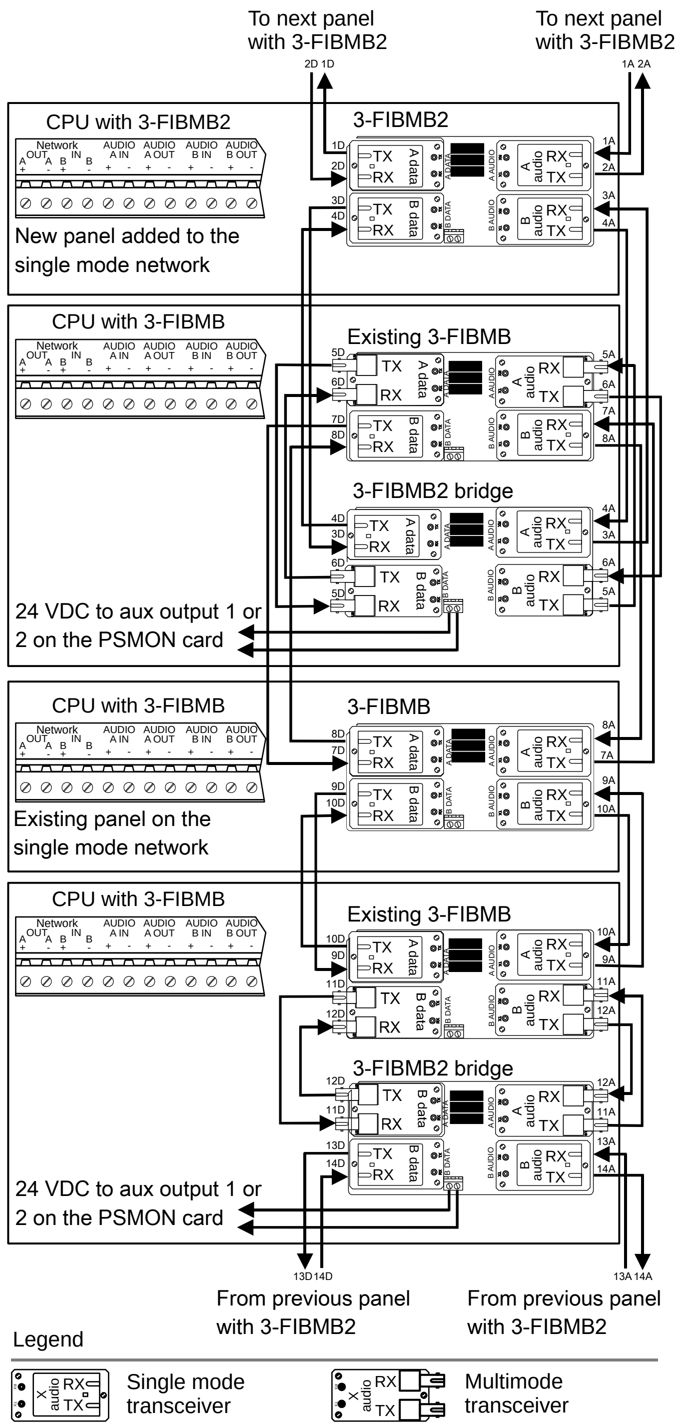


Figure 14: 3-FIBMB2 bridge for data and audio connections for a Class A single mode and multimode fiber network



Wiring to an alternate DC power supply

The 3-FIBMB2 provides terminals for connecting to an alternate DC power supply. This allows communication to continue through the module when panel power is disconnected.

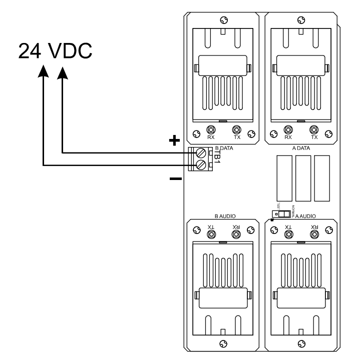
Notes

- In the event a panel needs to be powered down for service, a 24 VDC battery can be connected to the module.
- When powering the 3-FIBMB2 by battery, the battery size must support the specific field configuration for the duration of the service procedure. Example: The 3-FIBMB2 plus two SMXHI2 transceivers for 24 hours would require a 5.04 Ah battery: (90 + (2 x 60)) mA x 24hr = 5.04 Ah.

To wire the alternate power terminals:

Wire connector TB1 on the electronics card to the alternate power supply as shown in Figure 15.

Figure 15: Wiring the alternate power terminals



Testing

The system's fiber optic operating integrity and fiber type are calculated and verified by transmitting a constant test signal. Gathered test data is used for budget loss analysis and troubleshooting.

To test the fiber optic connection:

1. Place JP2 in the TEST position to generate a constant signal.
2. Return JP2 to the NORMAL position when testing is finished.

Specifications

Operating voltage	24 VDC
Fiber optics network and audio Budget	
SMXLO	15 dBm between two interfaces
SMXLO2	15 dBm between two interfaces
SMXHI	25 dBm max. and 8 dBm min. between two interfaces
SMXHI2	25 dBm max. and 8 dBm min. between two interfaces
MMXVR	10 dBm between two interfaces
Cable type	50/125, 62.5/125, or 100/140 for MMXVR
Connectors	
SMXLO, SMXLO2, SMXHI, and SMXHI2	Type Duplex SC
MMXVR	Type ST
Network data circuit	
Circuit configuration	Class B (Style 4) or Class A (Style 7)
Data rate	19.2 K, 38.4 Kbps
Isolation	Isolated from previous panel CPU when using copper Total isolation when using fiber optic
Digitized audio data circuit	
Circuit configuration	Class B (Style 4) or redundant Class B (Style 7) [1]
Data rate	327 Kbps
Isolation	Isolated from previous panel CPU when using copper Total isolation when using fiber optic
Copper wired network data circuit segment Circuit	
Length	5,000 ft. (1,524 m) max. between any three panels
Resistance	90 Ω max.
Capacitance	0.3 µF max. [2]
Wire type	Twisted pair, 18 AWG (0.75 mm²) min.
Copper wired audio data circuit Circuit	
Length	5,000 ft. (1,524 m) max. between any three panels
Resistance	90 Ω max.
Capacitance	0.09 µF, max [2]
Wire type	Twisted pair, 18 AWG (0.75 mm²) min.
Current rating	105 mA Add 79 mA for each SMXLO, SMXLO2, SMXHI, and SMXHI2 Add 20 mA for each MMSVR
Compatible CPUs	3-CPU1 and later
Operating environment	
Temperature	32 to 120 °F (0 to 49 °C)
Relative humidity	0 to 93% noncondensing

[1] Must be installed in separate conduit.

[2] Include shield capacitance.

Regulatory information

Manufacturer	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA Authorized EU manufacturing representative: UTC Fire & Security B.V. Kelvinstraat 7, 6003 DH Weert, Netherlands
Year of manufacture	The first two digits of the product serial number (located on the product identification label) are the year of manufacture.
Environmental class	UL: Indoor dry | Indoor damp and wet IEC: 3K5 | other class
North American standards	UL 864, UL 1638, CE; FCC Part 15, Subpart J, Class B; DOC Class / MDC Class B
European Union directives	1999/5/EC (R&TTE directive): Hereby, UTC Fire & Safety declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
	2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.

Contact information

For contact information see our Web site:
www.utcfireandsecurity.com

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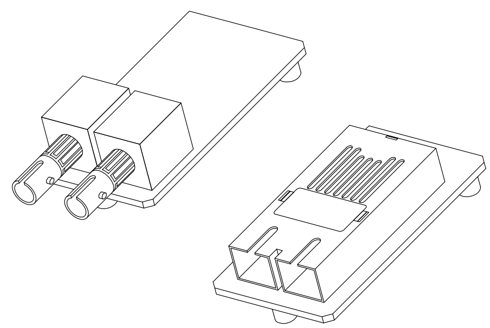
Fiber Optic Transceivers Installation Sheet

EN ES FR PT



EN: Installation Sheet

Description

Fiber optic transceivers are used with a fiber optic network module to provide transmission and reception capability over fiber optic cable for fire control panels. Class B and Class A configurations are supported.

The following transceivers can be installed on the electronics card of the fiber optic module.

Model	Description
SMXLO2	Standard output single-mode fiber optic transceiver for up to 8.7 mi. (14 km) node-to-node distance.
SMXHI2	High output single-mode fiber optic transceiver for up to 24.85 mi. (40 km) node-to-node distance.
MMXVR	Standard output multimode fiber optic transceiver for up to 8,000 ft. (2.4 km) node-to-node distance.

Installation

Cautions

- Circuit boards are sensitive to electrostatic discharge (ESD). To avoid damage, follow ESD handling procedures.
- Connecting SMXHI2 to SMXLO2 transceivers is not recommended. Doing so may damage the transceiver and electronics card.

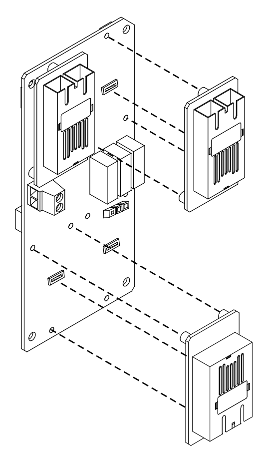
Notes

- One to four transceivers are required, depending on your application.
- Transceivers can be mounted in any of the four positions on the electronics card.
- Transceiver types can be mixed on the electronics card but should be connected to like transceivers.
- The fiber optic transmitters are eye-safe laser IEC 825/CDRH Class 1 compliant.

To install the transceivers:

1. Align the transceiver card mounting studs and terminal with the position holes and terminal on the fiber optic electronics card. See Figure 1.
2. Snap the transceiver into place. Do not put excessive pressure on the transceiver.
3. Repeat steps 1 and 2 to install additional transceivers.
4. Install the fiber optic electronics card as described on the installation sheet you received with the fiber optic network module.

Figure 1: Installing the transceivers



Wiring

Connect transceiver cables as described on the installation sheet you received with the fiber optic network module.

P/N 3101770-ML • REV 1.0 • ISS 24FEB11

Specifications

Operating voltage	24 VDC
Budget	
SMXLO2	15 dBm between two interfaces
SMXHI2	25 dBm max. and 8 dBm min. between two interfaces
MMXVR	10 dBm between two interfaces
Wavelength	
SMXLO2, SMXHI2	1300 nm
MMXVR	820 nm
Cable type	
SMXLO2, SMXHI2	8.3/125 µ
MMXVR	50/125 µ, 62.5/125 µ, or 100/140 µ
Connector type	
SMXLO2, SMXHI2	Duplex SC
MMXVR	ST
Operating environment	
Temperature	32 to 120°F (0 to 49°C)
Relative humidity	0 to 93% noncondensing

Regulatory information

Manufacturer	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
Year of manufacture	The first two digits of the product serial number (located on the product identification label) are the year of manufacture.
Environmental class	UL: Indoor dry

Contact information

For contact information, see www.utcfireandsecurity.com.

ES: Hoja de instalación

Descripción

Los transceptores de fibra óptica se utilizan para proporcionar capacidades de transmisión y recepción a lo largo de un cable de fibra óptica, para los paneles de control antiincendios. Se admiten las configuraciones Clase A y Clase B.

Los siguientes transceptores se pueden instalar en la tarjeta de electrónica del módulo de fibra óptica.

Modelo	Descripción
SMXLO2	Transceptor de fibra óptica de modo único, salida estándar, para una distancia de nodo a nodo de hasta 8,7 millas (14 km)
SMXHI2	Transceptor de fibra óptica de modo único, salida alta, para una distancia de nodo a nodo de hasta 24,85 millas (40 km)
MMXVR	Transceptor de fibra óptica de modo múltiple, salida estándar, para una distancia de nodo a nodo de hasta 8,000 pies (2,4 km)

Instalación

Precauciones

- Las tarjetas de circuitos son sensibles a descargas electrostáticas (ESD). Para evitar daños, siga los procedimientos de manejo de ESD.
- No se recomienda la conexión de los transceptores desde SMXHI2 a SMXLO2. Al hacerlo se podrían dañar el transceptor y la tarjeta de electrónica.

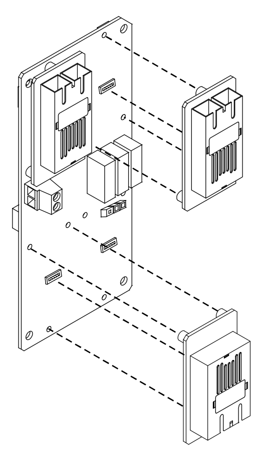
Notas

- Se requiere uno de cuatro transceptores, dependiendo de su aplicación.
- Los transceptores se pueden montar en cualquiera de las cuatro posiciones en la tarjeta de electrónica.
- Los tipos de transceptores se pueden combinar en la tarjeta de electrónica, pero deben ser conectados a transceptores similares.
- Los transmisores de fibra óptica cumplen con las normas de láseres de seguridad ocular IEC 825/CDRH Clase 1.

Para instalar los transceptores:

1. Alinee los soportes y el terminal de montaje de la tarjeta de transceptor con los orificios de posición y terminal que se encuentran en la tarjeta de electrónica de fibra óptica. Véase Figura 1.
2. Inserte a presión el transceptor. No ejerza presión excesiva en transceptor.
3. Repita los pasos 1 y 2 para instalar transceptores adicionales.
4. Instale la tarjeta de fibra óptica tal como se describe en la hoja de instalación que recibió con el módulo de red de fibra óptica.

Figura 1: Instalación de los transceptores



Cableado

Conecte los cables del transceptor tal como se describe en la hoja de instalación que recibió con el módulo de red de fibra óptica.

Especificaciones

Voltaje de operación	24 VCC
Presupuesto SMXLO2 SMXHI2 MMXVR	 15 dBm entre dos interfaces 25 dBm y 8 dBm como mínimo entre dos interfaces 10dBm entre dos interfaces
Longitud de onda SMXLO2, SMXHI2 MMXVR	 1300 nm 820 nm
Cable del tipo SMXLO2, SMXHI2 MMXVR	 8,3/125 µ 50/125 µ, 62,5/125 µ, o 100/140 µ
Conector del tipo SMXLO2, SMXHI2 MMXVR	 Dúplex SC ST
Ambiente de operación Temperatura Humedad relativa	 32 a 120°F (0 a 49°C) 0 a 93% sin condensación

Información regulatoria

Fabricante	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
Año de fabricación	Los primeros dos dígitos del número de serie del producto (ubicado en la etiqueta de identificación del producto) representan el año de fabricación.
Clase ambiental	UL: Ambientes interiores secos

Información de contacto

Para información de contacto, véase www.utcfireandsecurity.com.

FR: Fiche d'installation

Description

Les émetteurs-récepteurs en fibre optique sont utilisés avec un module de réseau en fibre optique afin de fournir une capacité de transmission et de réception par un câble en fibre optique pour les panneaux de commande incendie. Les configurations de classe B et de classe A sont prises en charge.

Les émetteurs-récepteurs suivants peuvent être installés sur la carte électronique du module en fibre optique.

Modèle	Description
SMXLO2	Émetteur-récepteur en fibre optique monomode à débit standard pour une distance nœud à nœud maximale de 14 km (8,7 miles).
SMXHI2	Émetteur-récepteur en fibre optique monomode haut débit pour une distance nœud à nœud maximale de 40 km (24,85 miles)
MMXVR	Émetteur-récepteur en fibre optique monomode à débit standard pour une distance nœud à nœud maximale de 2,4 km (8 000 pi).

Installation

Mises en garde

- Les cartes de circuit imprimé sont sensibles aux décharges électrostatiques (ESD). Observez les consignes de sécurité relatives aux ESD pour éviter tout dommage.
- Il est déconseillé d'effectuer un branchement entre un émetteur-récepteur SMXHI2 et un émetteur-récepteur SMXLO2. Un tel branchement risque d'endommager l'émetteur-récepteur et la carte électronique.

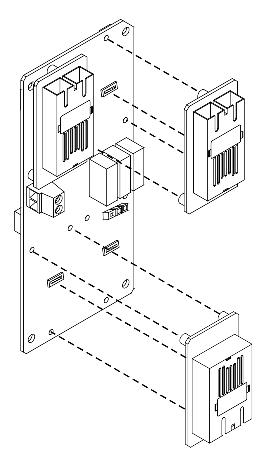
Remarques

- Vous avez besoin d'un à quatre émetteurs-récepteurs en fonction de votre application.
- Les émetteurs-récepteurs peuvent être montés dans une des quatre positions sur la carte électronique.
- Les types d'émetteurs-récepteurs peuvent être mélangés sur la carte électronique, mais doivent être branchés à des émetteurs-récepteurs semblables.
- Les émetteurs à fibre optique utilisent des lasers sans risque pour les yeux et conformes à la norme CEI 825/CDRH Classe 1.

Pour installer les émetteurs-récepteurs :

1. Alignez les goujons de fixation et les bornes de la carte de l'émetteur-récepteur avec les trous de position et les bornes situés sur la carte électronique en fibre optique. Voir Figure 1.
2. Enclenchez l'émetteur-récepteur en place. Ne lui appliquez pas de pression excessive.
3. Recommencez les étapes 1 et 2 pour installer des émetteurs-récepteurs supplémentaires.
4. Installez la carte électronique en fibre optique, conformément à la fiche d'installation que vous avez reçue avec le module de réseau en fibre optique.

Figure 1 : Installation des émetteurs-récepteurs



Câblage

Branchez les câbles des émetteurs-récepteurs, conformément à la fiche d'installation que vous avez reçue avec le module de réseau en fibre optique.

Caractéristiques techniques

Tension de fonctionnement	24 VCC
Budget	
SMXLO2	15 dBm entre deux interfaces
SMXHI2	25 dBm max. et 8 dBm min. entre deux interfaces
MMXVR	10 dBm entre deux interfaces
Longueur d'onde	
SMXLO2, SMXHI2	1 300 nm
MMXVR	820 nm
Type de câble	
SMXLO2, SMXHI2	8,3/125 µ
MMXVR	50/125 µ, 62,5/125 µ ou 100/140 µ
Type de connecteur	
SMXLO2, SMXHI2	SC Duplex
MMXVR	ST
Environnement de fonctionnement	
Température	0 à 49 °C (32 à 120 °F)
Humidité relative	0 à 93 % sans condensation

Renseignement réglementaire

Fabricant	Edwards, une division d'UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, États-Unis
Année de fabrication	Les deux premiers chiffres du numéro de série du produit (sur l'étiquette d'identification du produit) correspondent à l'année de fabrication.
Classe de service	UL : milieu intérieur sec

Coordonnées

Pour obtenir nos coordonnées, consultez le site Web www.utcfireandsecurity.com.

PT: Manual de Instalação

Descrição

Transceptores de fibra ótica são usados com um módulo de rede de fibra ótica permitindo a transmissão e recepção sobre cabos de fibra ótica em painéis de controle de incêndio. Configurações de classe B e A são suportados.

Os seguintes transceptores podem ser instalados na placa eletrônica do módulo de fibra ótica.

Modelo	Descrição
SMXLO2	Transceptor de fibra ótica monomodo rendimento padrão para distância nodo-a-nodo até 14km (8,7mi).
SMXHI2	Transceptor de fibra ótica monomodo alto rendimento para distância nodo-a-nodo até 40km (24,85mi).
MMXVR	Transceptor de fibra ótica monomodo rendimento padrão para distância nodo-a-nodo de 2,4km (8.000ft).

Instalação

Precauções

- Placas de circuito são sensíveis a descargas eletrostáticas (ESD). Para evitar danos, siga os procedimentos de segurança eletrostática.
- Não é recomendado conectar o transceptor SMXHI2 ao SMXLO2 . Isso pode danificar o transceptor e a placa eletrônica.

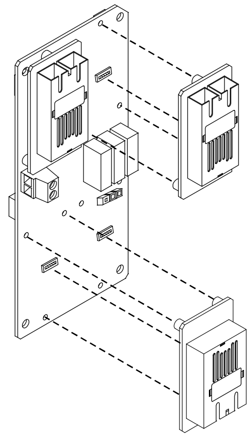
Notes

- Dependendo da sua aplicação, são necessários de um a quatro transceptores.
- Transceptores podem ser montados em qualquer das quatro posições na placa eletrônica.
- Tipos de transceptores podem ser misturados na placa eletrônica, mas devem ser conectados a transceptores assemelhados.
- Os transmissores de fibra ótica são lasers seguros à visão De acordo com IEC 825/CDRH Classe 1.

Para instalar os transceptores:

1. Alinhe os pinos de montagem e o terminal do transceptor com os furos de posição e terminal na placa eletrônica da fibra ótica. Veja Figura 1.
2. Encaixe o transceptor. Não coloque pressão excessiva no transceptor.
3. Repita os passos 1 e 2 para instalar transceptores adicionais.
4. Instale a placa da fibra ótica como descrito no manual de instalação que você recebeu com o módulo de rede de fibra ótica.

Figura 1: Instalando os transceptores



Ligação

Conecte os cabos do transceptor como descrito no manual de instalação que você recebeu com o módulo de rede de fibra ótica.

Especificações

Voltagem de funcionamento:	24 VDC
Budget	
SMXLO2	15 dBm entre duas interfaces
SMXHI2	25 dBm max. e 8 dBm min. entre duas interfaces
MMXVR	10 dBm entre duas interfaces
Comprimento de onda	
SMXLO2, SMXHI2	1300 nm
MMXVR	820 nm
Tipo de cabo	
SMXLO2, SMXHI2	8,3/125 µ
MMXVR	50/125 µ, 62,5/125 µ, or 100/140 µ
Tipo de conector	
SMXLO2, SMXHI2	Duplex SC
MMXVR	ST
Ambiente de operação	
Temperatura	0 a 49°C (32 a 120°F)
Umidade relativa	0 a 93% (não condensado)

Informações de regulamentação

Fabricante	Edwards, uma divisão da UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, EUA
Ano de fabricação	Os dois primeiros dígitos do número de série do produto (localizado na etiqueta de identificação do produto) são o ano de fabricação.
Classe ambiental	UL: Interno seco

Informações de contato

Para informações de contato, veja www.utcfireandsecurity.com.

COMMUNICATIONS ETHERNET PORT DEVICE

Operations & Maintenance Manual
December 2015

EST
Life Safety & Communications

MNEC Communications

MN-NETSW1, MN-COM1S

S3000

7165-1657:
0186/0306

Overview

MN-NETSW1
Four-port MNEC multimode fiber optic Ethernet switch
The MN-NETSW1 is an industrial grade, 10/100 Mbps auto-negotiating Ethernet switch used in Mass Notification/Emergency Communications (MNEC) and Fire Alarm applications to connect EST3-Sixty's FireWorks workstation to the MN-FVPN VoIP module and/or the MN-COM1S RS-232 interface. The MN-NETSW1 provides four RJ-45 ports for local connections and two full-duplex multimode fiber ports for remote connections.

The MN-NETSW1 has three LED indicators

- **Power:** On indicates the MN-NETSW1 has power.
- **Link:** On indicates Ethernet link has been established. Flashing indicates link is active.
- **HS:** Indicates data transferring at 100 Mbps.

MN-COM1S
MNEC Serial Communications/LAN interface
The MN-COM1S is a TCP/IP to RS-232 interface with one RJ-45 port and one RS-232 port. It is used in MNEC settings to connect a FireWorks workstation to an EST3 control panel.

Both the MN-NETSW1 and the MN-COM1S mount on an MN-BRKT1 or an MN-BRKT3 bracket. These install inside the EST3 control panel or Auxiliary Power Supply for a neat and self-contained MNEC solution.

Standard Features

MN-NETSW1 Four-port MNEC Ethernet Switch

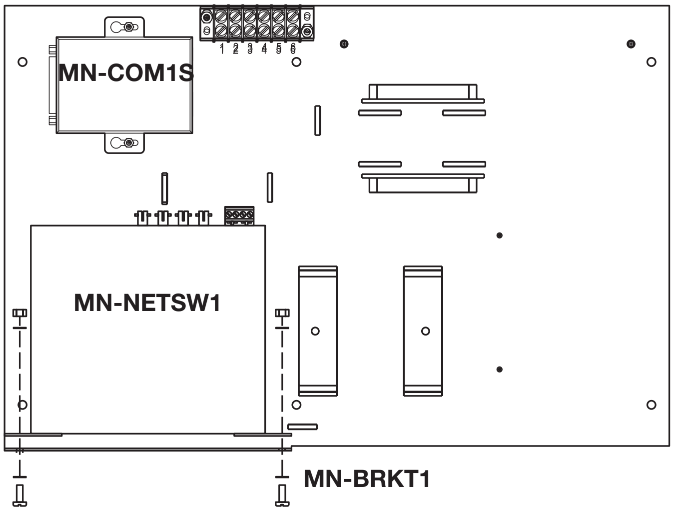
- Connect alarm panels to a remote FireWorks workstation over TCP/IP, LAN/WANs
- Supports MNEC and Fire Alarm applications
- Implement VoIP communications between EST3-Sixty nodes
- 10/100BASE-T Ethernet interface (RJ45)
- Supports MN-COM1S for Serial connection to 3-CPU3
- Supports MN-FVPN for VoIP communication between FireWorks workstations
- Four RJ-45 ports for local connections
- Two full-duplex multimode fiber ports for remote connections.
- Configuration and port director software included
- Flash ROM for easy software upgrade

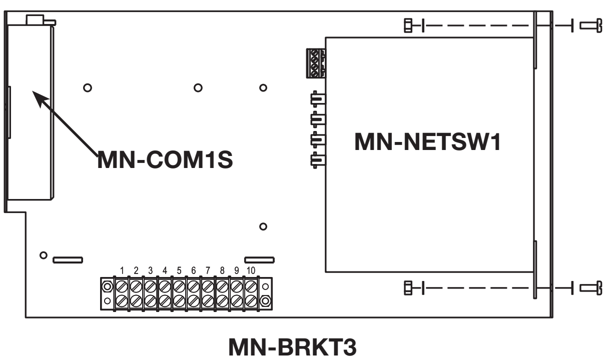
MN-COM1S MNEC Serial Communications/LAN interface

- Connect a FireWorks workstation to an EST3 control panel.
- RS-232 Serial port for connection to 3-CPU3
- One RJ-45 port
- One RS-232 port
- Browser-based setup and configuration

Mounting

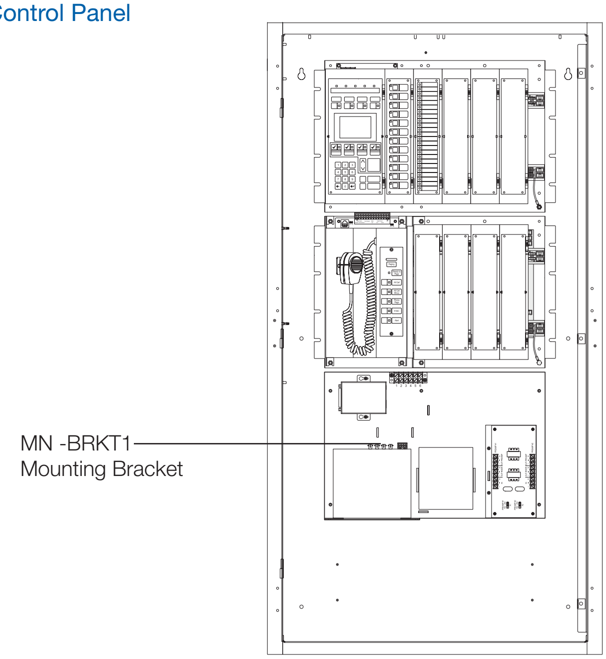
The MN-NETSW1 and the MN-COM1S mount on an MN-BRKT1 or an MN-BRKT3 bracket. These install inside the EST3 control panel or Auxiliary Power Supply for a neat and self-contained MNEC solution.



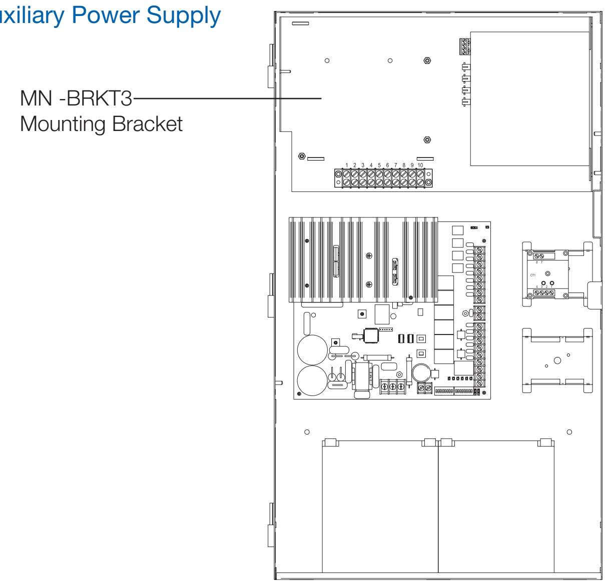


Component Layout

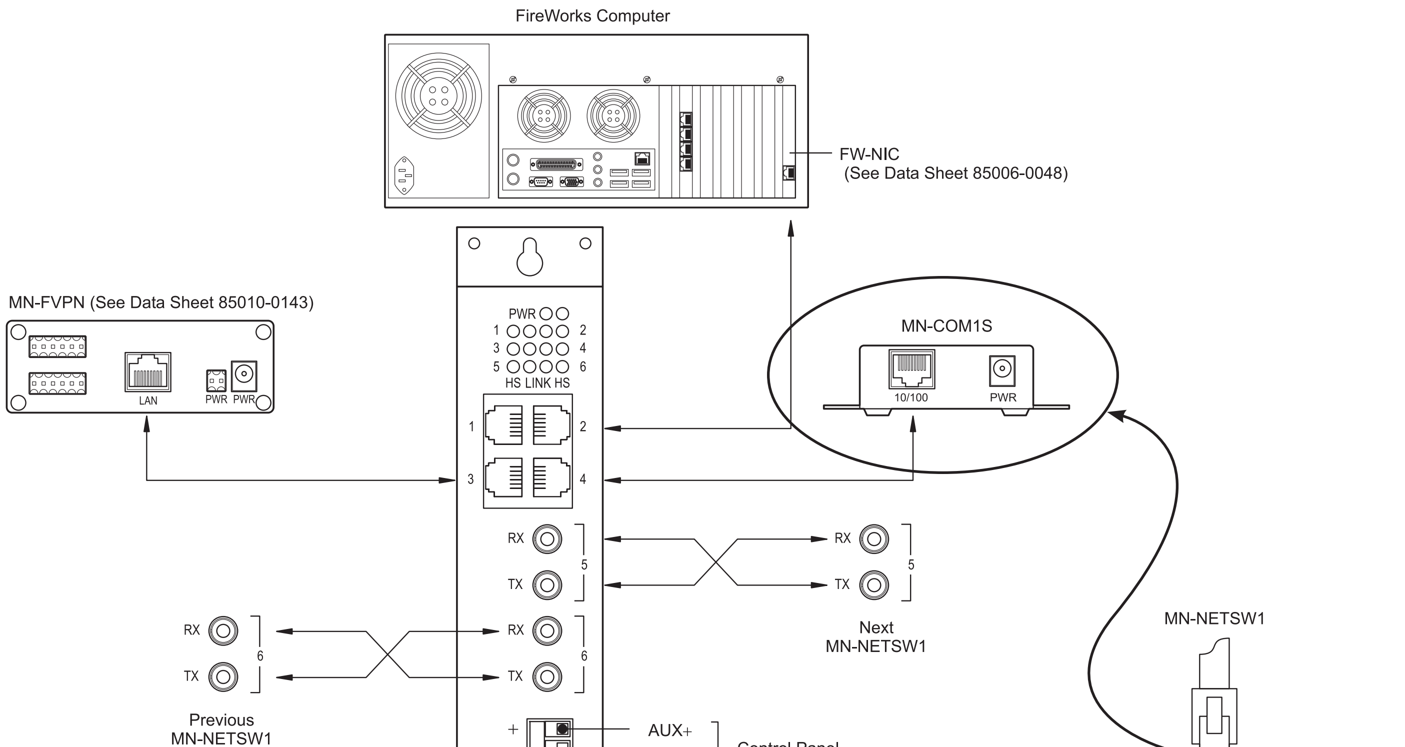
EST3 Control Panel

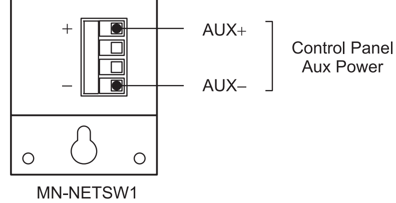


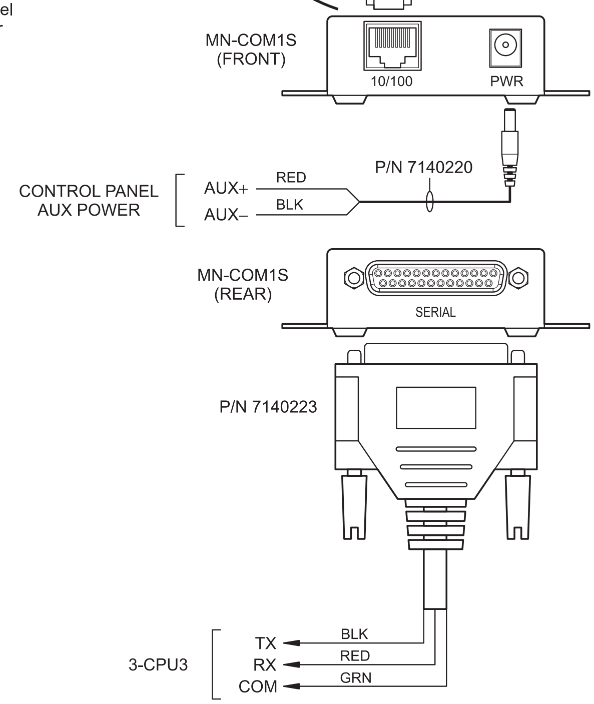
APS Auxiliary Power Supply



Wiring







WARNING: This is a Class A product. In a domestic environment, the product may cause radio interference in which case the user may be required to take adequate measures.

Notes

- The FireWorks computer must be within 20 feet and in the same room as the MN-NETSW1. Run cable through conduit and attach the conduit to the FireWorks computer using the required conduit adapter.
- Use the control panel power supply or a compatible regulated 24 VDC power supply that is UL/ULC listed for fire protective signaling systems.

Contact us...

Email: edwards.fire@fs.utc.com
Web: www.est-fire.com

EST is an EDWARDS brand.

1016 Corporate Park Drive
Mebane, NC 27302

In Canada, contact Chubb Edwards...
Email: inquiries@chubbedwards.com
Web: www.chubbedwards.com

Specifications, MN-COM1S

Voltage	18 to 28 VDC
Current	60 mA
Dimensions	(W × H × D) 2.5 × 0.9 × 3.5 in. (6.4 × 2.3 × 9.0 cm)
Serial interface	RS-232C
Network Interface	
Connector	RJ-45
Cable type	Category 5, min.
Other	10/100 Mbps, TCP/IP, autonegotiating
Operating environment	
Temperature	32 to 120°F (0 to 49°C)
Humidity	0 to 93% RH, noncondensing at 90°F (32°C)

Specifications, MN-NETSW1

Voltage	18 to 28 VDC
Current	350 mA, max.
Dimensions (W × H × D)	1.75 × 7.54 × 5.54 in. (44 x 191 × 138.4 mm)
Fiber optic ports	
Quantity	2
Connector type	ST
Signaling /Data Rate	100Base-FX / 100 Mbps
Attenuation	13 db, max. at a 1310 wave length
Operating environment	
Temperature	32 to 120°F (0 to 49°C)
Humidity	0 to 93% RH, noncondensing at 90°F/32°C
Segment Length	
Copper	3,28ft (100m)
Fiber Optic	~6,562 ft (2km) multi mode fiber
Fiber Optic Budget	10dB
Segment Media	
Copper	Category 6 UTP
Fiber Optic (1300 nm)	50/125 or 62/5/125 Multi Mode Fiber
Agency Listings	CE; FCC Part 15, Class A; EN50081-2; EN50082-2; UL-864
Power Requirements	24VDC at 21 mA, nominal10 –36VDC, 5 watts 8-24VAC, 47 – 63 Hz, 5 VA

Ordering Information

MN-COM1S	UL 864 Listed FireWorks Communications Ethernet Port, Command & Control. Comes with power and RS232 data cables
MN-NETSW1	Four-port multimode fiber optic Ethernet switch

Related Equipment

MN-BRKT1	MN-FVP mounting bracket for EST3 enclosures
MN-BRKT3	MN-FVP mounting bracket for APS-(6)(10)A power supplies
FW-NCCA4	Ethernet cable conduit connector assembly for UL4 computer
MN-FVPB1	Polymer mounting bracket for MN-FVPN
MN-FVPN	Fire VoIP encoder/decoder, includes power and audio cables
MN-PASM2	MN-FVPN preamp signal supervisory booster module (1 required per MN-FVPN, along with SIGA-RM1 or SIGA-MRM1)
SIGA -RM1/MRM1	Riser Supervision Module
MN-ABPM	Audio Bridge (Panel mount 3-ATPINT)

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MN-COM1S TCP/IP to RS-232 Interface Installation Sheet

Description

The MN-COM1S is a TCP/IP to RS-232 interface with one RJ-45 port and one RS-232 port. It is used to connect a FireWorks workstation to an EST3 control panel.

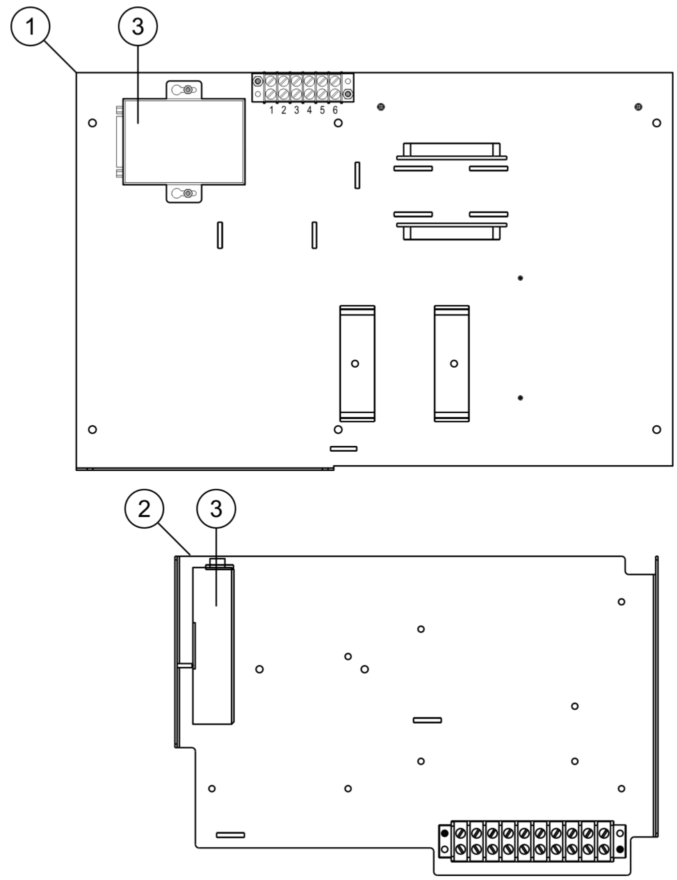
The MN-COM1S mounts on an MN-BRKT1 or an MN-BRKT3, both ordered separately.

Installation

Using the hardware provided, attach the MN-COM1S to the MN-BRKT1 or MN-BRKT3 mounting bracket as shown in Figure 1.

Note: Attach the MN-COM1S to the MN-BRKT3 before attaching the MN-BRKT3 to a back box.

Figure 1: Mounting diagram



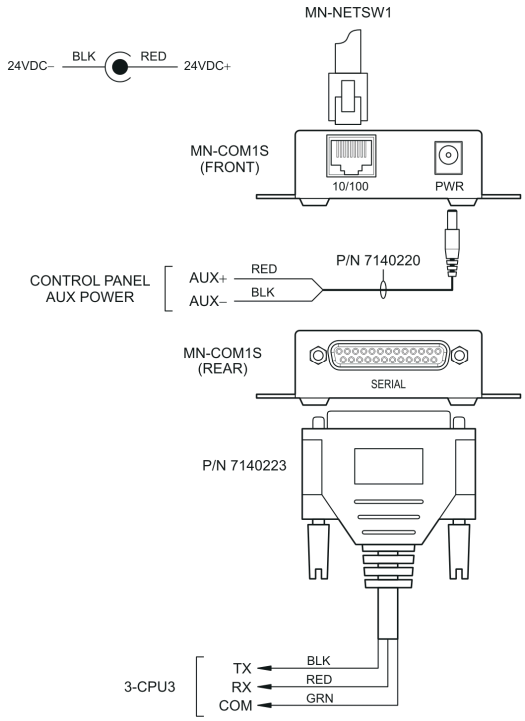
1. MN-BRKT1
2. MN-BRKT3
3. MN-COM1S

Wiring

Wire the MN-COM1S as shown in Figure 2 on page 2.

Caution: To avoid damage to the MN-COM1S, make sure that the power supply provides 24 VDC on the center conductor of the barrel connector, and common is on the outer connector.

Figure 2: Wiring diagram



Note: All connections to the RJ45 and RS-232 ports are restricted to the same room, within 20 feet, and enclosed in conduit.

Configuring the MN-COM1S

Before you begin

You should have a good understanding of basic networking principles, addressing, and terminology. If you do not, we recommend that you consult an IT professional.

Obtain the list of IP addresses assigned to the network components. You can get this list from the person in charge of setting up the network.

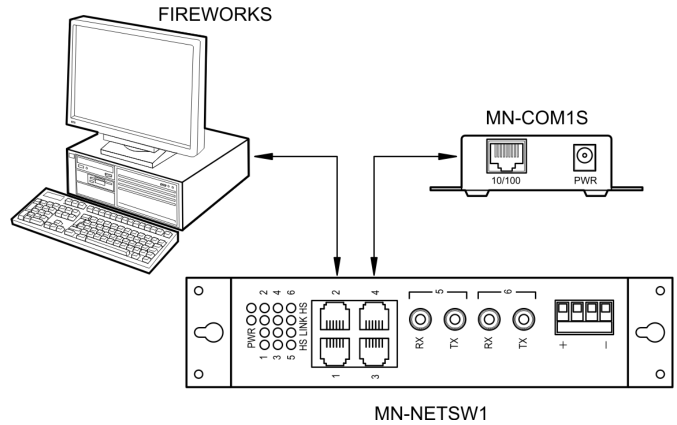
This procedure is for configuring the MN-COM1S at the site using the site equipment. Here is the general sequence of steps:

1. Connect the equipment.
2. Use the ARP -S command to assign a temporary IP address.
3. Use the TELNET command to open a TCP connection on port 1.
4. Use Internet Explorer to open the MN-COM1S module's embedded Web page then configure the MN-COM1S.

Connecting the equipment

Connect the MN-COM1S to the MN-NETSW1 as shown in Figure 3 below. Turn on the FireWorks workstation and apply power to the MN-COM1S, and then to the MN-NETSW1.

Figure 3: Setup diagram



Assigning a temporary IP address

To perform this procedure you will need an unused network IP address for the temporary IP address. You will also need the MAC address of the MN-COM1S module (as printed on the module).

Note: The IP address used depends on the site's network configuration.

To assign a temporary IP address:

1. Click Start > Run.
2. In the Open box, type `cmd`, and then click OK.

   This opens a command prompt window.
3. At the command prompt, enter:

```
ARP -S <temporary IP address> <MAC address>
```

Opening a TCP connection on port 1

This procedure uses the TELNET command to open a TCP connection on port 1. Do not use any other port number.

After a short delay (less than 1 second) the system returns a message that it could not open a connection to the host on port 1. This is normal.

To open a TCP connection on port 1:

1. Open a command prompt window.
2. At the command prompt, enter:

```
TELNET <temporary IP address> 1
```

Configuring the MN-COM1S module

This procedure is for configuring an MN-COM1S module using the MN-COM1S module’s embedded Web page.

To configure MN-COM1S module:

1. Start Internet Explorer.
2. In the Address box, type the temporary IP address you assigned to the MN-COM1S, and then click Go to open the embedded Web page.
3. In the navigation pane, click Network.
4. Under Network Settings, set the Network Mode option for Wired Only.
5. Under IP Configuration, click “Use the following IP Configuration” then set the IP configuration options as follows:

   IP Address: As required (ex. 192.168.1.XXX)
   Subnet Mask: As required (ex. 255.255.255.0)
   Default Gateway: As required (ex. 0.0.0.0)
6. Under Ethernet Configuration, click Auto Negotiate.
7. Click OK.
8. In the navigation pane, click Server.
9. Set the Server Configuration options as follows:

   Telnet Password: <blank>
   Retype password: <blank>
10. Set the Advanced options as follows:

    ARP Cache Timeout: 600 sec
    TCP Keepalive: 45 sec
    Monitor Mode @ Bootup: Enable
    HTTP Server Port: 80
    0x77FE Server Port: (unavailable)
    MTU Size: 1400
11. Click OK.
12. In the navigation pane, click Serial Settings under Channel 1.
13. Set the Channel options as follows:

    Disable Serial Port: Cleared (not checked)
14. Set the Port Settings options as follows:

    Protocol: RS232
    Baud Rate: 19200
    Data Bits: 8
    Flow Control: None
    Parity: None
    Stop Bits: 1
15. Set the Pack Control options as follows:

    Enable Packing: Checked
    Idle Gap Time: 5000 msec
    Match 2 Byte Sequence: No
    Match Byte: 0x0D 0x0D (Hex)
    Send Frame Immediate: Yes
    Send Trailing Bytes: None
16. Set the Flush Input Buffer options as follows:

    With Active Connect: No
    With Passive Connect: No
    At Time of Disconnect: No
17. Set the Flush Output Buffer options as follows:

    With Active Connect: No
    With Passive Connect: No
    At Time of Disconnect: No
18. Click OK.
19. In the navigation pane, click Connection under Channel 1.
20. Set the Protocol options as follows:

    Protocol: TCP
21. Under Connect Mode, set the Passive Connection options as follows:

    Accept Incoming: Yes
    Password Required: No
    Password: <blank>
    Modem Escape Sequence Pass Through: No
22. Set the Active Connection options as follows:

    Active Connect: None
    Start Character: 0x0D (in Hex)
    Modem Mode: None
    Show IP Address after RING: No
23. Set the End Point Configuration options as follows:

    Local Port: 10001
    Remote Port: 0
    Auto increment for active connect: Cleared (not checked)
    Remote Host: 0.0.0.0
24. Set the Common options as follows:

    Telnet Com Port Cntrl: Disable
    Terminal Name: <blank>
    Connect Response: None
    Use Hostlist: No
    LED: Blink
25. Set the Disconnect Mode options as follows:

    On Mdm_Ctrl_In Drop: No
    Check EOT (Ctrl-D): No
    Hard Disconnect: Yes
    Inactivity Timeout: 0 : 0 (min : sec)
26. Click OK.
27. In the navigation pane, click Apply Settings.

After you have finished configuring the MN-COM1S module, open a command prompt window, and then enter the ARP -D command to clear your computer’s ARP table.

Specifications

Voltage	18 to 28 VDC
Current	60 mA
Dimensions (W × H × D)	2.5 × 0.9 × 3.5 in. (6.4 × 2.3 × 9.0 cm)
Serial interface	RS-232C
Network Interface	
Connector	RJ-45
Cable type	Category 5, min.
Other	10/100 Mbps, TCP/IP, autonegotiating
Operating environment	
Temperature	32 to 120°F (0 to 49°C)
Relative Humidity	0 to 93%, noncondensing at 90°F (32°C)

Contact information

For contact information, see www.utcfireandsecurity.com.

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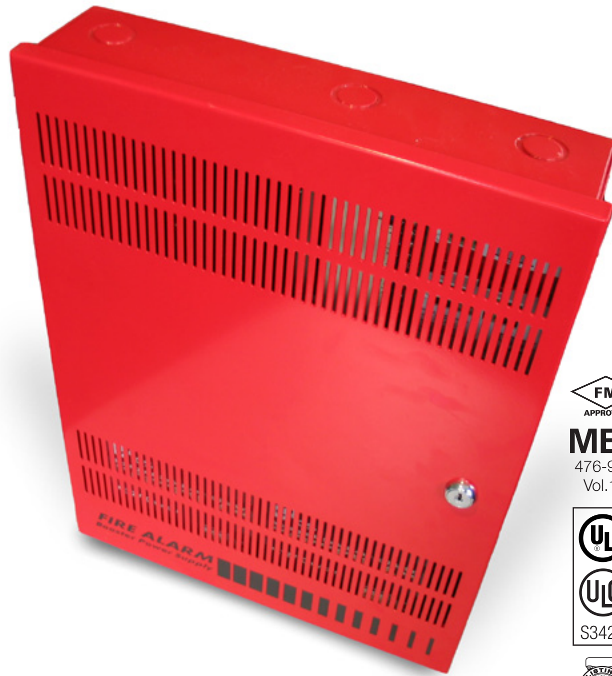
REMOTE BOOSTER POWER SUPPLY, 10-AMP (LIOS DETECTOR)

Operations & Maintenance Manual
December 2015

EST Life Safety & Communications

Remote Booster Power Supplies

BPS6A, BPS10A



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MEA 476-91-E Vol.13

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7300-1657: 0229

Overview

The Booster Power Supply (BPS) is a UL 864, 9th Edition listed power supply. It is a 24 Vdc filtered-regulated, and supervised unit that can easily be configured to provide additional notification appliance circuits (NACs) or auxiliary power for Mass Notification/ Emergency Communication (MNEC), as well as life safety, security, and access control applications.

The BPS contains the circuitry to monitor and charge internal or external batteries. Its steel enclosure has room for up to two 10 ampere-hour batteries. For access control-only applications, the BPS can support batteries totaling up to 65 ampere-hours in an external enclosure. The BPS has four Class B (convertible to two Class A) NACs. These can be activated in one or two groups from the BPS's unique dual input circuits.

The BPS is available in 6.5 or 10 ampere models. Each output circuit has a capacity of three amperes; total current draw cannot exceed the unit's rating.

The BPS meets current UL requirements and is listed under the following standards:

Standard (CCN)	Description
UL864 9th ed.ition (UOXX)	Fire Alarm Systems
UL636 (ANET, UEHX7)	Holdup Alarm Units and Systems
UL609 (AOTX, AOTX7)	Local Burglar Alarm Units and Systems
UL294 (ALVY, UEHX7)	Access Control Systems
UL365 (APAW, APAW7)	Police Station Connected Burglar Alarm Units and Systems
UL1076 (APOU, APOU7)	Proprietary Burglar Alarm System Units
UL1610 (AMCX)	Central Station Alarm Unit
ULC-S527 (UOXXC)	Control Units, Fire Alarm (Canada)
ULC-S303 (AOTX7)	Local Burglar Alarm Units and Systems (Canada)
C22.2 No. 205	Signaling Equipment (Canada)

Standard Features

- Allows for reliable filtered and regulated power to be installed where needed
- Cost effective system expansion
- Provides for Genesis and Enhanced Integrity notification appliance synchronization
- Supports coded output operation
- Self-restoring overcurrent protection
- Multiple signal rates
- Can be cascaded or controlled independently
- Easy field configuration
- On-board diagnostic LEDs identify wiring or internal faults
- Standard Edwards keyed lockable steel cabinet with removable door
- 110 and 230 Vac models available
- Accommodates 18 to 12 AWG wire sizes
- Optional tamper switch
- Dual battery charging rates
- Optional earthquake hardening: OSHPD seismic pre-approval for component Importance Factor 1.5

Application

The BPS provides additional power and circuits for notification appliances and other 24 Vdc loads. It is listed for indoor dry locations and can easily be installed where needed.

Fault conditions are indicated on the on-board diagnostic LEDs, opening the BPS input sense circuit and the trouble relay (if programmed). While this provides indication to the host system, the BPS can still be activated upon command. A separate AC Fail contact is available on the BPS circuit board, which can be programmed for trouble or AC Fail. There are seven on-board diagnostic LEDs: one for each NAC fault, one for battery fault, one for ground fault, and one for AC power.

The unique dual-input activation circuits of the BPS can be activated by any voltage from 6 to 45 VDC (filtered-regulated) or 11 to 33 Vdc (full-wave rectified, unfiltered). The first input circuit can be configured to activate 1-4 of the four possible outputs. The second input circuit can be configured to control circuits 3 and 4. When outputs are configured for auxiliary operation, these circuits can be configured to stay on or automatically deactivate 30 seconds after AC power is lost. This feature makes these circuits ideal for door holder applications. The BPS also has a separate 200 mA 24 Vdc output that can be used to power internal activation modules.

BPS NACs can be configured for a 3-3-3 temporal or continuous output. California temporal rate outputs are also available on certain models. This makes the BPS ideal for applications requiring signaling rates that are not available from the main system.

In addition to the internally generated signal rates, the BPS can also be configured to follow the coded signal rate of the main system NACs. This allows for the seamless expansion of existing NACs.

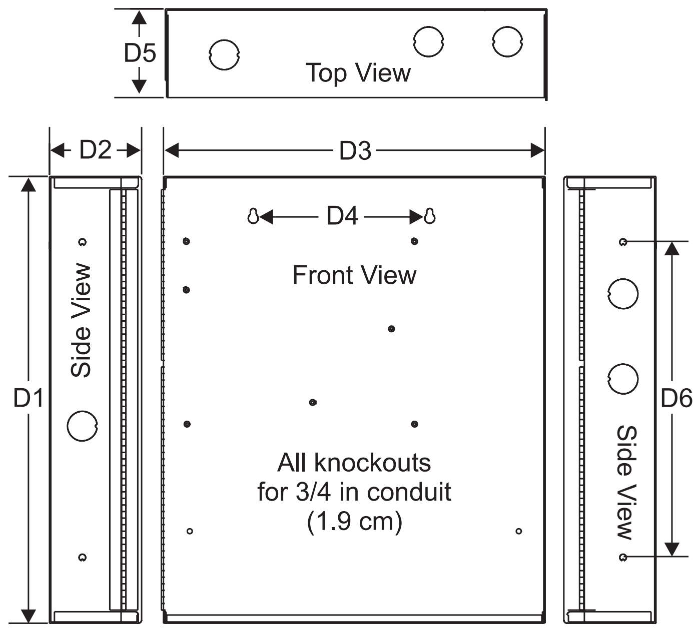
The BPS enclosure has mounting brackets for up to three Signature modules to the right of the circuit board.

Engineering Specification

Supply, where needed, Edwards BPS Series Booster Power Supplies (BPS) that are interconnected to and supervised by the main system. The BPS shall function as a stand-alone auxiliary power supply with its own fully-supervised battery compliment. The BPS battery compliment shall be sized to match the requirements of the main system. The BPS shall be capable of supervising and charging batteries having the capacity of 24 ampere-hours for Mass Notification/Emergency Communication (MNEC), life safety and security applications, and the capacity of 65 ampere-hours for access control applications.

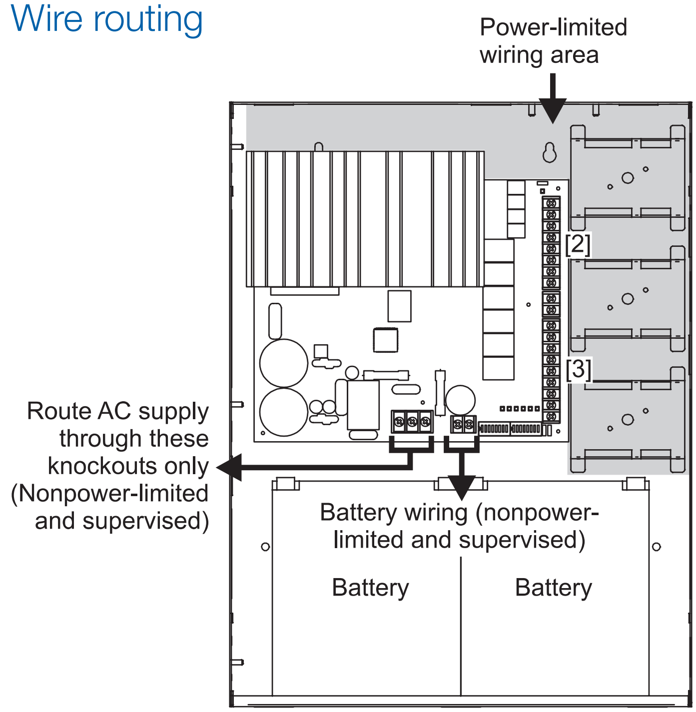
<<The BPS shall be capable of installation for a seismic component Importance Factor of 1.5.>> The BPS shall provide a minimum of four independent, fully supervised Class B circuits that can be field configurable for notification appliance circuits or auxiliary 24 Vdc power circuits. BPS NACs shall be convertible to a minimum of two Class A NACs. Each BPS output circuit shall be rated at 3 amperes at 24 Vdc. Each output circuit shall be provided with automatically restoring overcurrent protection. The BPS shall be operable from the main system NAC and/or Edwards Signature Series control modules. BPS NACs shall be configurable for continuous, 3-3-3 temporal or optionally, California rate. Fault conditions on the BPS shall not impede operation of main system NAC. The BPS shall be provided with ground fault detection circuitry and a separate AC fail relay.

Dimensions



D1	D2	D3	D4	D5	D6
17.0 in (43.2 cm)	3.5 in (8.9 cm)	13.0 in (33.0 cm)	6.5 in (16.5 cm)	3.375 in (8.6 cm)	12.0 in (30.4 cm)

Wire routing



Notes

1. Maintain 1/4-inch (6 mm) spacing between power-limited and nonpower-limited wiring or use type FPL, FPLR, or FPLP cable per NEC.

[2] Power-limited and supervised when not configured as auxiliary power. Non-supervised when configured as auxiliary power.

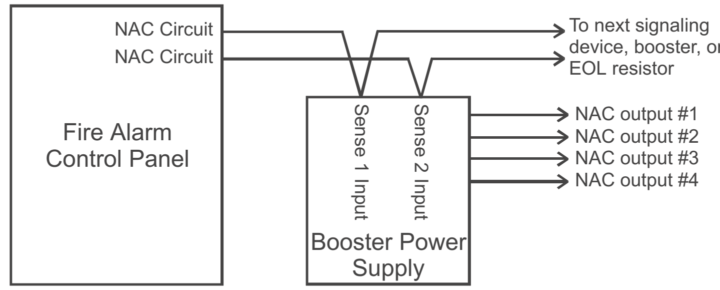
[3] Source must be power-limited. Source determines supervision.

4. When using larger batteries, make sure to position the battery terminals towards the door.

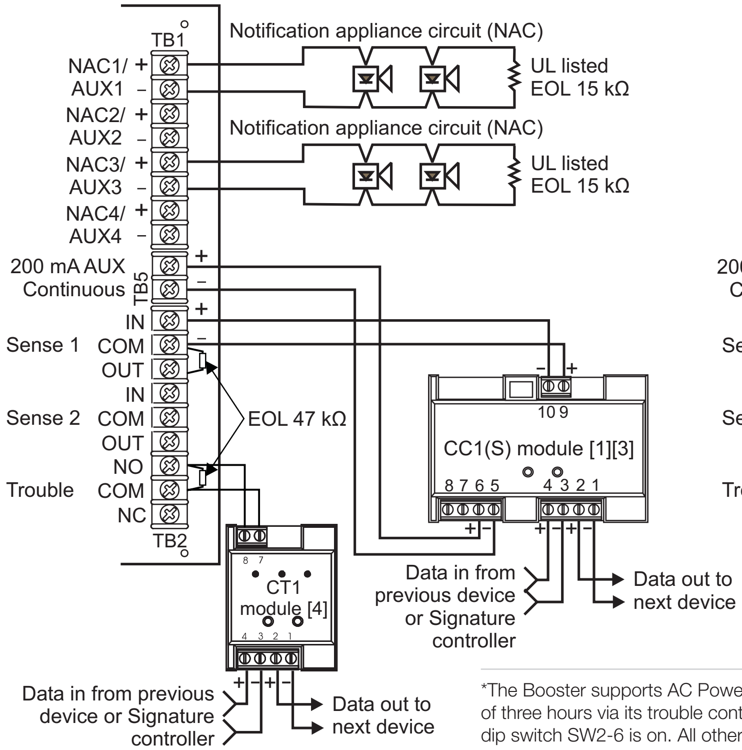
Typical Wiring

Single or cascaded booster anywhere on a notification appliance circuit

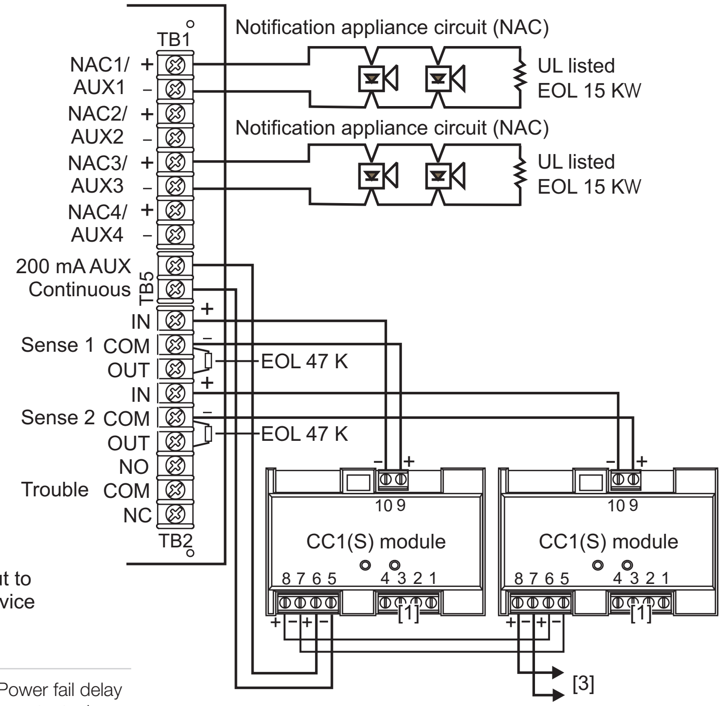
Existing NAC end-of-line resistors are not required to be installed at the booster's terminals. This allows multiple boosters to be driven from a single NAC circuit without the need for special configurations.



Configuring the Booster for AC Power Fail delay operation*

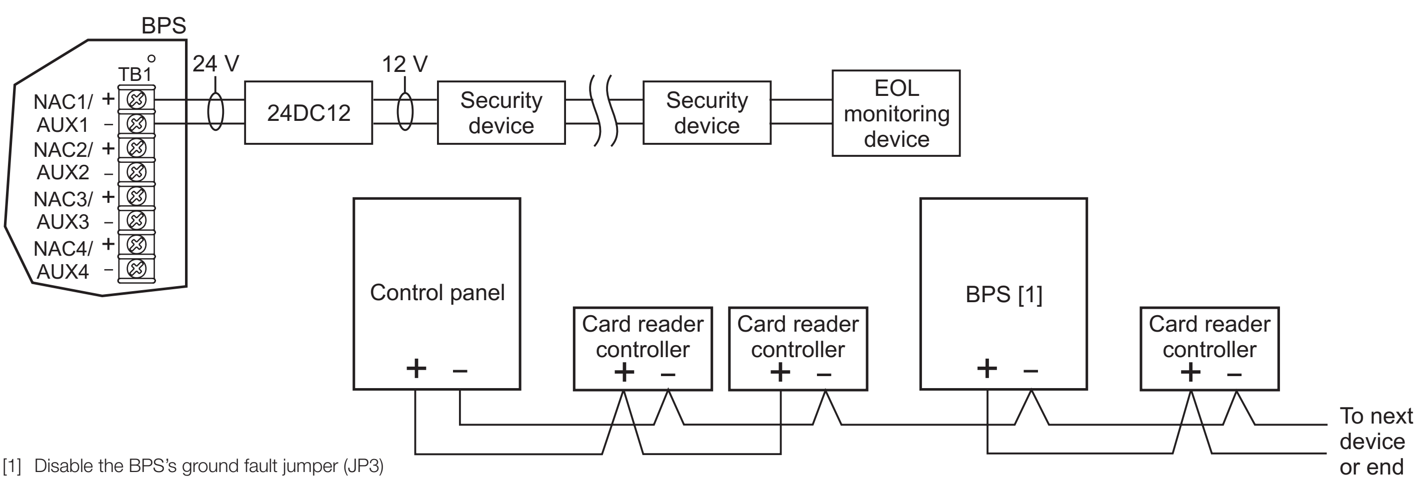


Multiple CC1(S) modules using the BPS's sense inputs



*The Booster supports AC Power fail delay of three hours via its trouble contact when dip switch SW2-6 is on. All other troubles are reported to supervising module or panel without delay via Sense inputs.

Security and access



[1] Disable the BPS's ground fault jumper (JP3)

Contact us...

Email: edwards.fire@fs.utc.com
Web: www.est-fire.com

EST is an EDWARDS brand.

1016 Corporate Park Drive
Mebane, NC 27302

In Canada, contact Chubb Edwards...
Email: inquiries@chubbedwards.com
Web: www.chubbedwards.com

Specifications

Model	6.5 amp Booster	10 amp Booster
AC Line Voltage	120VAC or 220-240VAC 50/60Hz 390 watts	120VAC or 220-240VAC 50/60Hz 580 watts
Notification Appliance Circuit Ratings	3.0A max. per circuit @ 24Vdc nominal 6.5A max total all NACs	3.0A max. per circuit @ 24Vdc nominal 10A max total all NACs
Trouble Relay	2 Amps @ 30Vdc	
Auxiliary Outputs	Four configurable outputs replace NACs 1, 2, 3 or 4. as auxiliary outputs and 200 mA dedicated auxiliary. (See note 2.)	
Input Current (from an existing NAC)	3mA @ 12Vdc, 6mA @ 24Vdc	
Booster Internal Supervisory Current	70mA + 35 mA for each circuit set to AUX	
Booster Internal Alarm Current	270mA	
Signature Mounting Space	Accomodates three two-gang modules.	
Maximum Battery Size	10 Amp Hours (2 of 12V10A) in cabinet up to 24 Amp hours with external battery cabinet for fire and security applications; up to 65 Amp hours for access control applications in external battery box.	
Terminal Wire Gauge	18-12 AWG	
Relative Humidity	0 to 93% non condensing @ 32°C	
Temperature Rating	32° to 120°F (0° to 49°C)	
NAC Wiring Styles	Class A or Class B	
Output Signal Rates	Continuous, California rate, 3-3-3 temporal, or follow installed panel's NAC. (See note 1.)	
Ground Fault Detection	Enable or Disable via jumper	
Agency Listings	UL, ULC, CSFM	

1. Model BPS*CAA provides selection for California rate, in place of temporal.
2. Maximum of 8 Amps can be used for auxiliary output.

Ordering Information

Catalog Number	Description	Shipping Wt. lb (kg)
BPS6A	6.5 Amp Booster Power Supply	13 (5.9)
BPS6AC	6.5 Amp Booster Power Supply (ULC)	13 (5.9)
BPS6A/230	6.5 Amp Booster Power Supply (220V)	13 (5.9)
BPS6CAA	6.5 Amp Booster Power Supply with California rate	13 (5.9)
BPS10A	10 Amp Booster Power Supply	13 (5.9)
BPS10AC	10 Amp Booster Power Supply (ULC)	13 (5.9)
BPS10A/230	10 Amp Booster Power Supply (220V)	13 (5.9)
BPS10CAA	10 Amp Booster Power Supply with California rate	13 (5.9)
Related Equipment		
12V6A5	7.2 Amp Hour Battery, two required	3.4 (1.6)
12V10A	10 Amp Hour Battery, two required	9.5 (4.3)
3-TAMP	Tamper switch	
BC-1EQ	Seismic Kit for BC-1. Order BC-1 separately. See note 3.	
BPSEQ	Seismic kit for BPS6A or BPS10 Booster Power Supplies. See note 3	
BC-1	Battery Cabinet (up to 2 - 40 Amp Hour Batteries)	58 (26.4)
BC-2	Battery Cabinet (up to 2 - 17 Amp Hour Batteries)	19 (8.6)
12V17A	18 Amp Hour Battery, two required (see note 1)	13 (5.9)
12V24A	24 Amp Hour Battery, two required (see note 1)	20 (9.07)
12V40A	40 Amp Hour Battery, two required (see notes 1, 2)	32 (14.5)
12V50A	50 Amp Hour Battery, two required (see notes 1, 2)	40 (18.14)
12V65A	65 Amp Hour Battery, two required (see notes 1, 2)	49 (22.2)

1. Requires installation of separate battery cabinet.
2. BPS supports batteries greater than 24 Amp hours for access control applications only.
3. For earthquake anchorage, including detailed mounting weights and center of gravity detail, refer to Seismic Application Guide 3101676. Approval of panel anchorage to site structure may require local AHJ, structural or civil engineer review.

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Remote Booster Power Supply Technical Reference Manual

P/N 3100485-EN • REV 04 • ISS 28AUG12

Manufacturer Edwards, A Division of UTC Fire & Security Americas Corporation, Inc.
8985 Town Center Parkway, Bradenton, FL 34202, USA

Certification

FCC compliance **Class A:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FDNY NYC Fire Department Certificate of Approval: MEA 476-91-E XIII

European Union directives **1999/5/EC (R&TTE directive):** Hereby, UTC Fire & Security declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.

2006/66/EC (battery directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: www.recyclethis.info.

Contact information For contact information, see www.utcfireandsecurity.com.

Content

Important information

Limitation of liability

To the maximum extent permitted by applicable law, in no event will UTCFS be liable for any lost profits or business opportunities, loss of use, business interruption, loss of data, or any other indirect, special, incidental, or consequential damages under any theory of liability, whether based in contract, tort, negligence, product liability, or otherwise. Because some jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages the preceding limitation may not apply to you. In any event the total liability of UTCFS shall not exceed the purchase price of the product. The foregoing limitation will apply to the maximum extent permitted by applicable law, regardless of whether UTCFS has been advised of the possibility of such damages and regardless of whether any remedy fails of its essential purpose.

Installation in accordance with this manual, applicable codes, and the instructions of the authority having jurisdiction is mandatory.

While every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents, UTCFS assumes no responsibility for errors or omissions.

Advisory messages

Advisory messages alert you to conditions or practices that can cause unwanted results. The advisory messages used in this document are shown and described below.

WARNING: Warning messages advise you of hazards that could result in injury or loss of life. They tell you which actions to take or to avoid in order to prevent the injury or loss of life.

Caution: Caution messages advise you of possible equipment damage. They tell you which actions to take or to avoid in order to prevent the damage.

Note: Note messages advise you of the possible loss of time or effort. They describe how to avoid the loss. Notes are also used to point out important information that you should read.

Remote Booster Power Supply FCC compliance

This equipment can generate and radiate radio frequency energy. If the equipment is not installed in accordance with this manual, it may cause interference to radio communications. This equipment has been tested and found to comply with the limits for Class A computing devices pursuant to Subpart B of Part 15 of the FCC Rules. These rules are designed to provide reasonable protection against such interference when this equipment is operated in a commercial environment. Operation of this equipment is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Introduction

This installation manual is intended for use by installers and field technicians. It provides the installation procedures, wiring diagrams, DIP switch settings, etc. required to install and set up the Remote Booster Power Supply (BPS).

Models covered

The following table lists the booster power supply models that are covered in this manual.

Catalog number	Description
BPS6A	6.5 A booster power supply
BPS6A/230	6.5 A booster power supply
BPS6AC	6.5 A booster power supply
MIRBPS6A	6.5 A booster power supply
MIRBPS6A/230	6.5 A booster power supply
XLS-BPS6A	6.5 A booster power supply
XLS-BPS6A/230	6.5 A booster power supply
EBPS6A	6.5 A booster power supply
EBPS6A/230	6.5 A booster power supply
BPS10A	10 A booster power supply
BPS10A/230	10 A booster power supply
BPS10AC	10 A booster power supply
MIRBPS10A	10 A booster power supply
MIRBPS10A/230	10 A booster power supply
XLS-BPS10A	10 A booster power supply
XLS-BPS10A/230	10 A booster power supply
EBPS10A	10 A booster power supply
EBPS10A/230	10 A booster power supply

Compatibility

The input circuits of the booster power supply can be connected to 12 VDC or 24 VDC systems.

For details about device compatibility, refer to the *Remote Booster Power Supply Compatibility List* (P/N 3100656).

Installation procedure checklist

Follow these steps to install and set up the booster power supply (BPS).

- ☐ Verify that all power and field wiring are de-energized before proceeding.
- ☐ Unpack the equipment.
- ☐ Review the “Getting started” section.
- ☐ Review the applications: Review the applications to determine how you want to use the BPS. See the “Applications” section.
- ☐ Prepare the site: Make sure the installation location is free from construction dust and debris and extreme temperature ranges and humidity.
- ☐ Install the enclosure: See “Installing the enclosure” for enclosure dimensions.
- ☐ Install option modules if required: See “Installing option modules in the enclosure.”
- ☐ Install the 3-TAMP tamper switch (if one is used): See “Installing the 3-TAMP tamper switch.”
- ☐ Set the jumpers: See “Setting the jumpers.”
- ☐ Set the DIP switch options: See “Setting the DIP switches.”
- ☐ Review wire routing: See “Wire routing.”
- ☐ Check field wiring for shorts, opens, and grounds.
- ☐ Connect the field wiring: See “Connecting the field wiring.”
- ☐ Turn on the AC mains power.
- ☐ Connect the battery compliment.
- ☐ Verify that no defaults are displayed.
- ☐ Test the system for proper operation.

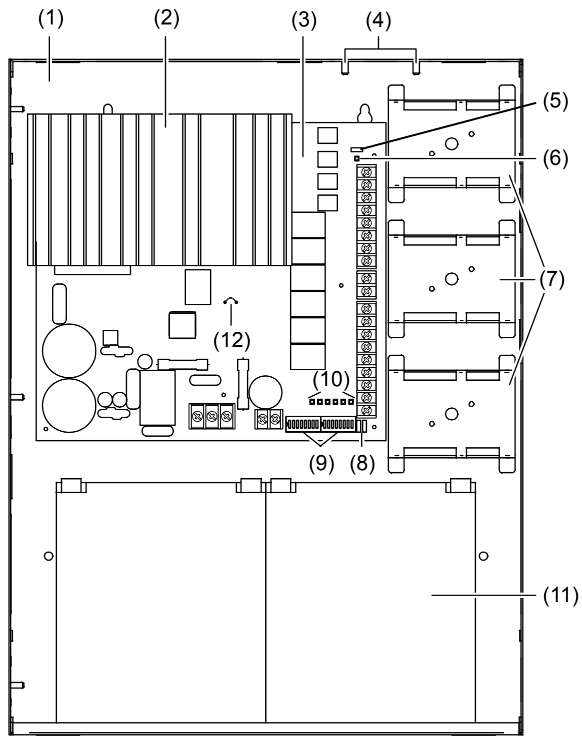
Getting started

Description

The 6.5 A and 10 A booster power supplies are designed to extend the power capacity of an emergency communication, life safety, fire alarm, security, or access control system. You can activate the BPS from options modules or from a control circuit. It has four independent NAC/AUX circuits that are supervised, when configured for NAC. It is also equipped with a fault relay that you can configure for common trouble (with immediate AC failure indication), or as an AC mains failure indication relay (with delayed output). The BPS's sense input #1 also provides a common fault indicator by opening the output side of the sense circuit.

Component descriptions

Figure 1: Components



(1) Enclosure: Houses the electronics and two standby batteries
(2) Heat sink: Distributes heat away from the circuit board
(3) Circuit board: Provides connections for all circuits
(4) Tamper switch standoffs: 3-TAMP mounting standoffs
(5) Jumper JP3: Ground fault enable or disable option
(6) AC LED: AC power on
(7) Mounting brackets: Option module mounting brackets
(8) Jumpers JP1 and JP2: Class A or Class B NAC option
(9) DIP switches: Two eight-position DIP switches used for configuration
(10) Circuit LEDs: NAC, battery, and ground fault trouble LEDs
(11) Batteries: Up to two 10 Ah batteries fit in the enclosure. For larger batteries, use an external battery cabinet (BC-1 or BC-2).
(12) Jumper JP4: Battery charging jumper

Specifications

The following specifications apply to all BPS models.

AC line voltage 6.5 A BPS	 120 VAC / 230 VAC (50/60 Hz), 390 W
10 A BPS	120 VAC / 230 VAC (50/60 Hz), 580 W
Sense voltage (input)	6 to 45 VDC (FWR and unfiltered DC)
Sense current (input)	6 mA at 24 VDC, 3 mA at 12 VDC, 12 mA at 45 VDC
NAC output voltage (special application circuit)	19.1 to 26.40 VDC **Note:** All NACs are supervised. Refer to the *Remote Booster Power Supply Compatibility List* P/N 3100656 for the maximum number of devices that can be used on a NAC circuit.
AUX output voltage (special application circuit)	19.0 to 26.48 VDC
NAC/AUX output current	3.0 A max. per circuit with 0.35 power factor (6.5 A or 10 A max. total for all NACs) (6 A or 8 A max. total for all AUXs)
NAC/AUX capacitive loading	10,000 µF max. for continuous NAC circuits 2,200 µF max. for coded rate NAC circuits 2,200 µF max. for AUX circuits
NAC/AUX class	Class A or Class B
Wire size	18 to 12 AWG (0.75 to 2.5 mm^2)
NAC EOL	UL: 15 k∧ (P/N EOL-15) ULC: Use P/N EOL-P1 and select the 15 k∧ resistor
Auxiliary output (continuous)	1 dedicated unsupervised, unswitched 200 mA auxiliary output Voltage range: 19.49 to 26.85 VDC
Common trouble relay	Form C, 1 A, 30 VDC (resistive)
Battery capacities	6.5 to 24 Ah for ECS/MNS/LSS applications 6.5 to 24 Ah for Security/Access Control applications 10 Ah maximum in BPS enclosure applications
Battery charger current limit [1]	1.2 A when the battery jumper wire is cut 2.1 A when the battery jumper wire is *not* cut
Operating environment Operating temperature Relative humidity	 32 to 120°F (0 to 49°C) 0 to 93% noncondensing
Ground fault impedance	10 k∧
Intended installation environment	Indoor-dry

[1] The battery charger is disabled automatically and will not charge the batteries when the unit is activated via either of its *sense* inputs.

LED indicators

The BPS has seven LED indicators. See “Component descriptions” for the location of the LEDs.

Table 1: LED indicators

LED	Color	Description
AC	Green	AC power on.
NAC1	Yellow	NAC1/AUX1 trouble [1].
NAC2	Yellow	NAC2/AUX2 trouble [1].
NAC3	Yellow	NAC3/AUX3 trouble [1].
NAC4	Yellow	NAC4/AUX4 trouble [1].
BAT	Yellow	Battery trouble. Indicates that the battery level has fallen below acceptable levels.
GND	Yellow	Ground fault. Indicates that a ground fault has been detected on the field wiring.

[1] The NAC LEDs indicate a trouble with the load or external wiring on the NAC/AUX circuit. For circuits configured as NACs, this could be an open circuit trouble, short circuit trouble, or an overload trouble.

For short circuit troubles, the NAC does not activate until the short circuit condition is removed.

For overload troubles, an active NAC is shutdown. After shutdown, if there is no short circuit condition, the NAC reactivates after 30 seconds and checks to see if the overload condition still exists.

For AUX circuits, the trouble indicates an overload condition. The AUX circuit is shutdown for 30 seconds and then is reactivated to see if the overload condition still exists.

Trouble indicating and reporting

When the BPS trouble relay is not dedicated to AC power loss reporting (DIP switch SW2-6 OFF), the trouble conditions listed in the table above are reported through the trouble relay. Other internal troubles that do not have an associated LED are also reported via the BPS trouble relay. Other internal troubles include: DIP switch read trouble, RAM failure, code checksum failure, A to D failure, and battery charger failure.

All troubles are also reported through both sense circuit trouble relays.

Installing the enclosure

When installing this system, be sure to follow all applicable national and local codes and standards.

The enclosure can be surface mounted or semiflush mounted. See “Enclosure dimensions” below for details.

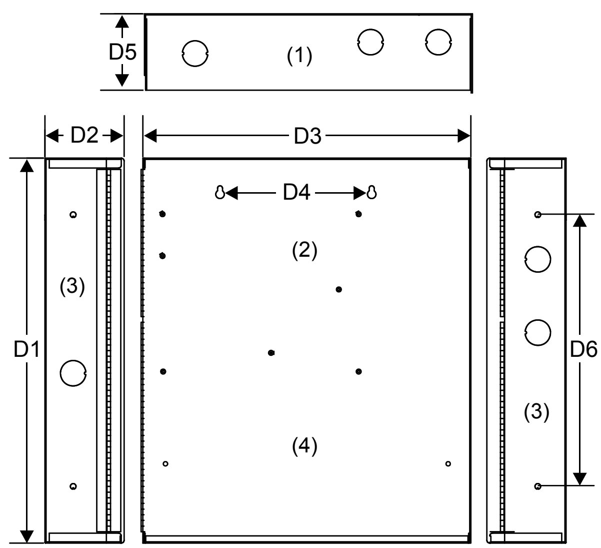
To surface mount the enclosure:

1. Position the enclosure on the finished wall surface.
2. Fasten the enclosure to the wall surface where indicated.
3. Install all conduits and pull all wiring into the enclosure before proceeding.

To semiflush mount the enclosure:

1. Frame the interior wall as required so that it supports the full weight of the enclosure and standby batteries.
2. Fasten the enclosure to the framing studs where indicated.
3. Install all conduits and pull all wiring into the enclosure before proceeding.

Figure 2: Enclosure dimensions



(1) Top view
(2) Front view
(3) Side view
(4) All knockouts are a combination 0.5 in. (1.27 cm) and 0.75 in. (1.9 cm)

D1	D2	D3	D4	D5	D6
17.0 in (43.2 cm)	3.5 in (8.9 cm)	13.0 in (33.0 cm)	6.5 in (16.5 cm)	3.375 in (8.6 cm)	12.0 in (30.4 cm)

Installing option modules in the enclosure

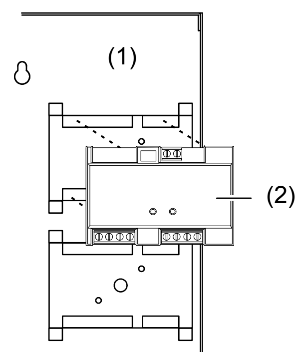
Up to three option modules can be installed on the mounting brackets inside the enclosure. Depending on the model, the device must be either screw-mounted or snap-mounted to the bracket.

To snap-mount modules on a bracket:

1. Snap the module into a mounting bracket.
2. Connect all wiring. Refer to the module’s installation sheet for wiring information or to the *Signature Series Component Installation Manual* (P/N 270497).

Note: Route the wiring around the perimeter of the enclosure, not across the circuit board.

Figure 3: Mounting brackets with an option module



(1) Mounting brackets
(2) Option module

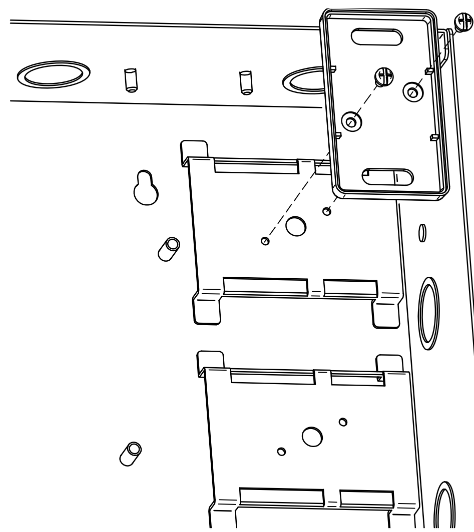
To screw-mount Signature Series modules on a bracket:

1. Remove the module’s plastic cover.
2. Remove the circuit board from the plastic backing.
3. Screw the plastic backing to the mounting bracket using two #6, 1/4 flat head sheet metal screws. See Figure 4 on page 9.

   Note: For mounting MN-NETRLY4 modules, refer to the *MN-NETRLY4 Network Relay Module Installation Sheet*, P/N 310-1827-ML.
4. Insert the circuit board into the plastic backing.
5. Snap the module’s plastic cover into place.
6. Connect all wiring. Refer to the module’s installation sheet for wiring information or to the *Signature Series Component Installation Manual* (P/N 270497).

Note: Route the wiring around the perimeter of the enclosure, not across the circuit board.

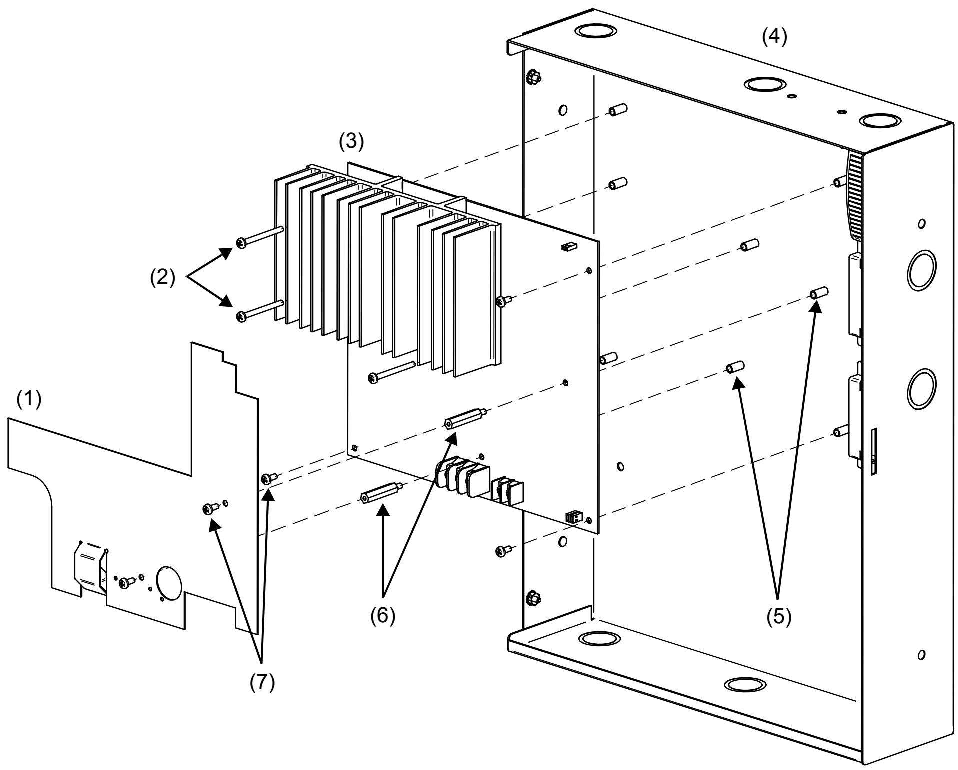
Figure 4: Inserting the circuit board



Installing the circuit board in the enclosure

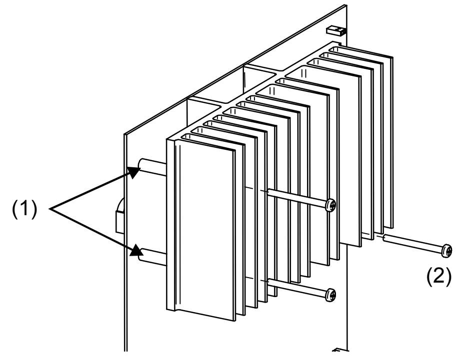
You may have to remove the circuit board to install the enclosure. Reinstalling the circuit board in the enclosure must be done with accuracy to avoid causing ground faults or shorts. The screws and standoffs must be installed correctly and in the right positions. Use the diagrams below to install the circuit board.

Figure 5: Complete circuit board installation



(1) Cover ("C" models, only)
(2) Long screws
(3) Circuit board
(4) Enclosure
(5) Enclosure standoffs
(6) Barrel spacers, see Figure 6 on page 11
(7) Short screws

Figure 6: Barrel spacer installation



(1) Barrel spacers
(2) Long screws

Note: The barrel spacers must be positioned correctly so that the long screw can pass through the spacer and into the enclosure standoff.

Setting the jumpers

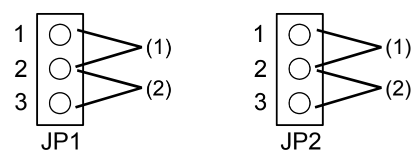
There are four jumpers on the BPS. See Figure 1 on page 4 for the location of the jumpers.

NAC Class A or Class B (JP1 and JP2)

JP1 and JP2 are used to select a Class A or Class B NAC wiring configuration for all NACs. The default is Class B.

Note: JP1 and JP2 must be positioned to match the SW2-8 DIP switch selection (Class A or Class B).

Figure 7: JP1 and JP2



(1) Class A
(2) Class B

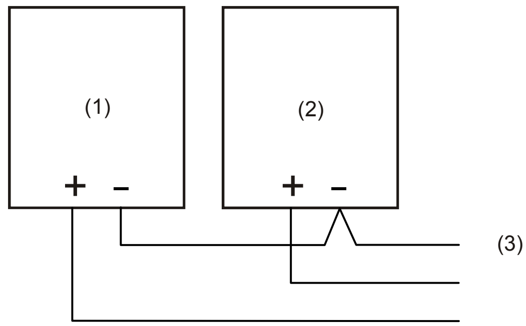
Ground fault enable (JP3)

JP3 is used to set the NAC/AUX circuits for ground fault enabled or disabled operation. The sense inputs are always isolated from local power.

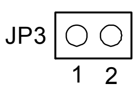
Enabled: Allows the BPS to perform its own ground fault checking. This is the *default* position.

Disabled: Disable the BPS's ground fault detection only when the controlling panel is providing ground fault detection for the BPS output circuits. See Figure 8 on page 13 for wiring information.

Figure 8: Ground fault enable



(1) Control panel. The control panel is responsible for ground fault detection when the BPS is wired in this fashion.
(2) BPS. Disable the BPS's ground fault jumper (JP3).
(3) To next BPS that requires ground fault detection from the control panel.

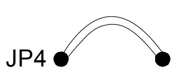


GF disable: *Do not* install jumper

GF enable: Install jumper

Battery charging (JP4)

The battery charging jumper is a small wire that controls how the batteries are charged. Battery size determines whether you must cut the jumper wire or leave it intact.



Cut the jumper wire when using batteries *under 10 Ah*.

Do not cut the jumper wire when using batteries *10 Ah or over*.

UL 864 programming requirements

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION, AND OTHER INVOLVED PARTIES

This product incorporates field-programmable options. In order for the product to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864, certain programming features or options must be limited to specific values or not used at all as indicated below. Some options were permitted under the previous versions of UL 864 and are provided to allow for service replacements on those systems.

Programmable feature or option	Permitted in UL 864? (Y/N)	Possible settings	Settings permitted in UL 864
Four second NAC audible synchronization delay [1]	N	On (4 second delay) Off (1 second delay)	Off
AC power delay	Y	On (3 hour, no dedicated AC failure contact) Off (no delay)	On

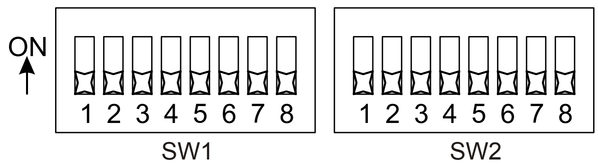
[1] This option is controlled by switch SW1-4. See “Synchronization control (SW1-4)” on page 16.

Setting the DIP switches

Two eight-position DIP switches are used to configure the BPS. The following sections show the DIP switch settings for the various input and output configurations.

Note: As shipped from the factory, all switches are in the OFF position.

Figure 9: Switch settings



Sense 1 and 2 operation (SW1-1 to 3)

The BPS has three operating modes, as shown in the following table. Switches SW1-1, -2, and -3 determine which mode is used.

Table 2: Switch settings

Operating mode [1]	SW1-1	SW1-2	SW1-3
Correlate mode	OFF	–	–
Genesis Master mode	ON	OFF	ON
Nondelayed mode	ON	ON	–

[1] See the descriptions below for operation details

These switches also determine how Sense 1 and 2 correlate to the NAC circuits. Details for each mode are described below.

Correlate mode

In correlate mode, switches SW1-2 and SW1-3 control which NACs activate when the sense circuits activate. The correlations do not affect output circuits that are operating as AUX circuits.

The following table details which NACs activate when the sense circuits activate.

Table 3: Sense circuit to NAC correlations

Switch settings		Class B		Class A	
SW1-2	SW1-3	Sense 1	Sense 2	Sense 1	Sense 2
OFF	OFF	1, 2, 3, 4	1, 2, 3, 4	1/2, 3/4	1/2, 3/4
OFF	ON	1	2, 3, 4	1/2	3/4
ON	OFF	1, 2	3, 4	–	–
ON	ON	1, 2, 3	4	–	–

Genesis Master mode

In Genesis Master mode, Sense 1 is connected to a visible zone and Sense 2 is connected to an audible zone. All NACs are activated when Sense 1 activates. Continuous NACs generate Genesis audible on/off signals based on the Sense 2 input circuit.

Nondelayed mode

Nondelayed mode is intended to support coders. In this mode, there is no delay between activation of the sense input and activation of the NAC.

In nondelayed mode, switch SW1-3 controls which NACs activate when the sense circuits activate. The correlations do not affect output circuits that are operating as AUX circuits.

The following table details which NACs activate when the sense circuits activate.

Table 4: Sense circuit to NAC correlations

SW1-3 setting	Class B		Class A	
SW1-3	Sense 1	Sense 2	Sense 1	Sense 2
OFF	1, 2, 3, 4	1, 2, 3, 4	1/2, 3/4	1/2, 3/4
ON	1, 2	3, 4	1/2	3/4

In nondelayed mode, SW2-5 can be used to generate sync pulses for NACs configured in continuous mode. This supports applications that include Genesis strobes and conventional audibles. For this operation, the NACs for the audible signals must be configured in sense follow mode. There is no delay for either the visibles or the audibles.

Synchronization control (SW1-4)

Switch SW1-4 controls the synchronization of signals with either one- or four-second delay times. See the topic “Understanding BPS synchronization” for more information.

Note: When using nondelayed mode, this switch is inactive.

Table 5: Switch settings (SW1-4)

Switch setting	Operation description
ON	NACs turn on 4 seconds after the sense input is activated (e.g. Genesis NACs sync with the second round of the temporal signal)
OFF	NACs turn on 1 second after the sense input is activated (e.g. the Genesis NACs sync with the second flash of the Genesis strobes)

NAC circuit operation (SW1-5 to 8 and SW2-1 to 4)

Switch SW1-5 to 8 and SW2-1 to 4 control NAC operation.

Table 6: Switch settings (SW1-5 to 8 and SW2-1 to 4)

Operating mode	NAC1 SW1-5	SW1-6	NAC2 SW1-7	SW1-8	NAC3 SW2-1	SW2-2	NAC4 SW2-3	SW2-4
Sense Follow [1]	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Continuous [1]	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Temporal [1] [2]	ON	OFF	ON	OFF	ON	OFF	ON	OFF
Auxiliary [1]	ON	ON	ON	ON	ON	ON	ON	ON

[1] See the descriptions below for operation details

[2] For externally coded or temporal operations, set the BPS to sense follow mode and use an externally coded or temporal source to activate the BPS sense circuit to generate the coded or temporal pattern.

Sense follow mode

In sense follow mode, NACs are activated following the sense circuits that are defined to turn on the NACs. The NACs turn on with a one- or four-second delay to allow Genesis strobes to synchronize on the NAC side and sense side. The four-second delay does not comply with UL864 9th edition. In this mode, a continuous input, 120 ppm, temporal, or coded input can be used.

Note: Sense follow must be used when the sense circuit is connected to a SIGA-CC1S, Genesis G1M-RM, FireShield panel, or a BPS generating Genesis sync pulses.

Continuous mode

In continuous mode, NACs are activated following the sense circuits in continuous mode. They activate one or four seconds after the sense input activates and restore seven seconds after the sense input restores.

Note: Activating the NACs four seconds after the sense input restores does not comply with UL 864 9th edition.

Temporal mode

In temporal mode, NACs are activated following the sense circuits in temporal mode. They activate one or four seconds after the sense input activates and restore seven seconds after the sense input restores. NACs generate temporal output as defined by NFPA.

Note: Activating the NACs four seconds following sense circuits in temporal mode does not comply with UL 864 9th edition.

Auxiliary

In auxiliary mode, NACs turn on during power-up. Sync pulses are not generated. Aux circuits can be configured to stay active during a power fail or load shed on a power fail (after a 20 second delay). Aux circuits are load shed when the system reaches low battery to prevent deep discharge of the batteries.

Genesis mode for continuous NACs (SW2-5)

Switch SW2-5 controls NAC operation for Genesis synchronization in continuous mode.

Table 7: Switch settings (SW2-5)

Switch setting	Operation description
ON	Continuous NACs are Genesis strobe or horn/strobe circuits. Continuous NACs generate a Genesis sync pulse. In Genesis Master mode, continuous NACs generate Genesis audible on/off signals based on the Sense 2 input circuit.
OFF	Continuous NACs do not generate Genesis signaling pulses

AC power loss reporting (SW2-6)

Switch SW2-6 controls when a report is sent to the system for an AC power loss.

Table 8: Switch settings (SW2-6)

Switch setting	Operation description
ON	The BPS trouble relay is dedicated to AC power loss reporting. The trouble relay switches within 20 seconds when AC fails or restores. The sense circuits immediately signal a fault condition for any *non-AC* power loss faults. If AC power fails, the sense circuits signal a fault condition after three hours of power loss.
OFF	The trouble relay operates for any trouble on the BPS. The sense circuits signal a fault for any troubles.

Auxiliary control during AC power loss (SW2-7)

Switch SW2-7 controls auxiliary outputs during AC loss.

Note: The 200 mA continuous AUX circuit is not affected by AC power loss.

Table 9: Switch settings (SW2-7)

Switch setting	Operation description
ON	Auxiliary outputs turn off 20 seconds after power fail
OFF	Auxiliary outputs stay on after AC power fail until the battery is less than 18.4 VDC

Class A or B NAC configuration (SW2-8)

Switch SW2-8 controls NAC Class A or B operation for all NACs.

Note: Jumpers JP1 and JP2 must be set to match the operation of this switch.

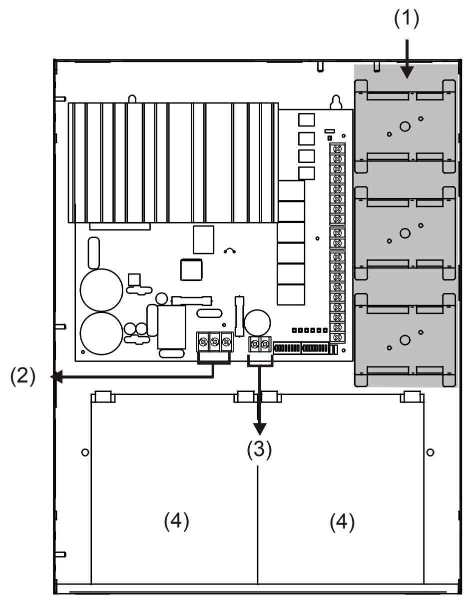
Table 10: Switch settings (SW2-8)

Switch setting	Operation description
ON	Class A NACs
OFF	Class B NACs

Wire routing

Separate power-limited from nonpower-limited wiring. Wiring within the enclosure should be routed around the perimeter of the enclosure, not across the circuit board.

Figure 10: Wire routing



Legend
(1) Power-limited wiring area
(2) Route AC supply through knockouts in nonpower-limited area
(3) Battery wiring
(4) Battery

Notes

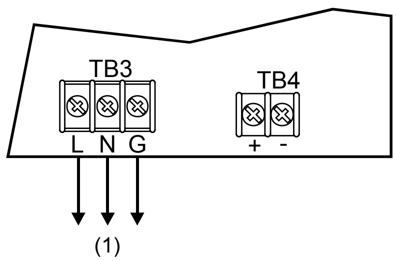
- Maintain 0.25 in. (6 mm) spacing between power-limited and nonpower-limited wiring.
- NAC circuits are power-limited and supervised for opens, shorts, and overcurrents. When configured as auxiliary power circuits, they are power-limited and supervised for shorts and overcurrents.
- Source must be power-limited. Source determines supervision.
- Position the battery terminals towards the door.

Connecting the field wiring

Caution: Break the wire run at each terminal connection to provide proper connection supervision. Do not loop wires under the terminals.

AC power wiring

Figure 11: AC power wiring



(1) 120 VAC connection shown. For 230 VAC connections, connect L1 to L and L2 to N. Do not operate unit without a ground connection.

Battery wiring

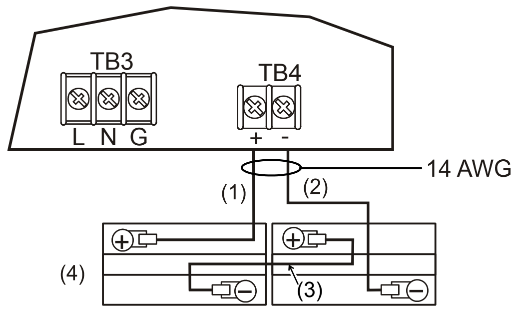
Two backup batteries are required with the BPS. The largest batteries that fit in the BPS enclosure are 10 Ah. Batteries larger than 10 Ah must be installed in a BC-1 or BC-2 battery cabinet.

Caution: For proper battery charging, the battery charging jumper wire (JP4) must be set according to the battery size you are using. Refer to “Setting the jumpers” for details about jumper JP4 and Figure 1 for the location of JP4.

Notes

- Batteries should be replaced every five years, or as required by local codes.
- Refer to local and national codes for battery maintenance requirements.

Figure 12: Battery wiring

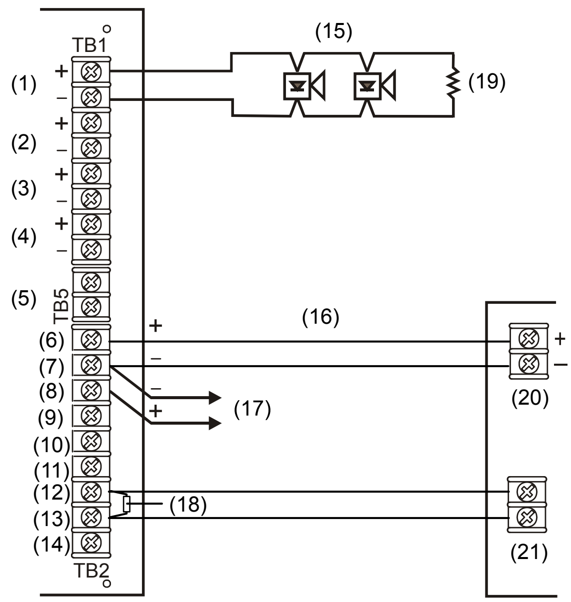


(1) Red
(2) Black
(3) Blue
(4) Top view

NAC Class B wiring

Connect a single NAC circuit to one NAC output. Terminate the circuit with a 15 k∧ EOL resistor.

Figure 13: NAC class B wiring



Legend

(1) NAC1
(2) NAC2
(3) NAC3
(4) NAC4
(5) 200 mA AUX Continuous
(6) Sense 1 IN
(7) Sense 1 COM
(8) Sense 1 OUT
(9) Sense 2 IN
(10) Sense 2 COM
(11) Sense 2 OUT
(12) Trouble NO
(13) Trouble COM
(14) Trouble NC
(15) Notification appliance circuit (NAC), typical of up to four NACs
(16) Input from signaling circuit. This is a control circuit. NACs are not permitted.
(17) To next booster, or NAC end-of-line resistor
(18) EOL
(19) EOL (UL listed 15 kΩ for NAC)
(20) Control circuit source
(21) AC power fail monitoring

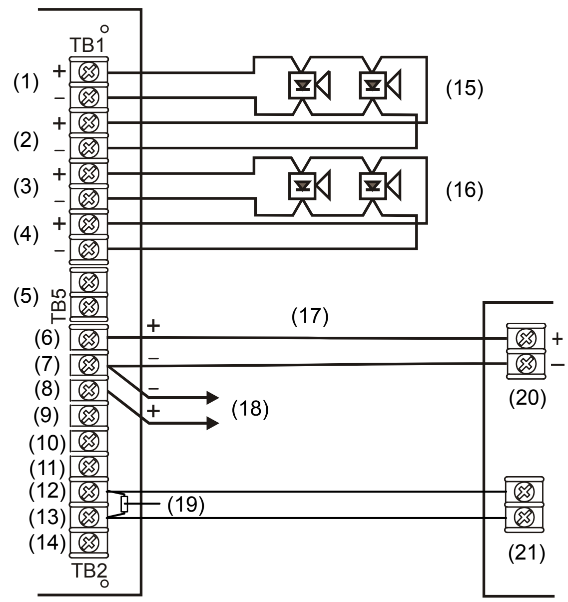
Notes

- A trouble on the booster power supply is sensed on the circuit that connects to the BPS sense input. This removes the need to separately monitor the trouble contact except for AC power failure.
- In an alarm condition, the booster power supply allows NAC current to move downstream to devices connected to the existing control panel's NAC circuit.
- Refer to the connected control module or control unit's documentation for more details on control circuit wiring.
- The AC power failure panel connection annunciates at the panel but does not report off premises for a predetermined time in U.S. fire applications. See Table 8 on page 19.

NAC Class A wiring

Connect one NAC circuit to one NAC output, either NAC1 or NAC3. Terminate the circuit at the NAC2 or NAC4 terminal screw, respectively.

Figure 14: NAC class A wiring



Legend

(1)	NAC1/AUX1	(12)	Trouble NO
(2)	NAC2/AUX2 (return for NAC1)	(13)	Trouble COM
(3)	NAC3/AUX3	(14)	Trouble NC
(4)	NAC4/AUX4 (return for NAC3)	(15)	Notification appliance circuit (NAC)
(5)	200 mA AUX Continuous	(16)	Notification appliance circuit (NAC)
(6)	Sense 1 IN	(17)	Input from signaling circuit
(7)	Sense 1 COM	(18)	To next booster, or NAC returning to existing control panel
(8)	Sense 1 OUT	(19)	EOL for IDC circuit
(9)	Sense 2 IN	(20)	Control circuit source
(10)	Sense 2 COM	(21)	AC power fail monitoring
(11)	Sense 2 OUT		

Note: The AC power failure panel connection annunciates at the panel but does not report off premises for a predetermined time in US fire applications. See Table 8 on page 19.

Sense circuit wiring

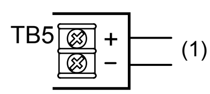
The BPS has two Class B sense (activation) circuits (Sense 1 and Sense 2). See Figure 13 and Figure 14.

Note: When NACs 1, 2, 3, and 4 are configured for AUX (Figure 16), sense activation of NAC circuits reports a trouble condition to the control panel using these circuits.

Any BPS trouble opens the sense circuit, which sends a trouble event message to the control panel, indicating that a trouble exists on that circuit.

AUX power wiring

Figure 15: Dedicated AUX power



(1) AUX power 200 mA continuous

NAC configured as AUX power

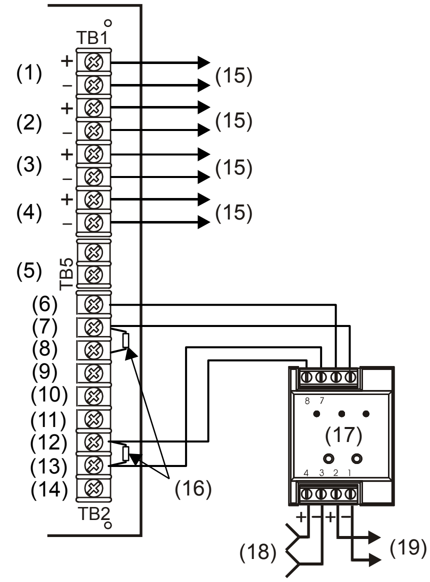
Each NAC can be configured through a DIP switch for use as AUX power. A DIP switch also controls AUX operation during AC power loss. See "Setting the DIP switches" for details.

This auxiliary configuration is compatible with fire alarm, security, and access control applications, which can be combined in a single system, if all of the devices are listed.

Trouble relay wiring with four AUX circuits

When all four NAC/AUX circuits are configured as AUX circuits and DIP switch SW2-6 is ON, a SIGA-CT2 module must be used to monitor the sense 1 trouble contacts and the trouble relay.

Figure 16: Trouble relay wiring with four AUX circuits



Legend

(1)	NAC1/AUX1	(11)	Sense 2 OUT
(2)	NAC2/AUX2	(12)	Trouble NO
(3)	NAC3/AUX3	(13)	Trouble COM
(4)	NAC4/AUX4	(14)	Trouble NC
(5)	200 mA AUX Continuous	(15)	To auxiliary device.
(6)	Sense 1 IN (trouble contact)	(16)	EOL 47 kΩ
(7)	Sense 1 COM (trouble contact)	(17)	CT2 module
(8)	Sense 1 OUT (trouble contact)	(18)	Data in from previous device or Signature controller
(9)	Sense 2 IN		
(10)	Sense 2 COM	(19)	Data out to next device

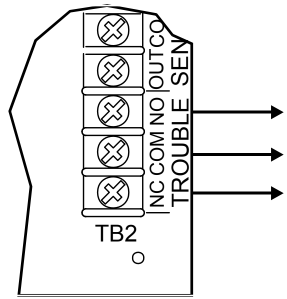
Notes

- The NAC/AUX circuit must be configured for AUX operation using the DIP switches. See “Setting the DIP switches” for details.
- CT2 modules must be wired and programmed on the Signature controller for proper operation.
- AC power loss causes circuit 2 on the CT2 to report a trouble to the control panel (see panel programming). All other BPS troubles cause circuit 1 (Sense 1) on the CT2 to report a trouble to the panel.

Common trouble relay wiring

The BPS has a Form C common trouble relay that provides a normally open and normally closed contact. The trouble relay switches under any trouble condition when DIP switch SW2-6 is off. When the switch is on, the BPS trouble relay is dedicated to AC power loss reporting. The trouble relay switches within 20 seconds when AC fails or restores. The sense circuits immediately signal a fault condition for any non-AC power loss faults. When AC power fails, the sense circuits signal a fault condition after three hours of power loss.

Figure 17: Common trouble relay wiring



(1) To booster trouble monitoring device

When using the sense circuit as common trouble relays, the BPS operates as outlined in the following scenarios.

Scenario 1: Trouble on any non-AC power fault

Result:

- Sense 1 opens.
- An AC power failure closes the trouble contact at 20 seconds and activates Sense 1 at three hours.

For a wiring example, see Figure 16 on page 27.

Scenario 2: Sense 1 activates all four NAC circuits

Result:

- Sense 1 opens.
- An AC power failure closes the trouble contact at 20 seconds and activates Sense 1 at three hours.

For a wiring example, see Figure 19 on page 30.

Scenario 3: Sense 1 and Sense 2 are operating with multiple CC1 modules

Result:

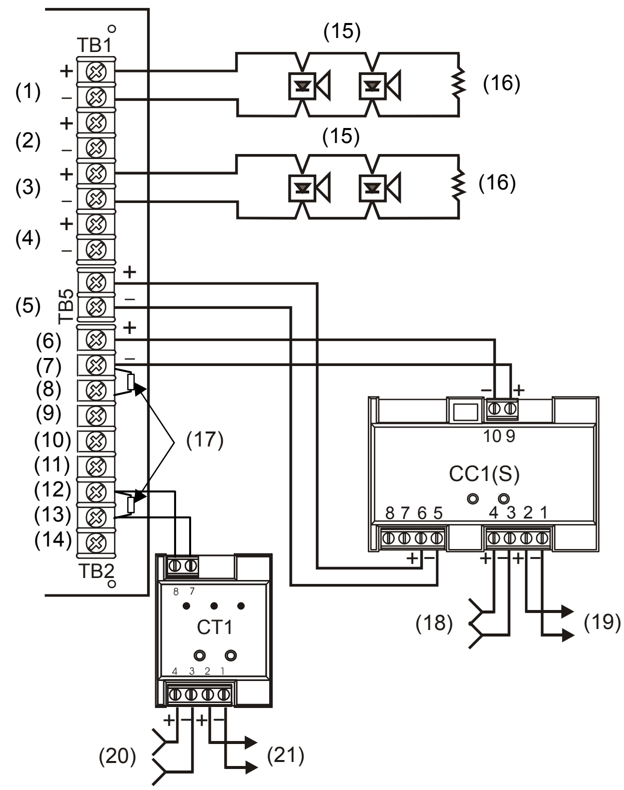
- A fault on NAC 1 or NAC 2 causes Sense 1 to open.
- A fault on NAC 3 or NAC 4 causes Sense 2 to open.
- A panel-related fault other than an AC failure (e.g., ground fault or battery fault) causes Sense 1 and Sense 2 to open.
- An AC power failure closes the trouble contact at 20 seconds and activates Sense 1 at three hours

For a wiring example, see Figure 20 on page 32.

NAC wiring using CC1(S) modules

The following wiring diagrams show Signature Series CC1(S) module connections. However, other Signature Series signal modules can be used.

Figure 18: Single CC1(S) using the BPS's 200 mA AUX continuous circuit



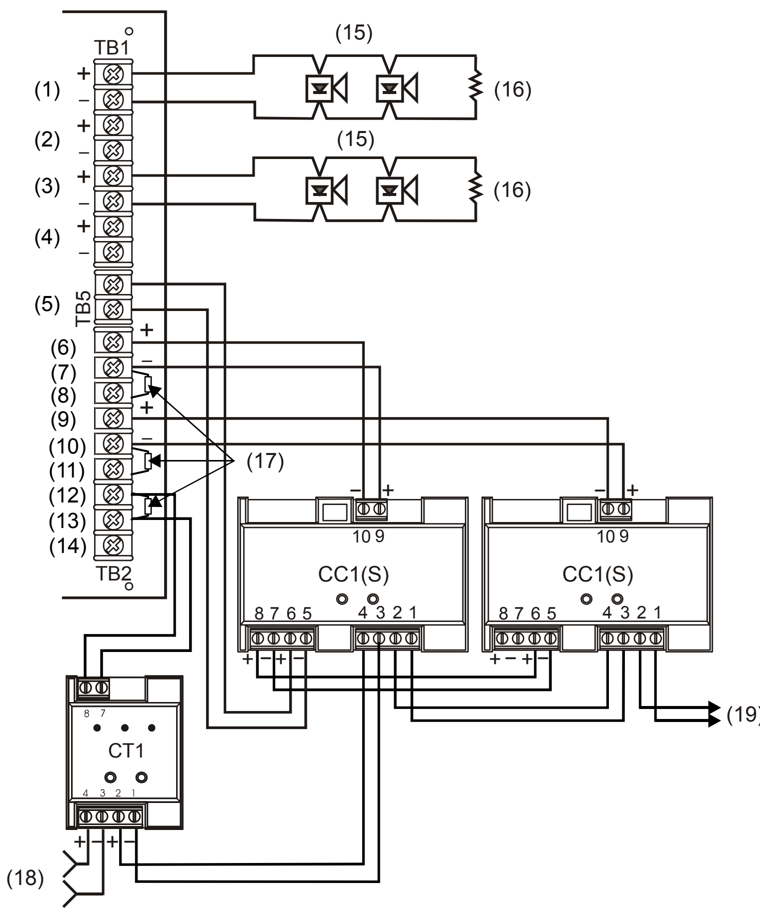
Legend

(1) NAC1/AUX1
(2) NAC2/AUX2
(3) NAC3/AUX3
(4) NAC4/AUX4
(5) 200 mA AUX Continuous
(6) Sense 1 IN
(7) Sense 1 COM
(8) Sense 1 OUT
(9) Sense 2 IN
(10) Sense 2 COM
(11) Sense 2 OUT
(12) Trouble NO
(13) Trouble COM
(14) Trouble NC
(15) Notification appliance circuit (NAC)
(16) UL listed EOL 15 kΩ
(17) EOL 47 kΩ
(18) Data in from previous device or Signature controller
(19) Data out to next device
(20) Data in from previous device or Signature controller
(21) Data out to next device

Notes

- CC1(S) modules must be wired and programmed on the Signature controller for proper operation.
- Any BPS trouble causes the CC1(S) supervision to report a trouble to the main control panel when DIP switch SW2-6 is on. AC power failure is delayed for three hours.
- CC1(S) wiring must be within three feet of the BPS enclosure and in conduit or mounted within the BPS's enclosure. If CC1(S) wiring is more than three feet from a BPS enclosure, then a separate listed EOL relay (PAM1, 6254A-003, or 73402A) or equivalent must be used to supervise the 200 mA AUX circuit wiring.
- When configured for AC power loss reporting using the trouble relay (DIP switch SW2-6 ON), the CT1 module supervises and reports the AC power loss to the control panel. When DIP switch SW2-6 is OFF, the CT1 module is not required.

Figure 19: Multiple CC1(S) modules using the BPS's sense inputs



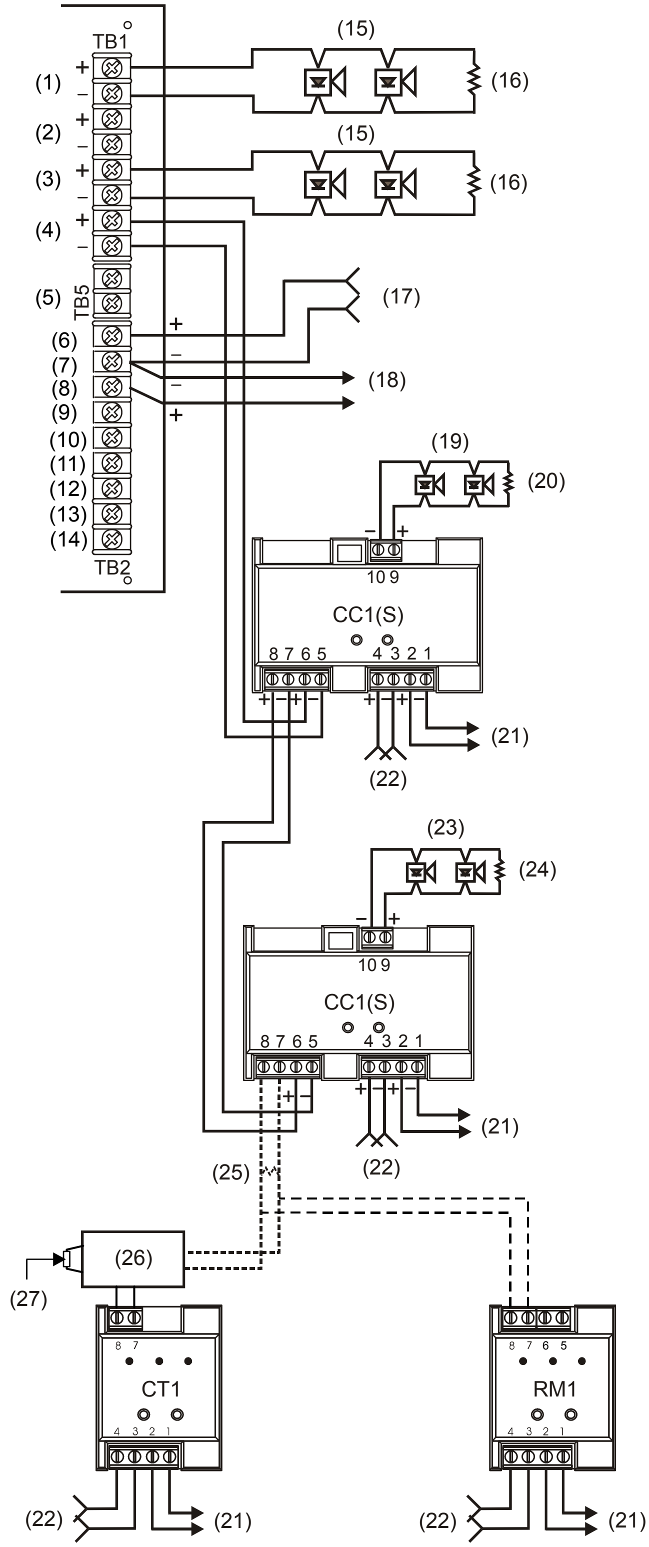
Legend

(1) NAC1/AUX1
(2) NAC2/AUX2
(3) NAC3/AUX3
(4) NAC4/AUX4
(5) 200 mA AUX Continuous
(6) Sense 1 IN
(7) Sense 1 COM
(8) Sense 1 OUT
(9) Sense 2 IN
(10) Sense 2 COM
(11) Sense 2 OUT
(12) Trouble NO
(13) Trouble COM
(14) Trouble NC
(15) Notification appliance circuit (NAC)
(16) UL listed EOL 15 kΩ
(17) EOL 47 kΩ
(18) Data in from previous device or Signature controller
(19) Data out to next device

Notes

- CC1(S) modules must be wired and programmed on the Signature controller for proper operation.
- Any BPS trouble causes the CC1(S) supervision to report a trouble to the main control panel when DIP switch SW2-6 is on. AC power failure is delayed for three hours.
- If CC1(S) wiring is more than three feet from a BPS enclosure, then a separate listed EOL relay (PAM1, 6254A-003, or 73402A) or equivalent must be used to supervise the 200 mA AUX circuit wiring.
- When configured for AC power loss reporting using the trouble relay (DIP switch SW2-6 ON), the CT1 module supervises and reports the AC power.

Figure 20: Multiple CC1(S) modules using one of the BPS's NAC/AUX circuits



FA - 668

Legend

(1) NAC1/AUX1
(2) NAC2/AUX2
(3) NAC3/AUX3
(4) NAC4/AUX4
(5) 200 mA AUX Continuous
(6) Sense 1 IN
(7) Sense 1 COM
(8) Sense 1OUT
(9) Sense 2 IN
(10) Sense 2 COM
(11) Sense 2 OUT
(12) Trouble NO
(13) Trouble COM
(14) Trouble NC
(15) Notification appliance circuit (NAC)
(16) UL listed EOL 15 kΩ
(17) From existing fire alarm panel notification circuit or CC1(S) module
(18) Out to EOL or next device
(19) NAC circuit
(20) UL listed EOL 15 kΩ
(21) Data out to next device
(22) Data in from previous device or Signature controller
(23) NAC circuit
(24) UL listed EOL 15 kΩ
(25) EOL 15 kΩ, when used as a NAC
(26) UL listed EOL relay
(27) EOL 47 kΩ

Notes

- When a booster power supply output is programmed as an AUX output, a listed EOL relay (PAM1, 6254A-003, or 73402A) or equivalent must be used to supervise the AUX output.
- When a booster power supply output is programmed as an NAC output, a 15 kΩ EOL resistor must be used for supervision.

Installing the 3-TAMP tamper switch

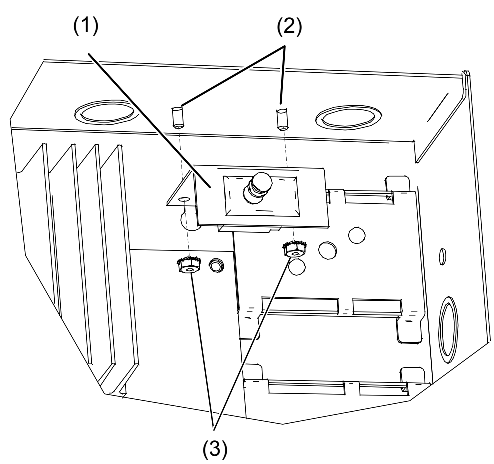
The 3-TAMP tamper switch is used to detect an open enclosure door for security purposes.

Note: The 3-TAMP tamper switch *must* be used for security applications and connected to a SIGA-SEC2 module mounted in the enclosure.

To install the tamper switch:

1. Install an EOL resistor on the 3-TAMP. Refer to the *3-TAMP Installation Sheet* (P/N 387422) for more information.
2. Position the tamper switch over the mounting standoffs. See the diagram below.
3. Use the two locking nuts provided to secure the tamper switch. See the diagram below.
4. Connect all wiring to the tamper switch. Refer to the *3-TAMP Installation Sheet* (P/N 387422) for details on wiring the tamper switch.

Figure 21: Tamper switch installation



(1) 3-TAMP tamper switch
(2) Mounting standoffs
(3) Locking nuts

Battery calculation worksheet

Supervisory (AUX1, AUX2, AUX3, AUX4) Note: Only add auxiliary current if SW2-7 is OFF. Auxiliary output stays on after AC power failure.				
Device type	Quantity	Current (mA)	Total/device	
Total AUX current (0 if switch SW2-7 is off, maximum 6.5 A for BPS6A and 8 A for BPS10A):				mA (A)
Number of circuits set to AUX		35 mA (per AUX circuit)		mA (B)

200 mA AUX				
Device type	Quantity	Current (mA)	Total/device	
Total 200 mA AUX current:				mA (C)

Rated base BPS supervisory current:	70 mA (D)
Total supervisory current (A + B + C + D):	mA (E)
Hours of supervisory:	Hrs (F)
Supervisory mAh (E x F):	mAh (G)

Alarm (NAC1, NAC2, NAC3, NAC4)				
Device type	Quantity	DC current (mA, RMS)	Total/device	
Total NAC current:				mA (H)

Rated base BPS alarm current:	270 mA (J)
Total alarm current (E + H + J):	mA (K)
Minutes of alarm:	Min (L)
Hours of alarm (L/60):	Hr (M)

Alarm mAh required (K x M):	mAh (N)

Total battery mAh (N + G):	mAh (O)
Total battery Ah (O/1000):	Ah (P)
Factor of safety 20% [1] (P x 1.20)	Ah (Q)
Supervisory battery current (E/1000):	A (R)

[1] Twenty percent safety margin per NFPA 72-2010 10.5.6.3.1 (1).

Notification appliance circuit calculations

Introduction

This topic shows you how to determine the maximum cable length of a notification appliance circuit (NAC) for a given number of appliances.

Two methods are presented: worksheet and equation. The worksheet method is simpler, but your installation must meet the criteria listed on the worksheet. If your installation does not meet these criteria, you need to use the equation method.

The methods given here determine cable lengths that work under all operating conditions. The calculations ensure that the required operating voltage and current will be supplied to all notification appliances. To do this, we assume these two worst-case conditions:

- The voltage at the NAC terminals is the minimum provided by the power supply
- The notification appliances are clustered at the end of the NAC circuit

Other, more detailed methods that distribute the appliance load along the NAC cable may indicate that longer cable runs are possible.

What you'll need

Appliance and cable values

Whether you use the worksheet method or the equation method, you'll need to know:

- The minimum operating voltage required for the appliances
- The maximum operating current drawn by each appliance
- The resistance per unit length of the wire used (Ω/ft)

This information can be found on the appliance installation sheets and on the cable specification sheet.

Power supply values

For either method, you'll need some fixed or calculated operating values for your specific power supply. The fixed values are:

- Maximum voltage = 26.3 V
- Source voltage = 19.1 V
- Load factor = 0.59 V/A
- Power type = DC (filtered/regulated)

The *maximum voltage* is the highest voltage measured at the NAC terminals. This value is not used in the calculations, but is given so you can ensure appliance compatibility.

The *source voltage* is the BPS is 19.1 VDC operating minimum for the power supply, and is calculated as 85% of 24 volts minus the internal panel loss.

The *load factor* is a measure of how the power supply voltage reacts when a load is applied. The load factor measures the voltage drop per ampere of current drawn by the load.

The *power type* reflects the type of power supplied to the NAC terminals at minimum voltage. The current draw of notification appliances can vary substantially with the type of power supplied: full-wave rectified (VFWR) or direct current (VDC). It is important to know the power type at minimum terminal voltage.

You'll need to calculate the following values relating to your power supply and to the NAC circuit current. These are:

- Minimum voltage
- Voltage drop

The *minimum voltage* is the lowest voltage measured at the NAC terminals when the power supply is under the maximum load for that circuit (i.e. for the appliances that constitute the NAC.)

The *voltage drop* is the difference between the minimum voltage and 16 V. This value is for use with the worksheet only.

Worksheet method

Use this worksheet to determine the maximum cable length of a notification appliance circuit for a given number of appliances.

Use this worksheet only if all the appliances are regulated. That is, they must have a minimum operating voltage of 16 V. For other appliances, use the "Equation method."

Worksheet 1: NAC cable length

		NAC1	NAC2	NAC3	NAC4	
Total operating current [1]						A
Load factor	×	0.59	0.59	0.59	0.59	V/A
Load voltage drop	=					V
Source voltage		19.1	19.1	19.1	19.1	V
Load voltage drop	−					V
Minimum voltage	=					V
Regulated appliance voltage	−	16.0	16.0	16.0	16.0	V
Voltage drop [2]	=					V
Total operating current	÷					A
Maximum resistance	=					Ω
Wire resistance (Ω/ft) [3]	÷					
Maximum wire length	=					ft
	÷	2	2	2	2	
Maximum cable length	=					ft

[1] Total of the maximum operating currents for all appliances as specified for DC power. See the appliance installation sheets for operating currents.

[2] This voltage drop is valid for regulated notification appliances only. For special application appliances, see "Equation method," later in this topic.

[3] Use the manufacturer's published wire resistance expressed in ohms per foot. For typical values, see Table 11 on page 40.

Equation method

Appliance operating voltage and current

Regulated notification appliances have an operating range from 16 V to 33 V. Use 16 V as the minimum appliance voltage when using regulated notification appliances.

When using special application appliances, refer to the installation sheets to determine the minimum appliance voltage required.

What if there are different types of appliances in the NAC, and each type has a different minimum operating voltage? In this case, use the *highest* minimum voltage required by any appliance.

The total current requirement for the appliances will be the sum of the individual maximum currents drawn by each appliance when using DC power. Use the maximum current for the appliance over the 16 V to 33 V range.

If all appliances draw the same maximum current, the total current is the maximum current multiplied by the number of appliances. If different appliance types have different maximum currents, the total current is the sum of the maximum current for each appliance type multiplied by the number of appliances of that type.

Wire resistance

Typical wire resistances are shown in the following table.

Table 11: Typical wire resistances

Wire gauge (AWG)	Resistance Solid uncoated copper		Resistance Stranded uncoated copper	
	Ω per foot	Ω per meter	Ω per foot	Ω per meter
12	0.00193	0.00633	0.00198	0.00649
14	0.00307	0.01007	0.00314	0.01030
16	0.00489	0.01604	0.00499	0.01637
18	0.00777	0.02549	0.00795	0.02608

Note: When performing these calculations, always refer to the actual cable supplier documentation and use the actual Ω/ft (or Ω/m) at the appropriate temperature for the cable being used.

Calculating cable length

To calculate the maximum NAC cable length:

1. Calculate the total current (Itot) as the sum of the maximum operating currents for all the appliances.

   $Itot = \Sigma Ia$

   Where:
   Ia = appliance maximum current

   See the appliance installation sheets for Ia. Remember to use the maximum operating current specified for DC power.

2. Calculate the minimum voltage (Vm).

   $Vm = Vs - (Itot \times K)$

   Where:
   Vs = source voltage
   Itot = total current (from above)
   K = load factor

   For the power supply, Vs is 19.1 V and K is 0.59 V/A.

3. Calculate the allowable voltage drop (Vd) between the power supply and the appliances.

   $Vd = Vm - Va$

   Where:
   Vm = minimum voltage (from above)
   Va = appliance minimum voltage

   For regulated notification appliances, Va is 16 V. For special application appliances, Va is the lowest operating voltage specified on the appliance installation sheet.

4. Calculate the maximum resistance (Rmax) for the wire.

   $Rmax = Vd / Itot$

   Where:
   Vd = voltage drop
   Itot = total current

5. Calculate the maximum length of the cable (Lc), based on the maximum resistance allowed, the resistance of the wire, and the number of wires in the cable (two).

   $Lc = (Rmax / Rw) / 2$

Where:
Rmax = maximum resistance
Rw = wire resistance factor

Example: You're using regulated notification appliances. Assume that the maximum operating current for each appliance is 100 mA for DC power, and that 20 appliances will be placed on the NAC. The cable is 12 AWG wire, and the manufacturer specifies a wire resistance factor of 0.002 Ω/ft.

Itot = ΣIa
= 20 × 0.1 A
= 2 A

Vm = Vr − (Itot × K)
= 19.1 V − (2 A × 0.59 V/A)
= 19.1 V − 0.76 V
= 18.94 V

Vd = Vm − Va
= 18.94 V − 16.0 V
= 2.94 V

Rmax = Vd / Itot
= 2.94 V / 2.0 A
= 1.47 Ω

Lc = (Rmax / Rw) / 2
= (1.47 Ω / 0.002 Ω/ft) / 2
= (367.5 ft) / 2
= 367.5 ft

So the maximum wire run for this NAC would be 367.5 ft (rounding down for safety).

Understanding BPS synchronization

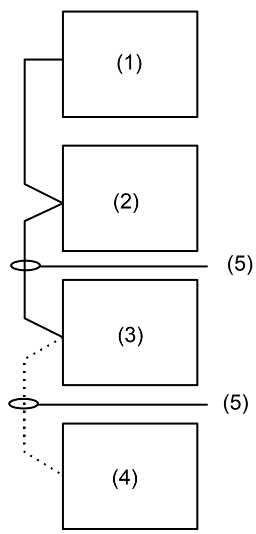
When using Genesis devices, the activation of the visible and audible output circuits on the BPS are determined by how the BPSs are connected. No matter how BPSs are connected, their outputs are “in sync” but there is an output activation delay of either one or four seconds. This section details how BPS outputs work based on how they are connected.

Connection of booster power supplies

Multiple BPSs can be connected in parallel. How you connect your BPSs affects the synchronization of your system’s outputs.

BPSs can be connected in parallel using their sense circuits. When connected via the sense circuits, all BPS outputs have either a one- or four-second delay from the time the driver NAC turns on to the time the BPS NACs turn on. The four-second delay does not comply with UL 864 9th edition. Delay time is controlled by DIP switch SW1-4. See “Setting the DIP switches” for more information.

Figure 22: BPSs connected in parallel with sense circuits



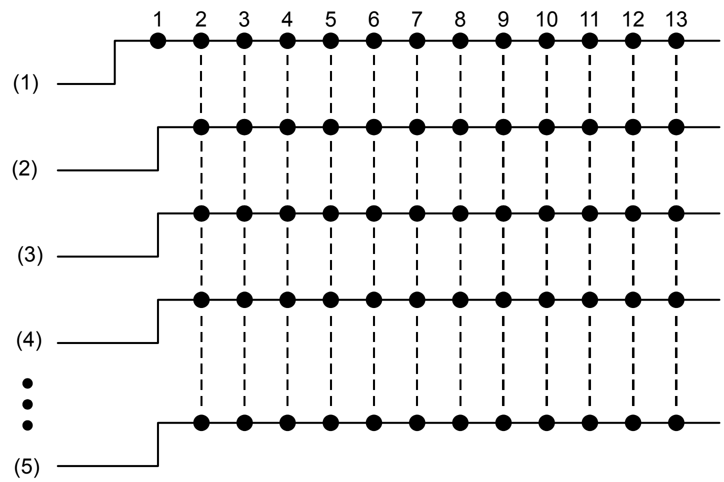
Legend
(1) NAC circuit
(2) BPS 1
(3) BPS 2
(4) BPS x
(5) Sense circuit

Notes
- To ensure all BPSs are synchronized in a Genesis application, the driving NAC must provide the Genesis synchronization pulse. Therefore, the BPSs must not be set to Genesis mode.
- The quantity of BPSs that can be connected is limited by wire run length and available current.

Synchronization of visible outputs

In the figure below, all visible output circuits on each BPS activate with a one second delay. This requires that the BPSs be connected in parallel through their sense circuits.

Figure 23: Synchronization with a one second output activation delay



(1) On Sense Off
(2) Output booster 1
(3) Output booster 2
(4) Output booster 3
(5) Output booster *n*

Sync diagram key
Strobe flash
Audible tone

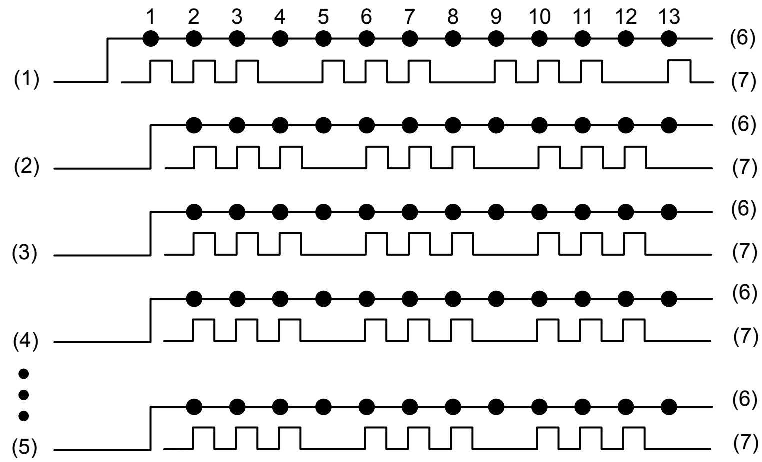
Synchronization of visible and audible outputs

One-second delay of outputs

In the figure below, all visible and audible circuits are synchronized with a one second output activation delay when the BPSs are connected in parallel through their sense circuits.

Note: Delay time is controlled by DIP switch SW1-4. See “Setting the DIP switches” for more information.

Figure 24: BPSs connected in parallel with sense circuits



(1) On Sense Off
(2) Output booster 1
(3) Output booster 2
(4) Output booster 3
(5) Output booster *n*
(6) Visible
(7) Audible

Sync diagram key
Strobe flash
Audible tone

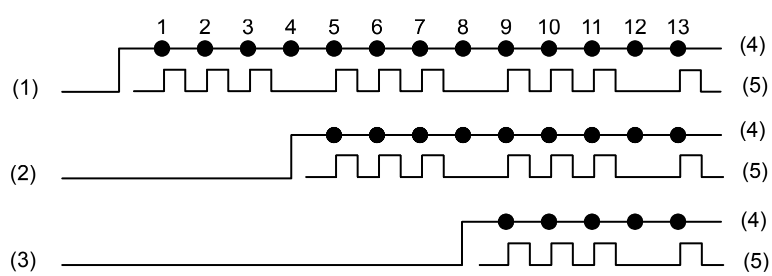
Four-second delay of outputs (temporal setting)

Note: Four-second delay operation does not comply with UL 864 9th edition.

In Figure 25 all visible and audible circuits are synchronized with a four second output activation delay when the BPSs are connected in parallel through their sense circuits.

Note: Delay time is controlled by DIP switch SW1-4. See “Setting the DIP switches” for more information.

Figure 25: BPSs connected in parallel with sense circuits



(1) On Sense Off
(2) Output booster 1
(3) Output booster 2
(4) Visible
(5) Audible

Sync diagram key
Strobe flash
Audible tone

Applications

Disclaimer: The applications in this section are shown in general terms. It is the responsibility of the installer and designer to adhere to the local and national codes when applying and installing the BPS.

Key

The following symbols and notations are found on the application diagrams in this section.

Device labels

Symbol	Description
$\boxed{V}$	Visible device
$\boxed{A}$	Audible device
$\boxed{G}$	Genesis visible/audible device
$\boxed{V/A}$	Visible or audible device
G	Device generating the Genesis sync pulse **Note:** When this symbol appears on a BPS, the Genesis sync pulse is controlled by DIP switch SW2-5.

BPS modes (controlled by DIP switch)

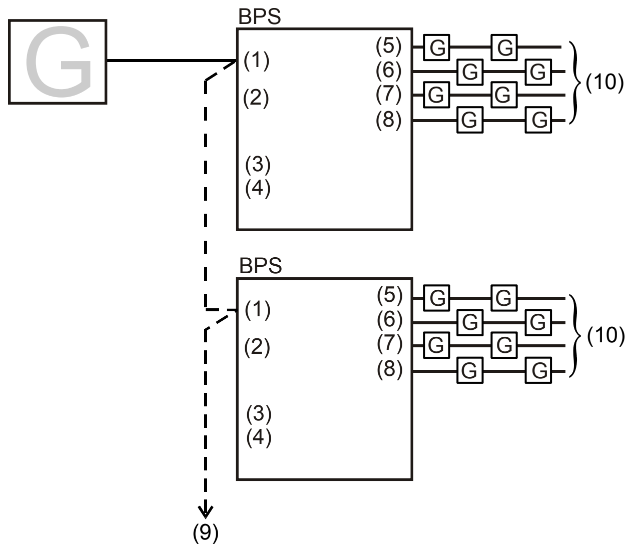
Notation	Description
COR	Correlate mode
GM	Genesis Master mode
ND	Nondelayed mode

NAC settings (controlled by DIP switch)

Notation	Description
SF	Sense follow
CONT	Continuous
Temp/Cal	Temporal/California
AUX	Auxiliary

Genesis circuit notification

Figure 26: Genesis circuit notification



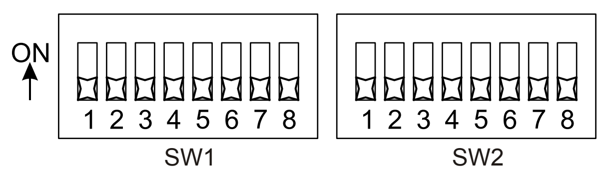
(1) Sense 1
(2) Sense 2
(3) Mode: COR
(4) NACs: SF
(5) NAC 1
(6) NAC 2
(7) NAC 3
(8) NAC 4
(9) To BPS, or EOL resistor
(10) To next device or EOL resistor

Note: The maximum number of BPSs that can be connected on a single NAC from sense circuit to sense circuit is limited by available current and wire run length.

DIP switch settings for this application

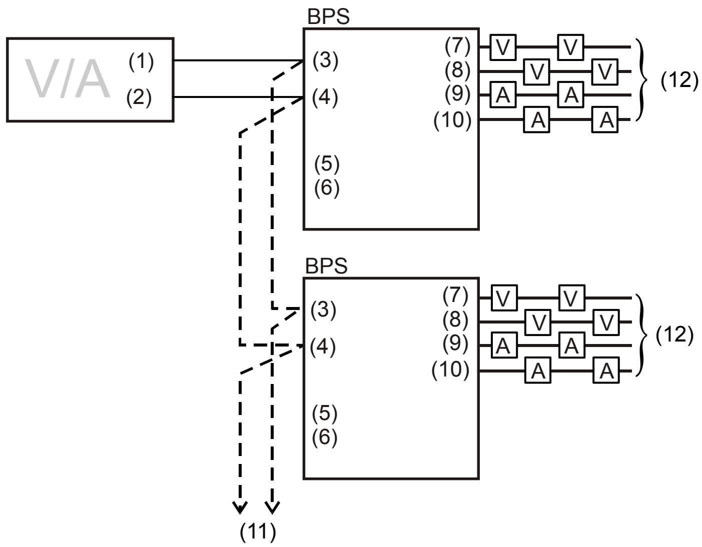
Each BPS DIP switch can be set this way for the application to work correctly. If other BPS options are required, refer to "Setting the DIP switches" for more information.

Figure 27: Switch settings



Conventional visible and audible circuit notification

Figure 28: Conventional visible and audible circuit notification



Legend

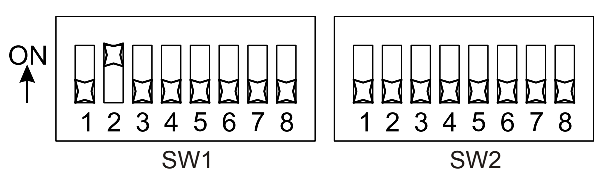
(1) NAC visible circuit	(7) NAC 1
(2) NAC audible circuit	(8) NAC 2
(3) Sense 1	(9) NAC 3
(4) Sense 2	(10) NAC 4
(5) Mode: COR	(11) To BPS, or EOL resistor
(6) NACs: SF	(12) To next device or EOL resistor

Note: The maximum number of BPSs that can be connected on a single NAC from sense circuit to sense circuit is limited by available current and wire run length.

DIP switch settings for this application

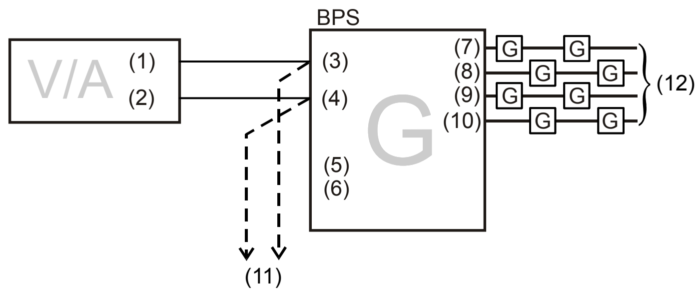
Each BPS DIP switch can be set this way for the application to work correctly. If other BPS options are required, refer to “Setting the DIP switches” for more information.

Figure 29: Switch settings



Conventional visible and audible circuit to Genesis notification

Figure 30: Conventional visible and audible circuit to Genesis notification



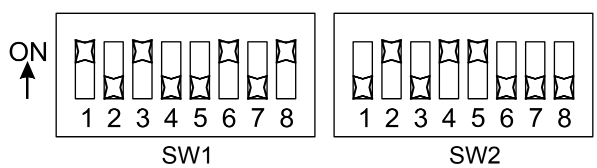
(1) NAC visible circuit	(7) NAC 1
(2) NAC audible circuit	(8) NAC 2
(3) Sense 1	(9) NAC 3
(4) Sense 2	(10) NAC 4
(5) Mode: GM	(11) To next device or EOL resistor
(6) NACs CONT	(12) To BPS, or EOL resistor

Note: The maximum number of BPSs that can be connected on a single NAC from sense circuit to sense circuit is limited by available current and wire run length.

DIP switch settings for this application

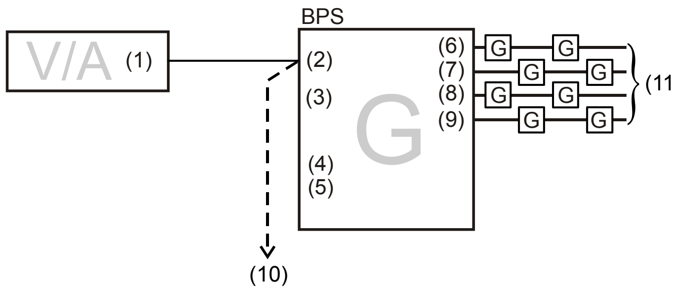
BPS DIP switches can be set this way for the application to work correctly. Refer to “Setting the DIP switches” for other options.

Figure 31: Switch settings



Conventional audible or visible circuit to Genesis notification

Figure 32: Conventional audible or visible circuit to Genesis notification



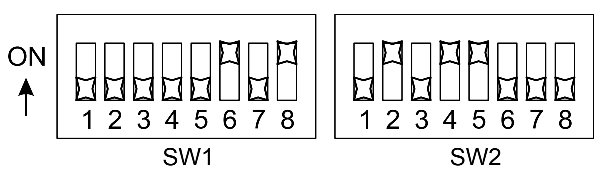
(1) Visible or audible circuit
(2) Sense 1
(3) Sense 2
(4) Mode: COR
(5) NACs: CONT
(6) NAC 1
(7) NAC 2
(8) NAC 3
(9) NAC 4
(10) To BPS, or EOL resistor
(11) To next device or EOL resistor

Note: The maximum number of BPSs that can be connected on a single NAC from sense circuit to sense circuit is limited by available current and wire run length.

DIP switch settings for this application

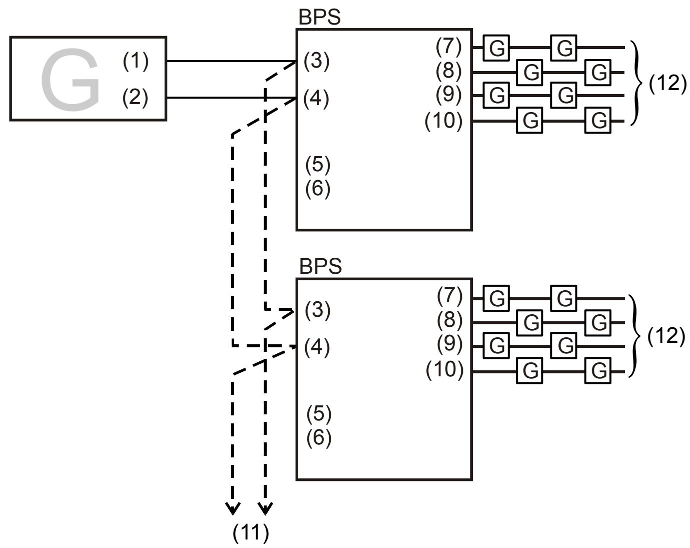
BPS DIP switches can be set this way for the application to work correctly. Refer to “Setting the DIP switches” for other options.

Figure 33: Switch settings



Genesis visible circuit and conventional audible circuit to Genesis notification

Figure 34: Genesis visible circuit and conventional audible circuit to Genesis notification



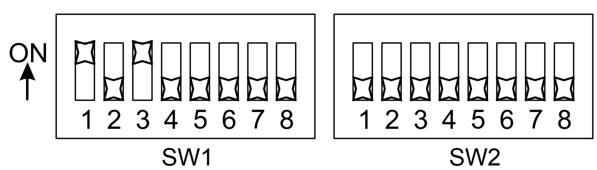
(1) NAC visible circuit
(2) NAC audible circuit
(3) Sense 1
(4) Sense 2
(5) Mode: GM
(6) NACs: SF
(7) NAC1
(8) NAC 2
(9) NAC 3
(10) NAC 4
(11) To next BPS, or EOL resistor
(12) To next device or EOL resistor

Note: The maximum number of BPSs that can be connected on a single NAC from sense circuit to sense circuit is limited by available current and wire run length.

DIP switch settings for this application

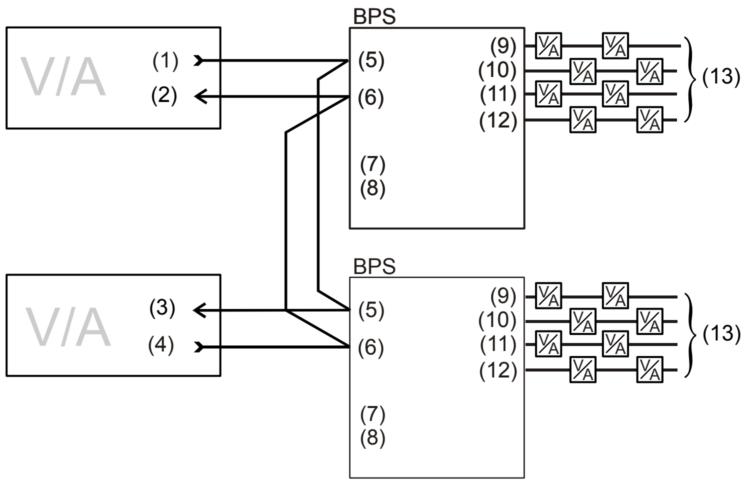
BPS DIP switches can be set this way for the application to work correctly. Refer to “Setting the DIP switches” for other options.

Figure 35: Switch settings



Conventional split mode circuit with fault tolerance notification

Figure 36: Conventional split mode circuit with fault tolerance notification



Legend

(1) Primary visible or audible circuit,
(2) To next BPS, or EOL resistor
(3) To next BPS, or EOL resistor
(4) Secondary visible or audible circuit
(5) Sense 1
(6) Sense 2
(7) Mode: COR
(8) NACs: SF
(9) NAC1
(10) NAC 2
(11) NAC 3
(12) NAC 4
(13) To next device or EOL resistor

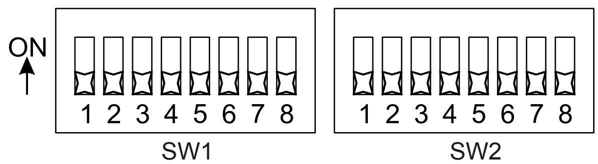
Notes

- The maximum number of BPSs that can be connected on a single NAC from sense circuit to sense circuit is limited by available current and wire run length.
- Fault tolerance can be increased by using Class A wiring.

DIP switch settings for this application

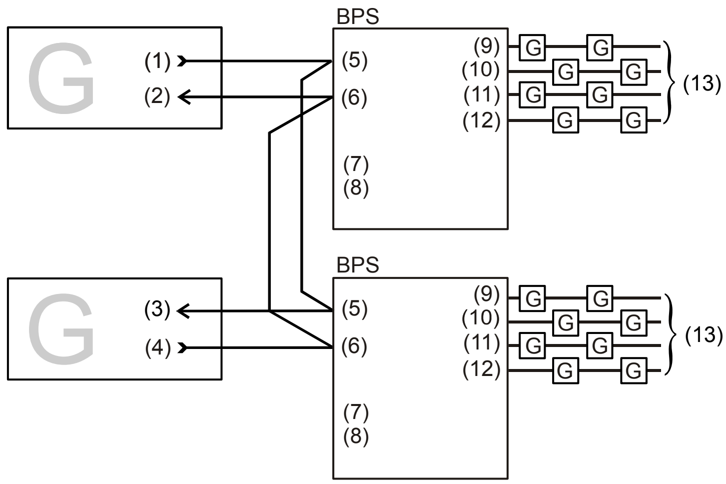
BPS DIP switches can be set this way for the application to work correctly. Refer to “Setting the DIP switches” for other options.

Figure 37: Switch settings



Genesis split mode circuit with fault tolerance notification

Figure 38: Genesis split mode circuit with fault tolerance notification



Legend

(1) Primary visible or audible circuit
(2) To next BPS, or EOL resistor
(3) To next BPS, or EOL resistor
(4) Secondary visible or audible circuit
(5) Sense 1
(6) Sense 2
(7) Mode: COR
(8) NACs: SF
(9) NAC1
(10) NAC 2
(11) NAC 3
(12) NAC 4
(13) To next device or EOL resistor

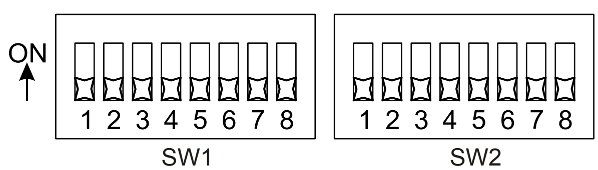
Notes

- The maximum number of BPSs that can be connected on a single NAC from sense circuit to sense circuit is limited by available current and wire run length.
- Fault tolerance can be increased by using Class A wiring.

DIP switch settings for this application

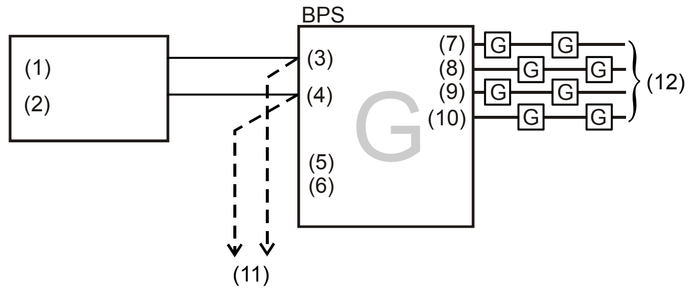
BPS DIP switches can be set this way for the application to work correctly. Refer to “Setting the DIP switches” for other options.

Figure 39: Switch settings



CDR-3 Coder to Genesis notification

Figure 40: CDR-3 Coder to Genesis notification



Legend

(1) NAC visible circuit	(7) NAC1
(2) NAC/CDR-3 audible circuit	(8) NAC 2
(3) Sense 1	(9) NAC 3
(4) Sense 2	(10) NAC 4
(5) Mode: GM	(11) To next BPS, or EOL resistor
(6) NACs: CONT	(12) To next device or EOL resistor

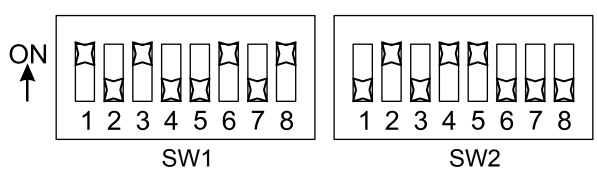
Notes

- In order for the audible appliances to follow the CDR-3 coder signals, you must modify each Genesis audible-capable appliance that is connected to a coded NAC. For Genesis G1 Series appliances cut open Circle. For Genesis WG4 horns & horn/strobes, cut jumper JP4. For Genesis GC(F)-HDVM(H) appliances, cut JP1.
- The maximum number of BPSs that can be connected on a single NAC from sense circuit to sense circuit is limited by available current and wire run length.

DIP switch settings for this application

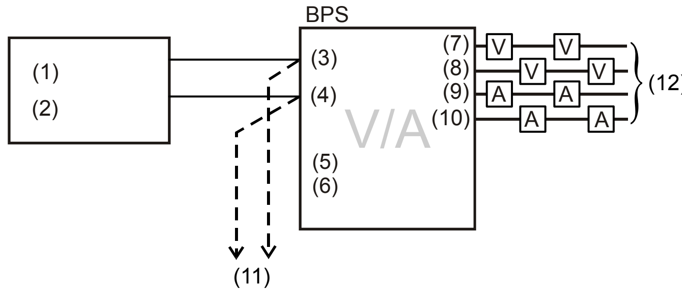
BPS DIP switches can be set this way for the application to work correctly. Refer to “Setting the DIP switches” for other options.

Figure 41: Switch settings



CDR-3 Coder to conventional notification

Figure 42: CDR-3 Coder to conventional notification



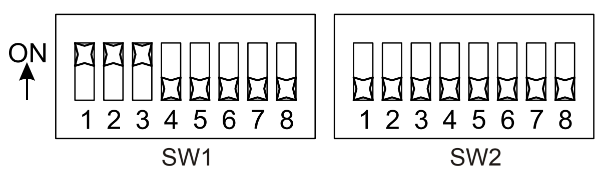
(1) NAC visible circuit
(2) NAC/CDR-3 audible circuit
(3) Sense 1
(4) Sense 2
(5) Mode: ND
(6) NACs: SF
(7) NAC1
(8) NAC 2
(9) NAC 3
(10) NAC 4
(11) To next BPS, or EOL resistor
(12) To next device or EOL resistor

Note: The maximum number of BPSs that can be connected on a single NAC from sense circuit to sense circuit is limited by available current and wire run length.

DIP switch settings for this application

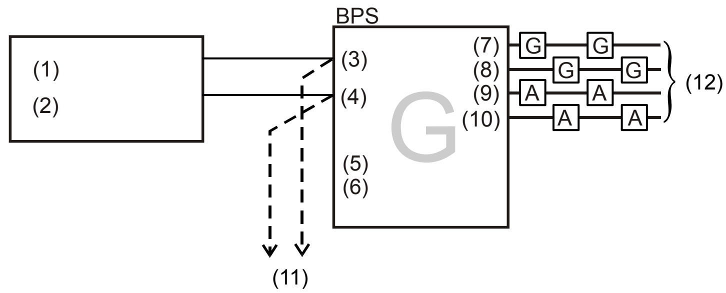
BPS DIP switches can be set this way for the application to work correctly. Refer to “Setting the DIP switches” for other options.

Figure 43: Switch settings



CDR-3 Coder to Genesis visibles and conventional audibles

Figure 44: CDR-3 Coder to Genesis visibles and conventional audibles



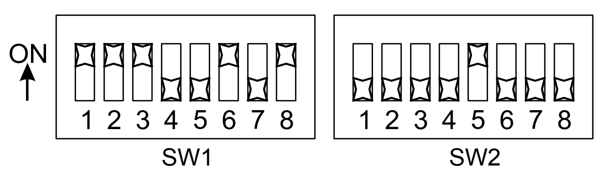
(1) NAC visible circuit
(2) NAC/CDR-3 audible circuit
(3) Sense 1
(4) Sense 2
(5) Mode: ND
(6) NACs: CONT, SF
(7) NAC1
(8) NAC 2
(9) NAC 3
(10) NAC 4
(11) To next BPS or EOL resistor
(12) To next device or EOL resistor

DIP switch settings for this application

BPS DIP switches can be set this way for the application to work correctly. Refer to “Setting the DIP switches” for other options.

NAC1 and NAC2 are configured for continuous mode. NAC3 and NAC4 are configured for sense follow mode. SW2-5 is set to generate a sync pulse on the continuous circuits.

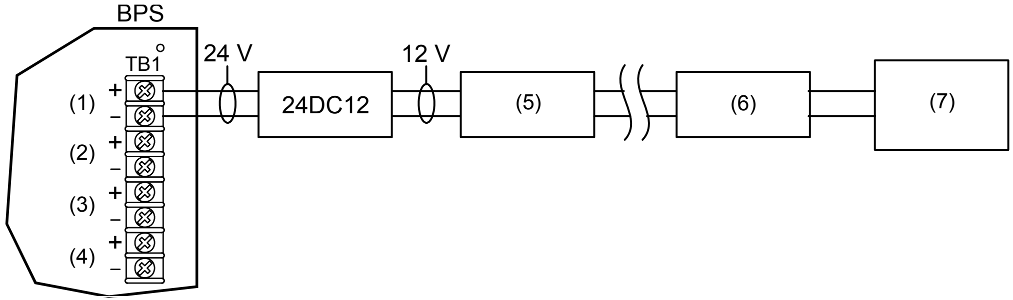
Figure 45: Switch settings



Security

In this application, 24 VDC is converted to 12 VDC for use with security devices.

Figure 46: Security 24 VDC to 12 VDC



(1) NAC1/AUX1
(2) NAC2/AUX2
(3) NAC3/AUX3
(4) NAC4/AUX4

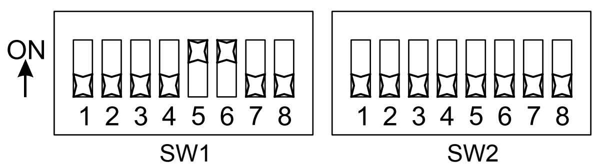
(5) Security device
(6) Security device
(7) EOL monitoring device

Note: NAC1 must be set for auxiliary. Any of the BPS NACs can be used in auxiliary mode for 12 V security applications.

DIP switch settings for this application

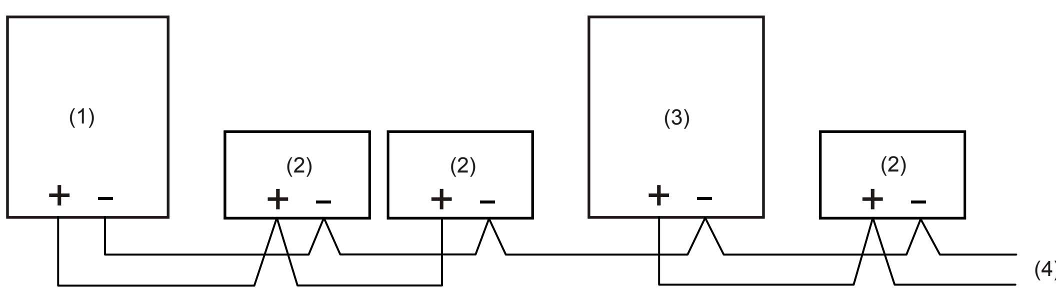
BPS DIP switches can be set this way for the application to work correctly. Refer to “Setting the DIP switches” for other options.

Figure 47: Switch settings



Access control power supply

Figure 48: Access control power supply



(1) Control panel
(2) Card reader controller

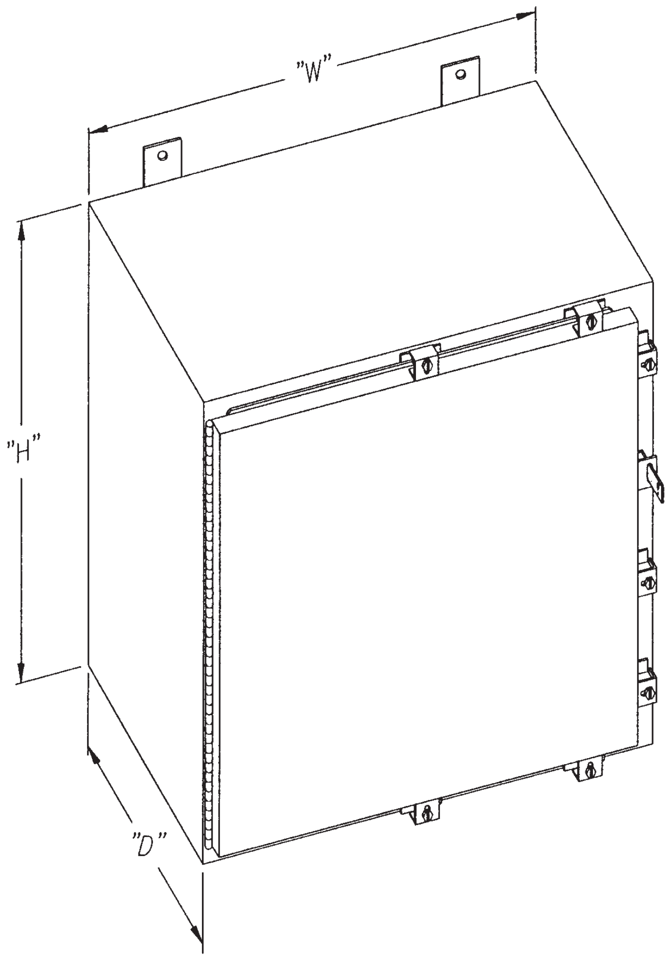
(3) BPS, Disable the BPS’s ground fault jumper (JP3)
(4) To next device or end

NEMA 4X CABINET, PLENUM FACP PANEL

Operations & Maintenance Manual
December 2015

Typical Plenum Area Releasing
Panel Equipment Location -
5-Zone Panel
#31-40SF

Type 4 Enclosure
Surface Mount
Single Door



To order this custom-made enclosure, please fill in your requirements.

"H" = Height of body: 32"
"W" = Width of body: 36"
"D" = Depth of body: 8"
(all dimensions are outer dimensions)

Mounting pan:
❑ Yes (Size ____________) ❑ No

Type of material: Stainless

Gauge: ____________

Color: ❑ Standard Gray
Other: ____________

Options/Special Requirements:
Nema 4X Rating
Welded Seams
Gasketed
1" Foil Insulation Foam - R6 Rating

UL NEMA

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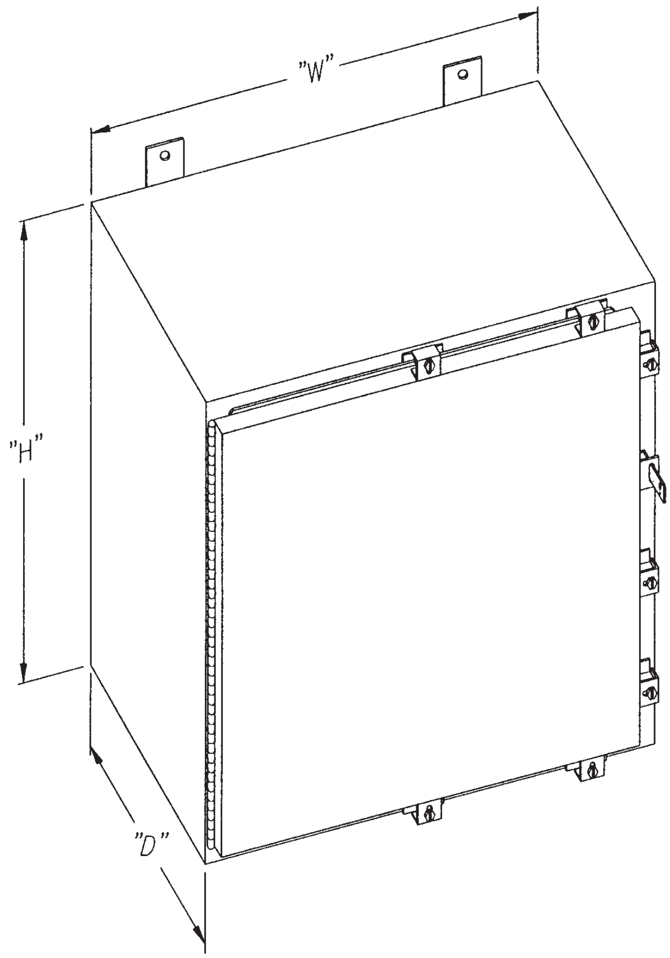
NEMA 4X CABINET, 5 ZONE RELEASING PANEL

Operations & Maintenance Manual
December 2015

Typical Plenum Area FACP
Panel Equipment Location -
#31-40SF



Type 4 Enclosure
Surface Mount
Single Door

To order this custom-made enclosure, please fill in your requirements.

"H" = Height of body: 32"
"W" = Width of body: 36"
"D" = Depth of body: 8"
(all dimensions are outer dimensions)

Mounting pan:
❑ Yes (Size ____________) ❑ No

Type of material: Stainless
Gauge: ____________
Color: ❑ Standard Gray
Other: ____________

Options/Special Requirements:
Nema 4X Rating
Welded Seams
Gasketed
1" Foil Insulation Foam - R6 Rating

UL NEMA

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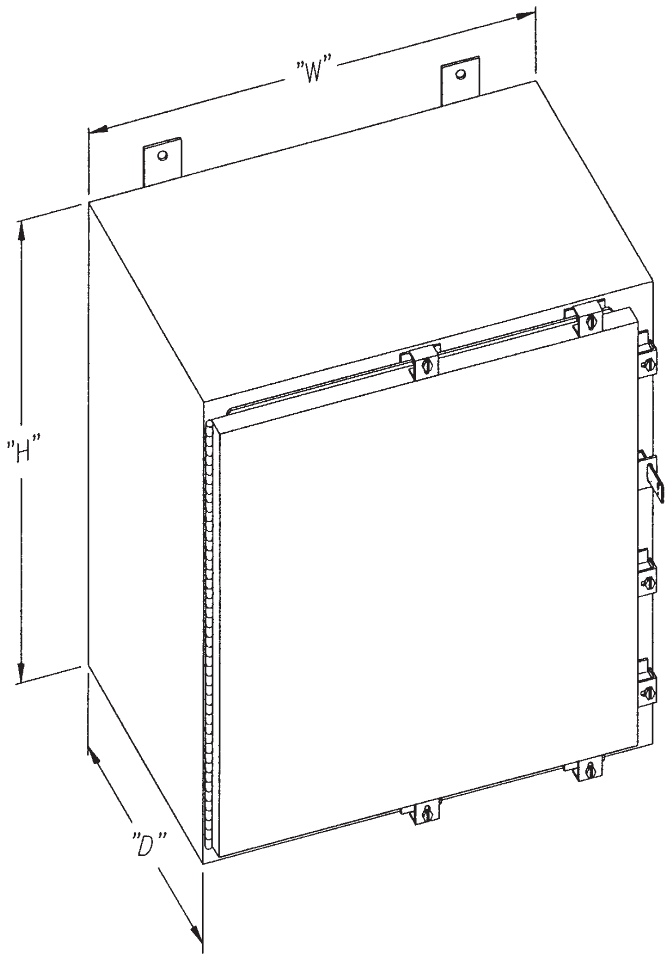
NEMA 4X CABINET, 8-ZONE, 10-ZONE RELEASING PANEL

Operations & Maintenance Manual
December 2015

Typical Plenum Area Releasing Panel Equipment Location - 8-Zone, 10-Zone Panel #41-50SF



Type 4 Enclosure
Surface Mount
Single Door

To order this custom-made enclosure, please fill in your requirements.

"H" = Height of body: 48"
"W" = Width of body: 36"
"D" = Depth of body: 8"
(all dimensions are outer dimensions)

Mounting pan:
❑ Yes (Size ________) ❑ No

Type of material: Stainless

Gauge: ________

Color: ❑ Standard Gray
Other: ________

Options/Special Requirements:
Nema 4X Rating
Welded Seams
Gasketed
1" Foil Insulation Foam - R6 Rating

UL NEMA

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SEALED LEAD ACID BATTERY, 8AH

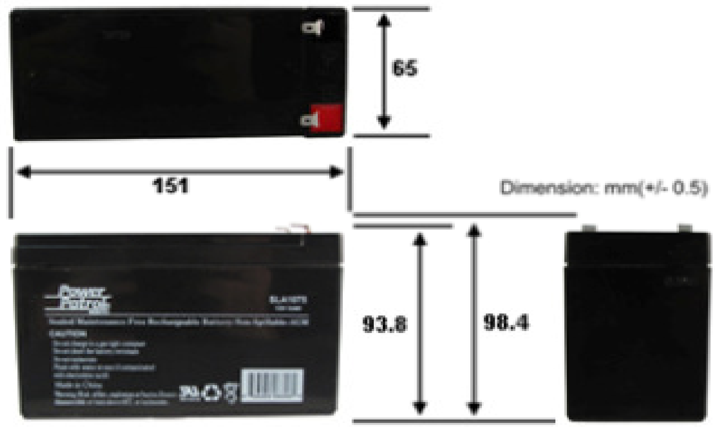
Operations & Maintenance Manual
December 2015

Battery Specification Sheet

SLA1075

Technical Specifications

Nominal Voltage	12 V
Nominal Capacity	8.0 Ah (20 Hr Rate)
Chemistry	Lead Acid - AGM

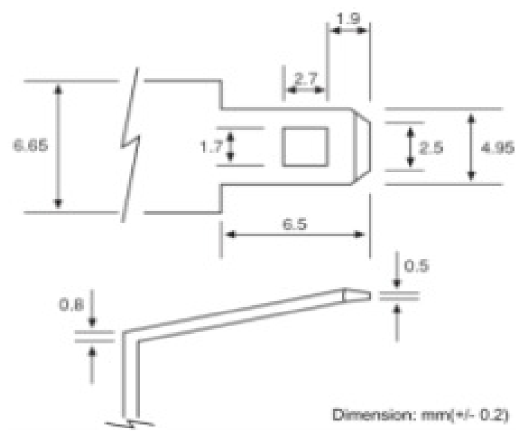


Physical Specifications

Length:	151 mm	5.94 in.
Width:	65 mm	2.56 in.
Height:	93.8 mm	3.69 in.
Height w/ Terminal:	98.4 mm	3.88 in.
Weight	2.51 kg	5.53 lbs.
Terminal Type		.187" Faston
Case Material		Black ABS

Charging Specifications

Max. Charge Current	2.16 A
Approx Final Charge Current (2.25 volts/cell Float)	0.014 A
Approx Final Charge Current (2.45 volts/cell Cycle)	0.07 A



Capacity Specifications

Cut-off Voltage	20 Hr Rate (.4A)	8 Ah
1.75 volts/cell @ 25℃	10 Hr Rate (.69A)	6.98 Ah
1.70 volts/cell @ 25℃	5 Hr Rate (1.27A)	6.37 Ah
1.55 volts/cell @ 25℃	1 Hr Rate (4.5A)	4.5 Ah
	Bloc	Per Cell
Charge Voltage	Float 13.5~13.8	2.25~2.30
(constant)	Cycle 14.4~14.7	2.40~2.45
Discharge Current *(5 seconds maximum)*		80 A
Discharge Current *(maximum continuous)*		50 A
Self Discharge *(to 80% capacity)*		9 months @ 21℃
Internal Resistance		25 mΩ

Due to changes in the manufacturing processes, specifications are subject to change without notice

BAZR2.MH18830

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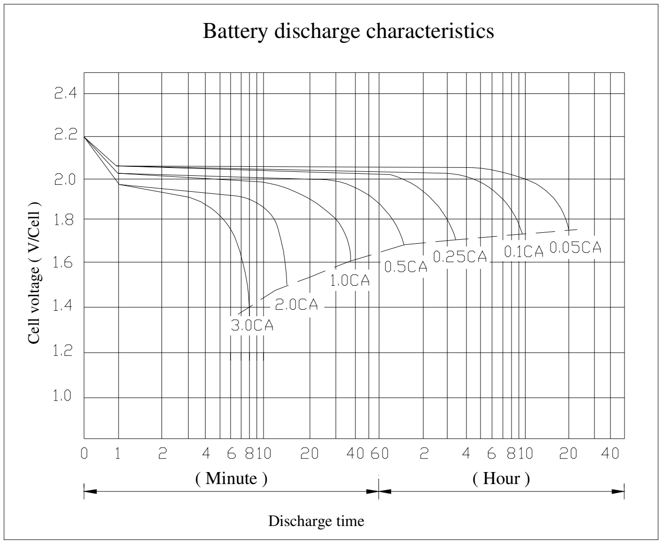
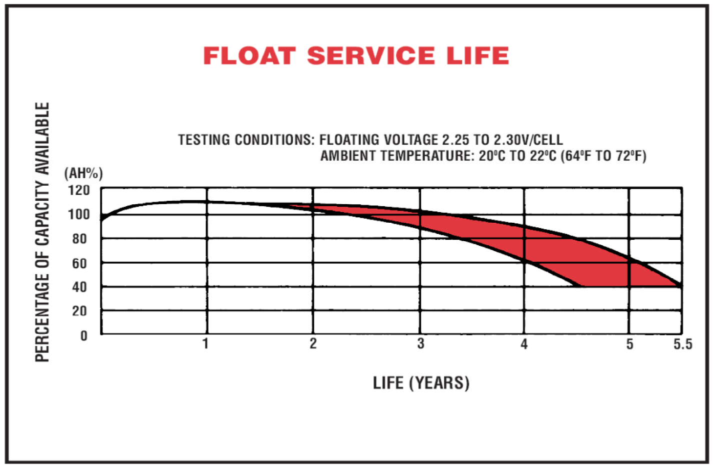
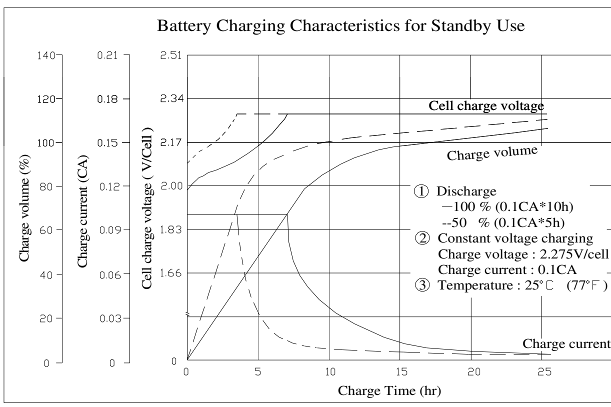
Power Patrol Batteries

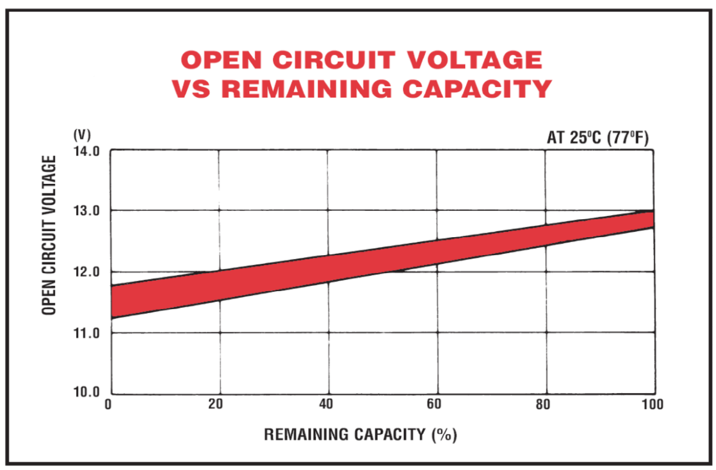
Battery Specification Sheet

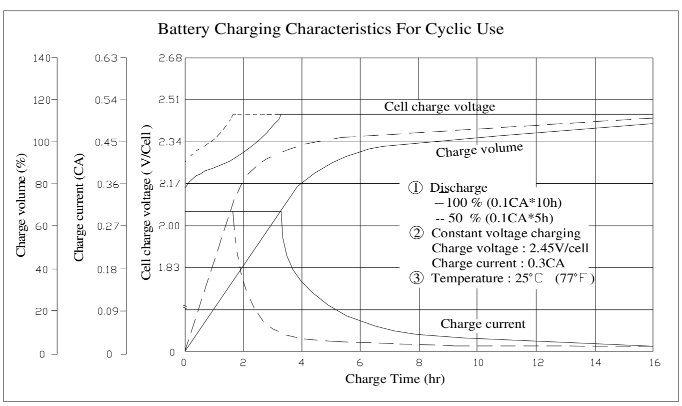
SLA1075











CAUTION: Do not charge in a sealed container. Avoid Short Circuit. Before using this battery in high current applications(>3C), consult with Interstate Batteries.

Notes: Leak-proof/spill-proof. Most SLA(Sealed Lead Acid) batteries now use AGM(Absorbent Glass Mat) technology which has largely replaced the old "gel" technology. In an AGM battery, fiberglass mats absorb the acid and hold it against the lead plates inside the battery. Because the acid is absorbed by the sponge-like mats, it will not leak or spill (provided proper charging and usage instructions are followed). Additional safety features include the use of special sealing epoxies, tongue-and-groove case and cover construction as well as long sealing paths for post and connectors. Our AGM batteries are approved for all modes of transport(water, road, rail, air, etc.).

interstatebatteries.com

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SEALED LEAD ACID BATTERY, 10AH

Operations & Maintenance Manual
December 2015

Power Patrol® Batteries

SLA1097
General Purpose Battery
Battery Specification Sheet

Technical

Nominal Voltage	12 V
Nominal Capacity (20HR)	10.0Ah
Chemistry	Lead Acid (AGM)

Charging

Initial Charging Current	3.0 A
Cycle Use	14.4V~15.0V at 25°C(77°F)
Standby Use	13.5V~13.8V at 25°C(77°F)

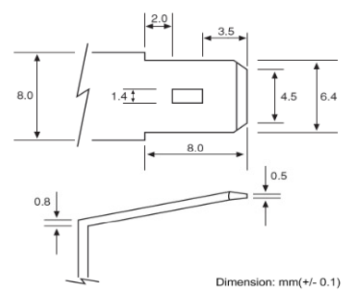
Physical

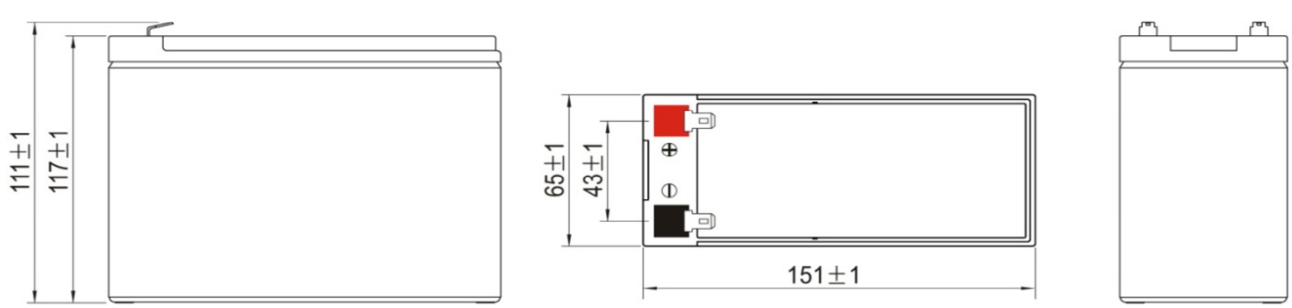
Length	151 mm	5.95 in.
Width	65 mm	2.56 in.
Height	111 mm	4.37 in.
Total Height (w/ terminals)	117 mm	4.61 in.
Weight	3.2 kg	7.06 lbs
Terminal Type		.250" Faston
Case Material		Black ABS

Capacity

20HR, 1.80V/cell, 25°C/77°F	10.0Ah	0.50A
10HR, 1.80V/cell, 25°C/77°F	9.30Ah	0.93A
5HR, 1.75V/cell, 25°C/77°F	8.10Ah	1.70A
3HR, 1.75V/cell, 25°C/77°F	7.65Ah	2.55A
1HR, 1.60V/cell, 25°C/77°F	6.28Ah	6.28A
Maximum Discharge Current		150A (5 seconds)
Self Discharge to 80%		6 months @ 25°C
Internal Resistance		~22 mΩ

BAZR2.MH18830

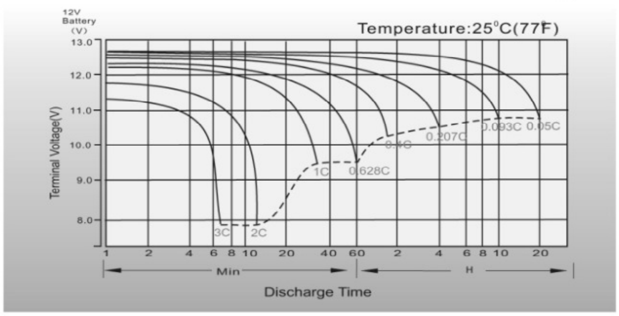




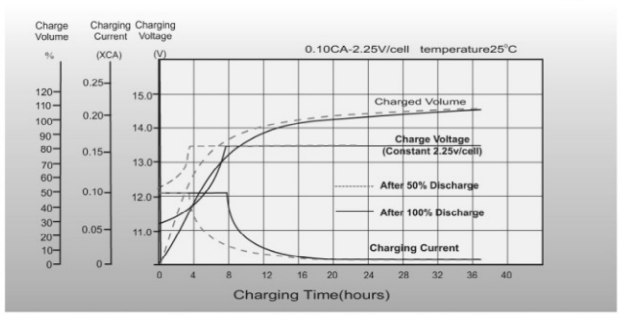
Power Patrol® Batteries

SLA1097
General Purpose Battery
Battery Specification Sheet

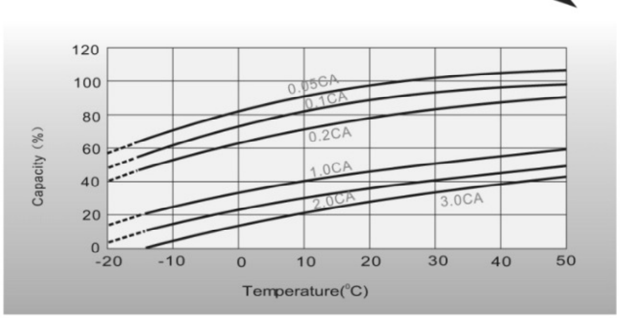
Discharge Characteristics



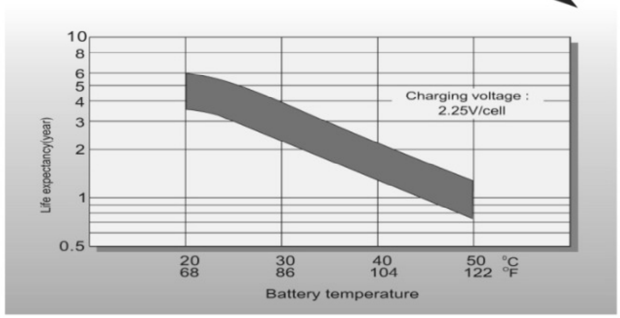
Float Charging Characteristics



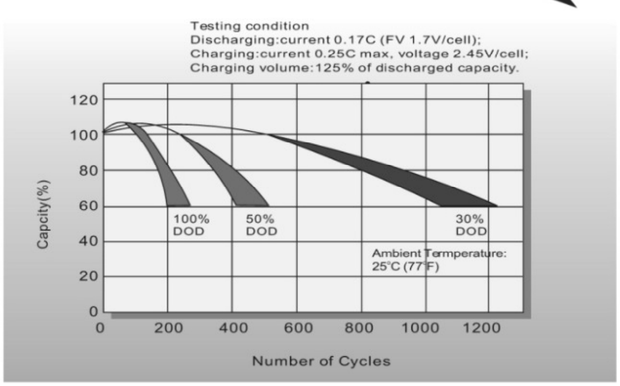
Temperature Effects in Relation to Battery Capacity



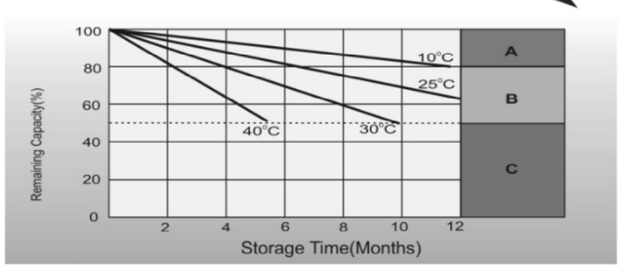
Effect of Temperature on Long Term Float Life



Cycle Life in Relation to Depth of Discharge



Self Discharge Characteristics



A No supplementary charge required
(Carry out supplementary charge before use if 100% capacity is required.)

B Supplementary charge required before use.Optional charging way as below:
1.Charged for above 3 days at limted current 0.25CA and constant volatge 2.25V/cell.
2.Charged for above 20hours at limted current 0.25CA and constant volatge 2.45V/cell.
3.Charged for 8~10hours at limted current 0.05CA .

C Supplementary charge may often fail to recover the capacity.
The battery should never be left standing till this is reached.

 Specifications are subject to change w/out notice.

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GRAPHIC COMMAND INTERFACE

Operations & Maintenance Manual
December 2015

EST Life Safety & Communications

42" Wall Mount Monitor

FireWorks®

Graphical Command Interface Hardware and Ordering Information

For detailed application and operation information please see Data Sheet 85006-0049.

22" Desktop Monitor

S3424

7300-1657: 0213

Overview

FireWorks is a family of software and hardware options that work in concert with Edwards Emergency Communication System/ Mass Notification System/Life Safety System (ECS/MNS/LSS).

FireWorks provides an intuitive user interface, taking what could be an overwhelmingly large amount of information and presenting it in an easy-to-understand format. FireWorks does this by dividing major system functions into easy-to-manage viewports. These viewports make the system intuitive to use because information is presented logically.

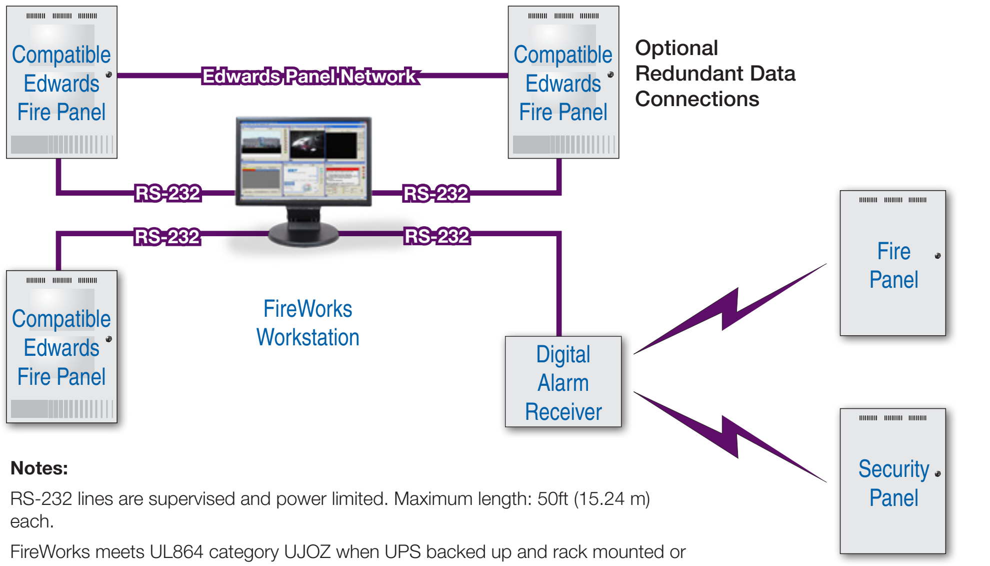
FireWorks is event driven. This greatly increases the user's ability to deal with system events by eliminating the confusion sometimes experienced when systems present all information at once. FireWorks automatically prioritizes the events for the user in an *Event Viewport*. Here the highest priority event is displayed first, and the lowest priority event is displayed last. This allows the user to quickly determine which events warrant the most immediate attention.

Each of the other supporting viewports provides specific information and/or control options that relate to the event highlighted in the Event Viewport. Related information may include event action information (specific tasks the user may need to perform in response to the event), or information about the area where the event has taken place (any hazardous materials present in the area, etc.). Access control card holder information, images, CCTV, video, audio messages, web pages, and graphical maps may also be presented to aid in the understanding of an event and how it should be managed.

Standard Features

- **UL/ULC Listed for ECS/MNS/LSS and Security**
- **Event-driven configurable multiple viewport display**
  Automatic prioritization of events simplifies the system for the user.
- **Software-only versions**
  Where UL listings are not required, FireWorks software allows the use of less expensive PCs for monitoring-only functions, while providing a full-featured graphic display.
- **Interactive life safety control**
- **Optional Internet Connectivity**
  Provides remote monitoring of FireWorks status.
  Provides ability to run reports.
- **Monitor and control for single or multi-line Life Safety networks**
- **HTTP/HTTPS Communications Engine**
- **Email events to multiple recipients automatically**
- **Email events to multiple recipients automatically**
- **Context-sensitive event action messages**
  Provides event-specific instructional text.
- **Use native graphic formats to create event maps**
  Import most standard graphic formats, such as wmf, dwg and more.
- **Optional Digital Alarm Receiver Connectivity**
  Provides the ability to monitor and display events from fire and security panels of different manufactures at a common location

Typical Direct Connections

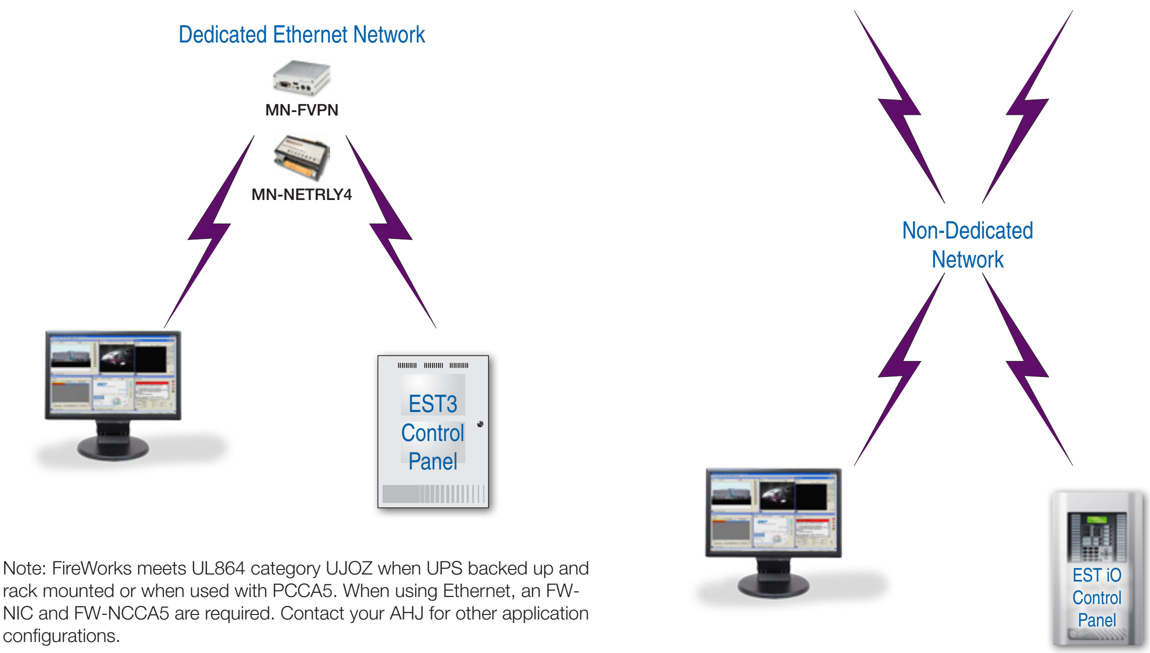


Notes:

RS-232 lines are supervised and power limited. Maximum length: 50ft (15.24 m) each.

FireWorks meets UL864 category UJOZ when UPS backed up and rack mounted or when used with PCCA5. Contact your AHJ for other application configurations.

Typical Network Deployment



Note: FireWorks meets UL864 category UJOZ when UPS backed up and rack mounted or when used with PCCA5. When using Ethernet, an FW-NIC and FW-NCCA5 are required. Contact your AHJ for other application configurations.

Installation and Mounting

FireWorks meets UL requirements when desk, floor or rack mounted. For floor and desk mounting a PCCA5 (ordered separately) must be used for conduit connection of PC to junction box. The FireWorks workstation must be UPS backed. Uninterruptible Power supplies (UPS) meeting UL1481 – "Power Supplies for Fire Protective Signaling Systems" and UL 864 category UTRZ required.

Specifications

FireWorks CPU (FWUL5W7 and FWUL5RAIDW7)	
Computer Type	Industrial Grade Dual Core 3.0 GHz Intel processor, 800MHz front side bus.
Harddrive	500 GB
Dimensions	17" w x 22.5" d x 7" h (432 mm x 572 mm x 177 mm)
Weight	44 lbs. (20.0 kg) - Actual Weight depends on the installed options.
Keyboard and mouse	Standard 101 key, black; Black two button PS2 mouse
Power Supply	350 Watts voltage range selected automatically. Acceptable inputs are: 100 - 127 (nominal) Vac; 50/60 Hz; 6 Amps max. 200 - 240 (nominal) Vac; 50/60 Hz; 3 Amps max. PC comes with conduit adapter for AC connection when desk or Tower mounting.
RAM	4 GB standard
Operating System	Windows 7 Ultimate 64 Bit
Fire Systems Monitored/Controlled	EST3 or EST2 (non-networked) iO Series, IRC-3, FCC. EST3X can be connected only through an EST3 panel/network.
Communication format	RS-232 and/or TCP/IP connections to systems via optional cards.
Log text	65000 characters per event Max.
Graphic Zoom fields	Unlimited (32 max recommended)
History archive	Subject to hard drive space (budget 2 meg per 10,000 events)
Operator Log/On Log/ Off	Three-security control access levels. Complete customization of user access attributes by password
Operating Temperature	0° to 49° C (32° to 120° F)
Relative Humidity	5% to 95% non-condensing
Optical Drive	DVD-RW
Mounting	Desktop or floor mounting or Rack/Panel mount in 19'' RKU series. Use RKU-61-24 when rack mounting.
Approvals	UL, ULC (see Note 1).
USB Ports	Eight USB ports: two on front, six on rear.
PCI Expansion Slots	Four PCI slots, one PCI express slot.
Serial Ports	Order FW-SP4i separately to obtain four serial ports (occupies one PCI slot).
Network Interface	Order FW-NIC and FW-NCCA5 for Ethernet 100Base-TX connections (occupies one PCI slot).
RAID 1 hard drive array	Specify FWUL5RAIDW7 computer for standard features plus RAID 1 mirrored hard drive array.

Rack-Mount LCD Monitors – 19" black (FW-19LCDWTS)	
Dimensions (W × H × D)	17.4 × 15.6 × 8.0 in. (441.96 × 396.24 × 203.2 mm)
Diagonal Viewing area	19"
Weight	15 lbs. (6.8 kg) with touch screen and base
Power	120 VAC, 1.5 A, 60 Hz, 180 W max.
Screen Resolution	1440 x 900 VGA
Speakers	Two built-in speakers in display head.
Mounting	Use FW-19LCDWRACK rack mount kit
Environment	0 to 49° C (32 to 120° F) 5 to 93% RH, noncondensing
Touch Screen	Capacitive w/USB Controller
Brightness	230 cd/m² typical
Approvals	UL, ULC, see Note 1.

Note 1:
FireWorks is modularly listed under the following standards: UL 864 categories: UOJZ, UOXX, UL 294 category ALVY, UL 636 category ANET, UL 1076 category APOU, UL 365 category APAW, UL 1610 category AMCX, ULC-S527 and UL 2572. Please refer to FireWorks Installation and Service Manual for complete system requirements.

Note 2:
Supported CCTV Systems (Windows XP only): Pelco Matrix Systems: CM6700 series, 8500, 9500. Philips: LTC8100, 8200, 8300, 8500, 8600, 8800, 8900 series. Vicom: Nova V142. Kalatel: KTD-348.

Note 3:
Compatible digital alarm receiver is a Bosch D6600.

Monitors – 22" black (Liquid Crystal Display) (FW-22LCDWTS)	
Dimensions (W × H × D)	20.2 × 15.9 × 8.7 in. (513.08 × 403.86 × 221.8 mm)
Diagonal Viewing area	
Weight	16.5 lbs. (7.48 kg) with touch screen and base
Power	120 VAC, 1.5 A, 60 Hz, 180 W max.
Screen Resolution	1680 × 1050 WSXGA
Speakers	Two built in Speakers
Mounting	Desk mount
Environment	0 to 49° C (32 to 120° F) 5 to 93% RH, noncondensing
Touch Screen	Capacitive w/USB Controller
Brightness	300 cd/m² typical (depending on panel spec)
Approvals	UL, ULC, see Note 1

Monitors – 42" black (Liquid Crystal Display) (FW-42LCDWTS)	
Dimensions (W × H × D)	41.3 × 25.2 × 5.0 in. (1049 × 640 × 127 mm
Diagonal Viewing area	
Weight	70 lbs. (32 kg)
Power	120 VAC, 1.97 A, 60 Hz, 236 W max.
Screen Resolution	1920 × 1080
Speakers	N/A
Mounting	Wall mount. Order kits separately.
Environment	0 to 49° C (32 to 120° F) 5 to 93% RH, noncondensing
Touch Screen	capacitive touch screen
Brightness	500 cd/m² typical
Approvals	UL, ULC, see Note 1
Cables	Comes with standard VGA, power, and USB cable

Software Options	
FW-CGSUL	Color Graphics Software supports Text Annunciation, Graphics and Reports. Must be run on UL listed PC. Provides a full-featured Event driven six-viewport graphic display. Supports IRC-3, EST2, FCC, and EST3 systems.
FW-CGS	Allows Text annunciation with graphics. Provides event driven six-viewport graphic display. No common control. Use with IRC-3, EST2, FCC, and EST3 systems.
SV	SiteVision - Allows use of existing CCTV monitors with control of CCTV system. No on-screen control provided at FireWorks PC. Operates with FW-CGS (UL) series software. Supported CCTV systems: See Note 2.
SV+	SiteVision+ Provides on Screen annunciation of CCTV at FireWorks PC. Allows control of cameras through CCTV matrix or multiplexer. Operates with FW-CGS (UL) series software. Supported CCTV Systems: See Note 2. FW-VIDTVC required, order separately.
FW-1S	One seat Web client.
FW-4S	Used in conjuction with FW-1S provide 4 additional concurent remote client seats for a total of 5 concurrent seats supported.
FW-10S	Used in conjunction with FW-1S and FW-4S to provide a total of 15 concurrent remote client seats.
FW-DARCOM	Provides connectivity for 1 to 8 Digital Alarm Receivers
FW-IPMON1000	IP Monitoring for 1000 connections to iO series panels. Requires companion software option FW-DARCOM.

Contact us...

Email: edwards.fire@fs.utc.com
Web: www.est-fire.com

EST is an EDWARDS brand.

1016 Corporate Park Drive
Mebane, NC 27302

In Canada, contact Chubb Edwards...
Email: inquiries@chubbedwards.com
Web: www.chubbedwards.com

Notes:

1. All FireWorks workstations come standard with mouse control.
2. FireWorks meets UL864 category UJOZ when rack mounted or when used with PCCA. The system must be UPS backed up. Approval by AHJ may be required for other applications.
3. One EIA panel space is 1.75" in height.

While every effort is taken to ensure that specifications accurately represent FireWorks workstations Edwards reserves the right to change FireWorks computer hardware and/or software specification without notice.

Ordering Information

Standalone Workstations	
FWUL5W7	Workstation (see notes) Dual Core 3.0 GHz processor comes with Windows 7 Ultimate 64-bit, DVR-RW, 4 Gig RAM memory, 500 Gig Hard drive, on board sound card, on board video, 8 USB ports, auto-ranging 120/220Vac 50/60 Hz power supply. Order serial interface card or network interface card, monitor, mounting hardware, Fireworks Application software and other optional cards separately.
FWUL5RAIDW7	Same as FWUL5W7 but with a 500 Gig RAID Hard drive array configured as RAID 1 for redundant drive mirroring.

Optional Components	
FW-SP4I	Serial Port for UL/ULC listed FWL5W7 or FWUL5RAIDW7 workstations. Provides four serial ports. Occupies one PCI slot. Maximum two FW-SP4I cards per workstation.
FW-NIC	UL/ULC Listed Ethernet 100Base-TX Network Interface Card.
FW-MOD	Modem for UL/ULC listed systems - 56K baud V.90
FW-HD5W7	Replacement hard drive for FW-UL57 computer.
FW-HD5RAIDW7	Replacement hard drive for FWUL5RAIDW7 computer.
FW-NCCA5	Network conduit adapter. Provides connection to FW-NIC for Ethernet conduit.

Monitors	
FW-19LCDWTS	Rack mount UL/ULC 19" LCD, 1440 x 900, capacitive TS order FW-19LCDWRACK Rack mount kit separately.
FW-22LCDWTS	UL/ULC Listed 22" 16:9 LCD, 115 Vac, 1680 X 1050 resolution, capacitive touchscreen, with integral speakers. C/W desk stand, cable set, driver disk.
FW-42LCDWTS	UL/ULC Listed 42" 16:9 LCD, 115 Vac, 1920x1080 resolution, surface acoustic wave (SAW) touchscreen, with integral speakers. Comes cable set and driver disk. Requires wall mounting bracket kit ordered separately.

Enclosures and Mounting Accessories	
RKU-61-24B	19" Rack mount enclosure black color- 35 EIA panel spaces available.
FW-19LCDWRACK	Rack mount kit for model FW-19LCDWTS monitor
FW-42LCDHMK1	42" wall mount bracket kit - single display, horizontal
FW-42LCDVMK1	42" wall mount bracket kit - single display, vertical
FW-42LCDVMK2	42" wall mount bracket kit - dual display, vertical
FW-RACKPCUL5	Computer rack mount kit - 4 EIA panel spaces required, C/W slides & handles.
FW-RACKKB	Keyboard Rack mount kit - Black - 2 EIA panel spaces required.
FW-RACKSD	Rack mount slides for use with FW-RACK PC
BP1	Blank plate - One EIA panel Space (1.75" x 19") (See Note 3)
BP2	Blank plate - Two EIA panel Spaces (3.5" x 19") (See Note 3)
BP3	Blank plate - Three EIA panel Spaces (5.25" x 19") (See Note 3)
MFC-A	Accessory Enclosure for mounting Mini-Mux at FireWorks workstation

Accessories	
MN-COM1S	UL 864 FireWorks Communications Ethernet Port, Command & Control
MN-NETSW1	Unmanaged Layer 2 Ethernet Switch
APS6A	6.5 Amp Auxiliary Power Supply
APS10A	10 Amp Auxiliary Power Supply
MN-NETRLY4	Ethernet controllable multi I/O module. 4 unsupervised inputs & 4 unsupervised outputs. Comes with one MN-NRKB1.
MN-FVPN	Voice Over Internet Protocol (VoIP) encoder/decoder, includes power and audio cable.
MN-TK10	10 Position, 4 pole terminal kit for use with MN-NETRLY4 or MN-FVPN
MN-BRKT2	MN-COM1S or MN-NETSW1 mounting bracket for MFC-A enclosures or on 3-CHAS7

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FireWorks UL5W7 Workstation Installation Manual

P/N 3101492-EN • REV 06 • ISS 05AUG13

Manufacturer Edwards, A Division of UTC Fire & Security Americas Corporation, Inc.
8985 Town Center Parkway, Bradenton, FL 34202, USA.

FCC compliance This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Contact information For contact information, see www.edwardsutcfs.com.

Content

Important information

Regulatory information

This product has been designed to meet the requirements of NFPA 72 *National Fire Alarm and Signaling Code*, UL 864 *Standard for Control Units and Accessories for Fire Alarm Systems*, and CAN/ULC-527 *Standard for Control Units for Fire Alarm Systems*.

Industry Canada information

Note: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. Industry Canada does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Limitation of liability

To the maximum extent permitted by applicable law, in no event will UTCFS be liable for any lost profits or business opportunities, loss of use, business interruption, loss of data, or any other indirect, special, incidental, or consequential damages under any theory of liability, whether based in contract, tort, negligence, product liability, or otherwise. Because some jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages the preceding limitation may not apply to you. In any event the total liability of UTCFS shall not exceed the purchase price of the product. The foregoing limitation will apply to the maximum extent permitted by applicable law, regardless of whether UTCFS has been advised of the possibility of such damages and regardless of whether any remedy fails of its essential purpose.

Installation in accordance with this manual, applicable codes, and the instructions of the authority having jurisdiction is mandatory.

While every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents, UTCFS assumes no responsibility for errors or omissions.

Advisory messages

Advisory messages alert you to conditions or practices that can cause unwanted results. The advisory messages used in this document are shown and described below.

WARNING: Warning messages advise you of hazards that could result in injury or loss of life. They tell you which actions to take or to avoid in order to prevent the injury or loss of life.

Caution: Caution messages advise you of possible equipment damage. They tell you which actions to take or to avoid in order to prevent the damage.

Note: Note messages advise you of the possible loss of time or effort. They describe how to avoid the loss. Notes are also used to point out important information that you should read.

Chapter 1
Introduction

Summary

This chapter provides a brief introduction to the FireWorks UL5W7 workstation, and summarizes listing requirements.

Content

About this manual

This manual is for the FireWorks UL5W7 workstation models described below.

Model	Description
FWUL5W7	Workstation, Intel Core 2 Duo CPU, 500 GB hard drive, DVD drive, 4 GB RAM (8 GB max.), Windows 7 Ultimate OS
FWUL5RAIDW7 [1]	Workstation, Intel Core 2 Duo CPU, 500 GB RAID 1 hard drive array, DVD drive, 4 GB RAM (8 GB max.), Windows 7 Ultimate OS

[1] RAID 1 provides fault tolerance through disk mirroring. Two separate hard drives are used. Both hard drives store the same data. If one drive fails, the other drive continues to operate with all of the data intact. The total capacity of the array of drives is limited to the capacity of a single drive. RAID 1 offers reliable data protection by providing 100% redundancy. If a drive fails, it is easily replaced. All the data is automatically copied to the replacement drive.

This manual is for authorized and product-certified distributors who are responsible for the installation of fire alarm equipment. It is assumed that you are already familiar with multiplex fire alarm systems and the relevant codes and standards.

The manual shows you how to install the hardware associated with a FireWorks display and control system. It does not show you how to install or program the FireWorks software.

About FireWorks

The FireWorks UL5W7 workstation and FireWorks graphical command interface software comprises a computerized display and control system. You can use the FireWorks UL5W7 workstation with the following:

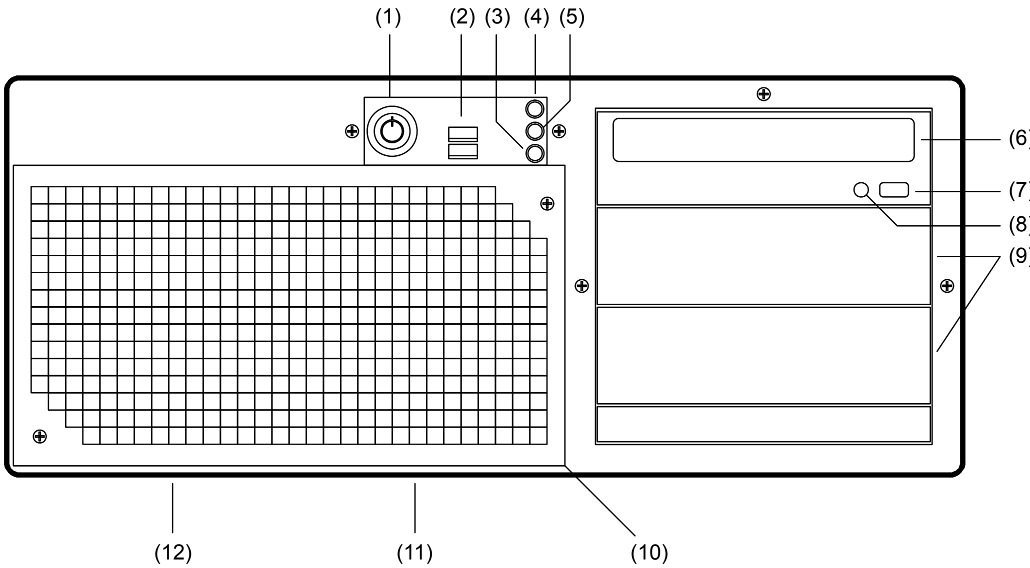
- EST3, EST3X, and combination EST3-EST3X systems
- iO Series systems
- EST2 stand-alone systems
- IRC-3 systems
- FCC systems

FireWorks lets you use one or more display computers to monitor and control several networks of multiplex signaling systems, and card access systems.

About the FireWorks UL5W7 workstation

Front panel features

Figure 1: Front panel features



(1) ON/OFF key switch

(2) USB connectors

(3) Trouble LED

(4) Power LED

(5) Hard drive LED

(6) DVD drive

(7) DVD drive OPEN/CLOSE button

(8) DVD drive LED

(9) Optional drive bays (not used)

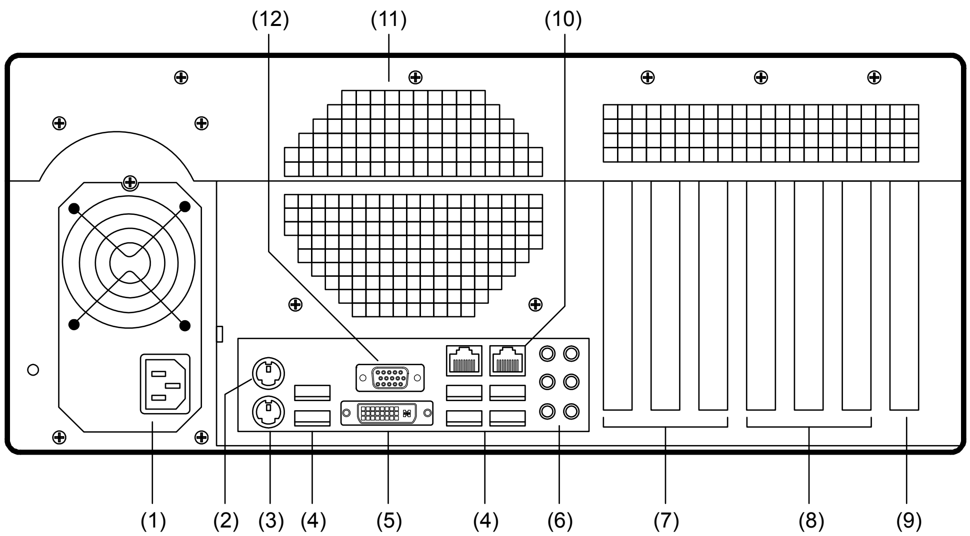
(10) Air filter

(11) Front fan (Fan 2)

(12) Front fan (Fan 3)

Rear panel features

Figure 2: Rear panel features



(1) Power connector

(2) Mouse connector

(3) Keyboard connector

(4) USB 2.0 connectors (6X)

(5) Digital (DVI) output

See “Setting up monitors” on page 16 for more information.

(6) Audio connectors, not used

(7) Not used

(8) Expansion slots (PCI1 to PCI3)

See “Installing option cards” on page 14 for more information.

(9) PCWD3 watchdog card (factory installed)

Note: You must add the watchdog card to your FireWorks project.

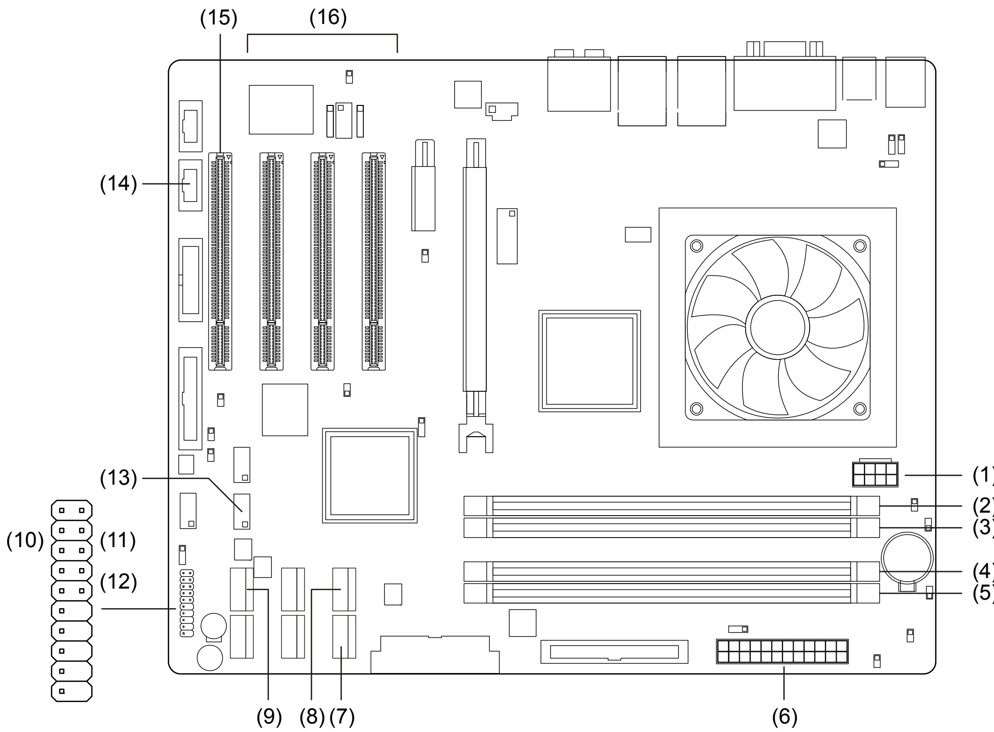
(10) Ethernet connectors (2X), not used

(11) Rear fan (Fan 4)

(12) Analog (VGA) output

Motherboard cable connections

Figure 3: Motherboard cabling diagram



(1) 12 V power connector

(2) Memory slot 1

(3) Memory slot 2

(4) Memory slot 3

(5) Memory slot 4

(6) ATX power connector

(7) Disk drive 1 (SATA 0)

(8) Disk drive 2 (SATA 1)

(9) DVD drive (SATA 5)

(10) Disk drive LED

(11) Power LED

(12) ON/OFF key switch

(13) Front panel

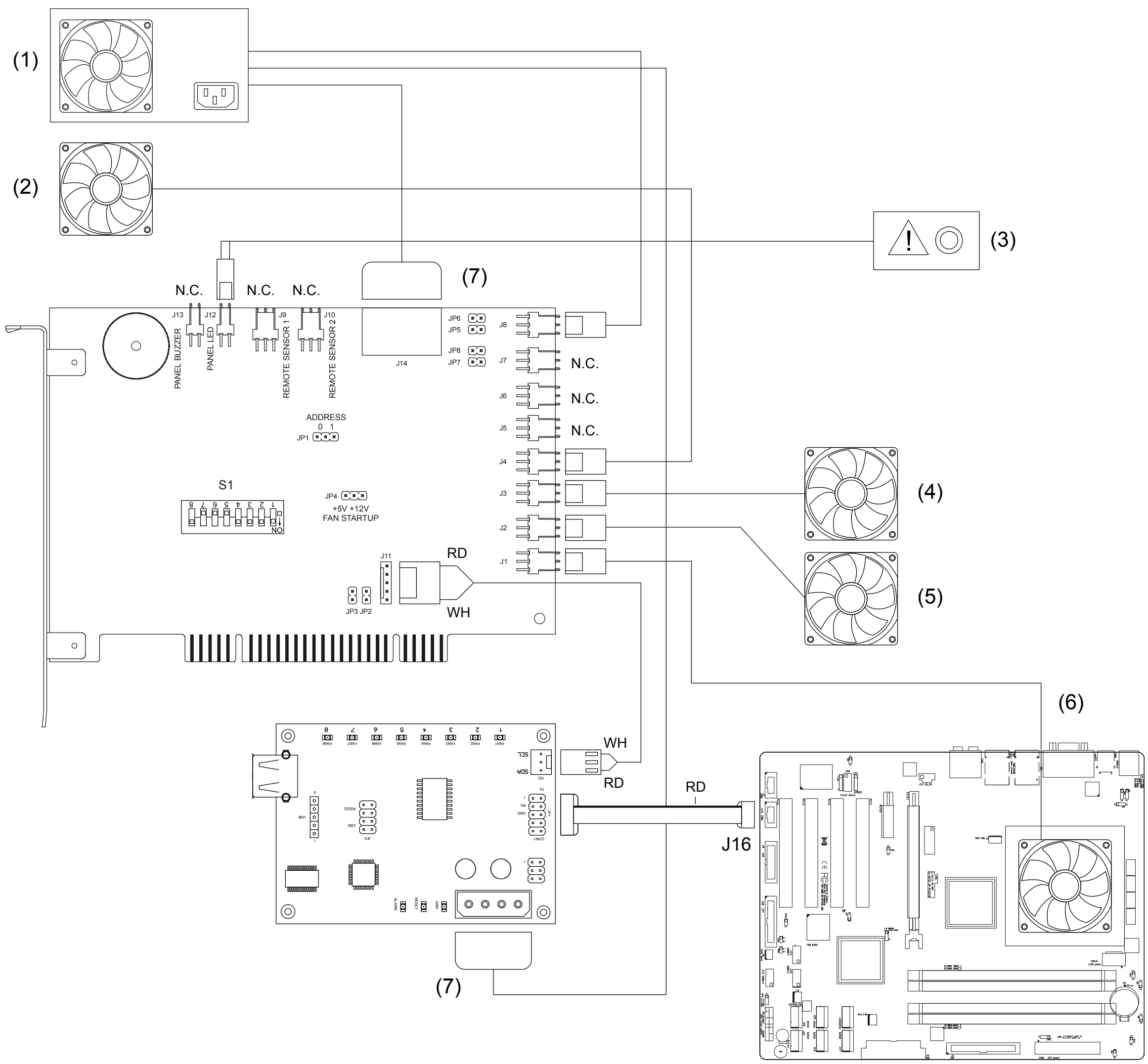
(14) PCWD3 daughter card

(15) PCWD3 PCI card

(16) Expansion card slots

PCWD3 cable connections

Figure 4: PCWD3 cabling diagram



(1) Power Supply fan (Fan 8)

(2) Rear fan (Fan 4)

(3) Front trouble LED

(4) Front fan (Fan 3)

(5) Front fan (Fan 2)

(6) CPU fan (Fan 1)

(7) Power connection from workstation power supply

Memory configuration

FireWorks UL5W7 workstations support dual channel memory configurations. Single channel memory configurations and mismatched memory are not supported. Install memory only as shown below. See Figure 3 on page 5 for memory slot locations.

Table 1: Supported memory configurations

	Channel A		Channel B	
Total RAM	**Slot 1**	**Slot 2**	**Slot 3**	**Slot 4**
4 GB [1]	2 GB	N/A	2 GB	N/A
8 GB	2 GB	2 GB	2 GB	2 GB

[1] Standard memory configuration.

Opening and closing the DVD drive

The disc tray on the DVD drive does not close when you push it. Pushing the disc tray to close it can damage the drive mechanism. Always use the DVD disc drive OPEN/CLOSE button (see Figure 1 on page 3) to open and close the disc tray.

Compatible devices and hardware options

The following tables list the devices and hardware options that have been tested and proven compatible with the FireWorks UL5 workstation.

Table 2: Compatible monitors

Model	Description	Installation sheet
FW-19LCDWTS	Monitor, LCD,19 inch, wide, capacitive touch screen	3101916
FW-22LCDWTS	Monitor, LCD, 22 inch, wide, capacitive touch screen	3101917
FW-42LCDWTS	Monitor, LCD, 42 inch, wide, surface acoustic wave (SAW) touch screen	3101918

Table 3: Compatible subassemblies

Mod el	Description	Installation sheet
PCCA5	Power cord conduit adapter	3101828
FW-NCCA5	Network cable conduit adapter	3101762

Mod el	Description	Installation sheet
DTK-120HW	DITEK surge protector	N/A
PCWD3	Watchdog card	N/A
FW-SP4i	RS-232 serial four port expander card	3100897
FW-NIC	PCI network card	3101498

Table 4: Compatible accessories

Model name	Description	Installation sheet
FW-HD5W7	Replacement hard drive for FWUL5W7 workstation (Windows 7 Ultimate OS)	3101494-EN
FW-HD5RAIDW7	Replacement hard drive for FWUL5RAIDW7 workstation (Windows 7 Ultimate OS)	3101532-EN
FWUL5RAM2G	2 GB memory module	3102020-EN
Mini-Mux/ FCOM-FIB	Combination RS-232/Fiber optic communication interface card	387059
PT-1S	System event printer	3100989
MN-COM1S	Ethernet to RS-232 interface module	3101601
MN-FVPN	VoIP encoder/decoder module	3101583
MN-NETRLY4	Network relay module	3101827
MN-NETSW1	Ethernet switch, fiber optic, multimode	3101602
MN-NETSW2	Ethernet switch, fiber optic, single mode	3101931
MFC-A	Accessory enclosure	387453
Bosch D6600	Digital alarm communicator receiver	N/A
Osborne Hoffman OH2000E	Digital alarm communicator receiver	N/A
FW-19LCDWRACK	Rack mount kit for model FW-19LCDWTS monitor	N/A
FW-42LCDHMK1	Wall mount bracket kit, single 42-inch LCD monitor, horizontal	N/A
FW-42LCDVMK1	Wall mount bracket kit, single 42-inch LCD monitor, vertical	N/A
FW-42LCDVMK2	Wall mount bracket kit, dual 42-inch LCD monitor, vertical	N/A
RKU-61-24B	Cabinet, 19 inch, rack-mount	N/A

UL 864 programming requirements

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISIDICTION, AND OTHER INVOLVED PARTIES

This product incorporates field-programmable software. In order for the product to comply with the requirements in the *Standard for Control Units and Accessories for Fire Alarm Systems*, UL 864, certain programming features or options must be limited to specific values or not used as indicated below.

Program feature or option	Permitted in UL 864? (Y/N)	Possible Settings or operation	Settings Permitted in UL 864
SYSCONTROL_RESOUND_24_HOUR	Y	0 (disabled), 1 (enabled)	1 (enabled)
SYSCONTROL_SELECT_HIGHEST_PRIORITY	Y	0 (disabled), 1 (enabled)	1 (enabled)
SYSCONTROL_SUPERVISORY_GOLD	Y	0 (yellow), 1 (gold)	0 (yellow)
UL_NINTH_EDITION_ACPOWER_TIMEOUT_HOURS	Y	0 to 9 (hours)	1, 2, 3 (hours)
Event Filter	Y		
Event Filter Types (Alarm, Supervisory, Trouble, Monitor, Security, Test, Disable)		Enable, Disable	Enable
EST3 partitions		Enable, Disable	Enable, Disable
Access (Display, Printer, History)		Enable, Disable	Enable
Use Filtering Schedule		Enable, Disable	Enable
Adding a watchdog card	Y	Added, Not added	Added
SYSCONTROL_BELL_SILENCE_MINUTES	Y	0 to <32k	0 to 240
Clear All Account Events	N	Disabled, Enabled	Disabled
Event Selection Method	Y	Maintain Selected Event Select High Priority Select Newest Select Newest (if Higher or Equal Priority)	Select High Priority
Local Mode of Operation	N	Disable, Enable	Disable

Chapter 2
Installation

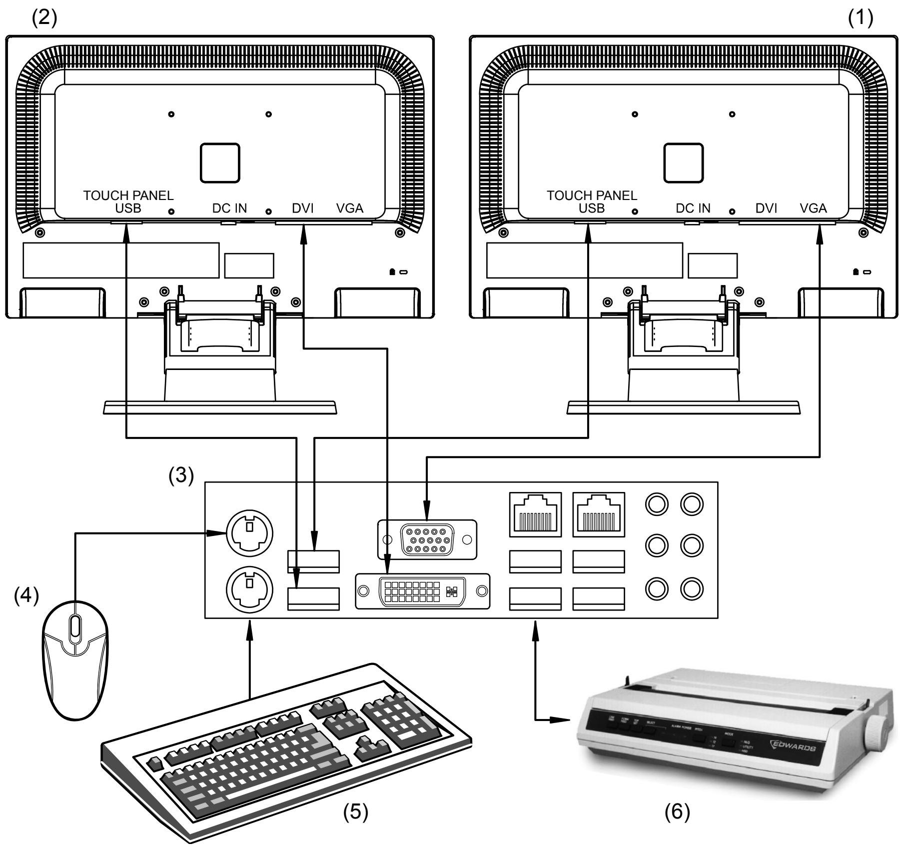
Summary

This chapter provides instructions for installing your FireWorks UL5W7 workstation.

Content

Quick setup

Figure 5: Quick setup diagram



(1) Primary monitor (VGA)

(2) Optional secondary monitor (DVI)

Requires a DVI-D (single link) video cable, purchased locally.

(3) Back panel connectors

(4) Mouse

(5) Keyboard

(6) PT-1S system event printer

Setting up a FireWorks UL5W7 workstation

The following procedure describes setting up a FireWorks UL5W7 workstation and connecting it to a control panel. The steps may refer you to other sections of this manual or to other documentation.

Caution: Equipment damage hazard. Turn off the workstation and disconnect AC power before installing or removing option cards, and connecting or disconnecting external equipment.

Note: When configured as a proprietary supervision station, you can use the FireWorks UL5W7 workstation to monitor contiguous and noncontiguous properties.

To set up a FireWorks UL5W7 workstation:

1. Check to make sure you have all the hardware and software components needed.
2. Install the option cards. See "Installing option cards" on page 14 for more information.
3. Install the workstation.

   For instructions, see "Installing the FireWorks UL5W7 workstation on a desk or bench" on page 22 or "Installing the FireWorks UL5W7 workstation in a rack" on page 24.
4. Connect the monitors, keyboard, and mouse. See "Quick setup" on page 12.
5. Connect AC power. See "Connecting AC power" on page 20.
6. Turn on the equipment.
7. Log on to the workstation. See "Logging on to the FireWorks UL5W7 workstation" on page 15.
8. Change passwords. See "Changing Windows logon passwords" on page 16.
9. Configure your monitors. See "Setting up monitors" on page 16.
10. Connect and configure your printers. See "Connecting printers" on page 19.
11. Connect external equipment (control panels, CCTV systems, etc.) and make sure all are communicating with the workstation.

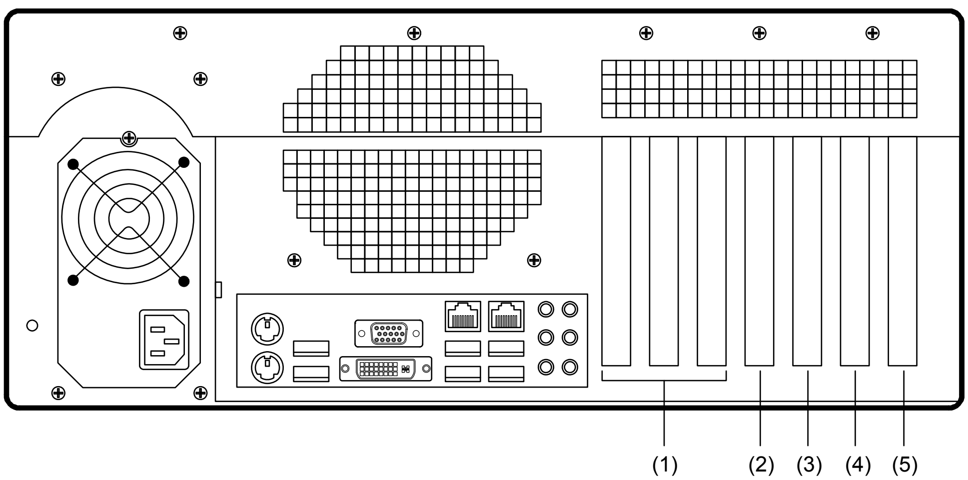
Important: Once the FireWorks UL5W7 workstation and all control panels are connected and communicating, synchronize the control panel system clocks with the clock on the FireWorks UL5W7 workstation. This will ensure that when events take place in your system, the panel time and workstation time match for each event.

Installing option cards

The FireWorks UL5W7 workstation provides three expansion slots (PCI1 to PCI3) for installing option cards. PCI4 contains the PCWD3 watchdog card. Option cards are ordered separately.

Note: The FW-VIDTVC card and FW-MOD card are not compatible with Windows 7 workstations.

Figure 6: Recommended option card placement



(1) Not used

(2) FW-NIC card (PCI1)

(3) FW-VIDTVC, FW-MOD, or FW-SP4i card (PCI2)

(4) FW-VIDTVC, FW-MOD, or FW-SP4i card (PCI3)

(5) PCWD3 card (PCI4)

Caution: Equipment damage hazard. Option cards are sensitive to electrostatic discharge (ESD). To avoid damage, follow accepted ESD handling procedures

Note: You can install the FW-NIC card in any of the available slot positions. PCI1 is recommended for bench top installations so you can attach the FW-NCCA5 conduit adapter without blocking the remaining PCI card slots.

To install an option card:

1. Turn off the FireWorks UL5W7 workstation and disconnect AC power.
2. Remove the workstation cover and the card hold-down bracket.
3. Locate the appropriate PCI slot. See Figure 6 above.

4. Plug the option card into the connector. Make sure the option card is fully seated in the connector.
5. Secure the option card to the workstation.
6. Replace the card hold-down bracket and the workstation cover.
7. Turn on the workstation and follow the instructions on the card’s installation sheet for operating system and driver configuration information.

Logging on to the FireWorks UL5W7 workstation

The Fireworks UL5W7 workstation is configured with the Windows user logon accounts shown below.

Table 5: User logon accounts

User name	Password [1]	Description
Administrator	ESTFW	Can install third party applications
		Can shut down the Windows operating system
		Can change the Administrator logon password
Maintenance	Admin	Cannot install third party applications
		Can shut down the Windows operating system
		Can change the Maintenance logon password
User	USER	Cannot install third party applications
		Cannot shut down the Windows operating system
		Cannot change passwords

[1] Passwords are case sensitive.

To log on to the FireWorks UL5W7 workstation:

1. Turn on the FireWorks UL5W7 workstation.
2. Type the user name in the User Name box.
3. Type the password in the Password box.
4. Click OK.

Changing Windows logon passwords

You should change the Windows logon account passwords before deploying the FireWorks UL5W7 workstation.

To change a logon password:

1. Log on to the FireWorks UL5W7 workstation using the default user name and password for the logon account you want to change.
2. Press Ctrl + Alt + Delete, and then click Change Password.
3. In the Old Password box, type the current password.
4. In the New Password box, type the new password.
5. In the Confirm New Password box, type the new password again.
6. Click OK.

Setting up monitors

The FireWorks UL5W7 workstation supports the use of one or two monitors. Typically, the first monitor connects to the Analog (VGA) video output and the second monitor connects to the Digital (DVI) video output. See Figure 5 on page 12.

For best viewing results, set the monitors for their native (recommended) resolutions. See the table below.

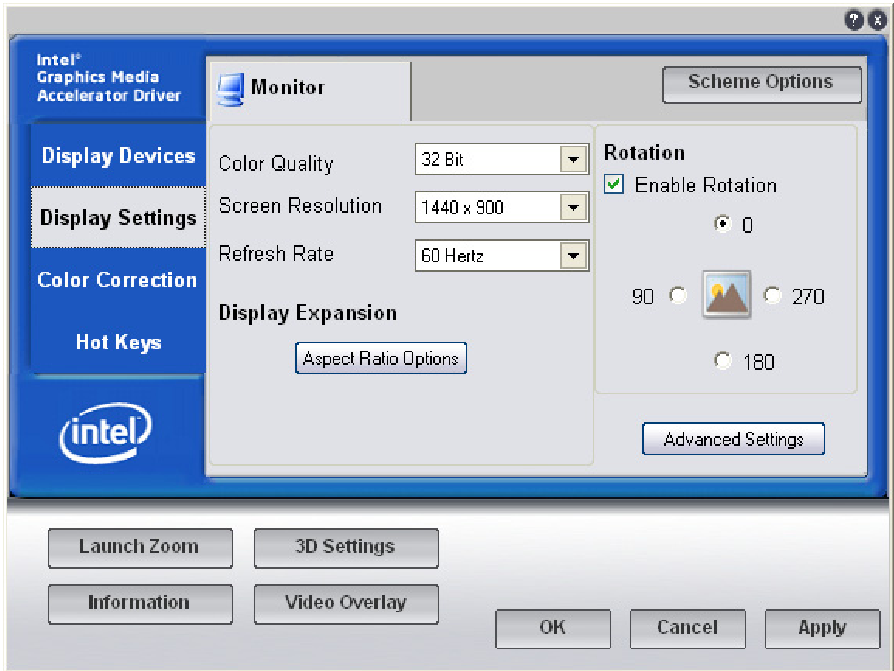
Table 6: Recommended monitor resolutions

Monitor	Resolution
FW-19LCDWTS	1440 × 900
FW-22LCDWTS	1680 × 1050
FW-42LCDWTS	1920 × 1080

To set up single monitor operation:

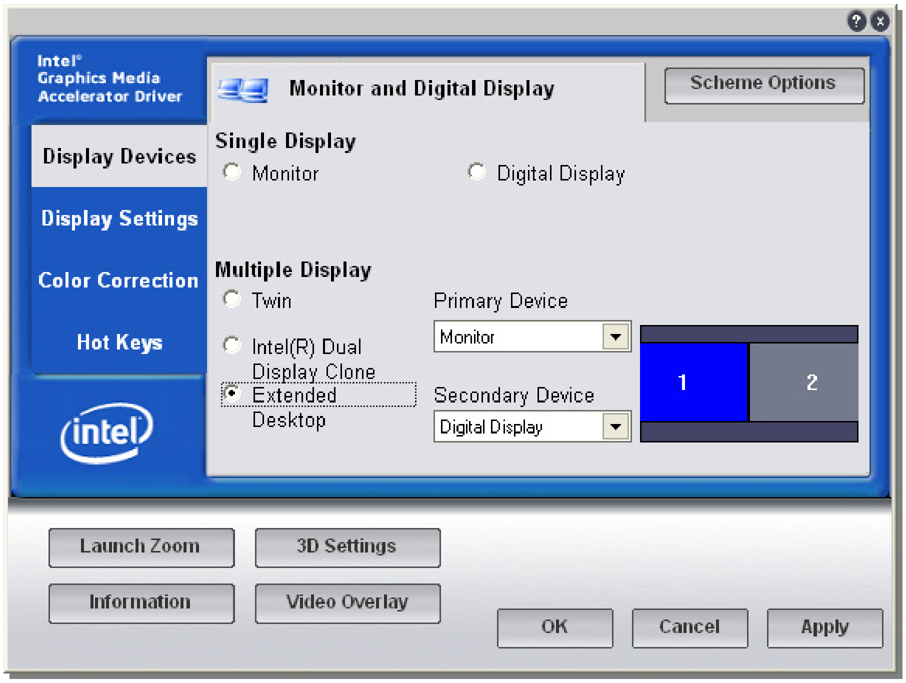
1. Connect the monitor, and then turn it on.
2. Log on to the FireWorks UL5W7 workstation.

3. Right-click the Windows desktop area, and then click Graphics Properties.
4. On the Display Settings page, set the Analog (VGA) output properties as shown below. Set Screen Resolution for the native resolution of the monitor. See Table 6 on page 16.

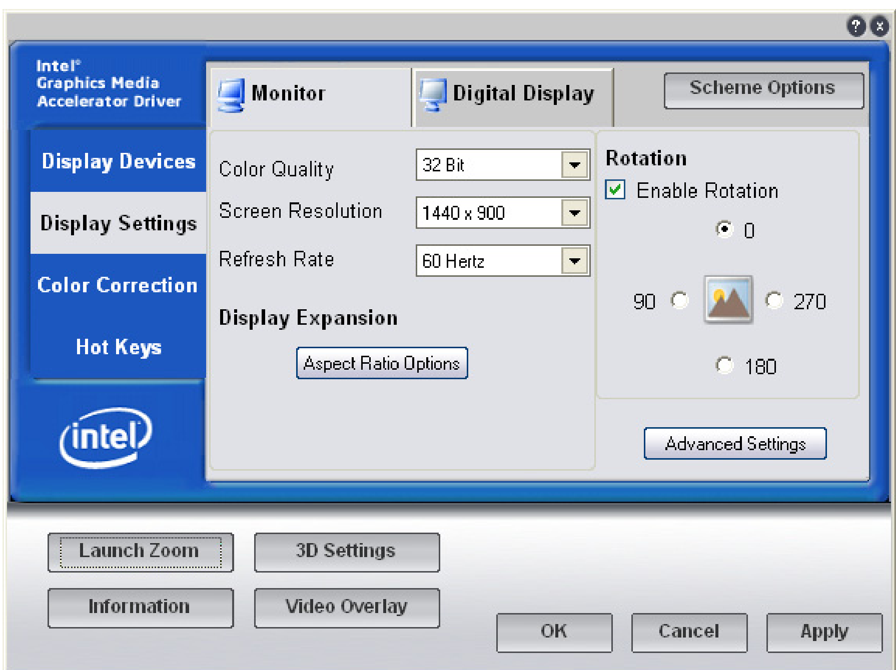


To set up dual monitor operation:

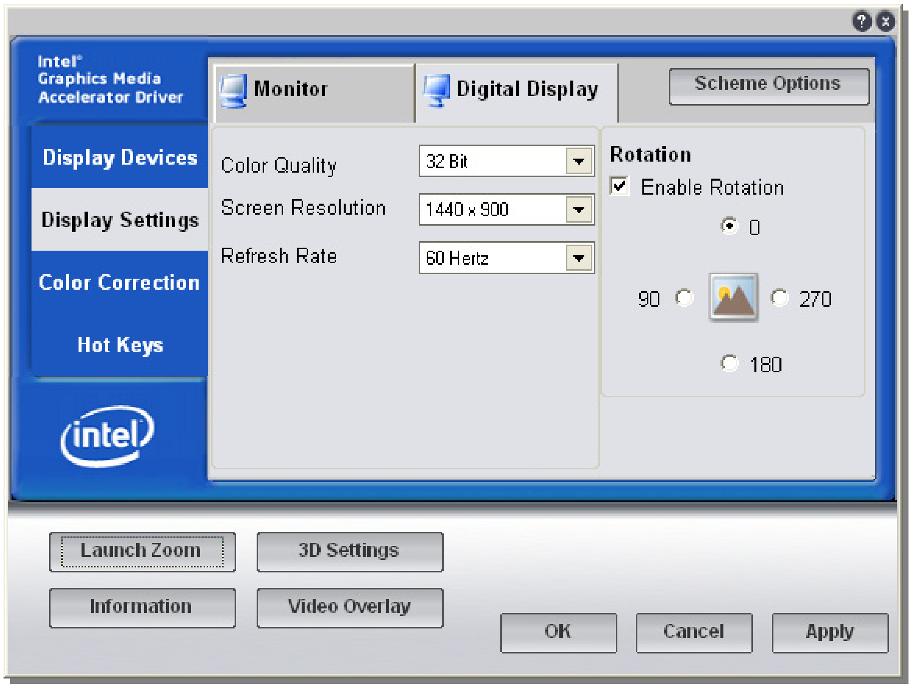
1. Connect the monitors, and then turn them on.
2. Log on to the FireWorks UL5W7 workstation.
3. Right-click the Windows desktop area, and then click Graphics Properties.
4. On the Display Devices page, arrange the monitors as shown below and set the Multiple Display option as follows:
   - Click Twin if you want to display the same information on both monitors. Twin monitors must be the same size and have the same configuration settings.
   - Click Intel(R) Dual Display Clone if you want to display the same information on both monitors. Cloned monitors do not have to be the same size or have the same configuration settings.
   - Click Extended Desktop if you want to extend the display across both monitors. Extended monitors do not have to be the same size or have the same configuration settings.



5. Set the Analog (VGA) output properties as shown below. Screen resolution may vary depending on the monitor.



6. Set the Digital (DVI) output properties as shown below. Set Screen Resolution for the native resolution of the monitor. See Table 6 on page 16.



Connecting printers

The FireWorks UL5W7 workstation supports multiple printers. Connect the printers to any one of the USB connectors on the back of the FireWorks UL5W7 workstation. See Figure 5 on page 12.

Typically, there are two printers connected to the FireWorks UL5W7 workstation. Connect one printer for printing system events and a second printer for printing everything else (reports, graphics, etc.).

Use the Windows Add Printer Wizard (Start > Printers and Faxes > Add a Printer) to install your printers. Additionally, you must add the system event printer to the Device Browser in System Builder.

Notes

- For Listed Supervising Station applications, you must use a PT-1S as the system event printer. Third party color graphic printers are optional and can only be used with local installations.
- FireWorks only supervises the system event printer for loss of communication. FireWorks does not differentiate between a printer that is turned off and a USB cable that is unplugged, and does not provide supervision for “loss of power” and “printer taken offline manually.”

- FireWorks does not display a printer fault event until after another event occurs.
- Locate the printers in the same room as the FireWorks UL5W7 workstation.

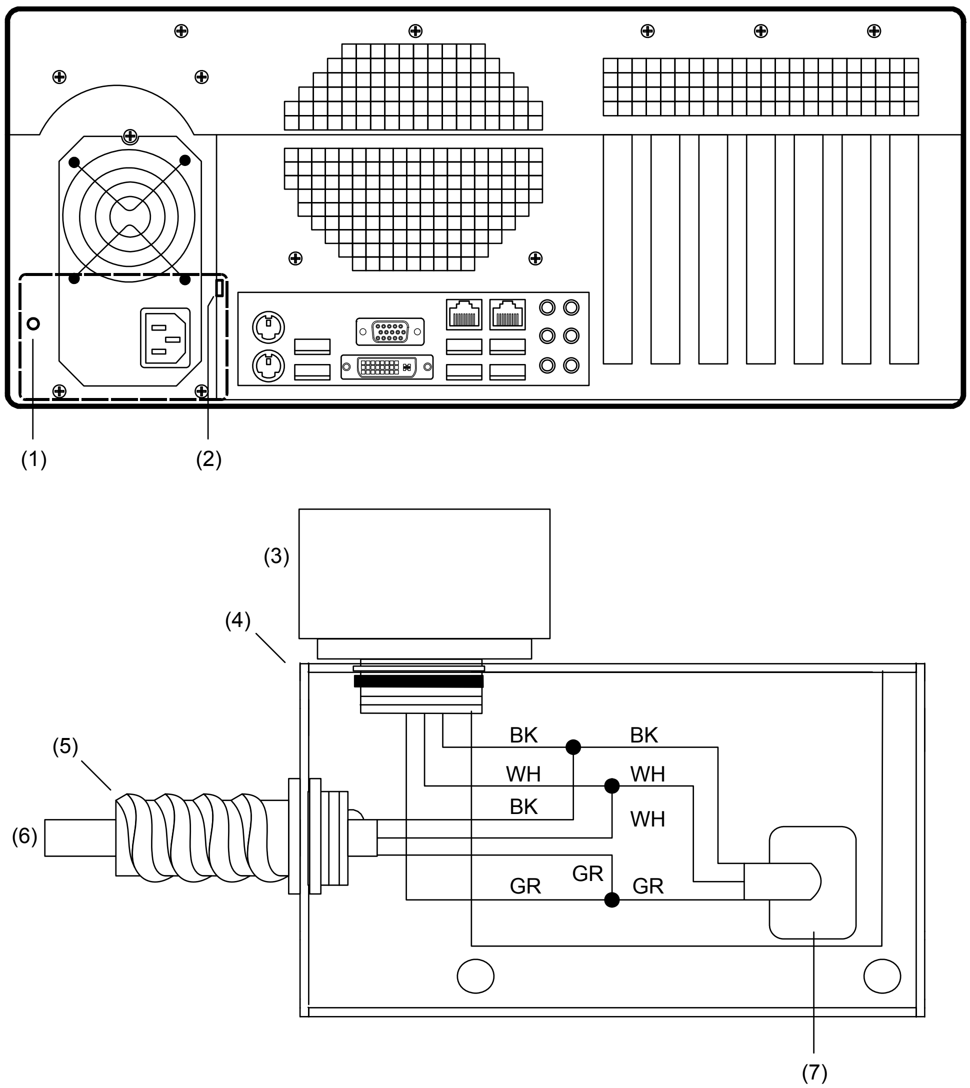
Connecting AC power

The FireWorks UL5W7 workstation requires a permanent connection to a dedicated fire alarm branch-circuit supply by way of a UL 1481 Listed uninterruptible power supply (UPS).

The AC power connection at the workstation must be mechanically protected using the power cord conduit adapter (PCCA5) and must include a surge protector (DITEK DTK-120HW). The PCCA5 and the DTK-120HW are included with the FireWorks UL5W7 workstation.

Note: You are not required to use the PCCA5 when the FireWorks UL5W7 workstation is rack mounted.

Figure 7: AC power connection



(1) Mounting screw hole for the PCCA5

(2) Mounting hook slot for the PCCA5

(3) DITEK DTK-120HW

(4) PCCA5

(5) Flexible conduit (provided by others)

(6) AC conductors from a UL 1481 Listed UPS (provided by others)

(7) Power cord AC connector

To connect AC power:

1. Remove the cover from the PCCA5.
2. Mount the PCCA5 to the back of the FireWorks UL5W7 workstation. See Figure 7 above.
3. Cut the plug along with four inches of cable from the workstation end of the power cord, and then plug the power cord into the workstation.

4. Mount the DTK-120HW to the top knock-out on the PCCA5.
5. Feed the AC conductors from the UPS through the flexible conduit and into the side knockout of the PCCA5. Leave four inches of the cut cable in the PCCA5.
6. Secure the flexible conduit to the PCCA5.
7. Strip the wires 1/2 to 3/4 inches, and then use wire nuts to connect the AC conductors together as shown in Figure 7 on page 21. Do not strip more wire than can fit inside the wire nut.
8. Push the wires inside the PCCA5, and then replace the cover.

Installing the FireWorks UL5W7 workstation on a desk or bench

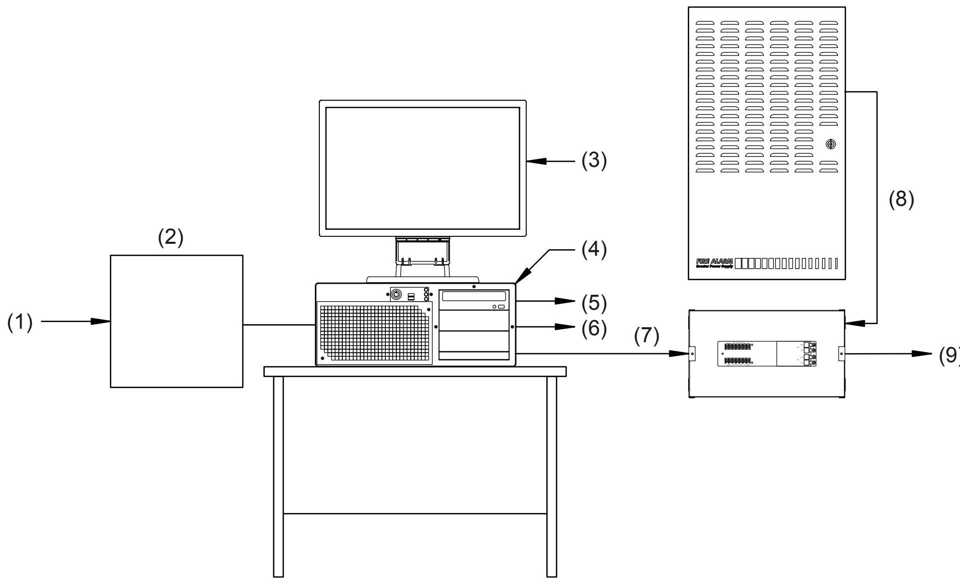
The FireWorks UL5W7 workstation can be installed on a desk or on a bench provided the power cord conduit adapter (PCCA5) is installed and all wiring is mechanically protected. Refer to the procedures below.

Note: The following parts and installation procedures are required for a UL/ULC compliant system. ULC Listings only allow bench mounting for ancillary applications with no common controls on the workstation. Bench mounting is not allowed for ULC central station receiver applications.

To install the FireWorks UL5W7 workstation on a desk or bench:

1. Select a location for the desk or bench that is close to a junction box.
2. Set up all workstation components on the desk or bench.
3. Connect AC power. See “Connecting AC power” on page 20.

Figure 8: Typical bench mounting configuration



(1) Dedicated 120 V branch-circuit supply.

(2) UL 1481 Listed UPS (uninterruptible power supply). The UPS must be supervised and capable of providing 120 V at 60 Hz for at least 24 hours. A UPS is not required in ancillary applications (applications without common controls).

(3) FW-19LCDWTS, FW-22LCDWTS , or FW-42LCDWTS.

(4) FireWorks UL5W7 workstation, keyboard, and mouse. AC connection requires a power cord conduit adapter (PCCA5) and a Ditek DTK-120HW surge protector. See “Connecting AC power” on page 20 for installation instructions.

(5) To a PT-1S system event printer. The PT-1S is required in proprietary systems.

(6) Ethernet connection must be within 20 ft. (6.1 m), in the same room, and enclosed in conduit or equivalent protection against mechanical injury. Requires an FW-NIC card and an FW-NCCA5 conduit adapter.

(7) RS-232 connection to serial port on the fire alarm control panel. The fire alarm control panel must be in the same room. Power-limited. Supervised.

— or —

RS-232 connection to a Mini-Mux and an FCOM-FIB, installed in an MFC-A cabinet.

(8) 24 VDC from a booster power supply. Supervise the trouble contact on the booster power supply for AC power failures. The booster power supply must be UL/ULC Listed for fire protective signaling service.

(9) Class B fiber optic connection to a fire network (EST3, EST2). Maximum attenuation between the FCOM-FIB and Mini-Mux connected to the workstation and the FCOM-FIB and Mini-Mux in the target control panel is 10 dB. Power-limited. Supervised.

Installing the FireWorks UL5W7 workstation in a rack

The following parts and installation procedures are required for a UL/ULC compliant system.

Rack mounting requires using a 19-inch rack to set up and mount all components of the workstation.

Note: All wiring must be mechanically protected.

Table 7: Parts needed for rack mounting

Part number	Description	Panel spaces
RKU-61-24B	19-inch rack	35
BP1	1.75-inch blank plate	1
BP2	3.50-inch blank plate	2
BP3	5.25-inch blank plate	3

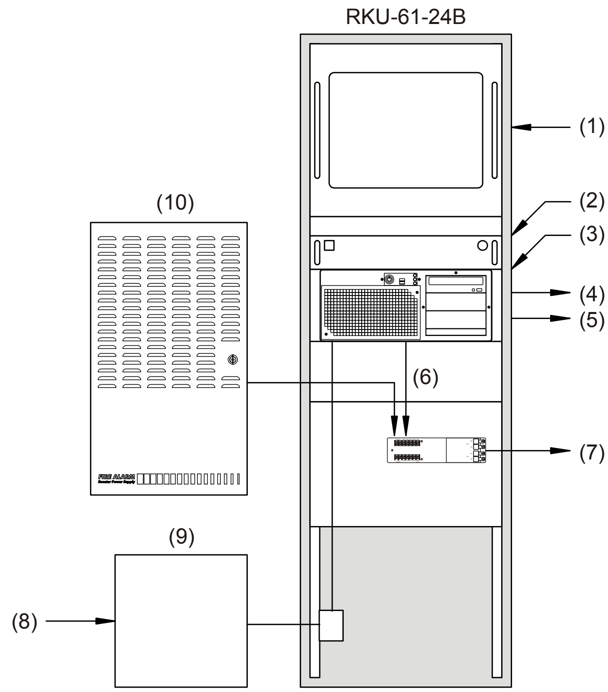
To mount the FireWorks UL5W7 workstation in a rack:

1. Select a location for the 19-inch rack.
2. Install the 19-inch rack.
3. Install all rack mount kits for the FireWorks UL5W7 workstation hardware.

   For detailed information, refer to the documentation that came with the computer and monitor.

Note: Blank plates must be installed over all open spaces in the rack. See Table 7 above.

Figure 9: Typical rack mount configuration



(1) FW-19LCDWTS. Optionally, the monitor may be placed outside of the rack but must be connected to the 120 V outlet installed in the rack.

(2) Keyboard drawer, keyboard, and mouse. Optionally, the keyboard and mouse may be placed outside of the rack.

(3) FireWorks UL5W7 workstation. AC connection requires a Ditek DTK-120HW surge protector and a 120 V outlet installed in the rack. See “Connecting AC power” on page 20 for installation instructions.

(4) To a PT-1S system event printer. The PT-1S is required in proprietary systems.

(5) Ethernet connection must be within 20 ft. (6.1 m), in the same room, and enclosed in conduit or equivalent protection against mechanical injury.

(6) RS-232 connection to serial port on the fire alarm control panel. The fire alarm control panel must be in the same room. Power-limited. Supervised.

— or —

RS-232 connection to a Mini-Mux and an FCOM-FIB, installed in the rack.

(7) Class B fiber optic connection to a fire network (EST3, EST2). Maximum attenuation between the FCOM-FIB and Mini-Mux connected to the workstation and the FCOM-FIB and Mini-Mux in the target control panel is 10 dB. Power-limited. Supervised.

(8) Dedicated 120 V branch-circuit supply.

(9) UL 1481 Listed UPS (uninterruptible power supply). The UPS must be supervised and capable of providing 120 V at 60 Hz for at least 24 hours. A UPS is not required in ancillary applications (application without common controls).

(10) 24 VDC from a booster power supply. Supervise the trouble contact on the booster power supply for AC power failures. The booster power supply must be UL/ULC Listed for fire protective signaling service.

Control panel RS-232 wiring connections

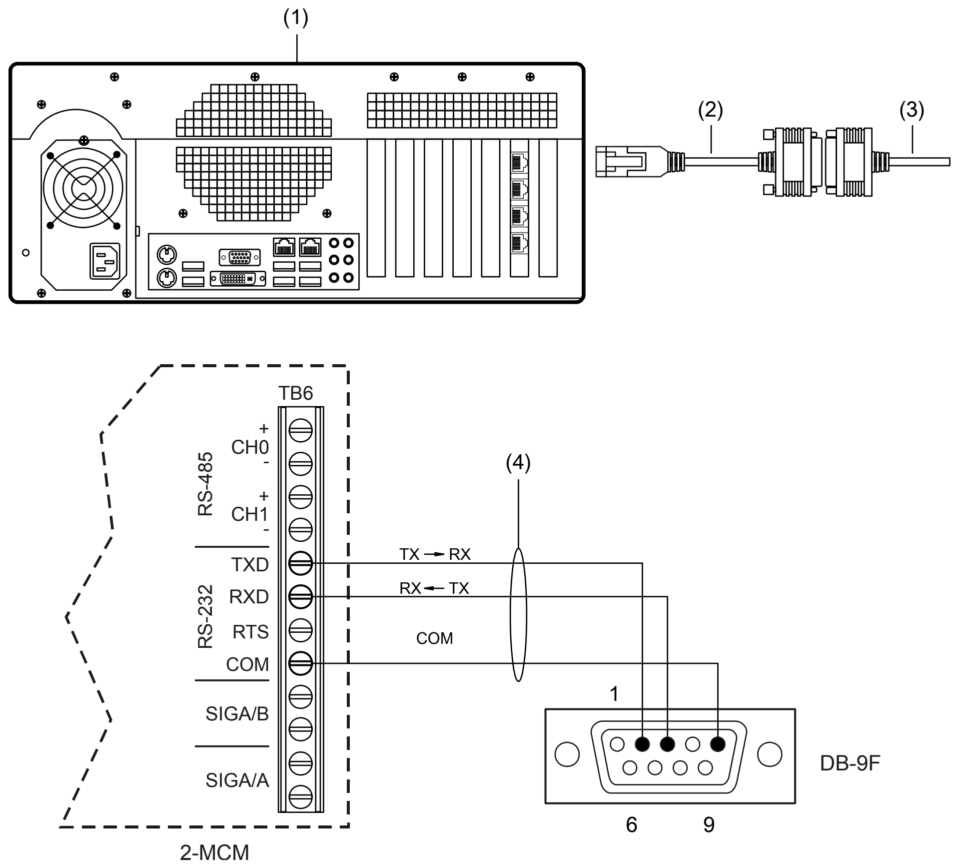
The FireWorks UL5W7 workstation can connect to fire alarm control panels using an RS-232 connection (see Figure 10 and Figure 11). The FireWorks UL5W7 workstation must include an FW-SP4i card and the RS-232 cable assembly used must have the following characteristics:

- Number of pairs: 2, twisted
- Shield: Longitudinal polyester-aluminum foil overshield
- Wire: 24 AWG
- Mutual capacitance: 14.5 pF/ft.
- DC resistance: 25.7 Ω/1,000 ft.
- Impedance 600 Ω at 1 kHz, 100 Ω at 1 MHz

You can also connect the FireWorks UL5W7 workstation to an EST3 control panel using an Ethernet connection.

Note: If distances greater than 50 ft. (15.25 m) between the FireWorks UL5W7 workstation and control panel are required, refer to “Extending the distance between a FireWorks UL5W7 workstation and a control panel” on page 40.

Figure 10: EST2 RS-232 connection (Class B)



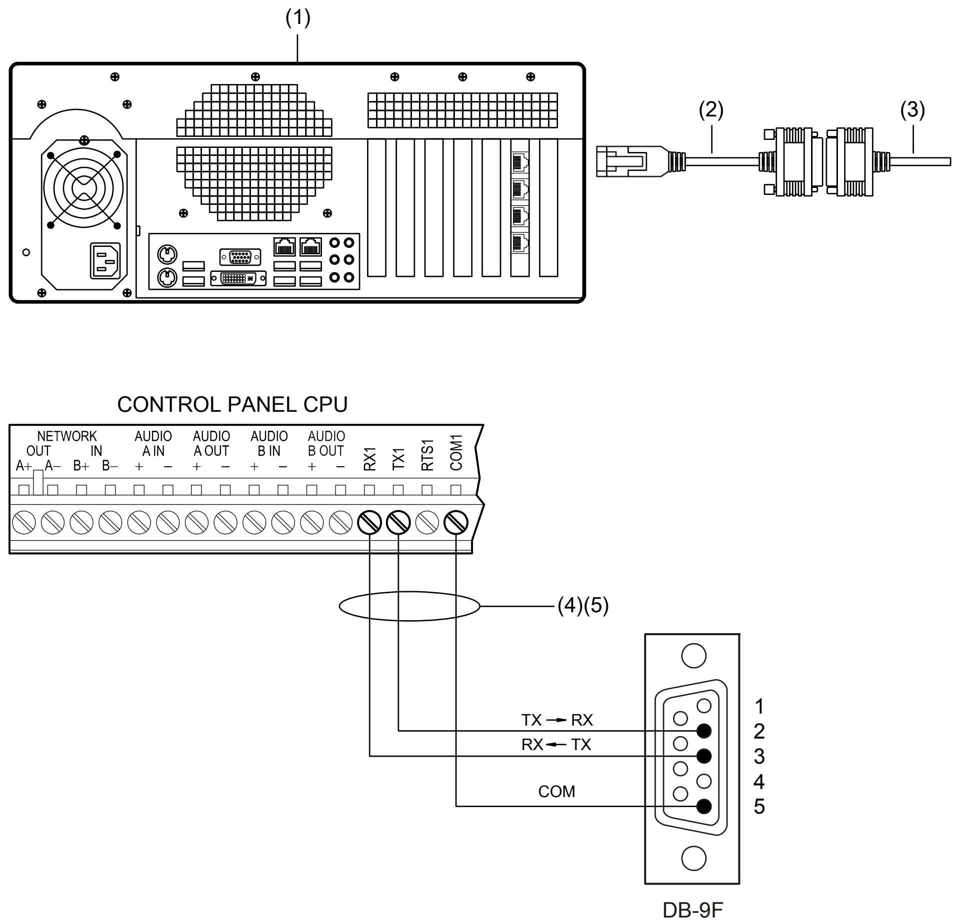
(1) FireWorks UL5W7 workstation with an FW-SP4i card.

(2) RJ-45 to DB-9 adapter cable (shipped with FW-SP4i card.)

(3) RS-232 cable assembly with DB-9 male connector, captive screws, and strain relief.

(4) Maximum distance is 50 ft. (15 m), in the same room, and enclosed in conduit or equivalent protection against mechanical injury. Supervised and power-limited.

Figure 11: EST3/EST3X RS-232 connection (Class B, Style 3.5)



(1) FireWorks UL5W7 workstation with an FW-SP4i card.

(2) RJ-45 to DB-9 adapter cable (shipped with FW-SP4i card.)

(3) RS-232 cable assembly with DB-9 male connector, captive screws, and strain relief.

(4) Maximum distance is 50 ft. (15 m), in the same room, and enclosed in conduit or equivalent protection against mechanical injury. Supervised and power-limited.

(5) Set the EST3 or EST3X serial port type to Gateway Type III.

Connecting digital alarm communicator receivers

Digital alarm communicator receiver setup overview

The FireWorks UL5W7 workstation can be connected to a digital alarm communicator receiver (DACR) in order to display event information that a fire panel sends to the DACR. The event information can be in either 4/2 or Contact ID format. (Refer to Appendix B for listing information.)

FireWorks can receive fire panel event information from several sources concurrently, allowing flexible configuration of event annunciation and fire panel control. The FireWorks UL5W7 workstation can be connected to both a DACR and to a fire panel via RS-232 or IP connection. DACR connection provides annunciation and monitoring of panel events, while panel connection allows both annunciation and control.

DACR connection may be needed if the control panel is in a remote location, or is not compatible with FireWorks.

Here are the steps to follow when setting up and configuring a DACR, a control panel and its dialer, and the FireWorks UL5W7 workstation so that FireWorks can receive control panel events from the DACR.

1. Acquire a FireWorks compatible DACR. See Table 4 on page 8.

   Note: Only one Bosch/Radionics receiver can be connected to a FireWorks workstation.

2. Set up and configure the DACR.

   Refer to the documentation that came with the receiver.

   Note: Certain options require specific values for the receiver to communicate with FireWorks. Configure the settings as outlined below for the receiver you are using.

   Osborne Hoffman OH-2000E

   COM port settings
   Baud: 9600
   Data bits: 8
   Stop bit: 1
   No parity

   Global flags
   G1: Y (no buzzer with computer)
   G2: N (buzzer in manual mode)

G3: N (account number listed first)
G4: N (no automatic time adjustment)
G5: N (printer is used)
G6: N (access denied to programming options authorization)

Bosch/Radionics 6600 (firmware CPU-1.2.03)

COM port settings
Baud: [9] (38,400)
Data bit: [8]
Stop bit: [1]
Parity: [0] (none)
BSFK fire bit: [1]
Output format: [2] (SIA - change requires hardware reboot/cycle power)

CPU configuration
Enable input commands: [0] (no input commands)
Buzzer: [1] (buzzer on for any events)
External parallel printer: [1] (primary: all reports go to this device)

Network configuration (automation network configuration)
Network automation output format: [2]
Device: [2]

3. Set up the telephone lines for the control panel's dialer.

   Note: For telephone connections, refer to the DACT or control panel installation instructions for UL requirements.

4. Install and configure the control panel's dialer.

   You will need the account number, the protocol (4/2 or Contact ID), and the phone numbers for the receiver.

   Refer to the control panel's documentation for details about configuring the dialer.

5. Once the dialer is configured, create a detailed report that contains the protocol and the event details for the control panel (this details the event codes and their meaning). Also, create a report listing the control panel's zones, groups, and partitions. These reports must be available to the FireWorks programmer.

   The control panel's location (physical address) and potential contact people for that location must also be noted.

   Caution: Each event type must be programmed in System Builder to be displayed properly in FireWorks. Event types that are not programmed in System Builder are defaulted to the highest priority. Refer to the System Builder Help for receiver event programming details.

6. Configure the DACR, lines, account information, the events and their meaning, the event states, and protocol in FireWorks System Builder Help > Receiver Configuration Manager.

   Refer to System Builder Help for detailed information about configuring a receiver using the Receiver Configuration Manager (RCM).

7. Map the event states to FireWorks functionality in System Builder.

   Refer to System Builder Help for more information.

8. Connect the FireWorks workstation to the DACR.

   See "Digital alarm communicator receiver wiring connections" below for more information.

9. Test the system by initiating events on the control panel and making sure the correct event information is being sent to FireWorks through the receiver.

Note: The basic operations of the system will change based on which receiver you are using with your system. The Osborne Hoffman receiver requires acknowledgement at both the receiver and the FireWorks UL5W7 workstation. The Bosch receiver only requires acknowledgement at the FireWorks UL5W7 workstation.

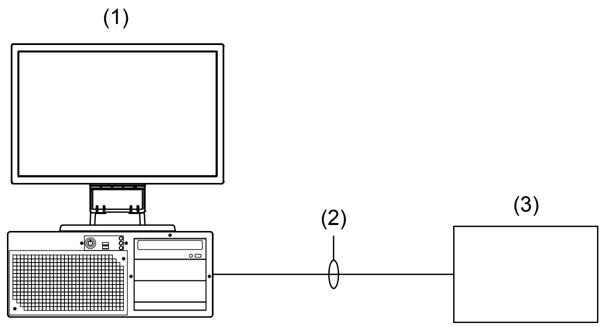
Digital alarm communicator receiver wiring connections

The FireWorks UL5W7 workstation can connect to compatible single line or multiple line DACRs using an RS-232 connection. See Figure 12 on page 32.

You can also connect the FireWorks UL5W7 workstation to DACRs using an Ethernet connection. See Figure 13 on page 32.

Note: Refer to the documentation that came with your receiver for detailed wiring information.

Figure 12: Typical RS-232 connection to digital alarm communicator receiver



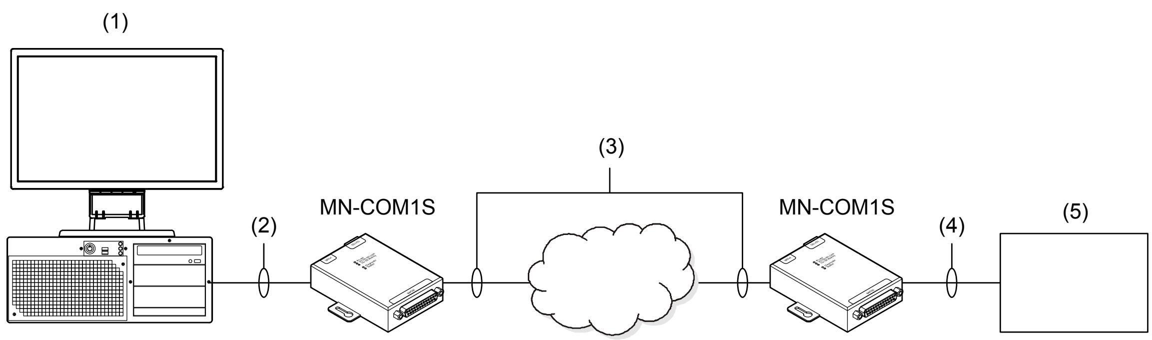
(1) FireWorks UL5W7 workstation with an FW-SP4i card.

(2) Serial RS-232 connection. Connect to dedicated serial port on FW-SP4i card using an RJ-45 to DB-9 adapter cable and null modem cable. Null modem cables are purchased locally.

Maximum distance is 50 ft. (15 m), in the same room, and enclosed in conduit or equivalent protection against mechanical injury. Supervised and power-limited.

(3) Digital alarm communicator receiver.

Figure 13: Typical Ethernet connection to digital alarm communicator receiver



(1) FireWorks UL5W7 workstation with FW-SP4i card.

(2) Serial RS-232 connection. Connect to dedicated serial port on FW-SP4i card using an RJ-45 to DB-9 adapter cable and MN-COMCBL1.

Maximum distance is 50 ft. (15 m), in the same room, and enclosed in conduit or equivalent protection against mechanical injury.

(3) Ethernet connection. Maximum distance is 300 ft. (100 m) without the use of a router, hub, switch, or fiber optic cable. Use Cat 5 cable, or better.

(4) Serial RS-232 connection. Connect to serial port on receiver using an MN-COMCBL1.

(5) Digital alarm communicator receiver

Connecting iO Series control panels

The FireWorks UL5W7 workstation can connect to iO Series control panels for monitoring purposes only and requires the following equipment and software:

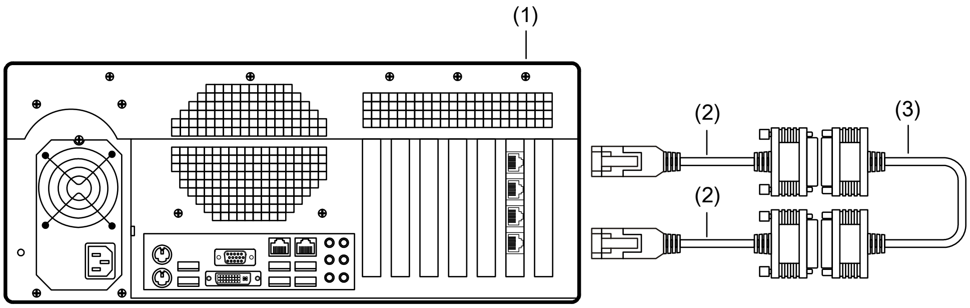
- An FW-SP4i card and two RJ45-to-DB9 adapter cables
- An FW-NIC card
- An RS-232 null modem cable
- FW-IPMON1000
- FW-DARCOM

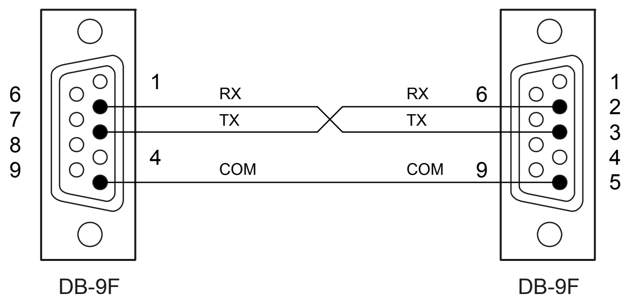
You can build the RS-232 null modem cable or purchase one locally.To build a null modem cable, you will need two DB-9 female connectors and wire that meets the following specifications:

- Number of pairs: 2, twisted
- Shield: Longitudinal polyester-aluminum foil overshield
- Wire: 24 AWG
- Mutual capacitance: 14.5 pF/ft.
- DC resistance: 25.7 Ω/1000 ft.
- Impedance 600 ohms at 1 kHz, 100 Ω at 1 MHz

Connect the cable wires to the DB-9 connectors as shown in Figure 14 on page 34. Note that the transmit and the receive wires are reversed (Pin 2 to Pin 3 and Pin 3 to Pin 2).

Figure 14: RS-232 null modem cable connection





(1) FireWorks UL5W7 workstation with FW-SP4i card and FW-NIC card

(2) RJ-45 to DB-9 adapter cable (shipped with FW-SP4i card)

(3) RS-232 cable assembly with DB-9 male connector, captive screws, and strain relief

IP digital alarm communicator receiver setup overview

You will need the account number and the IP address of the iO Series control panel. The protocol will be Contact ID.

The Fireworks UL5W7 workstation must include an FW-SP4i card and an FW-NIC card. See “Installing option cards” on page 14.

Refer to the control panel’s documentation for details about configuring network connectivity.

1. Once the panel is configured, create a detailed report that contains the event details for the control panel (this details the event codes and their meaning). Also create a report listing the control panel’s zones, groups, and partitions. These reports must be available to the FireWorks programmer.

   The control panel’s location (physical address) and potential contact people for that location must also be noted.

   Caution: Each event type must be programmed in System Builder to be displayed properly in FireWorks. Event types that are not programmed in System Builder are defaulted to the highest priority. Refer to System Builder Help for receiver event programming details.

2. Configure the receiver, lines, account information, the events and their meanings, the event states, and protocol in FireWorks System Builder Help > Receiver Configuration Manager.

   Refer to System Builder Help for detailed information about configuring a receiver using the Receiver Configuration Manager (RCM). See the topic "Using the RCM to configure a receiver."
3. Set the FireWorks UL5W7 workstation IP address and the iO Series control panel IP address so they are compatible. For example, set the FireWorks UL5W7 workstation for 192.168.1.1 and the iO Series control panel for 192.168.1.3.
4. Select the OH Lite icon on the Windows Taskbar to run the OH Lite setup. Click Setup > Automation on the menu bar and check the Automation Present check box. Select the Over Serial radio button. Click Setup > Linecut timeouts and set Supervision Port [1] to 1 minute and 30 seconds.
5. Click Setup > Serial ports and select an open COM port on the FW-SP4I serial expander card.

Connecting the RS-232 null modem cable

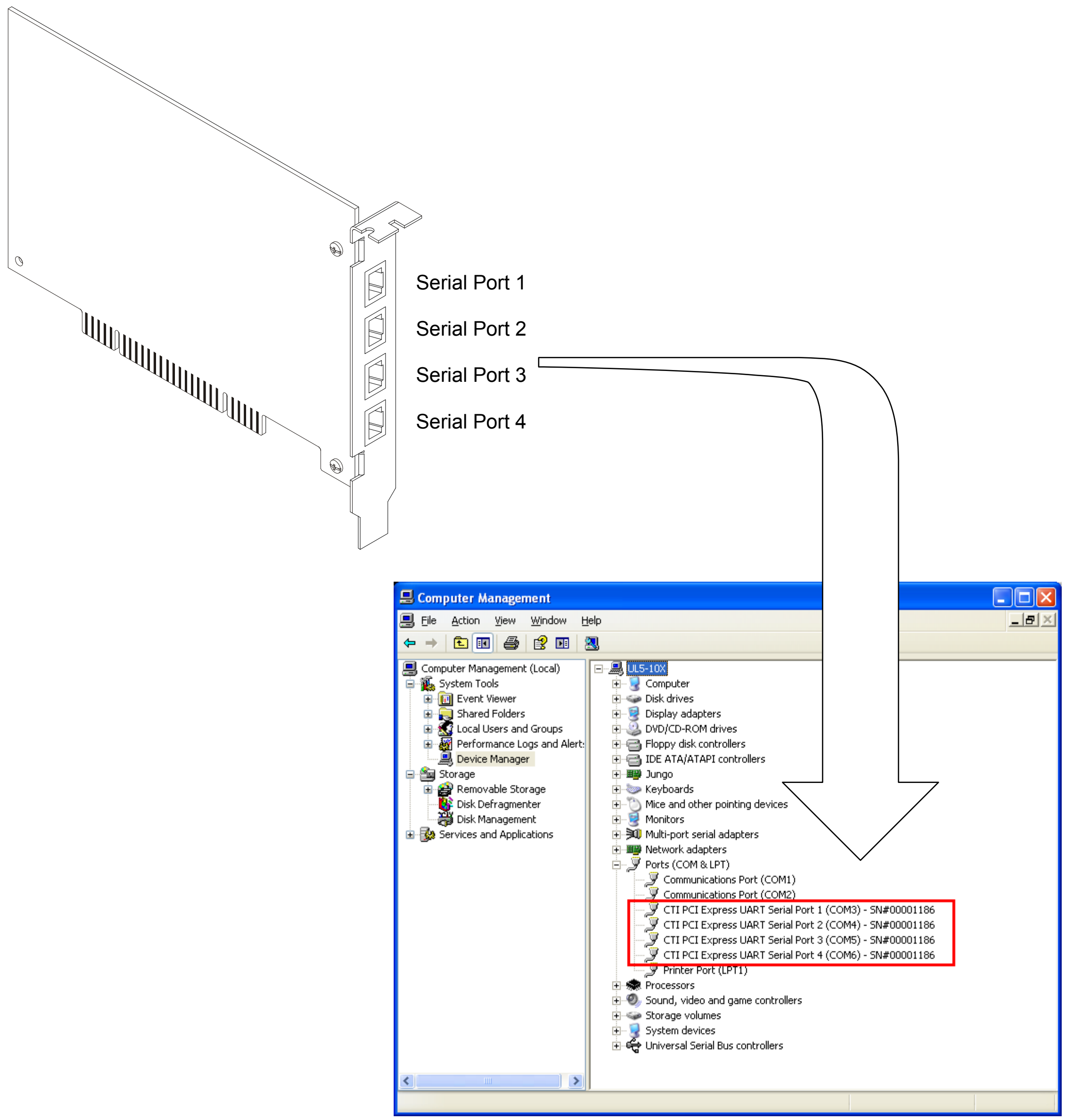
Connect the RS-232 null modem cable to the FW-SP4i card serial port that the FireWorks workstation computer uses to receive data and to the FW-SP4i card serial port that the FW-IPMON1000 uses to transmit data.

To see which COM port numbers are assigned to the FW-SP4i card serial ports:

1. Start Device Manager (Start > Control Panel > System > Hardware > Device Manager).
2. Expand the Ports (COM & LPT) group. Note the COM port designations.

The figure below shows how COM ports are typically assigned to the serial ports on an FW-SP4i card.

Figure 15: Typical COM port designations

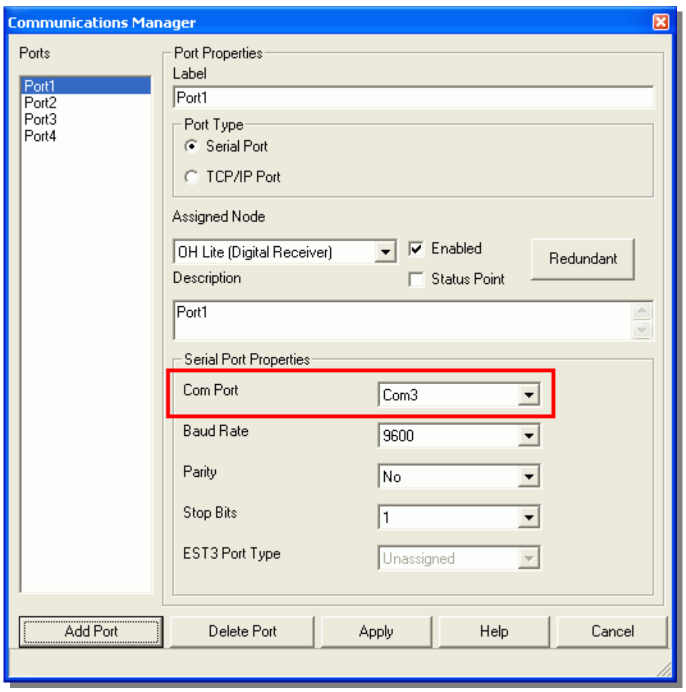


To see which serial port the FireWorks UL5W7 workstation uses to receive data:

1. Start System Builder, and then click Communications Manager.
2. Select OH Lite (Digital Receiver) from the Assigned Node list.

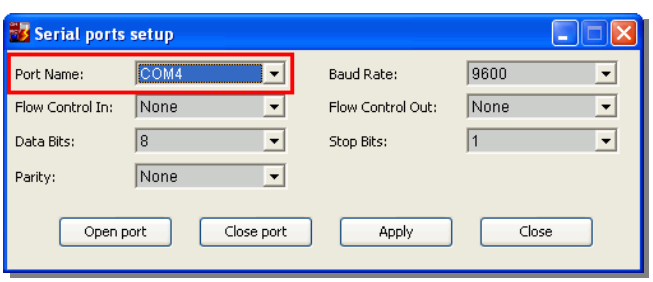
   Note: "OH Lite" is the receiver label used in this example. Your receiver label may be different.

3. Note the COM port number listed for Com Port under Serial Port properties, as shown below.



To see which serial port the FW-IPMON1000 uses to transmit data:

1. Start System Control.
2. From the OH Lite [1000] window, click Setup, and then click Serial Ports.
3. Note the COM port number listed for Port Name, as shown below.



Activating the FireWorks software

The FireWorks UL5W7 workstation ships with the entire suite of FireWorks software already installed. See Table 8 below.

Access to the software is controlled by personal identification numbers (PINs) stored on the FireWorks HASP key. The PINs are issued to you by way of a Software Key Certificate shipped with the workstation.

Table 8: FireWorks software descriptions

Application	Description
FW-DARCOM	Gives FireWorks the ability to display Contact ID or SIA 4/2 formatted events from any fire alarm or security control panel by way of a compatible digital alarm communicator receiver (DACR).
FW-1S	Gives FireWorks the ability to share data with one remote (client) computer over an Ethernet connection. The remote computer must be running the same version of FireWorks Web Client software.
FW-4S	Gives FireWorks the ability to share data with up to five remote (client) computers over an Ethernet connection. The remote computers must be running the same version of FireWorks Web Client software (ordered separately). You must install FW-1S before you can install FW-4S.
FW-10S	Gives FireWorks the ability to share data with up to 15 remote (client) computers over an Ethernet connection. The remote computers must be running the same version of FireWorks Web Client software (ordered separately). You must install FW-1S and FW-4S before you can install FW-10S.
FW-IPMON1000	Gives FireWorks the ability to display events from iO-Series fire alarm control panels over an Ethernet connection.

To activate a software package:

1. Plug in the FireWorks HASP key, and then turn on the workstation.
2. Click Start > All Programs > Edwards Software > FireWorks > Utilities, and then click PINKeyAdder.
3. Click Next.
4. In the Serial Number box, type the PIN for the software package you want to activate, and then click Next. The PINs are on your Software Key Certificate.
5. When you are done adding PINs to the HASP key, click Finish.

Chapter 3
Applications

Summary

This chapter describes typical FireWorks UL5W7 applications.

Content

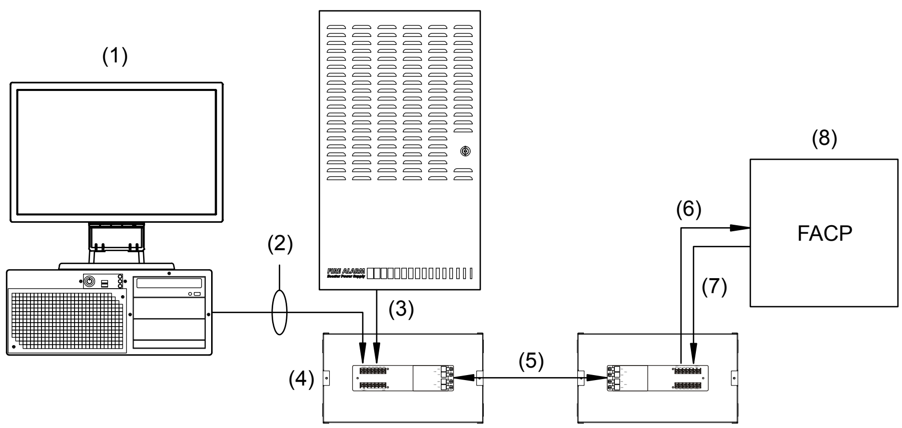
Extending the distance between a FireWorks UL5W7 workstation and a control panel

When the distance between a FireWorks UL5W7 workstation and a control panel exceeds 50 ft. (15.25 m), use the applications presented in this topic.

Fiber optic application

First, you must convert the RS-232 signal from the FireWorks UL5W7 workstation to fiber optic. Second, the fiber optic signal entering the control panel must be converted back to RS-232. This is accomplished using the Mini-Mux communication card and a FCOM-FIB card. See Figure 16 below.

Figure 16: Fiber optic application



(1) FireWorks UL5W7 workstation with an FW-SP4i card.

(2) RS-232 serial connection. For Style 4 and ULC, the workstation and the Mini-Mux must be mounted in the RKU rack mount enclosure if the workstation includes common controls. If the workstation is ancillary, then use a maximum of 50 ft. (15.25 m) between the workstation and the Mini-Mux. This connection must be in the same room.

(3) 24 VDC from booster power supply. Supervise the trouble contact on the booster power supply for AC power failures. Booster power supply must be UL/ULC Listed for fire protective signaling service.

(4) MFC-A cabinet with Mini-Mux and FCOM-FIB.

(5) Class B fiber optic connection to the fire network. Maximum attenuation between the FCOM-FIB and Mini-Mux connected to the workstation and the FCOM-FIB and Mini-Mux in the target control panel is 10 dB. Supervised and power-limited.

(6) RS-232 serial connection to the control panel serial port.

(7) 24 VDC from the control panel.

(8) EST3, EST3X, or EST2 cabinet with half-footprint mounting space, or MFC-A cabinet.

For detailed wiring and setup information, refer to:

- *Mini-Mux Installation Sheet* (P/N 387059)
- *MFC(A) Accessory Enclosure Installation Sheet* (P/N 387453)

Table 9: Parts needed

Model number	Quantity needed
Mini-Mux	2
FCOM-FIB	2
MFC(A)	1 (2 if one is needed at the control panel)

Ethernet network application

FireWorks can communicate with an EST3 or EST3X control panel over an Ethernet network (LAN or WAN).

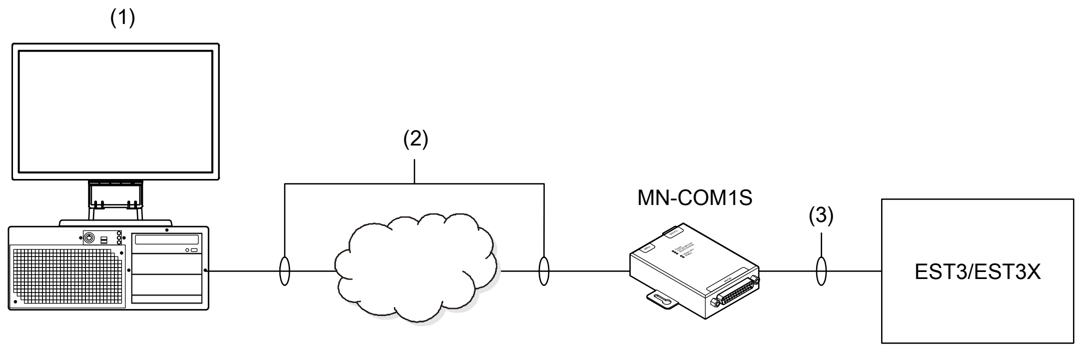
Notes

- When connecting FireWorks over a standard network to an EST3 or EST3X control panel with no firefighter interface, the FireWorks connection is considered ancillary, meaning that it cannot have common controls capability with the control panel.
- When connecting FireWorks over a network to an EST3 or EST3X control panel that has a firefighter interface, the FireWorks can have common controls capability with the control panel. This is a fire-only UL/ULC proprietary application and is not suitable for UL/ULC security applications.

What's needed:

- Network interface connection on the FireWorks workstation
- One MN-COM1S module
- MN Series Ethernet switch
- Ethernet LAN/WAN connection

Figure 17: Single Ethernet communication path



(1) FireWorks UL5W7 workstation with one FW-NIC card.

(2) Ethernet connection. Maximum distance is 300 ft. (100 m) without the use of a router, hub, switch, or fiber optic cable. Use CAT 5/6 cable.

(3) Serial RS-232 connection. Maximum distance is 50 ft. (15 m), in the same room, and enclosed in conduit or equivalent protection against mechanical injury.

EST3 to FireWorks redundant communication wiring

Redundant communication ensures that when one connection fails or is broken, the other connection still provides annunciation of system events.

Note: For FireWorks software configuration requirements, refer to the System Builder Help topic “Setting up redundant communications for EST3 nodes.”

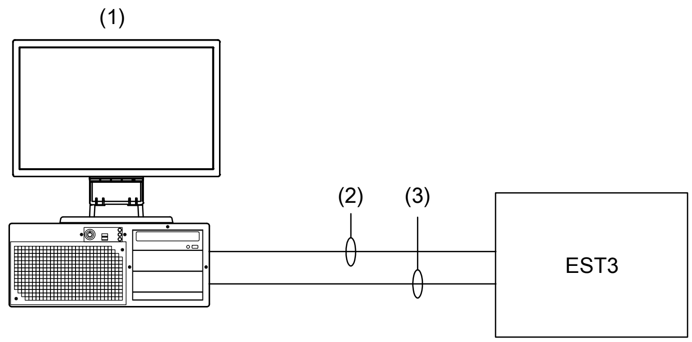
Redundant RS-232 communication

Redundant communication for EST3 systems requires the use of two RS-232 connections on the EST3 network. Both connections are wired directly to the FireWorks UL5W7 workstation.

What’s needed:

- Two unused RS-232 serial ports on the FW-SP4i card
- Both RS-232 ports on the 3-CPUx

Figure 18: Redundant RS-232 communication



(1) FireWorks UL5W7 workstation with FW-SP4i card.

(2) Primary RS-232 connection to EST3 COM port 1. Maximum distance is 50 ft. (15 m), in the same room, and enclosed in conduit or equivalent protection against mechanical injury.

(3) Secondary RS-232 connection to EST3 COM port 2. Maximum distance is 50 ft. (15 m), in the same room, and enclosed in conduit or equivalent protection against mechanical injury.

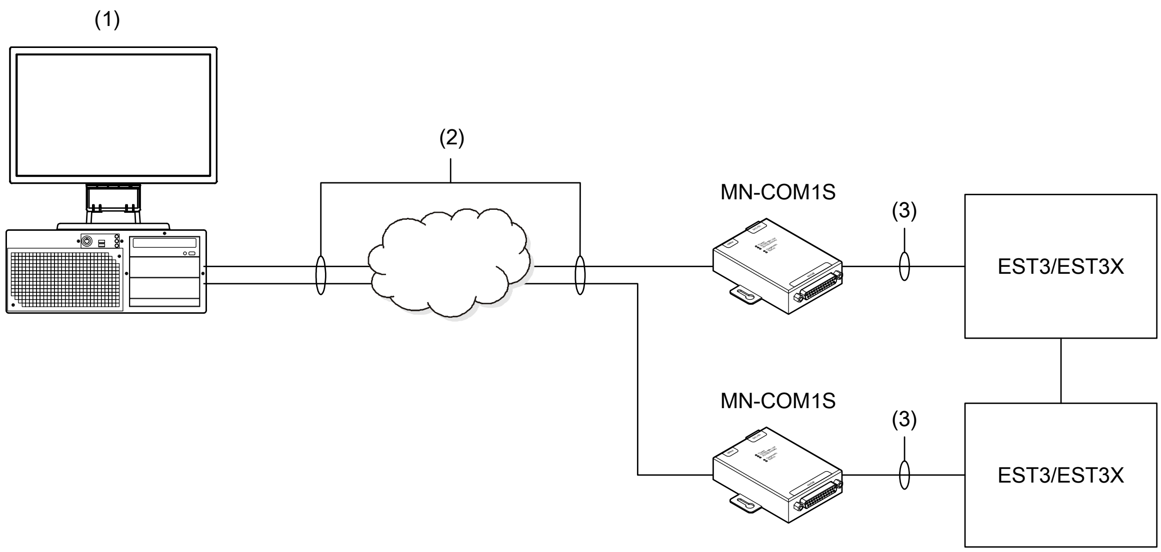
Redundant Ethernet network communication

Redundant Ethernet network communication for EST3 and EST3X systems requires the use of device servers with the FireWorks workstation.

What's needed:

- Two network interface connections in the FireWorks workstation
- Two MN-COM1S modules

Figure 19: Redundant Ethernet communication path



(1) FireWorks UL5W7 workstation with two FW-NIC cards.

(2) Ethernet connection. Maximum distance is 300 ft. (100 m) without the use of a router, hub, switch, or fiber optic cable. Use CAT 5/6 cable.

(3) Serial RS-232 connection. Maximum distance is 50 ft. (15 m), in the same room, and enclosed in conduit or equivalent protection against mechanical injury.

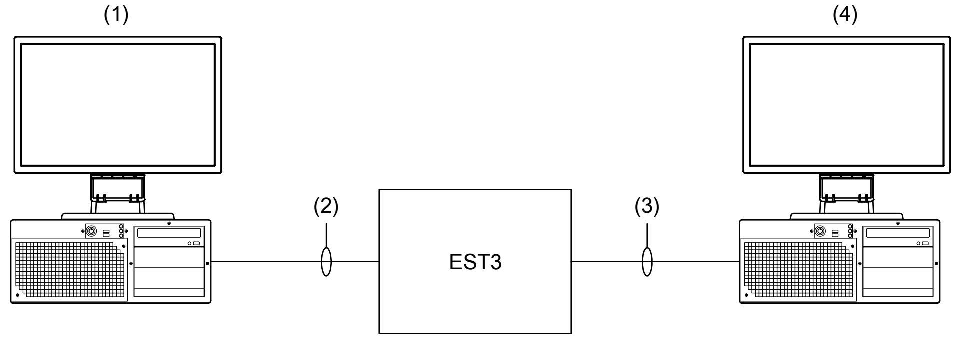
Multiple FireWorks

Multiple FireWorks requires the use of two FireWorks UL5W7 workstations connected to the 3-CPUx. Both workstations wire directly to the 3-CPUx. In the case that one connection fails or a workstation goes down, the other connection and workstation will still provide annunciation of system events.

What's needed:

- Two FireWorks UL5W7 workstations with an available serial port
- Both RS-232 ports on the 3-CPUx

Figure 20: EST3 to FireWorks redundant wiring



(1) Primary FireWorks UL5W7 workstation with FW-SP4i card.

(2) RS-232 connection to EST3 COM port 1. Maximum distance is 50 ft. (15 m), in the same room, and enclosed in conduit or equivalent protection against mechanical injury.

(3) RS-232 connection to EST3 COM port 2. Maximum distance is 50 ft. (15 m), in the same room, and enclosed in conduit or equivalent protection against mechanical injury.

(4) Secondary FireWorks UL5W7 workstation with FW-SP4i card.

Passing commands between control panels

FireWorks is capable of passing commands between the following control panel models:

- EST3
- EST3X
- EST2 stand-alone
- IRC-3 (not Listed to UL 864 9th edition)
- FCC (not Listed to UL 864 9th edition)

FireWorks acts like a control panel by receiving the command or event (e.g. reset command or alarm event) from one control panel, processing that command or event, and then sending a command to another control panel. This is accomplished through programming in System Builder using the Command Browser and Device Browser.

Note: Refer to System Builder Help for more information on creating commands in Command Browser and assigning them to devices in the Device Browser.

Example 1: An alarm event on panel 1 triggers a command in FireWorks, which turns on the strobes on panel 2.

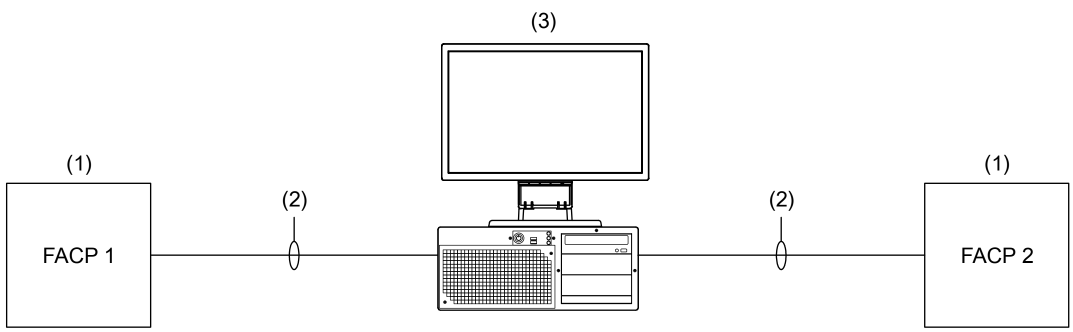
Example 2: An alarm event on panel 2 triggers a command in FireWorks, which turns on the strobes on panel 1.

Example 3: Reset is pressed on panel 1, which triggers a command in FireWorks that resets panel 2.

For commands like Reset or Signal Silence, program the command to execute in one direction only. For example, do not configure your system so that pressing Reset on the EST3 panel resets the IRC-3 panel and pressing Reset on the IRC-3 panel resets the EST3 panel. Programming the command to execute in both directions can result in an infinite loop condition in which both panels reset each other continuously.

It is easier to program commands like Reset and Signal Silence to execute from the EST3 panel to the IRC-3 panel because of the programming required. However, if you need the command to execute in the other direction (IRC-3 to EST3), the programming procedures are provided here.

Figure 21: Command passing flow diagram



Event takes place on FACP 1. The Event is sent to FireWorks.	FireWorks receives the event. The event triggers a command in FireWorks. The command is sent to FACP 2.	FACP 2 receives and executes the command.
FACP 1 receives and executes the command.	FireWorks receives the event. The event triggers a command in FireWorks. The command is sent to FACP 1.	Event takes place on FACP 2. The Event is sent to FireWorks.

(1) The fire alarm control panels (FACP) must be located in the same room and positioned so both can be viewed at the same time. For use in UL 864 applications only.

(2) Serial RS-232 connection: maximum distance 50 ft. (15 m) and in the same room.

(3) FireWorks UL5W7 workstation with FW-SP4i card.

EST3 and EST3X programming

When sending a reset command to another panel (e.g. IRC-3), additional programming is required in FireWorks.

Desired operation: When reset is pressed on an EST3 or EST3X panel, FireWorks receives the event and sends a reset command to the other panel and the panel resets.

This is accomplished by:

- Creating an “other panel” reset command using Command Browser in FireWorks System Builder
- Assigning the reset command to the EST3 or EST3X reset activation event (Label: Reset_Active_00_00, Address: 00-00-0011) in Device Browser in System Builder

IRC-3 programming

When sending an IRC-3 reset command to another panel (e.g. EST3), special programming and setup are required on the IRC-3 panel and in FireWorks.

Action 9002 in IRC-3 can be used to turn on an output on the IRC-3 panel when reset is pressed on IRC-3. The activation of this output can trigger the other panel to reset when the event is received in FireWorks. When FireWorks receives the event, it sends a reset command to the other panel and the panel resets.

Note: There can be up to a 90-second delay between the reset command and the 9002 action.

This is accomplished by:

- Adding an output on the IRC-3 panel and programming it to turn on when reset is pressed on the panel
- Creating an “other panel” reset command using Command Browser in FireWorks System Builder
- Assigning the reset command to the IRC-3 output activation event in Device Browser in System Builder
- Configuring the output on IRC-3 to turn off after a period of time

Note: Other commands, like Signal Silence, use other actions. Refer to the IRC-3 documentation for the other actions.

Security and access applications

The following applications are UL/ULC Listed for use with EST3 systems only and can be used in a rack mount or bench mount configuration:

- Police station connection with basic line security
- Central station alarm
- Proprietary
- Holdup alarm
- Access system control unit

Note: For information about setting up these applications, refer to the *EST3 Installation and Service Manual* (P/N 270380).

The following is optional equipment when bench mounting or rack mounting your system for *annunciator only* applications:

- PT-1S printer
- UPS
- PCCA5 conduit adapter

Fire applications

The following applications are UL Listed for use with all systems and can be used in a rack mount or bench mount configuration:

- Signaling device accessory
- Signaling system control unit

The following is optional equipment when bench mounting or rack mounting your system for *annunciator only* applications:

- PT-1S printer
- UPS
- PCCA5 conduit adapter

Chapter 4
Troubleshooting

Summary

This chapter covers problems and solutions that you may experience while setting up and using your FireWorks UL5W7 workstation.

Content

Fire alarm control panel to workstation communication problems

Note: In this section, we assume that your fire network already operates correctly on its own. Refer to the appropriate technical reference manual for additional information about your fire alarm control panel and network.

Workstation communication

Problem

The workstation is not communicating with a fire alarm control panel.

Causes and solutions

Check the status bar. LED indicators in the status bar turn from green to yellow when there is an RS-232 port communication problem.

When multiple fire networks are connected to a single workstation, you can identify which node has a problem by displaying the Node Status window.

RXD and TXD connections are crossed. Verify correct connections using the system control menu or the F2 quick key. Is the cable correct? Is the panel connection correct?

Communication port configuration is wrong. Use System Builder to check and correct the hardware, node, and port settings for the node with trouble. Check for:

- Incorrect port selection or wiring
- Baud rate mismatch between the workstation and fire network

The wrong drivers are installed. The COM ports should not be configured for WinRT communications; they should be configured for serial communications.

EST2 communication

Problem

The 2-MCM is not communicating with the workstation.

Causes and solutions

A communication failure between the 2-MCM and the workstation network appears as an internal trouble on zone 0013.

Different events can cause the 0013 trouble state. Failure of the external command port is identified on the Status screen as PRN. If a “1” is displayed next to PRN, there is an internal fault on the printer/external command port on the 2-MCM.

RXD and TXD connections are crossed. Verify correct connections. Is the cable correct? Is the panel connection correct?

The external command set on the 2-MCM is not enabled. Use the EST2 data entry program to enable the external command set.

The printer on the 2-MCM is not disabled. Use the 2-MCM data entry program to disable the printer.

Communication baud rates for the 2-MCM and workstation do not match. Set the 2-MCM (printer) baud rate using the EST2 data entry program. Set the workstation baud rate from the System Builder software to define the node (port) connected to the 2-MCM. The suggested baud rate for the 2-MCM is 4800.

The RS-232 cable between the 2-MCM and the workstation is too long. The maximum distance for the RS-232 cable is 50 ft. (15.25 m). Use two Mini-Mux units to increase the distance between the 2-MCM and the workstation. The Mini-Mux can use the FCOM-FIB card.

Mini-Mux wiring or configuration is wrong. Verify wiring and configuration when Mini-Mux units are in use. Refer to the *Mini-Mux Installation Sheet* (P/N 387059) for additional information.

EST3 or EST3X communication

Problem

The control panel is not communicating with the workstation.

A communication failure between the control panel and the workstation network appears as an internal trouble on zone 0607 (port 1 on EST3 or EST3X) or 0608 (port 2 on EST3).

Different events can cause the 0607/0608 trouble state. Failure of the auxiliary port is identified on the control panel and on the FireWorks displays.

Causes and solutions

RXD and TXD connections are crossed. Verify correct connections. Is the cable correct? Is the panel connection correct?

The gateway port on the control panel is not configured, or the FireWorks and control panel gateways are set differently. Use the SDU data entry program to configure the control panel port as Gateway 3. Make sure the port is not configured for a printer. Make sure the gateway settings are correctly set and are the same in both FireWorks and the control panel.

Communication baud rates for the control panel and the workstation do not match. Set the control panel baud rate using the SDU program. Set the workstation baud rate from the System Builder software to define the node (port) connected to thecontrol panel. The suggested baud rate is 19,200.

The RS-232 cable between the control panel and the workstation is too long. The maximum distance for the RS-232 cable is 50 ft. (15.25 m). Use two Mini-Mux units to increase the distance between the control panel and the workstation. The Mini-Mux uses the FCOM-FIB card.

Mini-Mux wiring or configuration is wrong. Verify wiring and configuration when Mini-Mux units are in use. Refer to the *Mini-Mux Installation Sheet* (P/N 387059) for additional information.

Workstation hard drive failure

Standard FireWorks workstation (no RAID)

When a workstation's hard drive fails, the computer's operating system and FireWorks software crash, and the workstation will not boot up again. FireWorks will not operate until the hard drive is replaced in the workstation.

Order an FW-HD5W7 hard drive and follow the installation instructions included with the drive to get your system back up and running.

FireWorks workstation with RAID

When you are running a workstation with RAID, there are two hard drives in the computer. If one of the drives fails, a message is displayed on the screen indicating that a RAID volume is degraded (see the message example below). When you click the message, the Storage Console window is displayed (see Storage Console example window below). Under the RAID Hard Drives section, the failed hard drive displays with a red "X" next to it and its port number is now displayed under Unused Ports. The good hard drive displays with its port number. The port number information is important so that when you open up the computer to replace the drive you know which drive to replace.

FireWorks continues to operate using the good hard drive, but the fault-tolerant RAID functionality will not work until the bad hard drive is replaced. Once the hard drive is replaced, the RAID system rebuilds the data on the replaced drive and your system is back to full operation.

Order an FW-HD5RAIDW7 hard drive and follow the installation instructions that come with it to get your system back up and running.

Figure 22: RAID volume degraded message

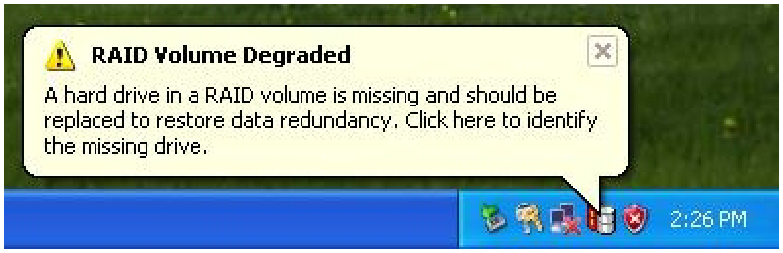
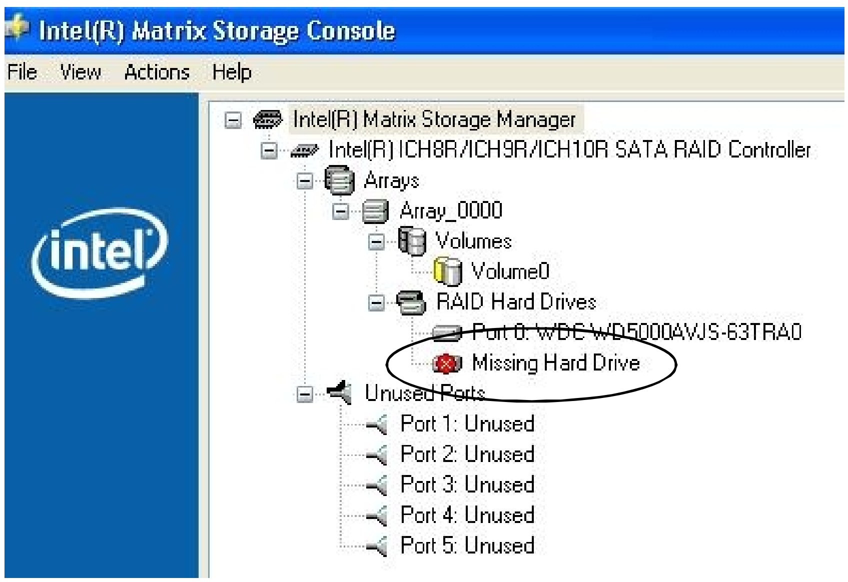


Figure 23: Storage Console example window



Appendix A Calculations

Summary

This appendix provides worksheets for calculating UPS sizing and fiber optic attenuation

Content

UPS sizing calculations

Background and worksheet

NFPA guidelines require the use of a UL 1481 listed uninterruptible power supply (UPS) for FireWorks workstations. The UPS must be UL Listed for Fire Protection Signaling applications (UTRZ). It must provide 120/220 VAC at 50/60 Hz as required by code or the AHJ.

Use the worksheet below to calculate the volt-amp (VA) requirements for the uninterruptible power supply to be used with the FireWorks UL5W7 workstation. Instructions follow the sheet.

Uninterruptible power supply (UPS) sizing calculations

Computer related equipment	Volts	Amps	Power (volts × amps)
UL5W7 workstation	120/220	6.0/3.0	720/660
Monitor [1]			
PT-1S printer	120/220	1.0/0.55	120/120
Optional 24 V power supply [2]	120/220		
		Subtotal	
		Derating (25% of subtotal)	
		Required VA	

[1] Refer to the monitor’s installation sheet for rating specifications.
[2] Refer to the power supply’s manufacturer product information for ratings.

Calculating the UPS size

To calculate UPS size:

1. List the equipment to be protected by the UPS in the “Computer related equipment” column.

   The computer, monitor, and printer have already been listed.

2. Record the Volts and Amps required by each piece of equipment.

   You can find this information on the equipment tags.

3. Multiply the volts and amps for each piece of equipment and write the result in the Power column.

   The power on some equipment may be listed in watts. You can use the following formula to convert watts to VA. Use a power factor of 0.7, which is typical for computer equipment.

   VA = Watts x Power factor

4. Add the Power column and enter the result in Subtotal.
5. Multiply the Subtotal by 0.25 and enter the result in Derating.
6. Add the Derating to the Subtotal and enter the result in Required VA.
7. The required standby power (VA) you just calculated must be maintained for the time period as required by NFPA code.
8. Calculate the required standby battery size in amp-hours according to the following equations.

You will need to know the UPS conversion efficiency (EC) and battery voltage (VB). You'll calculate the DC power required by the UPS and the battery current. These yield the battery size in amp-hours.

PDC = VA / EC

Where:
PDC = DC power required by UPS
VA = Volt-amps you calculated
EC = UPS conversion efficiency

IB = PDC / VB

Where:
IB = Battery current
PDC = DC power required by UPS
VB = UPS battery voltage

CB = IB x BP

Where:
CB = Battery capacity in amp-hours
BP = Backup period from table

Note: Consult UPS manufacturer's instructions for specific battery sizing instructions. Remember that you must provide for bypassing the UPS for servicing.

Example UPS calculation

Suppose your facility contains a proprietary life safety system. The FireWorks workstation includes a FireWorks computer, a monitor, and a PT-1S printer. This hardware is listed in the worksheet shown below. Calculate the sum of the numbers in the Power column to get the Subtotal (1080 volt-amps). You should allow a 25% Derating (0.25 x 1080 = 270) in the event that additional equipment or options are added to the system in the future.

Uninterruptable power supply (UPS) sizing calculations

Computer related equipment	Volts	Amps	Power (volts x amps)
UL5W7 workstation	120	6.0	720
Monitor	120	2.0	240
PT-1S printer	120	1.0	120
		Subtotal	1080
		Growth factor (25% of Subtotal)	270
		Required VA	1350

A proprietary type system requires that its UPS be capable of supplying 4 hours of power for standby operation, followed by 5 minutes of alarm power. To calculate the battery size required, you must know the conversion efficiency of the UPS and the battery input voltage.

Suppose a particular UPS manufacturer states that their backup power supplies are typically 85% efficient and use 48 VDC batteries.

PDC = VA / EC
= 1350 / 0.85
= 1588

IB = PDC / VB
= 1588 / 48
= 33

CB = IB x BP
= 33 x 4
= 132 Ah

The required minimum battery capacity is 132 amp-hours.

Attenuation worksheet

Use the fiber optic attenuation worksheet below to ensure that your fiber optic budget is sufficient.

Fiber optic attenuation worksheet

Link name	A [1]	B [1]	C	D [1]	E	F [2]
	Cable loss / Unit distance [ ] db/ft [ ] db/km [ ] db/mi	Distance [ ] ft [ ] km [ ] mi	Cable loss (dB) (A ×B)	Number of splices	Contingency splices	Total link loss (dB) C + 2(D + E)

[1] Provided by the fiber optic cable installer.

[2] The device fiber optic budget must be greater than the total link loss.

Appendix B
Listing requirements

Summary

This appendix lists the requirements for UL or ULC Listed installations.

Content

Listing requirements

UL	ULC	Requirement
		Workstation computer
X	X	A workstation display may be normal even when the computer has locked up. Each workstation must be supervised by an internal Watchdog card.
X	X	When devices are connected to the workstation by copper cabling, you must limit the effects of induced power surges. Any device connected to the workstation by copper wiring must be in the same room as the computer. To connect devices outside the room you must use a Mini-Mux unit and fiber optic cable.
X	X	The workstation CPU and monitor must have a secondary power supply capable of sustaining operation in the event of a power failure. Each workstation must be powered by a UPS that is UL Listed for fire protection (UTRZ). The UPS must provide 120 VAC at 50/60 Hz for a minimum of 24 hours. The UPS must be supervised.
	X	For proprietary installations, the workstation must be protected from tampering. The workstation CPU must be rack mounted. The floppy drive and power switch must be locked. This can be accomplished using part number RKU-61-24. For annunciator installations, the workstation CPU need not be rack mounted.
X	X	When bench mounting the workstation, the CPU, keyboard, monitor, mouse, etc. are placed on a desktop surface. When bench mounting, the PCCA5 Conduit Adapter must be used. ULC only allows bench mounting for ancillary applications with no common controls on the workstation.
X	X	UL 1076 and UL 1610 require an acknowledgement signal from the proprietary/central station. This is sometimes called “closing confirmation” or “ring-back.” To comply with UL 1076, connect FireWorks to the EST3 RS-232 serial port by way of a direct connection or by way of an MN-COM1S interface module. In this configuration FireWorks functions as a “multiplex central station.” Program the sub-states so that the security partitions activate an audible and visual signal at the security location. See FireWorks System Builder Help for more information. To comply with UL 1610, the EST3 communicates with the proprietary/central station by way of a 3-MODCOM(P) Digital Alarm Communicator Transmitter (DACT). Program the EST3 to activate an audible and visual signal at the security location after it confirms that the proprietary/central station received a partition arming (closing) message. See 3-SDU Help for more information.
X	X	Security: A COM fault trouble to an EST3 system must be investigated immediately because it comes in as a COM fault and not a security compromise.
X		Security: The FireWorks receiving equipment is suitable for proprietary burglar alarm service, central station service, hold up alarm service, police station connect service with basic line security, and access control service.
X	X	Security: For holdup operations, the CMS or FireWorks must be manned 24 hours a day.

UL	ULC	Requirement
	X	For ULC applications, all wiring must be mechanically protected.
X	X	When applied per section “Digital alarm receiver setup overview,” FireWorks is suitable for the following: UL/ULC Proprietary and Central Station Receiver for fire applications (one DACR per workstation), UL/ULC Central Station Receiver for security applications (one DACR per workstation). If more than one Osborne Hoffman DACR is connected to a single FireWorks workstation in either application this configuration is considered ancillary and requires acknowledgement at the DACR. These configurations are not suitable for use as Central Station Automation Equipment.
X	X	FireWorks with common controls can be used on standard LAN/WAN Ethernet networks for communication to the EST3 control panel system as long as the EST3 system is used as the firefighter’s interface. For fire applications only. All equipment connected directly to EST3 and FireWorks must be UL Listed for ITE or fire. Must be installed within the protected premises or per the authority having jurisdiction. For ULC applications, the use of secure protocols needs to be applied, such as HTTPS, VPN, or another similar encryption method.
X		When applied per the “FireWorks command passing” topic, the control panels must be mounted in the same room and positioned so both can be simultaneously observed. For use in UL 864 applications only.
	X	**Proprietary Fire Signal Receiving Centre Applications** For CAN/ULC-S559 compliant proprietary fire signal receiving centre applications refer to the *CAN/ULC-S559 Supplement Manual* (P/N 3101563).
		PT-1S printer
X	X	Event messages must be recorded so users can review them. Each system must include at least one printer (PT-1S) for the purpose of printing event messages.

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FireWorks 1.71 Software Installation Guide

P/N 3100034-EN • REV 08 • ISS 25JUN13

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Contact information For contact information, see www.edwardsutcfs.com.

Content

Important information

Limitation of liability

To the maximum extent permitted by applicable law, in no event will UTCFS be liable for any lost profits or business opportunities, loss of use, business interruption, loss of data, or any other indirect, special, incidental, or consequential damages under any theory of liability, whether based in contract, tort, negligence, product liability, or otherwise. Because some jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages the preceding limitation may not apply to you. In any event the total liability of UTCFS shall not exceed the purchase price of the product. The foregoing limitation will apply to the maximum extent permitted by applicable law, regardless of whether UTCFS has been advised of the possibility of such damages and regardless of whether any remedy fails of its essential purpose.

Installation in accordance with this manual, applicable codes, and the instructions of the authority having jurisdiction is mandatory.

While every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents, UTCFS assumes no responsibility for errors or omissions.

Advisory messages

Advisory messages alert you to conditions or practices that can cause unwanted results. The advisory messages used in this document are shown and described below.

WARNING: Warning messages advise you of hazards that could result in injury or loss of life. They tell you which actions to take or to avoid in order to prevent the injury or loss of life.

Caution: Caution messages advise you of possible equipment damage. They tell you which actions to take or to avoid in order to prevent the damage.

Note: Note messages advise you of the possible loss of time or effort. They describe how to avoid the loss. Notes are also used to point out important information that you should read.

Introduction

FireWorks is a computerized display and control system that can be used with one or more remote display computers to provide monitor and control functions for multiple life safety networks.

FireWorks unites building systems technology with an easy-to-use graphical interface. By combining product innovation with application flexibility, FireWorks simplifies the configuration and management of your building systems.

Software options

You can install FireWorks with or without common controls, and with several other software options. See Table 1 for a list of available options.

Access to the software is controlled by personal identification numbers (PINs) stored on the FireWorks HASP key. The PINs are issued to you by way of a Software Key Certificate shipped with your software.

Table 1: FireWorks software options

SKU	Description
FW-CGS	Graphical user interface platform *without* common controls.
FW-CGSUL [1]	Graphical user interface platform *with* common controls.

SKU	Description
FW-DARCOM	Digital alarm receiver communications software for receiving Contact ID (CID) or SIA 4/2 events from Bosch D6600 and Osborne-Hoffman OH2000E receivers, or from IPMON1000 software. Supports up to eight receivers in annunciator-only, non-Listed Central, Proprietary, or Remote Station applications. For Listed applications, use one Bosch D6600 receiver.
FW-IPMON1000	Network receiver software for receiving Contact ID (CID) events from up to 1000 iO Series fire alarm control panels.
FW-1S	Web client software with support for one remote computer connection.
FW-4S	Web client software with support for up to five concurrent remote computer connections. Requires FW-1S.
FW-10S	Web client software with support for up to 15 concurrent remote computer connections. Requires FW-1S and FW-4S.
SiteVision [2]	Displays live video from a CCTV system but does not provide on-screen control of the CCTV equipment.
SiteVision+ [2]	Displays live video from a CCTV system and provides on-screen control of the CCTV equipment.

[1] To meet the requirements for a UL Listed system, the FW-CGSUL software must be installed on a UL Listed FW Series FireWorks workstation.

[2] Windows XP workstations only.

Recommended minimum system requirements

FireWorks 1.71 runs on any computer that meets the following recommended minimum system requirements:

- Windows 7 Ultimate 64-bit SP1 or Windows XP Professional SP3
- Intel Core 2 Duo Processor E8400
- 4 GB RAM
- 256 MB dedicated video RAM
- DVD drive (optional)
- 500 GB hard drive
- Two or more USB 2.0 ports
- 1280 × 1024 16-bit color display

Note: The DVD drive is required for installing the software. If your computer does not have a DVD drive, you can use use an external DVD drive or copy the FireWorks 1.71 DVD to a 4 GB or larger USB flash drive.

Installing FireWorks 1.71

Before you begin

Here are some things you should do before installing FireWorks 1.71:

- Install the latest Windows updates. If you do not know how, start Windows Help and Support, and then enter the search phrase: `windows update`.

- If you are installing FireWorks on a Windows 7 computer, turn User Account Control off. If you do not know how, start Windows Help and Support, and then enter the search phrase: `UAC`.
- Create a restore point. If you do not know how, start Windows Help and Support, and then enter the search phrase: `restore point`.
- Read the software release notes in their entirety.

Installing FireWorks 1.71

Installing FireWorks 1.71 is a multiple-step process. During the installation, your computer may automatically restart or you may be asked to restart it. Always restart your computer when asked and do not remove the installation disc at any time during the installation.

The installation can take up to 45 minutes or more for a clean install, so be patient. Do not attempt to run any other programs, or perform any other operations on the computer when installing FireWorks.

Do not install FireWorks on computers that are running any other edition of Windows 7 or Windows XP, or on any other operating system — *including those that offer an "XP Emulation" mode.*

To install FireWorks 1.71:

1. Plug the Hasp key into your computer.
2. Insert the installation disc into your DVD drive.

If the DVD does not start automatically, start Windows Explorer, open the FireWorks 1.71 DVD, and then double-click setup.exe.

3. Follow the on-screen instructions.
4. When prompted for a PIN, enter the product installation numbers from your Software Key Certificate. Enter the FW-CGS or FW-CGSUL PINs first, and then enter the PINs for the other software options.

Upgrading FireWorks 1.7*x* and 1.6*x*

You can install FireWorks 1.71 over FireWorks 1.7*x* and FireWorks 1.6*x*. Simply insert the installation disc and follow the on-screen instructions. You do not need to enter your software PINs again.

FireWorks 1.7*x* and FireWorks 1.6*x* projects are compatible with FireWorks 1.71.

Always back up your projects before upgrading your current version of FireWorks.

Upgrading FireWorks 1.5*x* and earlier

You cannot install FireWorks 1.71 over FireWorks 1.5*x* and earlier. Instead, you must first uninstall your current version of FireWorks, uninstall all of its components, and then install FireWorks 1.71.

FireWorks 1.5*x* projects are compatible with FireWorks 1.71.

FireWorks projects prior to 1.50 are not compatible with FireWorks 1.71. To open these projects in FireWorks 1.71 you must first convert them into FireWorks 1.5*x* projects.

To upgrade FireWorks 1.5*x* and earlier:

1. Convert any projects prior to FireWorks 1.50 to FireWorks 1.5*x*.
2. Verify and repair your FireWorks project until the utility returns a message that verification was completed without any issues.
3. Back up your FireWorks 1.5*x* database to a safe location.
4. Click Start, click Control Panel, and then click Add or Remove Programs.
5. In the Currently installed programs list, uninstall the following programs:
    - The previous version of FireWorks and, if prompted, previous versions of Crystal Reports
    - Microsoft SQL Server Desktop Engine
    - FireWorks Remote Web Server, if installed
6. Click Add/Remove Windows Components, and then clear the Internet Information Server check box.

    Note: FireWorks no longer uses IIS, but other applications on your machine may still need it. You can leave the Internet Information Server check box checked.

7. Delete the C:\Program Files\Microsoft SQL Server folder.
8. Rename the C:\Fireworks folder. For example, C:\FireWorks_old.
9. Restart the computer.
10. Install FireWorks 1.71.

Start FireWorks System Builder and restore your migrated FireWorks 1.50 database (File > Restore a 1.5x version project).

Installing FireWorks 1.71 for demonstration purposes

Before installing FireWorks 1.71 for demonstration purposes, make sure the demonstration computer meets the recommended minimum system requirements and that all Windows updates have been applied.

To install FireWorks 1.71 for demonstration purposes:

1. Insert the installation disc into your DVD drive.

   If the DVD does not start automatically, start Windows Explorer, open the FireWorks 1.71 DVD, and then double-click setup.exe.
2. When prompted to enter a PIN number, type: FIREWORKS.
3. Follow the on-screen instructions.

Installing the FireWorks Web Client software

The FireWorks Web Client software is used to view information on the FireWorks workstation from a remote (client) computer over an Ethernet (TCP/IP) connection.

Before installing FireWorks Web Client, it is important that your network administrator and the FireWorks administrator fill out the “FireWorks Web Client network administration form” (see Table 2 on page 9). Both administrators should retain the completed form for future reference.

This form is used to provide a means of communication between the FireWorks administrator and the network administrator so that remote FireWorks Web Client users can access the FireWorks Web Server.

To install the FireWorks Web Client software:

1. Insert the FireWorks DVD in your DVD drive.
2. Cancel the autoplay for installing FireWorks.
3. Open the FireWorks DVD in Windows Explorer, and then double-click FireWorks Remote Web Client 17.exe.
4. Follow the on-screen instructions.

Refer to the FireWorks Web Client Help for other information on connecting FireWorks Web Client to the FireWorks workstation.

Table 2: FireWorks Web Client network administration form

Section 1 (To be filled out by the FireWorks administrator)

The FireWorks Web Client users will be located on
(check all that apply):

☐ Internet

☐ Company or building VPN (virtual private network)

☐ Company or building intranet

☐ Same LAN that the FireWorks Web Server is on

☐ Other: ____

Section 2 (To be filled out by the network administrator)

The network address of the FireWorks workstation is:

Full computer name: ___________________________________

— or —

Static IP address: _____________________________________

FireWorks uses Microsoft Web Communication Foundation (WCF) to communicate with the FireWorks Web Client. These web services communicate over port 8021 using TCP/IP. The network address of the FireWorks workstation therefore needs to remain constant either through the use of a static IP address or a DNS name.

Note: If a static IP address is available, the network administrator must configure the FireWorks workstation with that IP address.

Installing and setting up OH Network Receiver

The OH Network Receiver software provided with FireWorks 1.71 can monitor up to 1000 iO Series fire alarm control panels over an Ethernet (TCP/IP) network. You must activate the FW-DARCOM and FW-IPMON1000 software options before you can use the OH Network Receiver software.

Installing OH Network Receiver

Typically, OH Network Receiver is installed when you install FireWorks. You can also install it separately.

To install the OH Network Receiver separately:

1. Open the C:\Fireworks\NETREC folder, and then double-click OHNetRec-2.5.1127.exe.
2. Follow the on-screen instructions.

Setting up OH Network Receiver

Double-click the OH Network Receiver desktop icon, and then for each command on the Setup menu, set up OH Network Receiver as shown in Figure 1 through Figure 7.

Figure 1: Serial ports setup dialog box

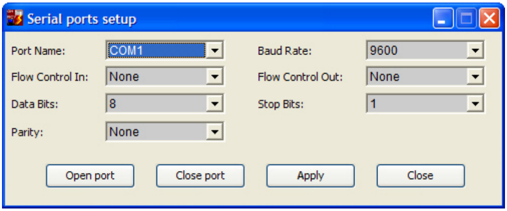


Figure 2: Network ports setup dialog box

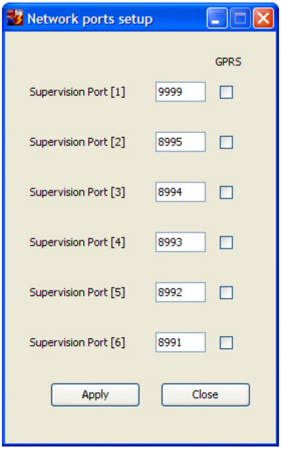


Figure 3: Receiver Type Selection dialog box

Figure 4: Automation setup

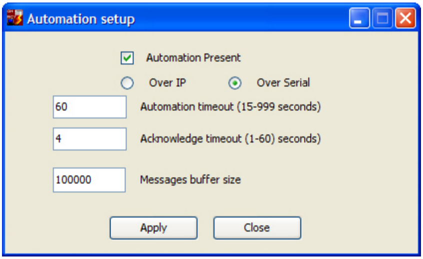


Figure 5: Sound setup

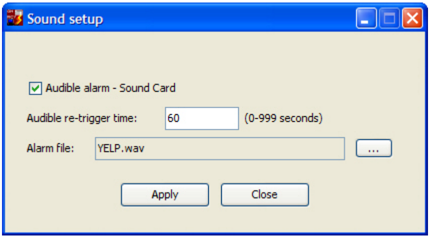


Figure 6: Linecut timeouts

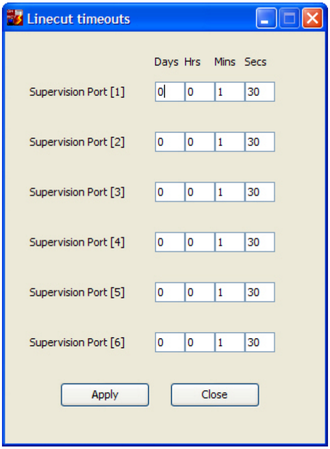
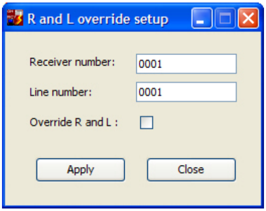


Figure 7: R and L override setup

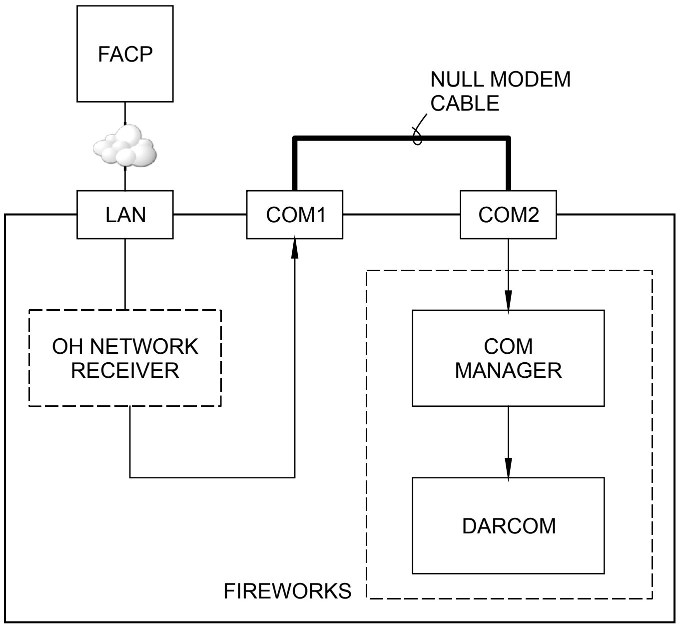


Connecting an iO Series control panel to FireWorks

An iO Series control panel connects to FireWorks by way of an Ethernet (TCP/IP) connection, the OH Network Receiver, and a null modem cable (see Figure 8 below).

Note: The FireWorks workstation and the iO Series control panel must reside on the same network. Set the IP addresses for both accordingly.

Figure 8: iO panel connection diagram



The iO Series control panel sends Contact ID event data over an Ethernet (TCP/IP) connection to the OH Network Receiver installed on the FireWorks workstation. The OH Network Receiver then sends the event data out an RS-232 communications port. See Figure 1 on page 11 for default settings.

The FireWorks digital receiver (DARCOM) receives the event data by way of the COM Port defined in COM Manager. A null modem cable connects the OH Network Receiver to the FireWorks digital receiver.

In OH Network Receiver, do the following:

- Set the Serial Port for an unused COM Port (see Figure 1).
- Set the Receiver Type for OH 2000 (see Figure 3).
- Set Automation Preset for Over Serial (see Figure 4).

In FireWorks, do the following:

- Use the Receiver Configuration Manager to add a digital receiver. Set the Receiver Type for Osborne-Hoffman OH 2000E. Set the Receiver Account Protocol Type for Contact ID Protocol.
- Use the COM Manager to assign the digital receiver to an unused COM port. Change the Serial Port Properties to match the OH Network Receiver (see Figure 1).

On the FireWorks workstation, configure the Local Area Connection >TCP/IP properties to use a static IP address. If you do not know how to change the TCP/IP address on your computer, start Windows Help and Support, and then enter the search phrase: `TCP/IP`.

On the iO Series control panel, set the network options as shown in Table 3 below.

Table 3: iO Series panel network options

Option	Setting
Network Enabled	Enabled
Account ID	The same account number as the FireWorks digital receiver account number
IP	The static IP address of the FireWorks computer
TCP/IP	The same port number as the supervision port number on the OH Network Receiver (see Figure 1 on page 11)
Send Restorals	Yes
Evnt Notif	Event, Device, or Zone
Hello Time	025
Timeout Sec	040
Receiver #	The same receiver number as the FireWorks digital receiver
Line #	The same line number as the FireWorks digital receiver line number

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FW-NIC Network Interface Card Installation Sheet

Description

The FW-NIC card is used to connect a FireWorks UL4 (or later) computer to an Ethernet LAN. It is capable of transfer speeds of up to 100 Mbps/sec. Full duplex support means that the card can simultaneously transmit and receive information at these speeds.

The FW-NIC card complies with 10BaseT Ethernet and 100BaseTX Fast Ethernet standards, is capable of full and half-duplex communications, complies with plug-and-play specifications, auto-negotiates to determine the optimal transmission rate, and supports 32-bit PCI Bus Master for high performance and low processor utilization.

Installation

WARNING: To avoid electrical shock, unplug the FireWorks computer from the electrical outlet before removing the computer cover.

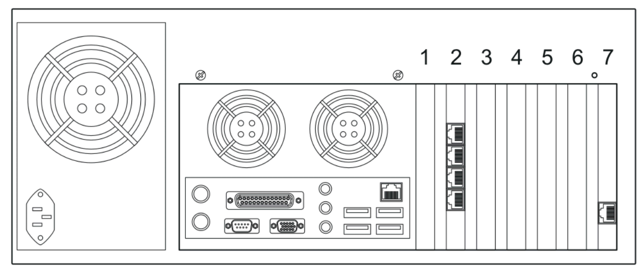
Caution: Hold the FW-NIC card by its edges or by its metal mounting bracket. Do no touch the components or the connector contacts.

To install the FW-NIC card:

1. Turn off the computer and unplug the AC power cord.
2. Disconnect all peripheral devices (monitor, mouse, etc.) and cables from the rear of the computer.
3. Remove the computer cover.
4. Remove the filler bracket from the expansion (slot 7). See Figure 1. Save the screw for use later.

   If replacing an existing card, remove the card.
5. Position the FW-NIC card above slot 7. Make sure that the card is aligned with the connector and that the bottom of the bracket is aligned with the slot between the computer motherboard and the case.
6. Press the FW-NIC card into slot 7. Make sure the card is fully seated into the connector and the card bracket is flush with the alignment bar.
7. Secure the card to the alignment bar using the screw from the filler bracket.
8. Replace the computer cover.

Figure 1: FireWorks UL4 computer



After installing the FW-NIC card, connect the computer to the LAN and turn the computer on. Verify the LED above the cable connector is on or blinking.

If the LED shows no sign of activity, make sure that all devices are turned on and that the network cable is properly connected at both ends. Also make sure that your network cables comply with EIA/TIA568 and Category 5 specifications.

If problems persist, turn off all devices and disconnect all plugs. Wait at least ten seconds then plug the devices back in and turn them back on.

Specifications

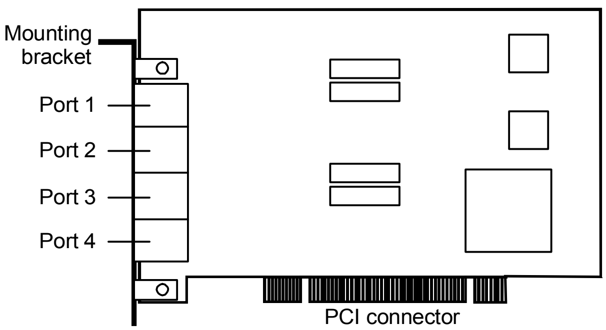
Bus type	PCI
Form Factor	Standard profile
RJ-45 ports	1
Data rate	100 Mbps, max.
Cable type	Category 5, min.
Operating environment	
Temperature	32 to 120°F (0 to 49°C)
Relative humidity	0 to 93% noncondensing

Contact information

For contact information, see www.edwardsutcfs.com.

P/N 3100977 • REV 03 • REB 04FEB13

FW-SP4I Serial Port Expander Card Installation Sheet



Description

The FW-SP4I Serial Port Expander Card provides four optically isolated RS-232 serial ports for connecting fire alarm control panels to a FireWorks workstation.

Note: FireWorks software version 1.41 or later is required.

Installation

Note: The COM port numbers in Windows may not match the port numbers on the card. Use Windows to determine COM port designations.

Step 1. Install the serial card:

1. Turn off the computer and disconnect AC power.
2. Remove the computer cover.
3. Locate PCI slot 5 or 6 (for model FWUL5) or PCI slot 6 or 7 (for model FW4UL4) on the computer motherboard.
4. Remove the expansion slot cover. Save the screw.
5. Insert the serial card in the PCI slot, making sure it is fully seated.
6. Screw the card in place using the screw from step 4.
7. Attach the computer cover and connect AC power.
8. Connect the DB-9 cable extenders to the RJ-45 ports on the card.

Step 2. Install the driver software:

1. Turn on the computer.

   The Found New Hardware dialog displays.
2. Insert the Connect Tech CD.
3. Select "Install software automatically."
4. Click Next.
5. Select the driver for Windows XP (look in the Location column for XP in the file location). This is usually the first driver in the list.
6. Click Next.
7. Click Continue Anyway.

   The drivers are loaded for each COM port and the card is configured for operation.
8. Remove the Connect Tech CD.
9. Restart the computer.

Configuration information

FireWorks and Windows

No special configuration is required in the FireWorks software or in Windows to set up the serial port expander.

EST3 SDU software

When you are connecting FireWorks to an EST3 control panel using the serial port expander, you must set the EST3 control panel communication ports to Gateway 3 using the EST3 SDU software.

Specifications

Bus used	PCI
Connectors (RS-232)	Four RJ-45 connectors with four DB-9 male cable extenders
Optical isolation	Each port individually isolated up to 3 kVAC peak to peak
Operating environment Temperature Relative humidity	 32 to 120°F (0 to 49°C) 0 to 93% noncondensing

Contact information

For contact information, see www.edwardsutcfs.com

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EDWARDS
A UTC Fire & Security Company

FW-42LCDWTS Monitor Installation Sheet

Description

The FW-42LCDWTS is a widescreen LCD monitor with a resolution of 1920 × 1080 pixels (1080P) and a capacitive touch screen.

Installation

For more information, refer to the documentation included with the monitor.

To wall mount the touch screen monitor:

1. Turn off the computer.
2. Mount the monitor to the wall. Be sure the location you choose is close enough for the cables to reach the computer. A 15 ft. VGA cable is supplied. VGA cables up to 25 ft. can be used and are sourced locally. You can use a longer cable if it is high-quality and approved by the AHJ. Be aware that longer cable distances may impact video quality.
3. Connect the VGA cable to the VGA Input (PC IN) connector on the monitor.
4. Connect the other end of the VGA cable to the VGA connector on the back of the computer. Tighten the screws on each connector end.
5. Plug the monitor's AC power cord into the AC power outlet.
6. Turn on the monitor, and then the computer.
7. Install the driver and calibrate the monitor. Refer to the driver installation instructions on this page.

To install the touch screen driver:

Caution: When installing the drivers, you must use the CD provided with the monitor and follow all instructions or you will not be able to calibrate the touch screen.

1. Connect the monitor USB cable to an available USB port on the computer.
2. Locate the CD (P/N 57-11476-001) provided with the monitor.
3. Insert the CD into the computer's optical drive.
4. Open the setup.exe file in the root directory of the CD.
5. Check the GeneralTouch touch screen control panel check box to select the default setting, and then click Finish.

To calibrate the touch screen monitor:

Caution: Do not use any object other than your finger to touch the LCD display.

1. Select the Calibrate button and follow the on-screen calibration instructions.
2. Touch the monitor at the calibration target point.

   The software uses this information to adjust the sensitivity to your touch response. Continue to touch the screen at each calibration target point as it appears. The cursor will jump to that target point.
3. In the Checking Calibration results window, select Yes, and then click OK.
4. Test the calibration by moving your finger across the screen. Be sure the cursor follows your movements and you can activate all icons and menus.

P/N 3101918 • REV 1.0 • ISS 02MAR11

Specifications

Power	120 VAC, 1.97 A, 60 Hz, 236 W max.
Resolution	1920 × 1080 pixels (1080P)
Dimensions (W × H × D)	41.3 × 25.2 × 5.0 in. (1049 × 640 × 127 mm)
Weight	70 lbs. (32 kg) with touch screen and base
Wall mounting Horizontal display	 FW-42LCDHMK1
Accessory wall mounting Vertical single display Vertical dual display	 FW-42LCDVMK1 FW-42LCDVMK2

Regulatory information

Manufacturer	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
North American standards	UL 864, ULC-S527
FCC compliance	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Contact information

For contact information, see www.utcfireandsecurity.com.

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<u>PRINTER, SERIAL</u>

Operations & Maintenance Manual
December 2015

Life Safety & Communications

System Event Printer

PT-1S, PT-1P

FDNY
COA 6086
COA 6087
7165-1657:
0173
S3424

Overview

The PT-1 series printers are high speed, 9-pin dot matrix type which use standard, continuous tractor feed computer paper. The PT-1 series printers are used to permanently record Life Safety System changes of state. All printed entries contain the date, time, event type and a user defined message for each printed event. The printer is required in proprietary type systems. In local, auxiliary or remote station systems the printer is ancillary and is optional. The printer must be backed up by a UPS in a proprietary system. Printer paper may be fed from the rear or bottom of the printer.

Standard Features

- High speed, bi-directional printing
- Serial (model PT-1S) or parallel (model PT-1P) interface
- Front panel setup
- Supports modems for remote installation
- Supports fiber optics module
- LED Status indicators
- RS-232 direct cable
- Printer self-test mode

Application

The PT-1S (serial, RS-232 interface) is used when connecting to the CM1(N), CM2N, FCCD, 2-MCM or 3-CPU1. The PT-1P (Parallel interface) is used when the printer is connected to the VDU-3, CCA-1/4/8 or the CGP-1/4/8.

Installation

The printer comes from the factory with all DIP switches and operating modes setup for proper operation with the system. The baud rate in some instances may have to be adjusted to provide reliable transmission over long distances. When configuring a system to meet the requirements of proprietary, the printer must be located adjacent to the Fire Command Center.

When the printer is located greater than 50 ft (15.2 m) from the Fire Command Center, Short Haul Modems (model SHM-M1 or SHM-F1) may be used. Short Haul Modems will allow distances up to 5 miles (8 km) @ 2400 Baud. When Short Haul Modems are used the printer is considered ancillary and the connection is not supervised.

When the SHM modules are used with the CM1(N) or CM2N an IOP3A module must be used to properly power the modules. The IOP3A may be located on the inside of the Fire Command Center enclosure.

Contact us...

Email: edwards.fire@fs.utc.com
Web: www.est-fire.com

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Mebane, NC 27302

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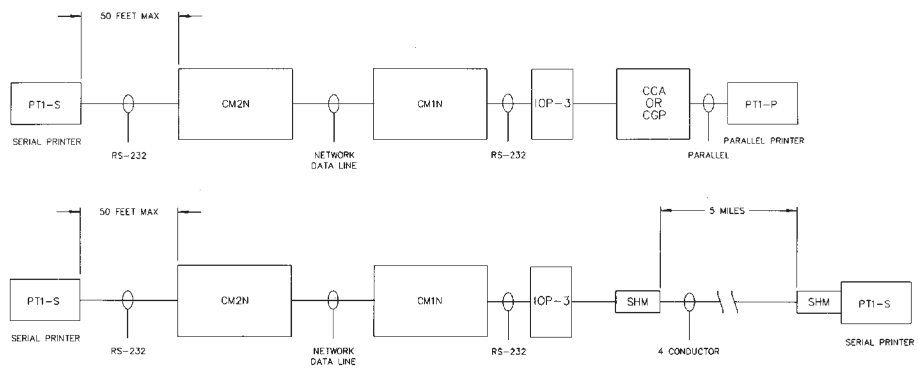
Web: www.chubbedwards.com

Engineering Specifications

The event and status printer shall be a 9-pin, impact, dot matrix printer with a minimum print speed of 232 characters per second. Print parameters shall be set up with a menu drive program in the printer. The printer shall be capable of serial or parallel communications protocol. The communications speed for RS-232 communications protocol shall be adjustable from 300 to 9600 Baud. The serial or parallel cable shall be supervised. The serial printer shall support Short Haul Modems. The printer shall list the time, date, type and user defined message for each event printed.

Connection Diagram



Specifications

Print Speed	232 cps
Voltage	120 Vac, ±10% 220/240 Vac, ±10%
Power rating	48VA
Frequency	50/60 Hz
MTBF	4000 Hrs @ 25% duty cycle
Size	14.2 x 10.8 x 3.2 inches 36.1 x 27.4 x 8.1 cm
Weight	9.9 lbs (4.5 kg)
Agency Listings	UL, ULC, MEA, CSFM
Operating Environment	Temperature: 32° - 120°F (0° - 49°C). Humidity: 85% non-condensing

Ordering Information

Model	P/N	Description
PT-1S	360038	Serial Printer
PT-1P	360039	Parallel Printer
PT-1S/220	360070	Serial Printer-220/240 Vac
PT-1P/220	360071	Parallel Printer-220/240 Vac
Related Parts Ordering Information		
SHM-M1	360024	Short Haul Modem with male DB-25 connector
SHM-F1	360025	Short Haul Modem with female DB-25 connector
IOP3A	130117	Isolated I/O port card

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PT Series Printer Installation Sheet

Description

PT Series Printers are freestanding, nine-pin, dot matrix printers that accept standard cut sheets and form feed paper. They can be connected to fire alarm control panels, security and access control panels, or computers to record system events such as status changes, active events, or reports. See Table 1 for a list of model numbers.

The printers are compatible with the following control panels: EST2, MIR2, EST3, QuickStart, FireWorks, FX-64/254, eFSA64/250, VS1/2, and iO64/500. Windows printer drivers required for FireWorks are included on the enclosed CD. Each printer is shipped with a power cord and serial connector for building a serial cable. USB and parallel printer interface cables can be purchased locally.

Table 1: Models

Number	Description
MIR-PRT/S, PT-1S	120 V serial
PT-1P	120 V parallel
PT-2	120 V serial/parallel/USB

Assembly and setup

The illustrated setup guide (included with the printer) contains detailed instructions for assembling the printer, installing the print drivers, and performing other basic tasks. Please refer to this guide when unpacking, assembling, and setting up the printer.

In addition, a user’s guide is provided on the CD that is included with the printer. Adobe Acrobat Reader is required for viewing the user’s guide, and this also is provided on the CD.

Configuration

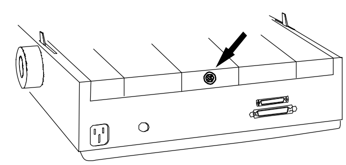
Many printer default settings are controlled through the front panel. Refer to the user’s guide for information about using the front panel to set printer defaults.

For serial computers, additional defaults are set through the DIP switches located on the serial card. Settings for specific applications are provided with the wiring diagrams in “Wiring and configuration” starting on page 3.

To configure serial card DIP switch settings:

1. Turn off power to the printer.
2. Open the DIP switch cover on the back of the printer by removing the screw holding it in place. (See Figure 1 .)
3. Set the DIP switches, referring to the switch setting tables in “Wiring and configuration.”
4. Replace the DIP switch cover and secure it with the screw.

Figure 1: Screw holding the DIP switch cover in place



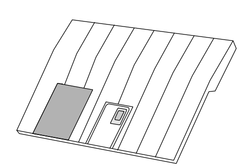
Installation

Cautions

- Do not connect the printer to power until all packing materials have been removed and the printer has been assembled.
- Be sure the voltage rating of the electrical outlet matches that of the printer.
- To avoid print-head damage and paper jams, set the head gap as instructed in the user’s guide.

Notes

- Perform a printer self-test by loading paper and holding down the Line Feed button while turning on printer power.
- Interface cables are not supplied. DB-25 connectors are provided for constructing a serial printer interface cable.
- For serial printers, do not install the paper separator, shown below, until you have finished setting up and configuring the printer.

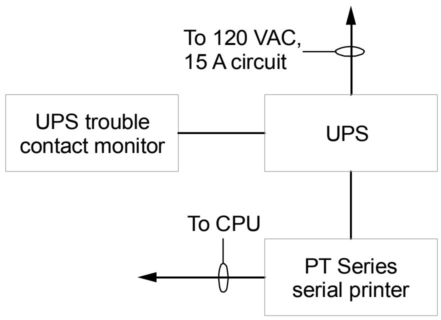


Uninterruptible power supply

If the printer is required to operate during brownout conditions and AC power failures, you must install an uninterruptible power supply (UPS).

The UPS should be UL Listed for fire protection (UTRZ). It should provide 120 VAC at 60 Hz, for at least 24 hours.

Figure 2: Supervised UPS connected to a PT Series printer



Maximum distance from FACP to printer and from printer to computer

In proprietary fire alarm systems, serial printers must be located within 50 ft. (15 m) of the fire alarm control panel (FACP). For optimum performance, however, locate serial printers within 20 ft. (6 m) of the FACP for both proprietary and local systems.

Locate parallel and USB printers in the same room and within 6 ft. (2 m) of the computers to which they are connected.

Connecting the printer to a control panel

Connecting directly to the RS-232 serial port on the control panel requires a serial interface cable. This can be purchased locally or constructed using the DB-25 connector provided.

Serial cable requirements

- Shielded RS-232C cable, UL Listed and CSA Approved
- DB-25 serial connector (included with serial printers)

To build a serial cable:

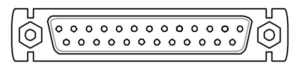
1. Cut the cable to the length required for your application. (See “Maximum distance from FACP to printer” above.)
2. Connect one end of the cable to the DB-25 connector at the contacts shown in the wiring diagram for your application. See “Wiring and configuration” starting on page 3.

Note: Connecting a serial printer to the RS-232 terminals in EST2, MIR2, and QuickStart systems may cause a ground fault that clears when the printer is disconnected. To correct this problem, install an RS-232 isolator module (IOP3A).

To connect a serial printer:

1. Disconnect power from the control panel and turn the printer off.
2. Plug the DB-25 connector into the serial port on the back of the printer (shown below). Tighten the screws.
3. Connec t the other end of the cable to the RS-232 module at the control panel, according to the diagram shown in “Wiring and configuration” on page 3.
4. Turn on the printer and return power to the control panel.

Figure 3: Sample serial port



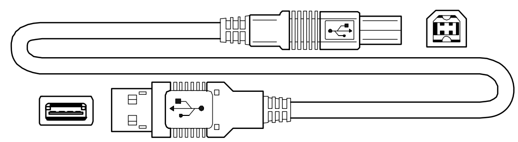
Connecting the printer to a computer

Note: Do not use both serial and USB cables simultaneously on the same printer.

Connecting to a USB port

USB cables are used for connecting the printer to a computer with a USB port. USB cables can be purchased locally. The cable must have A and B series connectors as shown below, and must be USB version 1.1 or higher.

Figure 4: Sample USB cable



Enabling the parallel port

Connecting to the computer’s parallel port requires the removal of the serial card from the printer. The parallel port remains disabled until the serial card is removed.

Notes

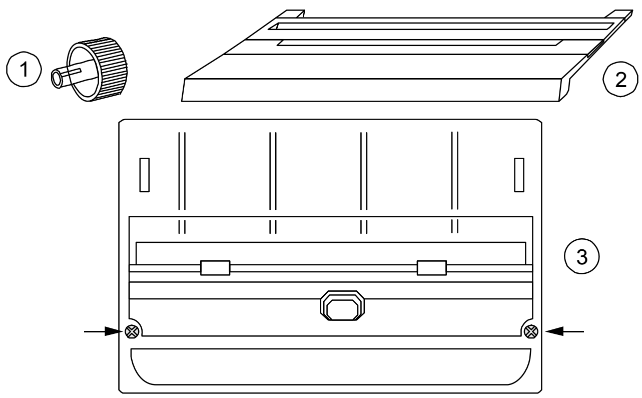
- Locate parallel and USB printers in the same room as the computer
- Use a bidirectional parallel interface cable and a 36-pin Centronics type connector
- Cable length may not exceed 6 ft. (2 m)

To remove the serial card from the printer:

1. Turn off and unplug the printer.
2. Remove the access cover (shown in Figure 5).
3. Remove the top cover, as follows (see Figure 5):
   - Unplug the power cord and the printer interface cable
   - Remove the platen knob
   - Remove the two screws holding the top cover in place
4. Lift off the top cover. The serial card can be seen behind the platen, on the left (see Figure 6).
5. Remove the two screws holding the card in place.

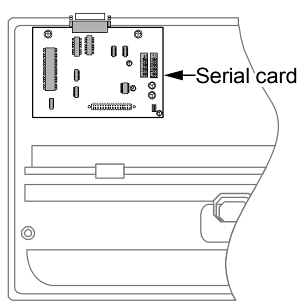
6. Gently unplug the serial card from the motherboard and store it in a safe place.
7. Reinstall the top cover and secure it with the two screws.
8. Reinstall the platen knob.
9. Reinstall the access cover.
10. Plug in the parallel interface cable and the power cord.

Figure 5: Serial card access



1. Platen knob
2. Access cover
3. Overhead view showing the screws that hold the top cover in place

Figure 6: Overhead view of the printer with top cover removed



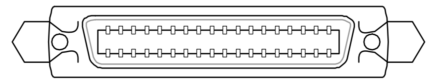
Connecting to a parallel port

If you have purchased a parallel printer, use the following procedure to connect it to the computer.

To connect a parallel printer:

1. Turn off the computer.
2. Turn off and unplug the printer.
3. Remove the plastic guard from the parallel connector at the back of the printer (see Figure 7).
5. Plug a parallel cable (LPT, IEEE-1284) into the parallel connector. The cable should be no longer than 6 ft. (2 m). Secure the plug with the wire loops.
6. Plug the other end of the cable into the computer's parallel port.
7. Plug in the printer and turn the printer and the computer back on.

Figure 7: Sample parallel port



Wiring and configuration

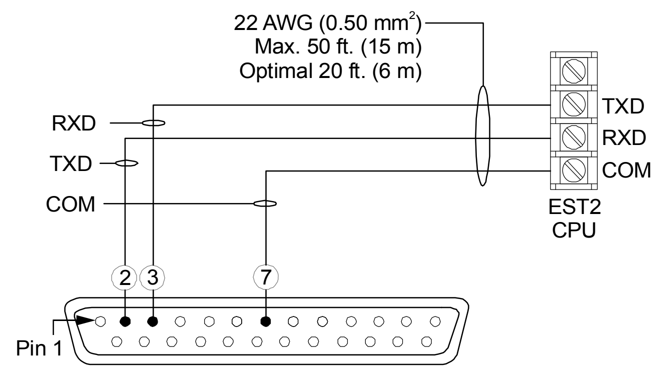
This section gives wiring diagrams, front panel settings, and DIP switch settings for compatible control panels.

FireWorks parallel printers

FireWorks workstation computers have a parallel port located on the back of the computer. You must remove the serial card from the printer and connect using a parallel cable. Refer to "Connecting the printer to a computer" on page 2 for detailed instructions.

EST2 and MIR2 serial printers

Figure 8: Serial printer connected to an EST2 or MIR2 panel



Front view, male DB-25 connector

Settings for EST2 or MIR2 serial printers

Baud	Bits	Parity
2400	8	Even

Table 1: DIP switch settings for EST2 or MIR2 serial printers

	1	2	3	4	5	6	7	8
SW1	Off	Off	On	Off	On	On	On	On
SW2	Off	Off	On	Off	On	On	On	On

EST3 serial printers

Settings for EST3 printers

Baud	Bits	Parity	Stop bit	Flow
2400, 4800, 9600	8	None	1	None

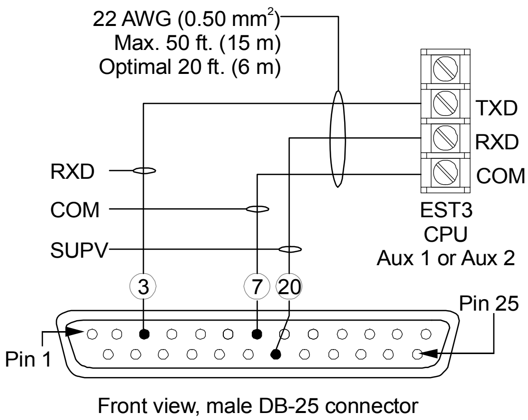
EST3 supervised serial printers

DIP switch settings for EST3 supervised printers

	1	2	3	4	5	6	7	8
SW1	On	On	On	On	On	On	On	On
SW2	On [1]	Off [1]	On [1]	Off	Off	On	On	On

[1] 4800 bps

Figure 9: Supervised EST3 serial printer



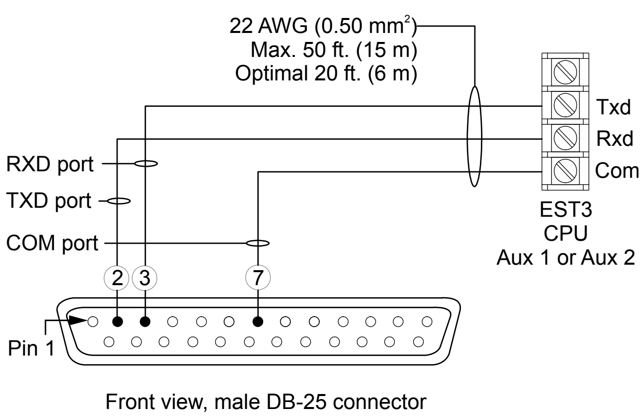
EST3 unsupervised serial printers

DIP switch settings for unsupervised EST3 printers

	1	2	3	4	5	6	7	8
SW1	On	On	On	Off	On	On	On	On
SW 2	Off [1]	On [1]	On [1]	Off	Off	On	On	On

[1] 9600 bps

Figure 10: Unsupervised EST3 serial printer



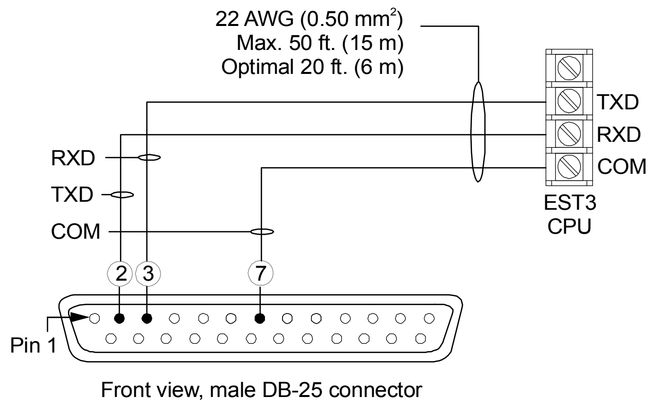
EST3 unsupervised printers with CDR-3 Bell Coders

DIP switch settings for unsupervised EST3 serial printers with a CDR-3 bell coders

	1	2	3	4	5	6	7	8
SW1	Off	Off	On	Off	On	On	On	On
SW2	Off [1]	Off [1]	On [1]	Off	Off	On	On	On

[1] 2400 bps

Figure 11: Unsupervised EST3 serial printer with a CDR-3 Bell Coder



QuickStart serial printers

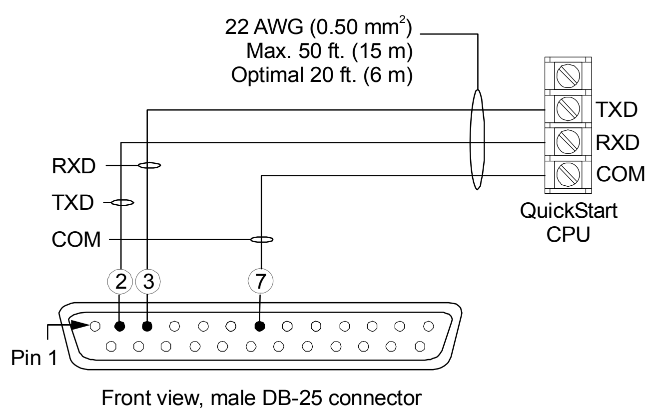
Settings for QuickStart printers

Baud	Bits	Parity
9600	8	None

DIP switch settings for QuickStart serial printers

	1	2	3	4	5	6	7	8
SW1	On	On	On	Off	On	On	On	On
SW2	Off	On	On	Off	Off	On	On	On

Figure 12: Serial printer connected to a QuickStart panel

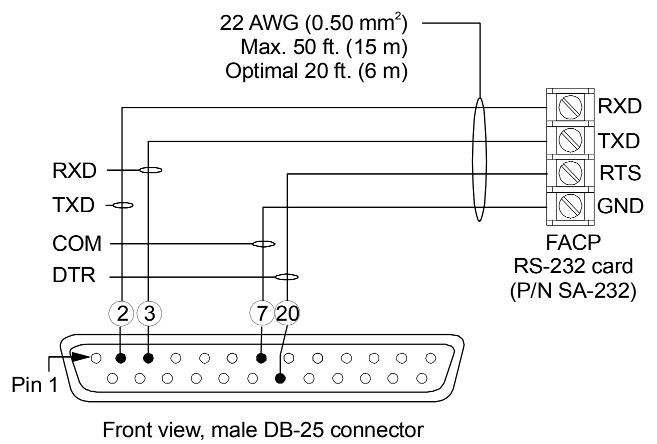


Supervised FX-64/254, eFSA64/250, VS1/2, and iO64/500 serial printers

DIP switch settings for supervised small analog printers

	1	2	3	4	5	6	7	8
SW1	On	On	On	On	On	On	On	On
SW2	Off	On	On	Off	Off	On	On	On

Figure 13: Supervised serial printer connected to the RS-232 card in a small analog panel



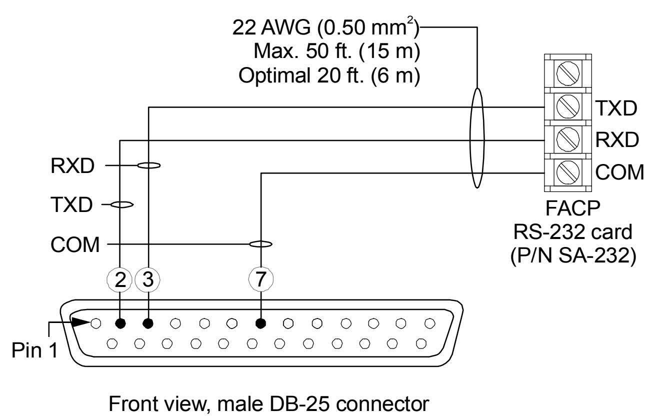
Unsupervised FX-64/254, eFSA64/250, VS1/2, and iO64/500 serial printers

DIP switch settings for unsupervised small analog printers

	1	2	3	4	5	6	7	8
SW1	On	On	On	Off	On	On	On	On
SW 2	Off [1]	On [1]	On [1]	Off	Off	On	On	On

[1] 9600 bps

Figure 14: Unsupervised serial printer connected to the RS-232 card in a small analog panel



Specifications

Power	1 A at 120 VAC, 60 Hz
Wire size	22 AWG (0.50 mm^2)
UL/ULC Listed	120 V units only
Print speed	250 cps (utility mode)
Message buffer size	128 KB
MTBF rating	20,000 hrs. at 25% duty cycle
Printhead life	200 million characters at 10 cpi, typical
Ribbon life	3 million characters, typical
Noise	Less than 54 dBA
Dimensions Height Width Depth	 3-1/4 in. (83 mm) 14-3/4 in. (375 mm) 11 in. (280 mm)
Weight	10 lb. (5 kg)
Operating temperature	32 to 120°F (0 to 49°C)
Ambient conditions	0% to 93% RH, noncondensing

Contact information

For contact information, see www.edwardsutcfs.com.

<u>UNINTERRUPTABLE POWER SOURCE (UPS), 1500 VA</u>

Operations & Maintenance Manual
December 2015

APC Smart-UPS™ C

Efficient, true sine-wave power protection for entry-level servers and network equipment.

>

Brings the reliability of the world's most popular network and server UPS to entry level applications.

The most affordable true sine-wave UPS's in the Smart-UPS family . Designed for entry level servers, it is compatible with today's active power factor corrected (PFC) power supplies. Included PowerChute Business Edition software is compatible with all major server operating systems and provides UPS management and safe system shutdown.

- ***Reliable***
- ***Economical***
- ***Efficient***
- ***Manageable***

APC by Schneider Electric

Revision 1, January 2012

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APC Smart-UPS C

Application optimized models ideal for entry-level servers, point of sale and other small network devices.

Tower and Rackmount 1000 and1500VA

Standard features:

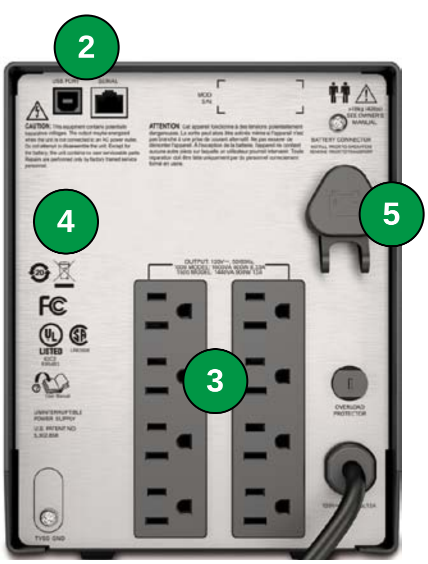
1 **LCD Display**
Intuitive interface provides comprehensive status information at a glance.

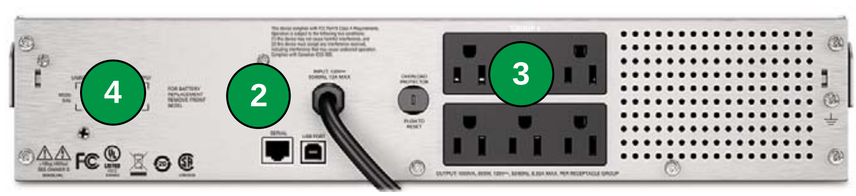
High Efficiency Green Mode
Saves utility costs and reduces heat promoting longer component life.

Pure Sine-Wave Output
Simulates the utility when on battery for optimum device compatibility.

Network Grade Power Conditioning
Automated voltage regulation (Boost AVR), noise filtering and surge protection.

Advanced battery management
Temperature compensated charging extends life of internal batteries.





2 **Communication Ports**
USB and serial ports for UPS management .

3 **Generous number of outlets** All receptacles are surge and UPS output protected .

4 **Safety-agency approved**
Ensures the product has been tested and approved to national standards .

5 **Battery disconnect**
Convenient way to disconnect battery for transport (tower models).

APC by Schneider Electric

Revision 1, January 2012

APC Smart-UPS™ C Display

Comprehensive LCD interface for status at a glance.

Interface on all SMC models.

1 LCD Display Screen
Comprehensive status at a glance

Status Conditions
-On line
-On battery
-Green mode
-Load graph
-Battery charge graph
-Audible Alarm

Measures
-Input & Output Voltage
-Load viewable in Watts, VA or %
-Output current and frequency
-Event counter
-Estimated on battery runtime

2 On Line/On Battery
LED illuminates Green when UPS in on utility power, or will illuminate Orange when providing battery power.

3 On/Off button

4 System Fault LED
Illuminates in the event of a system fault and displays error message.

5 Mute Button
Used to silent the alarms

6 Display Button
Steps through each measurement screen and provides the ability choose the default view.

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Tower models

Product feature	SMC1000	SMC1500
Output		
Power Capacity	600W/1000VA	900W/1440VA
Nominal Output Voltage	120V	
Output Frequency	47-63Hz	
Wave Form Type	Sine wave	
Output Connections	(8) NEMA 5-15R	
Input		
Nominal Input Voltage	120V	
Input Voltage Range for main operations (Max adjustable range)	93-130V (85-136V)	
Input Frequency	50/60 Hz +/-3 Hz (auto sensing)	
Input Connection	NEMA 5-15P, 6ft cord	
Batteries and Runtime		
Battery Type	Maintenance-free sealed lead-acid battery with suspended electrolyte, leak proof	
Typical Backup Time at 1/2 Load (min)	14 min	11 min
Typical Backup Time at full Load (min)	5.min	4 min
Replacement Battery	APCRBC142	RBC6
Communication and Management		
Interface Ports	USB and Serial (RJ45)	
Control Panel and audible alarms	Etched glass LCD display with LED status indicators; alarm on battery, distinctive low battery alarm	
Surge Protection and Filtering		
Surge Energy Rating	455J	
Filtering	Full time multi-pole noise filtering: 0.3% IEEE surge let-through, zero clamping response time, meets UL1449	
Physical		
Maximum Height (in)	8.62 in	8.62 in
Maximum Width (in)	6.73 in	6.73 in
Maximum Depth (in)	17.28 in	17.28 in
Net Weight	38 lbs	45 lbs
Conformance		
Regulatory	UL 1778, CSA, FCC Part 15 Class A, NOM	
Warranty and Equipment Protection Policy	2 years repair or replace and $150,000 lifetime EPP	

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Rackmount models

Product feature	SMC1000-2U	SMC1500-2U
Output		
Power Capacity	600W/1000VA	900W/1440VA
Nominal Output Voltage	120V	
Output Frequency	47-63Hz	
Wave Form Type	Sine wave	
Output Connections	(6) NEMA 5-15R	
Input		
Nominal Input Voltage	120V	
Input Voltage Range for main operations (Max adjustable range)	93-130V (85-136V)	
Input Frequency	50/60 Hz +/-3 Hz (auto sensing)	
Input Connection	NEMA 5-15P, 8ft cord	
Batteries and Runtime		
Battery Type	Maintenance-free sealed lead-acid battery with suspended electrolyte, leak proof	
Typical Backup Time at 1/2 Load (min)	14 min	18 min
Typical Backup Time at full Load (min)	5 min	6 min
Replacement Battery	APCRBC124	APCRBC132
Communication and Management		
Interface Ports	USB, Serial (RJ45)	
Control Panel and audible alarms	Etched glass LCD display with LED status indicators; alarm on battery, distinctive low battery alarm	
Surge Protection and Filtering		
Surge Energy Rating	455J	455 J
Filtering	Full time multi-pole noise filtering: 0.3% IEEE surge let-through, zero clamping response time, meets UL1449	
Physical		
Maximum Height (in)	3.5 in	3.5 in
Maximum Width (in)	17.0 in	17.0 in
Maximum Depth (in)	16.0 in	18.7 in
Net Weight	45.15 lbs	61.2 lbs
Conformance		
Regulatory	UL 1778, CSA, FCC Part 15 Class A, NOM	
Warranty and Equipment Protection Policy	2 years repair or replace, and $150,000 lifetime EPP	

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APC by Schneider Electric

Operation Manual

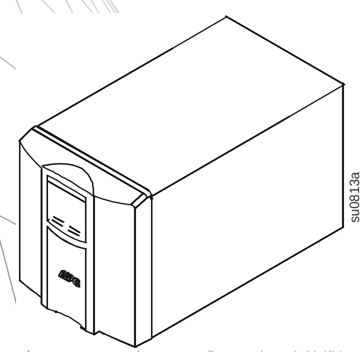
Smart-UPS™ C

Uninterruptible Power Supply

Tower

1000/1500 VA

120/230 Vac



Product Description

The APC™ by Schneider Electric Smart-UPS™ is a high performance uninterruptible power supply (UPS). The UPS provides protection for electronic equipment from utility power blackouts, brownouts, sags, and surges, small utility power fluctuations and large disturbances. The UPS also provides battery backup power for connected equipment until utility power returns to safe levels or the batteries are fully discharged.

This user manual is available on the enclosed Documentation CD and on the APC by Schneider Electric Web site, www.apc.com.

Important Safety Messages

Read the instructions carefully to become familiar with the equipment before trying to install, operate, service or maintain it. The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Caution product safety label indicates that a hazard exists that can result in injury and product damage if the instructions are not followed.

The following safety messages may appear throughout this manual to warn of potential hazards.

CAUTION
CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** equipment damage.

Safety and General Information

Inspect the package contents upon receipt. Notify the carrier and dealer if there is any damage.

Read the Safety Guide supplied with this unit before installing the UPS.

- Adhere to all local and national electrical codes.
- This UPS is intended for indoor use only.
- Do not operate this UPS in direct sunlight, in contact with fluids, or where there is excessive dust or humidity.
- Be sure the air vents on the UPS are not blocked. Allow adequate space for proper ventilation.
- The battery typically lasts for two to five years. Environmental factors impact battery life. Elevated ambient temperatures, poor quality utility power, and frequent short duration discharges will shorten battery life.
- Connect the UPS power cable directly to a wall outlet. Do not use surge protectors or extension cords.
- The batteries are heavy. Remove the batteries prior to installing the UPS in a rack.
- Refer to “Specifications” on page 2 for UPS and battery weight.

Specifications

For additional specifications, refer to the APC by Schneider Electric Web site at www.apc.com.

	UPS + Battery	**Battery**
Weight specifications	SMC1000 / SMC1000I 17.24 kg (38 lb)	APCRBC142 5.1 kg (11.2 lb)
	SMC1500 / SMC1500I 20.41 kg (45 lb)	APCRBC6 7.7 kg (16.9 lb)
Temperature	**Operating**	0° to 40° C (32° to 104° F)
	Storage	-15° to 45° C (5° to 113° F) charge UPS battery every six months
Maximum Elevation	**Operating**	3,000 m (10,000 ft)
	Storage	15,000 m (50,000 ft)
Humidity	0% to 95% relative humidity, non-condensing	0° to 40° C (32° to 104° F)
Battery Type	Maintenance free, sealed lead acid	

Pb Pb

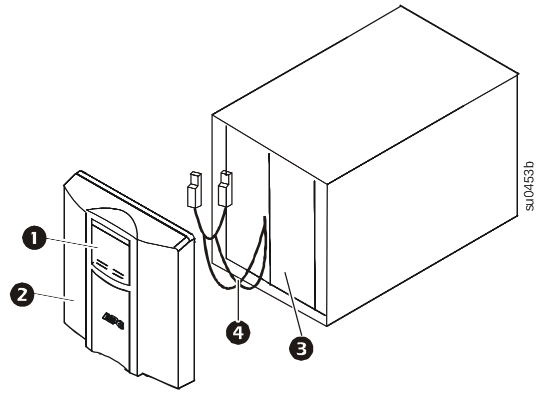
Replace used batteries with APC by Schneider Electric approved batteries.
To order a replacement battery go to the APC by Schneider Electric Web site, www.apc.com.

Always recycle used batteries.
For information on recycling a used battery, refer to the Battery Disposal Information sheet included with the replacement battery.

Product Overview

Front panel features

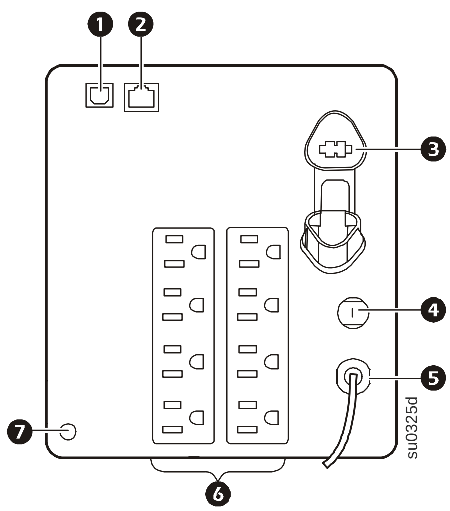
1. Display interface
2. Bezel
3. Battery
4. Internal battery connector cables



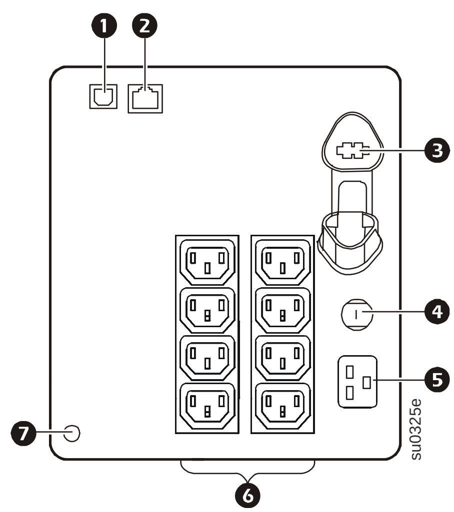
Rear panel features

1. USB Port
2. Serial data port
3. Battery connector
4. Circuit breaker
5. UPS input
6. Outlets
7. Chassis ground screw

120 Vac



230 Vac



Installation

For UPS installation information, refer to the Installation Guide for the Smart-UPS C 1000/1500 VA Tower included with the UPS.

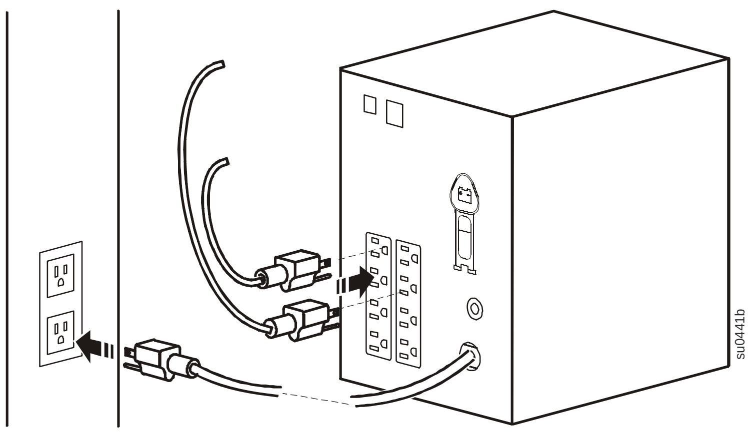
The Installation Guide is also available on the Documentation CD included with the UPS and on the APC by Schneider Electric Web site, www.apc.com.

Operation

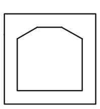
Note: The UPS will charge to 90% capacity in the first three hours of normal operation. **Do not expect full battery runtime capability during this initial charge period.**

1. Connect equipment to the UPS.
2. Connect the UPS to a two pole, three wire, grounded source.

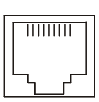
CAUTION
RISK OF EQUIPMENT DAMAGE
• Adhere to all local and national electrical codes.
• Wiring should be performed by qualified electrician.
• Always connect the UPS to a grounded outlet.
Failure to follow these instructions can result in equipment damage



Connect equipment to the UPS



USB port: Connect to a computer to use power management software.



Serial port: Connect a serial port cable (not supplied) to use power management software.

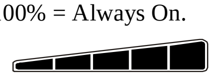
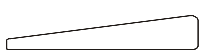
Chassis ground screw: Connect the ground leads on transient voltage devices to the chassis ground screw(s), located on the rear panel of the UPS.

Configuration mode

Configuration mode provides additional UPS configuration options. Press and hold the MUTE and MENU buttons   for two seconds. The UPS will emit a short beep and the two icons will flash to indicate that Configuration mode is enabled.

When Configuration mode is enabled use the MENU button to scroll through the available options. Use the MUTE button to scroll through the settings in each option.

Note: The UPS will automatically disable Configuration mode after 15 seconds of no activity. To manually disable Configuration mode, press and hold the MUTE and MENU buttons for two seconds. The UPS will a emit a short beep.

Function	Options	Description
Self-Test	• 0: Default Setting • 1: Begin Self-Test	0 is the default setting for Configuration mode. Press the MENU button to scroll through the available options. Press 1 to manually initiate a Self-Test. The UPS will automatically disable Configuration mode. **Note:** When the UPS is operating on battery power and Configuration mode is enabled, only the default setting will be available. A manual Self-Test cannot be initiated.
Power Quality	• Good  • Fair  • Poor 	Select the input utility power quality tolerance. • When Good is selected, the unit will go on battery power more often to provide the cleanest power supply to the connected equipment. • When Fair is selected, the UPS is under normal operating conditions. • When Poor is selected, the UPS will tolerate more fluctuations in power and will go on battery power less often. If unsure of the local power quality, select Good.
Output Voltage Setting 230V models only	• 220 Vac • 230 Vac • 240 Vac	Select the appropriate voltage for outlets when the UPS is in battery mode.
LCD Display Dimmer	• Load Bar Icon shows 100% = Always On.  • Load Bar Icon shows 0% = Auto Dim. 	When the LCD display dimmer is configured to Auto Dim the LCD will illuminate if a button is pressed or an event occurs. The display will automatically dim after 60 seconds of no activity.
Green Mode Enable	• 0: Disable • 1: Enable	When Green Mode is enabled the UPS is operating at the most efficient level, bypassing unused AVR components while acceptable utility voltage is present. The UPS will enter and exit Green mode automatically while enabled.
Clear Event Counter	N/A	Press the MUTE button to clear the event counter.

Power saving LCD screen

The display interface can be configured to remain continuously illuminated or to extinguish after a period of inactivity to save electricity.

1. **Continuous Illumination Mode**: Press and hold the DISPLAY button for two seconds. The display will illuminate and the UPS will beep to confirm **Continuous Illumination** mode is activated.
2. **Power Saving mode**: Press and hold the DISPLAY button for two seconds. The display will extinguish and the UPS will beep to confirm **Power Saving** mode is enabled. While in **Power Saving** mode, the display will illuminate when a button is pressed. The display will extinguish after 60 seconds of inactivity.

Sensitivity adjustment settings

The UPS detects and reacts to line voltage distortions by transferring to battery backup power to protect connected equipment. In situations where either the UPS or the connected equipment is too sensitive for the input voltage level it is necessary to adjust the transfer voltage.

1. Connect the UPS to a utility power source. Be sure the UPS is turned off.
2. Press and hold the POWER button for six seconds. The **load capacity** bar will flash on and off, to indicate the UPS is in **Program** mode.
3. Press the POWER button again to scroll through the menu options. The UPS will beep to confirm the selection.

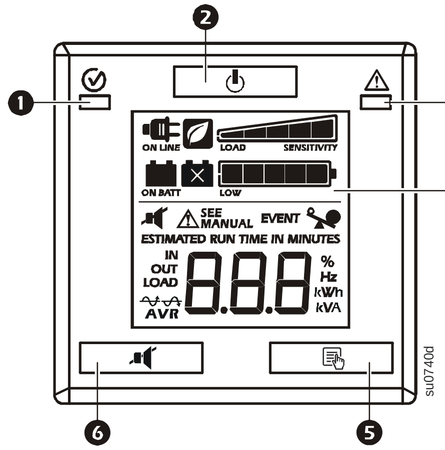
When the UPS is in **Sensitivity Configuration** mode, the **Sensitivity** bar graph icons display the sensitivity level setting. See the examples here as a reference.

		
Low sensitivity	Medium sensitivity	High sensitivity (Default)
1000/1500 VA 120 Vac: 97-136 Vac	1000/1500 VA 120 Vac: 103-130 Vac	1000/1500 VA 120 Vac: 106-127 Vac
1000/1500 VA 230 Vac: 195-265 Vac	1000/1500 VA 230 Vac: 203-257 Vac	1000/1500 VA 230 Vac: 207-253 Vac
Use this setting with equipment that is less sensitive to fluctuations in voltage or waveform distortions.	Use this setting under normal operating conditions.	Use this setting when connected equipment is sensitive to any minor fluctuations in voltage or waveform distortions.

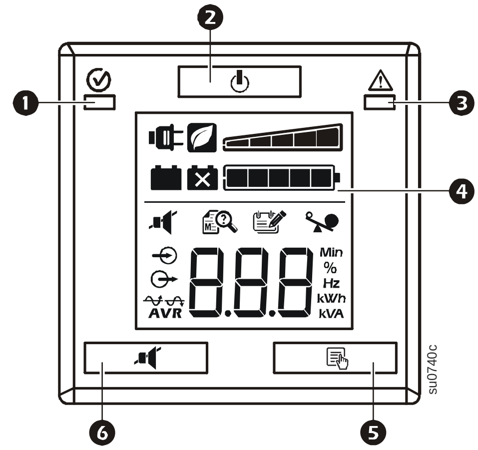
Status Indicators

Display panel features

1000/1500 VA 120 Vac



1000/1500 VA 230 Vac



❶ On Line/On Battery LED

❷ POWER ON/OFF button

❸ Site Wiring Fault/System Fault LED

❹ Display interface

❺ DISPLAY button

❻ MUTE button

Note: Refer to “Feature Reference Guide” on page 10 in this manual for a detailed description of the front panel buttons and icons.

LED status indicators

Status	LED	Audible Indicator On	Audible Indicator Terminates
Power On The UPS is supplying utility power to connected equipment.	The **On Line/On Battery** LED illuminates green	None	N/A
On Battery The UPS is supplying battery power from the internal battery.	The **On Line/On Battery** LED illuminates amber	The UPS beeps 4 times every 30 seconds.	The beeping stops when utility power is restored or the MUTE button is pressed for two seconds.
System Fault The UPS detects an internal system fault.	System Fault LED illuminates red	Constant tone	The alarm stops when the POWER ON/OFF button is pressed for two seconds. This creates a Fault Reset.
Site Wiring Fault A building wiring fault has occurred. Do not operate the UPS. Contact a qualified electrician to correct the building wiring fault.	**Site Wiring Fault** LED flashes red	None	N/A

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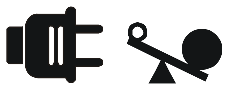
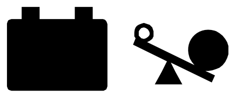
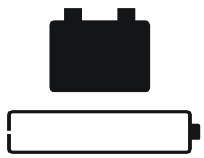
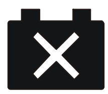
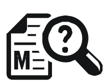
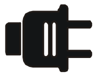
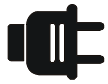
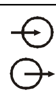
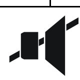
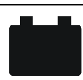
LCD status indicators

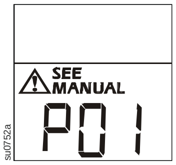
Status	LCD Icon	Audible Alarms	Audible Alarm Terminates
On Battery The UPS is supplying battery power to the connected equipment.		Beeps 4 times every 30 seconds.	The beeping stops when utility power is restored or the UPS is turned off.
Utility Power Overload An overload condition has occurred while the UPS is operating on utility power.		Constant tone	The alarm stops when nonessential equipment is disconnected from the outlets or the UPS is turned off
Battery Power Overload An overload condition has occurred while the UPS is operating on battery power.		Constant tone	The alarm stops when nonessential equipment is disconnected from the outlets or the UPS is turned off.
Low Battery The UPS is supplying battery power to the connected equipment and the battery is near a total discharge state.		Continuous beeping	The beeping stops when utility power is restored or the UPS is turned off.
Battery Fault The UPS is operating on utility power. The battery does not provide expected backup.		The UPS will beep twice to indicate the battery is disconnected. The UPS will beep continuously for one minute every five hours to indicate that the battery should be replaced.	Verify that the battery is securely connected. The battery is nearing the end of its service life and should be replaced.
System Fault The UPS has experienced an internal fault.	120 Vac models  230 Vac models 	N/A	Identify the fault message on the display and refer to **System Faults** in this manual.

Display interface features

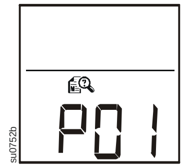
1000/1500 VA 120 Vac	1000/1500 VA 230 Vac	Description
 ON LINE		**On Line:** The UPS is supplying conditioned utility power to connected equipment.
		**Green mode**: The UPS is operating at the most efficient level, bypassing unused AVR components while acceptable utility voltage is present. The UPS will enter and exit Green mode automatically and will not compromise power protection.
		**Load Capacity:** The load capacity percentage is indicated by the number of load bar sections illuminated. Each bar represents 20% of the load capacity.
ESTIMATED RUN TIME IN MINUTES	Min	**Estimated Run Time / Min:** This indicates the battery runtime minutes that remain if the UPS switches to battery power.
		**Battery Charge:** The battery charge level is indicated by the number of load bar sections illuminated. When all five blocks are illuminated, the battery is fully charged. Each bar represents 20% of the battery charge capacity.
		**Overload:** The equipment connected to the UPS is drawing more power than the voltage rating allows.
EVENT		**Event:** The event counter indicates the number of events that occurred to cause the UPS to switch to battery operation.
		**Automatic Voltage Regulation (AVR):** The UPS has an AVR boost and trim feature that automatically regulates high or low levels of input voltage without using battery power. The UPS also features AVR Bypass which temporarily deactivates the AVR circuitry when the input voltage is within normal range. This conserves battery power and helps to maximize battery life.  When illuminated, the UPS is compensating for low input voltage.  When illuminated, the UPS is compensating for high input voltage.
IN OUT		**In:** Input voltage. **Out:** Output voltage.
 SEE MANUAL		**System Fault:** An internal system fault has occurred. The fault number will illuminate on the display. Refer to **"Display interface features" on page 9**.
		**Mute:** An illuminated line through the icon indicates that audible alarms are disabled.
		**Battery Fault:** The icon will flash to indicate that the battery is disconnected. When the icon remains continuously illuminated the UPS has failed a Self-Test or the battery is near the end of its service life and should be replaced. **Refer to "LCD status indicators" on page 8.**
		**On Battery:** The UPS is supplying battery backup power to the connected equipment.

System Faults

1000/1500 120 Vac



1000/1500 230 Vac



P00	Output Overload
P01	Output Short Circuit
P02	Output Over Voltage
P04	Unit Over Temperature
P06	AVR Relay Fault
P13	Inverter Fault

Note: Refer to the “Feature Reference Guide” on page 10 for a detailed description of the front panel buttons and icons.

For more information on System Faults, contact customer support at the APC by Schneider Electric Web site, www.apc.com/support.

Feature Reference Guide

Function	Button	Timing (seconds)	UPS Status	Description
Power				
Power On		0.2	Off	Press the POWER ON/OFF button to turn on the UPS. The UPS will operate on utility power. If utility power is not available the UPS will operate on battery power.
Power Off		2	On	Press the POWER ON/OFF button to turn off the UPS.
Display				
Status Inquiry		0.2	On	Press to verify the status or condition of the UPS. The LCD will illuminate for 60 seconds.
Power Saving mode Continuous Illumination		2	On	The LCD will illuminate and the UPS will beep to confirm **Continuous Illumination** mode is activated. The LCD will extinguish and the UPS will beep to confirm that **Power Saving** mode is activated. While in **Power Saving** mode, the LCD will illuminate if a button is pressed or an event occurs, then extinguish after 60 seconds of no activity.
Mute				
Event Specific		0.2	On	Disable any audible alarms caused by an event.
Enable/Disable		2	On	Enable or disable the audible alarms. The **Mute** icon will illuminate and the UPS will beep once.
Sensitivity		6	Off	The **Load Capacity** icon will flash to indicate the UPS is in **Program** mode. Use the POWER ON/OFF button to scroll through and select Low, Medium, and High sensitivity levels. The UPS will beep to confirm the selection. Refer to “Sensitivity adjustment settings” on page 6 in this manual.
Self-Test		2	On	The UPS will automatically run a Self-Test of the internal battery when the UPS is turned on. A manual Self-Test can be run at any time while the UPS is operating. Press and hold the MUTE button, then press the DISPLAY button for 2 seconds until the system emits a short beep to indicate the UPS has started a Self-Test.
Event Reset		0.2	On	When the **Event** screen is visible, press and hold the DISPLAY button, then press the POWER ON/OFF button to clear the utility failure event counter.
Fault Reset		2	Fault	After a fault has been identified, press the POWER ON/OFF button. The icon will extinguish and the UPS will go to standby mode.

Troubleshooting

Problem and Possible Cause	Solution
The UPS will not turn on or there is no output	
The UPS has not been turned on.	Press the ON button once to turn on the UPS.
The UPS is not connected to utility power.	Be sure the power cable is securely connected to the UPS and to the utility power supply.
The input circuit breaker has tripped.	Disconnect nonessential equipment and reset the circuit breaker.
The UPS shows very low or no input voltage.	Check the utility power supply to the UPS by plugging in a table lamp. If the light is very dim, check the utility voltage.
The battery is not securely connected.	Be sure that all battery connections are secure.
There is an internal UPS fault.	Do not attempt to use the UPS. Unplug the UPS and have it serviced immediately.
The UPS is operating on battery while connected to utility power	
The input circuit breaker has tripped.	Disconnect nonessential equipment and reset the circuit breaker.
There is very high, very low, or distorted input line voltage.	Move the UPS to a different outlet on a different circuit. Test the input voltage with the utility voltage display. If acceptable to the connected equipment, reduce the UPS sensitivity.
The UPS is beeping	
The UPS is operating normally.	None. The UPS is protecting the connected equipment.
The UPS does not provide expected battery backup time	
The UPS battery is weak due to a recent power outage or is near the end of its service life.	Charge the battery. Batteries require recharging after an extended outage. Elevated ambient temperatures, poor quality utility power, and frequent short duration discharges will shorten battery life. If the battery is near the end of its service life, consider replacing the battery even if the replace battery icon is not illuminated.
The UPS is experiencing an overload condition.	Check the UPS load display. Unplug nonessential equipment, such as printers.
The Fault LED is illuminated, the UPS displays a fault message and emits a constant beeping	
Internal UPS fault.	Do not attempt to use the UPS. Turn the UPS off and have it serviced immediately. If more than one fault is present the fault messages will be displayed alternately on the display screen.
The Replace Battery icon is illuminated	
The battery has a weak charge.	Allow the battery to recharge for at least four hours. Then, perform a Self-Test. If the problem persists after recharging, replace the battery.
The replacement battery is not properly connected.	Be sure the battery connector is securely connected.
Site Wiring Fault LED is flashing	
Wiring faults detected include missing ground, hot-neutral, polarity reversal, and overloaded neutral circuit.	If the UPS indicates a site wiring fault, have a qualified electrician inspect the building wiring. Applicable for 120 Vac units only.

Service and Transport

If the unit requires service, do not return it to the dealer. Follow these steps:

1. Review the *Troubleshooting* section of the manual to eliminate common problems.
2. If the problem persists, contact APC by Schneider Electric Customer Support through the APC by Schneider Electric Web site, **www.apc.com**.
    a. Note the model number and serial number and the date of purchase. The model and serial numbers are located on the rear panel of the unit and are available through the LCD display on select models.
    b. Call APC by Schneider Electric Customer Support and a technician will attempt to solve the problem over the phone. If this is not possible, the technician will issue a Returned Material Authorization Number (RMA#).
    c. If the unit is under warranty, the repairs are free.
    d. Service procedures and returns may vary internationally. Refer to the APC by Schneider Electric Web site for country specific instructions.
3. Pack the unit in the original packaging whenever possible to avoid damage in transit. Never use foam beads for packaging. Damage sustained in transit is not covered under warranty.
    a. **Always DISCONNECT THE UPS BATTERIES before shipping. The United States Department of Transportation (DOT), and the International Air Transport Association (IATA) regulations require that UPS batteries be disconnected before shipping.** The internal batteries may remain in the UPS.
    b. External Battery Pack products are deenergized when disconnected from the associated UPS product. It is not necessary to disconnect the internal batteries for shipping. Not all units utilize an external battery pack.
4. Write the RMA# provided by Customer Support on the outside of the package.
5. Return the unit by insured, prepaid carrier to the address provided by Customer Support.

Transport the unit

1. Shut down and disconnect all connected equipment.
2. Disconnect the unit from utility power.
3. Disconnect all internal and external batteries (if applicable).
4. Follow the shipping instructions outlined in the *Service* section of this manual.

Two Year Limited Factory Warranty

This warranty applies only to the products you purchase for your use in accordance with this manual.

Terms of warranty

Schneider Electric IT (SEIT) warrants its products to be free from defects in materials and workmanship for a period of two years from the date of purchase. SEIT will repair or replace defective products covered by this warranty. This warranty does not apply to equipment that has been damaged by accident, negligence or misapplication or has been altered or modified in any way. Repair or replacement of a defective product or part thereof does not extend the original warranty period. Any parts furnished under this warranty may be new or factory remanufactured. For country specific warranty information, refer to the APC by Schneider Electric Web site at www.apc.com.

Non-transferable warranty

This warranty extends only to the original purchaser who must have properly registered the product. The product may be registered at the APC by Schneider Electric Web site, **www.apc.com**.

Exclusions

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Warranty claims

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Worldwide Customer Support

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  - **www.apc.com** (Corporate Headquarters)
    Connect to localized APC by Schneider Electric Web sites for specific countries, each of which provides customer support information.
  - **www.apc.com/support/**
    Global support searching APC by Schneider Electric Knowledge Base and using e-support.
- Contact the APC by Schneider Electric Customer Support Center by telephone or e-mail.
  - Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.
  - For information on how to obtain local customer support, contact the APC by Schneider Electric representative or other distributors from whom you purchased your APC by Schneider Electric product.

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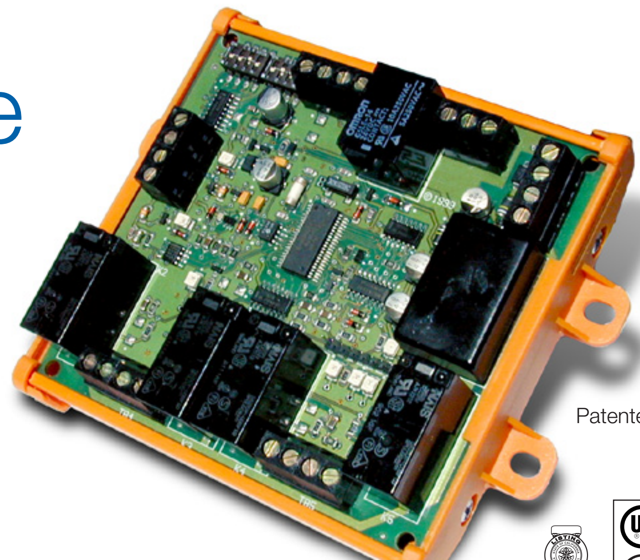
ADDRESSABLE RELEASING MODULE

Operations & Maintenance Manual
December 2015

Life Safety & Communications

Releasing Module

SIGA-REL



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Overview

The SIGA-REL is an analog addressable module that communicates directly with the fire alarm panel Signature loop controller. The SIGA-REL controls sprinkler, pre-action and deluge systems, and may also be used to release extinguishing agents such as CO_2, Halon, or foam. The module is easily configured in the field and offers a wide range of options that ensure dependable service, while preventing the unnecessary release of extinguishing agent.

In addition to being an intelligent network component, the SIGA-REL interfaces with a number of conventional devices. These provide manual actuation of abort, release, and service disconnect functions. Together with the SIGA-REL, they comprise a complete fire suppression package. There is no need for a separate releasing panel because the SIGA-REL takes full advantage of the existing control panel communications infrastructure. This ensures low-cost installations with all the benefits of Signature Series analog initiation and control.

Seven on-board circuits provide added flexibility. Each SIGA-REL hosts:

- Two supervised Class B release circuits
- Two supervised Class B pre-release NACs
- One supervised Class B manual release input circuit (latching)
- One supervised Class B abort circuit for normally-open abort switch (non-latching)
- One first alarm output relay (Form C contact)

The SIGA-REL also includes a series of built-in timers that determine the duration of abort routines and release sequences. These timers are easily configured in the field and provide a highly flexible range of options.

Standard Features

- **Ideal for sprinkler, pre-action and deluge systems**
  Suitable a wide range of sprinkler applications and extinguishing agents such as CO2 and Halon.
- **Built-in timers**
  Selectable durations for abort, manual, and automatic delays.
- **Four abort modes**
  Field-configurable abort routines determine how the timers operate when the abort function is initiated.
- **Supervised circuitry you can rely on**
  Two Class B release circuits and two pre-release circuits provided.
- **Manual operation keeps ultimate control in plain view**
  The SIGA-REL features a manual release input circuit as well as a manual abort input circuit.
- **Fully automated response leaves nothing to chance**
  This module's Form C relay is ideal for room preparation routines.
- **Automatic device mapping simplifies installation**
  Signature modules transmit directly to the loop controller their circuit locations with respect to other Signature devices on the wire loop.

Application

Understanding fire suppression

Fire suppression today is an important part of a growing number of life safety installations. With an ever-increasing reliance on mission-critical computer systems and record high capital investment in high-tech production facilities, businesses large and small are looking for a means of protecting their investments and ensuring a fire won't cripple their operations.

While fire detection remains the first line of defense against the risks of fire to people, building owners are looking to fire suppression as a means of protecting their property and assets.

But it's a well known fact that fire suppression is a double-edged sword: water can snuff out a mission-critical computer system as easily as it can a fire. Alternatives to water, including carbon dioxide and other extinguishing agents can endanger lives, while the release of even the most inert extinguishing agents can disrupt operations and cost millions of dollars in down-time and lost production.

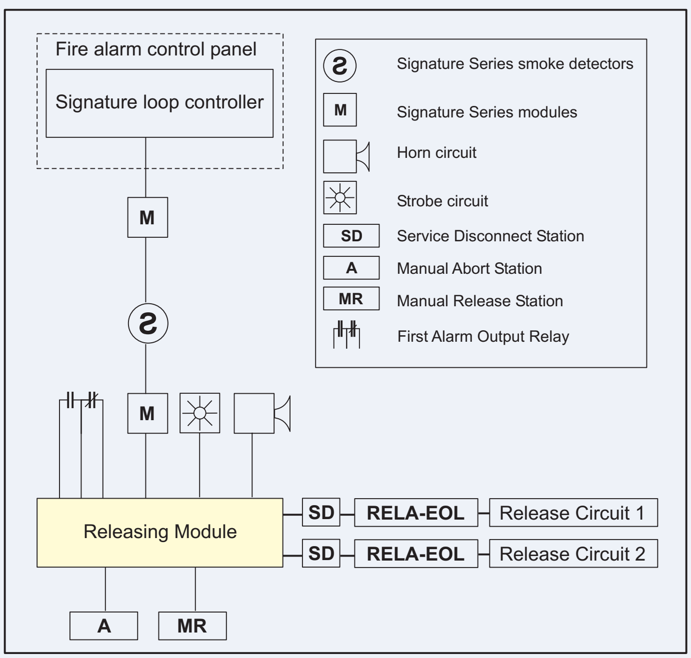
A primary goal of any fire suppression system is to prevent the release of extinguishing agent unless it is absolutely necessary. There is no margin for error. But no matter what measures are taken to prevent the unwanted release of extinguishing agent, the fact remains that no suppression system is any better than the detectors it relies on for input. The foundation of an effective suppression system, therefore, rests firmly on the quality and reliability of its smoke detectors.

Signature Series detectors form an integral part of the suppression system built around the SIGA-REL releasing module. These detectors provide unsurpassed reliability and immunity from false alarms. The SIGA-REL is engineered to the same exacting standards of quality and performance. With a robust set of features designed to eliminate any unwanted release of extinguishing agent, the SIGA-REL provides all the benefits of a dedicated releasing panel without the extra expense, and equally important, all the proven advantages of the Signature Series family of products.

Understanding the SIGA-REL

The SIGA-REL Releasing Module is a network component that provides control for fire suppression routines. It fulfils much the same purpose as a standalone releasing panel, but supports Signature Series detectors as an integral part of the suppression system. The SIGA-REL is easy to set up and accepts programming via the control panel's SDU Rules Editor.

The diagram below represents typical application of the SIGA-REL. The explanations that follow summarize each element of the module.



Release Circuits. The SIGA-REL includes two supervised release circuits, each of which provides fire suppression control to different areas of a protected space. The releasing circuits actuate solenoids on the suppression agent tanks according to pre-defined release routines. These solenoids release the agent into the protected area. Both circuits operate together.

First Alarm Relay. This on-board relay provides a Form C contact that activates at the first alarm input or manual release. The relay is typically used for room preparation such as controlling fans and dampers in advance of the release of suppression agent.

Pre-release. Pre-release circuits are used to provide power to notification appliances located within the protected are. Two supervised pre-release circuits are provided: one (steady) for visual notification appliances, and one (pulsed) for audible notification appliances. The pre-release circuits activate with the start of the automatic delay timer.

MR **Manual Release.** The manual release circuit is used to activate the suppression system by means of a connected normally-open release station. This initiates the manual release sequence according to a pre-defined routine. The manual release circuit is supervised and latching. Input from this circuit is processed at the module – communication with the control panel is not necessary.

A **Abort.** The abort circuit is used to prevent the release of agent into the protected area after the release sequence has begun, but before the automatic delay timer expires. A connected normally-open release station provides manual control over this circuit. The abort circuit is supervised and non-latching.

SD **Service Disconnect.** The service disconnect switch is used to temporarily disable the fire suppression system. There is no dedicated circuit for this switch. Instead, it is installed on both release circuits between the SIGA-REL and the RELA-EOL end-of-line relay. Opening the Service Disconnect Switch allows the fire alarm system to be tested without activating the fire suppression system. The operation of this switch causes a trouble signal at the control panel.

M **Data.** The Signature data circuit provides an input and an output to the data loop that communicates with the Signature loop controller at the control panel. The SIGA-REL resides on the same data loop as the Signature Series detectors that initiate the automatic release sequence. This close association offers the most reliable performance and ensures compliance with prevailing life safety codes.

Power. The SIGA-REL requires 24 Vdc (power limited). See the specification table for details.

Operation

The SIGA-REL has several built-in safeguards to prevent the unwanted release of extinguishing agent. All release sequences are subject to configurable delay timers that provide the opportunity for an occupant of the area to manually abort the release sequence. If no abort signal is received before the delay timer expires, the suppression agent is released.

The SIGA-REL includes three delay timers: one for manual release sequences (up to 30 seconds); one for automatic release sequences (up to 50 seconds); and one for abort sequences (10 seconds).

Note: Misapplication of the SIGA-REL can have serious consequences. Descriptions provided here are for information only, are subject to change, and should not be used as a guide to field installation of equipment. Always consult the SIGA-REL installation manual when setting up or configuring this component.

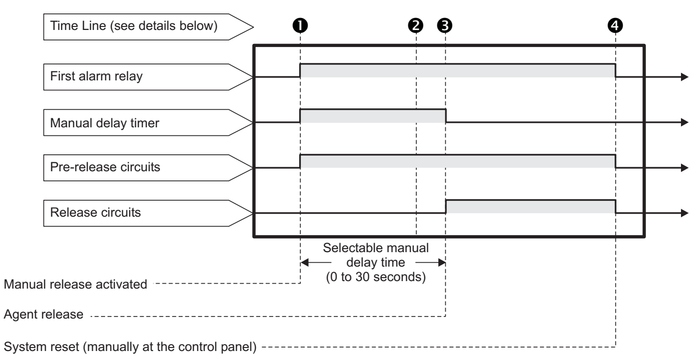
Normal State

In its normal operating state the SIGA-REL supervises both of its release circuits and both of its pre-release NAC circuits for faults. Should a short or open occur on any of these circuits, a Trouble condition is reported to the control panel.

A trouble condition on any of these circuits may prevent the operation of that circuit, but it won't inhibit the operation of any other fault-free circuit.

Manual Release Sequence

The operation of a manual release station initiates the manual release sequence. The diagram below outlines the manual release sequence.



***Note:** A manual release sequence cannot be aborted.*

Manual Release Time Line

❶ An active manual release station disables automatic operation and the abort function and simultaneously activates the:
- Manual delay timer
- Pre-release circuit
- Pre-release strobe circuit (steady On)
- Pre-release horn circuit (60 pulses per minute)

❷ Ten seconds before the expiration of the manual delay timer, the pre-release horn changes from 60 pulses per minute to steady On.

❸ The manual delay timer expires and the release circuits activate.

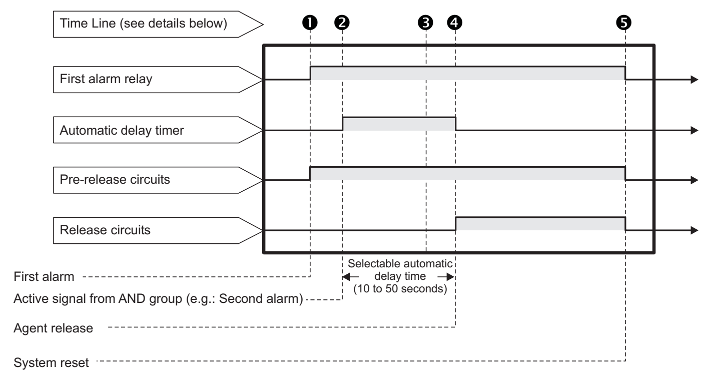
❹ A manual reset at the fire alarm control panel deactivates the release solenoids and the Releasing Module returns to the normal state.

Automatic Release Sequence

The automatic release sequence requires an AND group (cross zone) or a matrix group (counting zone). AND groups and matrix groups require fire alarm signals from designated Signature Series devices. These logic groups are programmable through a laptop computer and the System Definition Utility (SDU).

Note: EST2 systems do not support matrix groups. See *Programming the SIGA-REL* for AND group rules. To create AND groups and matrix groups, see the *System Programming Manual* and the SDU *Online Help* for your system.

The diagram below outlines the automatic release sequence.



Automatic Release Time Line

❶ A detector signals the first alarm. This event simultaneously activates the:
- First alarm relay
- Pre-release strobe circuit (steady On)
- Pre-release horn circuit (15 pulses per minute)

❷ A detector in the protected area signals a second alarm and meets the AND group conditions.* The automatic delay timer then starts its countdown and the pre-release horn circuit changes to 60 pulses per minute.

* AND group and matrix group conditions depend on programming.

❸ 10 seconds before the automatic delay timer expires, the pre-release (horn) circuit changes to steady On.

❹ The automatic delay timer expires and the release circuits activate.

❺ A manual reset at the fire alarm control panel deactivates the release solenoids and the Releasing Module returns to the normal state.

Abort Sequences

The SIGA-REL provides four abort modes. Aborts do not terminate the release of fire suppression agents. They merely offer a limited extension of the automatic timer delay period.

Abort Mode 1 (factory default)

If the abort is initiated before the automatic time delay expires, it will prevent the releasing action. The automatic delay timer will continue to run while the abort is active. When the abort switch is restored, the release will occur with the expiration of the automatic delay timer or the abort delay timer, whichever occurs last.

Abort Mode 2

If the abort is initiated before the automatic time delay expires, it will prevent the releasing action. The automatic delay timer will stop running. When the abort switch is restored, the automatic delay timer will continue from the stop point and the release will occur with the expiration of the timer.

Abort Mode 3

Industrial Risk Insurers (IRI) Mode: To be recognized as valid, the abort must be active when the second alarm is received. When the abort switch is restored, the release will occur with the expiration of the abort delay timer (set for 10 sec).

Abort Mode 4

International applications: If the abort is initiated before the automatic time delay expires, it will prevent the releasing action. The automatic delay timer will stop running. When the abort switch is restored, the automatic delay timer will reset and commence time from t = 0. The release will occur with the expiration of the timer setting minus 10 seconds.

Compatibility

Sprinkler systems

The SIGA-REL works with two types of sprinkler systems: deluge and pre-action. The primary difference between both systems is the type of sprinkler head (or nozzle) that terminates the pipes. Table1-1 outlines the Factory Mutual Research Corporation (FMRC) requirements for deluge and pre-action systems.

FM approval requirements for deluge and pre-action sprinkler systems

Standby operation	90 hours
Alarm operation	10 minutes
NFPA style	Class A (Style D or E) or Class A (Style 2, 5, 6, or 7)
FMRC documentation	FMRC Approval Guide (Volume 1)

Deluge sprinkler systems

In Deluge sprinkler systems, open-valve sprinkler heads terminate pipes connected to a water supply controlled by a single valve. When the system detects a fire it automatically opens the valve to allow the waterflow through all of the sprinkler heads. Deluge sprinklers are useful for applications that require the simultaneous discharge of water through every sprinkler.

The following fire detection systems meet FRMC requirements for deluge systems:

- Wet pilot sprinkler line
- Dry pilot sprinkler line
- Hydraulic rate-of-rise
- Pneumatic rate-of-rise
- Electric

Pre-action sprinkler systems

In Pre-action sprinkler systems, closed-valve sprinkler heads terminate pipes connected directly to a water supply. The water supply is usually in the same area as the sprinklers and the pipes are supervised for air pressure. Pre-action sprinklers are useful where it is important to prevent the accidental discharge of water.

Warning! Improper applications of fire suppression agents can lead to property damage, injury, or loss of life. Consult the applicable NFPA documents and the authority having jurisdiction (AHJ) for more information.

The following fire detection systems meet FRMC requirements for pre-action systems:

- Hydraulic rate-of-rise
- Pneumatic rate-of-rise
- Electric

Automatic fire extinguishing systems

Automatic fire extinguishing systems automatically detect and extinguish fires. They require no manual input because detectors automatically activate releasing solenoids or sprinkler valves. The table below provides a list of the fire suppression agents and the applicable NFPA documents.

Fire suppression agents and NFPA documentation

Agent	NFPA documentation
Low-expansion foam	NFPA 11
Medium- and high-expansion foam	NFPA 11A
CO2	NFPA 12
Sprinklers	NFPA 13
Water spray	NFPA 15
Foam-water	NFPA 16
Dry chemicals	NFPA 17

The table below outlines the FMRC requirements for automatic fire extinguishing systems.

FM approval requirements for automatic fire extinguishing systems

Standby operation	24 hours
Alarm operation	10 minutes
NFPA style	B or D
FMRC documentation	FMRC Approval Guide (Volume 1)

Compatible panels. The SIGA-REL is compatible with iO Series, QuickStart, EST2 and EST3 fire alarm control panels. You may install the SIGA-REL in any of the following enclosures:

- 2-WB(X) series
- 2-CAB series
- 3-CAB series
- RACCR series
- MFC-A
- APS6A/APS10A

Note: Maintain a 1-inch (25.4 mm) minimum clearance all around the SIGA-REL. The clearance space must also comply with the National Electrical Code.

Power supplies. The SIGA-REL is compatible with the following power supplies:

- 2-PPS(-220)
- 2-PPS/6A(-220)
- SIGA-APS(-220)
- 3-BPS/M
- 3-PPS/M
- BPS6*, BPS10*, APSxA

*Not compatible with FMRC sprinkler applications that require 90 hours of standby.

Solenoid polarizing relays. Use the RELA-EOL with the SIGA-REL. For more information, see the RELA-EOL installation sheet.

Abort stations. The SIGA-REL is only compatible with normally-open, momentary-action abort stations. Abort stations must be listed with the appropriate agencies in your area. See *Listing agencies*.

Service disconnect stations. The SIGA-REL is only compatible with service disconnect stations that are normally-closed (minimum 2.0 Amps). Service disconnect stations must be listed with the appropriate agencies in your area. See *Listing agencies*.

Releasing solenoid valves. Releasing solenoid valves must be listed with the appropriate agencies in your area. See *Listing agencies*.

Listing agencies. Listing agencies include:

- Factory Mutual Research Corporation (FMRC)
- Underwriters Laboratories, Inc. (UL)
- Underwriters Laboratories Canada (ULC)

Switch Settings

Abort mode and time delay settings are configured by means of dip switches on the module.

Abort mode

	Mode	SW1	SW2	
DEFAULT	1	0	0	*Routines that determine how the abort function interacts with the timers.*
	2	0	1	
	3	1	0	
	4	1	1	

Manual time delay (seconds)

	Delay	SW3	SW4	
	0	0	0	*The length of time that the deluge is inhibited when the releasing function is manually initiated.*
DEFAULT	10	0	1	
	20	1	0	
	30	1	1	

Automatic time delay (seconds)

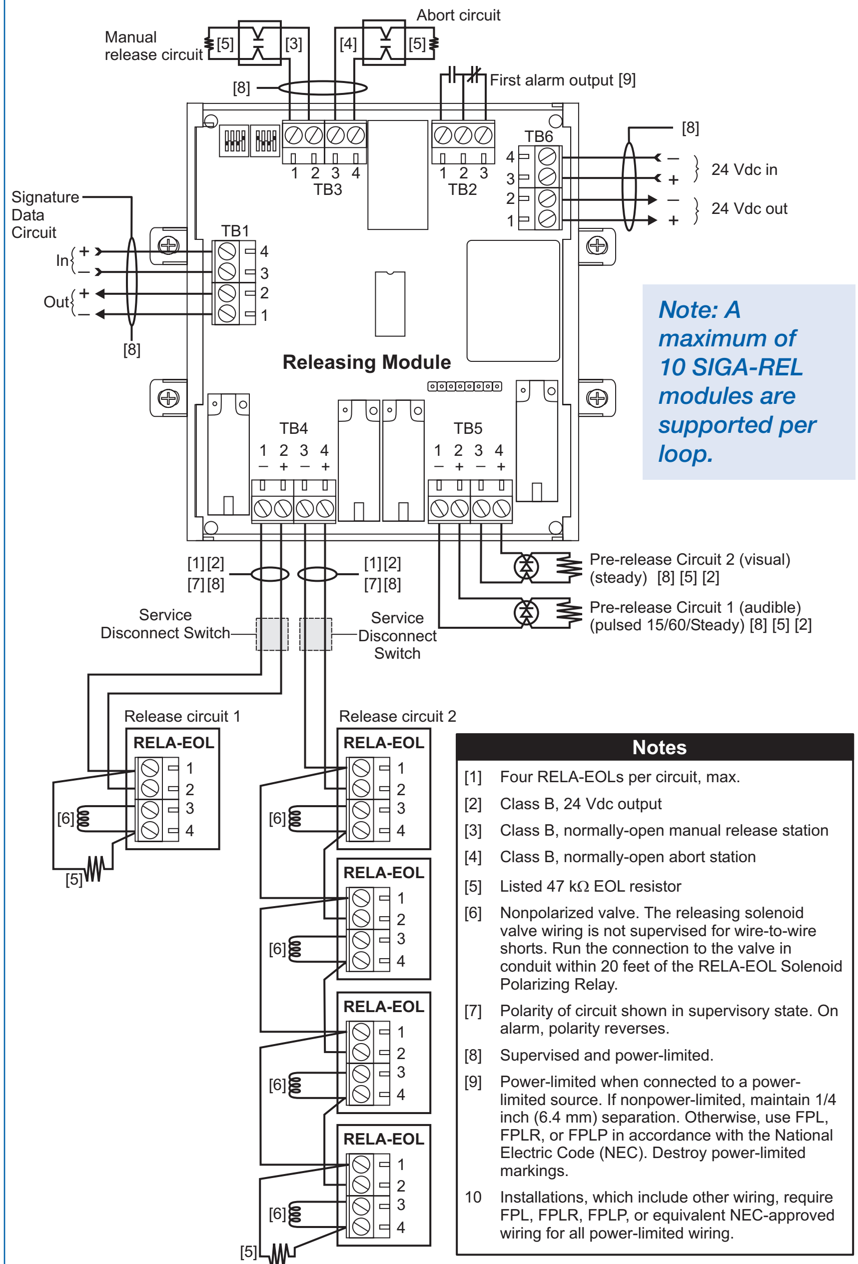
	Delay	SW5	SW6	SW7	
	10	0	0	0	*The length of time that the deluge is inhibited when the releasing function is initiated by the control panel (i.e.: after receiving an alarm).*
	20	0	0	1	
	30	0	1	0	
	40	0	1	1	
DEFAULT	50	1	0	0	

Abort time delay (seconds)

	Delay	SW8	
	0	0	*The length of time that the deluge is inhibited when the abort function is restored (i.e.: cancelled).*
DEFAULT	10	1	

DEFAULT Denotes default settings.

Wiring



Note: A maximum of 10 SIGA-REL modules are supported per loop.

Notes

[1] Four RELA-EOLs per circuit, max.

[2] Class B, 24 Vdc output

[3] Class B, normally-open manual release station

[4] Class B, normally-open abort station

[5] Listed 47 kΩ EOL resistor

[6] Nonpolarized valve. The releasing solenoid valve wiring is not supervised for wire-to-wire shorts. Run the connection to the valve in conduit within 20 feet of the RELA-EOL Solenoid Polarizing Relay.

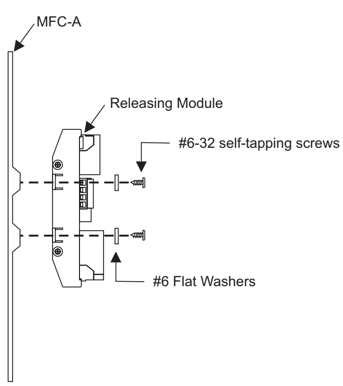
[7] Polarity of circuit shown in supervisory state. On alarm, polarity reverses.

[8] Supervised and power-limited.

[9] Power-limited when connected to a power-limited source. If nonpower-limited, maintain 1/4 inch (6.4 mm) separation. Otherwise, use FPL, FPLR, or FPLP in accordance with the National Electric Code (NEC). Destroy power-limited markings.

10 Installations, which include other wiring, require FPL, FPLR, FPLP, or equivalent NEC-approved wiring for all power-limited wiring.

Mounting



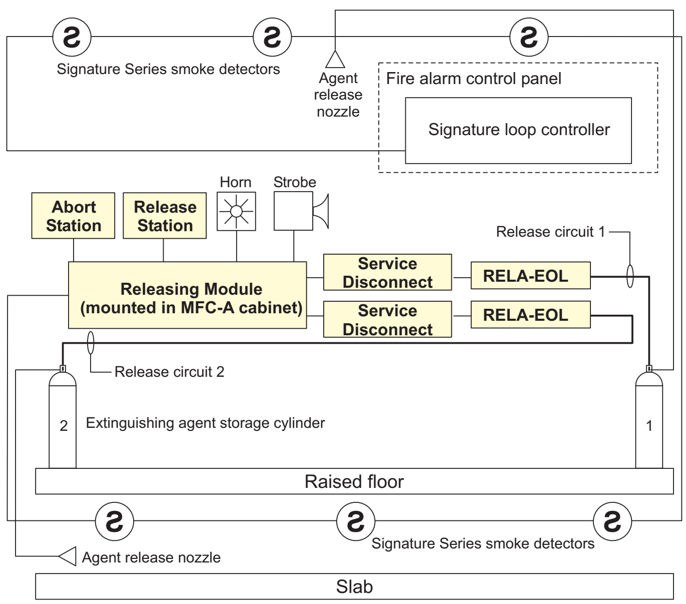
LED Operation

LED	Color	Pattern	Function
DS1	Red	Flashing	Data (alarm conditions)*
DS2	Green	Flashing	Data (normal conditions)*
DS3	Red	Steady	Alarm
DS4	Green	Steady	Power
DS5	Yellow	Steady	Abort
DS6	Yellow	Steady	Trouble
DS7	Red	Steady	Release Active

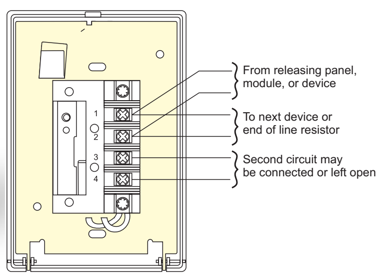
**Note: During a loss of communications, the Releasing Module will go into a standby condition, which will cause DS1 and DS2 to change to a steady pattern during an alarm condition.*

Accessories

Typical application of SIGA-REL accessories (computer room)

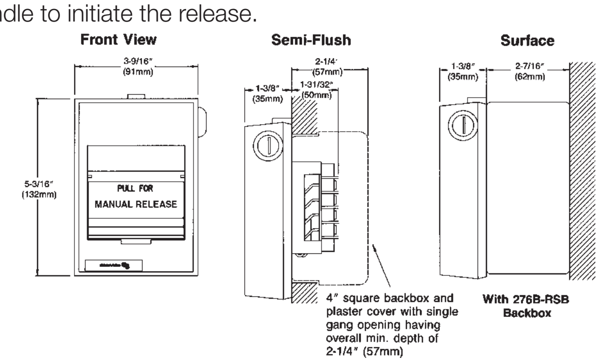


Manual Release Station

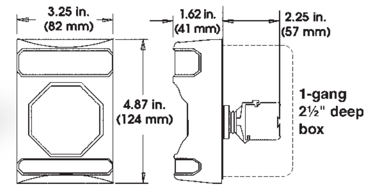


Release Station (rear view)

The manual release station is a normally-open, dry contact signal initiating device. The 276A-REL is a single-action station that requires the user to pull the release handle to initiate the release of a fire suppression agent. The 278A-REL (shown) is a double-action station that requires the user to raise the upper door, then pull the release handle to initiate the release.

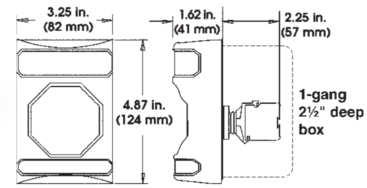


Abort Station



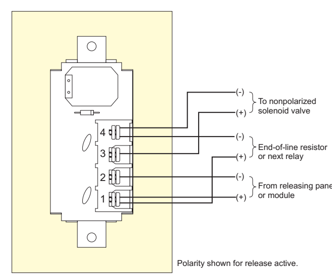
The abort station is a normally-open, non-latching device. It is used to prevent the release of agent into the protected area after the release sequence has begun.

Service Disconnect Switch



The service disconnect switch is used to temporarily disable the fire suppression system. One switch is installed on each of the two release circuits between the SIGA-REL and the RELA-EOL end-of-line relay. Opening the Service Disconnect Switch allows the fire alarm system to be tested without activating the fire suppression system. The operation of this switch causes a trouble signal at the control panel.

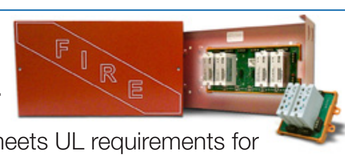
End-of-Line Relay



End-of-Line Relay (rear view)

The End-of-Line Relay facilitates the connection of a non-polarized releasing solenoid to a supervised, polarized releasing circuit. One relay is required per release solenoid.

Module Enclosure



The MFC-A cabinet is UL-listed for use with Signature modules. Shown here with plug-in style I/O modules, the MFC-A also meets UL requirements for spacing and clearance around the SIGA-REL Releasing Module. The cabinet features red epoxy finish with white “FIRE” markings.

Specifications

Power riser	Input voltage	24 Vdc (power limited)
	Supervisory current	25 mA, max.
	Riser input current	4 amps maximum
	Alarm	170 mA min.; 4 A max.
Release circuits	Output rating	2 A @ 24 Vdc (for each circuit)
	Valves per circuit	4 valves, max.
	Max. supervisory current	0.4 mA (short circuit)
	Nominal supervisory current	0.18 mA
	Supervisory voltage	26 Vdc, max. (open circuit)
	End of line device	47k Ohm EOL
Pre-release alarm circuits	Output rating	2 A @ 24 Vdc (for each circuit)
	Max. supervisory current	0.4 mA (short circuit)
	Nominal supervisory current	0.18 mA
	Supervisory voltage	26 Vdc, max. (open circuit)
	End of line device	47k Ohm resistor
Manual release input circuit	Max. supervisory current	0.4 mA (short circuit)
	Nominal supervisory current	0.18 mA
	Supervisory voltage	26 Vdc, max. (open circuit)
	End of line device	47k Ohm resistor
	Circuit type	Class B N.O. latching
	Circuit capacitance	0.1 µF, max
Abort circuit	Max. supervisory current	0.4 mA (short circuit)
	Nominal supervisory current	0.18 mA
	Supervisory voltage	26 Vdc, max. (open circuit)
	End of line device	47k Ohm resistor
	Circuit type	Class B N.O. non- latching
	Circuit capacitance	0.1 µF, max
First alarm output relay	Contact rating	3 A @ 24 Vdc (0.6 power factor) Form C
Signature Data line	Operating voltage	5.2 to 19.95 Vdc
	Supervisory current	1000 µA
	Alarm current	1000 µA
Environmental condiitions	Operating temperature	32° F to 120° F (0° C to 49° C)
	Storage temperature	-4° F to 140° F (-20° C to 60° C)
	Humidity	0 to 93% Non-condensing
Wiring Terminals	Suitable for #18 to #12 AWG (2.5 mm² to .75 mm²)	
Type Code	Factory Set	
Addressing Requirements	Uses six module addresses	
Agency Listings	UL, ULC, and FM	
Compatible Solenoids	Must be both UL/ULC-listed and FM-approved	

***Note:** Output circuits are power-limited when the riser circuit is power-limited.*

Line Resistance

Power riser

Total riser current (Amps)	Distance from SIGA-REL to power supply				Wire resistance (Ohms per wire)
	#12 AWG	2.5 mm²	#14 AWG	1.5 mm²	
4.0	29 ft	8.84 m	20 ft	6.10 m	0.050
3.5	34 ft	10.36 m	23 ft	7.01 m	0.057
3.0	39 ft	11.89 m	27 ft	8.23 m	0.067
2.5	47 ft	14.33 m	32 ft	9.75 m	0.080
2.0	59 ft	17.98 m	40 ft	12.19 m	0.100
1.5	78 ft	23.77 m	53 ft	16.15 m	0.133
1.0	118 ft	35.97 m	80 ft	24.38 m	0.200

Pre-release and release circuits (per circuit)

Total riser current (Amps)	Distance from SIGA-REL to power supply				Wire resistance (Ohms per wire)
	#12 AWG	2.5 mm²	#14 AWG	1.5 mm²	
2.00	176 ft	53.64 m	120 ft	36.58 m	0.300
1.75	202 ft	61.57 m	137 ft	41.76 m	0.343
1.50	235 ft	71.63 m	160 ft	48.77 m	0.400
1.25	282 ft	85.95 m	192 ft	58.52 m	0.480
1.0	353 ft	107.59 m	240 ft	73.15 m	0.600
0.50	706 ft	215.19 m	480 ft	146.30 m	1.200

Ordering Information

Model	Description	Ship Wt. lb (kg)
SIGA-REL	Analog addressable releasing module	0.52 (0.23)
276A-REL	Manual releasing station (single-action). English markings, black text on yellow polycarbonate body.	1.0 (0.45)
278A-REL	Manual releasing station (double-action). English markings, black text on yellow polycarbonate body.	1.0 (0.45)
RELA-ABT	Manual Abort Station. English markings, black text on yellow polycarbonate body.	1.0 (0.45)
RELA-SRV-1	Service Disconnect Switch. One n/c contact and one n/o contact. English markings, white text on blue polycarbonate body.	1.0 (0.45)
RELA-EOL	Polarized end-of-line relay. English markings on stainless steel cover.	0.2 (0.1)
MFC-A	UL listed cabinet for mounting releasing modules, red with white "FIRE". HWD: 8" x 14" x 3½" (203mm x 356mm x 89mm)	7.0 (3.1)

Contact us...

Email: edwards.fire@fs.utc.com
Web: www.est-fire.com

EST is an EDWARDS brand.

1016 Corporate Park Drive
Mebane, NC 27302

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Web: www.chubbedwards.com

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SIGA-REL Technical Reference Manual

P/N 387348 • REV 04 • REB 18JAN13

Document number: 387348-EN Revision: 04

Intended use Use this product only for the purpose it was designed for; refer to the data sheet and user documentation for details. For the latest product information, contact your local supplier or visit us online at www.edwardsutcfs.com.

FCC compliance This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

You are cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

European Union directives

The European directive “Waste Electrical and Electronic Equipment” (WEEE) aims to minimize the impact of electrical and electronic equipment waste on the environment and human health. For proper treatment, recovery, and recycling, you can return the equipment marked with this symbol to your local supplier upon the purchase of equivalent new equipment, or dispose of it in designated collection points. Further information can be found on the following website: *www.recyclethis.info.*

European representative for manufacture: UTC Fire & Security B.V., Kelvinstraat 7, 6003 DH Weert, Netherlands.

Versions

Information in this manual applies to the following versions of system development or configuration software.

EST2 Version 3.2
EST3 Version 3.6
QS-CU Version 1.8

Content

Important information

Limitation of liability

This product has been designed to meet the requirements of NFPA 72 *National Fire Alarm Code,* UL 864 *Standard for Control Units for Fire Protective Signaling Systems,* and ULC S527 *Standard for Control Units for Fire Alarm Systems.* Installation in accordance with this manual, applicable codes, and the instructions of the authority having jurisdiction is mandatory. UTC Fire & Security shall not under any circumstances be liable for any incidental or consequential damages arising from loss of property or other damages or losses owing to the failure of UTC Fire & Security products beyond the cost of repair or replacement of any defective products. UTC Fire & Security reserves the right to make product improvements and change product specifications at any time.

While every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents, UTC Fire & Security assumes no responsibility for errors or omissions.

FCC compliance

This equipment can generate and radiate radio frequency energy. If the equipment is not installed in accordance with this manual, it may cause interference to radio communications. This equipment has been tested and found to comply with the limits for Class A computing devices pursuant to Subpart B of Part 15 of the FCC Rules. These rules are designed to provide reasonable protection against such interference when this equipment is operated in a commercial environment. Operation of this equipment is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Related documents

EST2 documentation	*EST2 Installation and Service Manual* (P/N 270186) *EST2 Network Supplement Manual* (P/N 270894) *EST2 System Operations Manual* (P/N 270188) *EST2 System Programming Manual* (P/N 270187) *EST2 Installation Sheets* (P/N 3100056) *2-SDU Online Help*
EST3 documentation	*EST3 Installation and Service Manual* (P/N 270380) *EST3 System Operations Manual* (P/N 270382) *EST3 Installation Sheets* (P/N 3100051) *EST3 International Supplement Manual* (P/N 270925) *3-SDU Help*
QuickStart documentation	QS1 Technical Reference Manual (P/N 3100184) QS4 Technical Reference Manual (P/N 3100186) QuickStart Configuration Utility Online Help (P/N 7350047)
Signature Series documentation	Signature Series Intelligent Smoke and Heat Detectors Applications Bulletin (P/N 270145) Signature Series Component Installation Manual (P/N 270497) Serial Number Log Book (P/N 270267)
EST Publications: Speaker and strobe documentation	EST Speaker Application Guide (P/N 85000-0033) Handbook of Visual Notification Appliances for Fire Alarm Applications (P/N 85001-0541)

Installation codes and standards

The Signature Series fire detection devices are designed to meet the requirements of NFPA Standard 72, Underwriters Laboratories, Inc. Standard 864, and Underwriters Laboratories of Canada, Inc. Standard ULC S527. Other related codes and standards are listed below. Information contained in this document is intended to serve as a guide. Installation in accordance with the instruction sheets (provided with Signature Series devices), applicable codes, and the instructions of the AHJ is mandatory.

National Fire Protection Association (NFPA)	NFPA 11 *Low-Expansion Foam Systems* NFPA 12 *Carbon Dioxide Extinguishing Systems* NFPA 11A *Medium- and High-Expansion Foam Systems* NFPA 12A *Halon 1301 Fire Extinguishing Systems* NFPA 13 *Sprinkler Systems* NFPA 15 *Water Spray Fixed Systems for Fire Protection* NFPA 16 *Deluge Foam-Water Sprinkler and Foam-Water Spray Systems* NFPA 17 *Dry Chemical Extinguishing Systems* NFPA 70 *National Electric Code* NFPA 72 *National Fire Alarm Code* NFPA 2001 *Standard on Clean Agent Fire Extinguishing Systems*
Underwriters Laboratories, Inc. (UL)	QuickStart: UL 864 (8th Edition) *Control Units for Fire-Protective Signaling Systems* EST2: UL 864 (8th Edition) *Standard for Control Units for Fire Protective Signaling Systems* EST3: UL 864 (9th Edition) *Standard for Control Units and Accessories for Fire Alarm Systems*
Underwriters Laboratories, Canada (ULC)	ULC S527 *Standard for Control Units for Fire Alarm Systems*
Factory Mutual Research Corporation (FM)	1011-1012 *Deluge and Preaction Systems*
European standards	73/23/EEC *Low Voltage Directive* 89/336/EE *Electromagnetic Compatibility Directive* (as amended by 9/31/EEC) EN 50130-4; 1995 *Immunity requirements for Components of Fire, Intruder, and Social Alarm Systems* EN 55022:1995 *Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Components*
Other requirements	Other requirements that affect the installation of this system include: • State and local building codes • Instructions of the AHJ

Chapter 1
Product design

Summary

This chapter provides information for system designers. The SIGA-REL supports a variety of fire suppression applications. These applications include sprinkler systems and automatic fire extinguishing systems. The SIGA-REL works with manual and automatic inputs. This chapter explains how the SIGA-REL fits into a fire alarm system and how it behaves during fire alarms.

Content

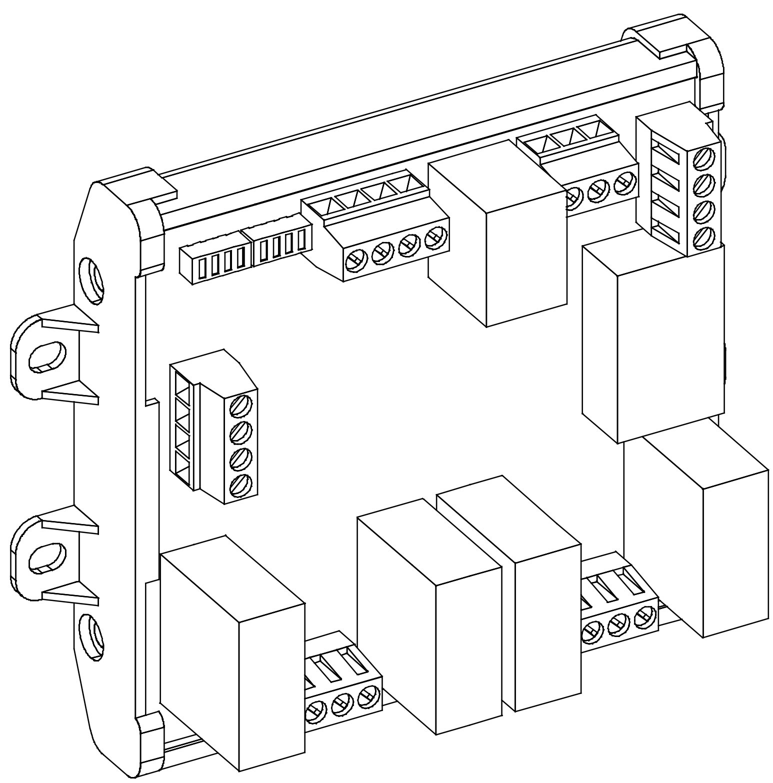
Introducing the SIGA-REL

Description

The SIGA-REL Releasing Module (Figure 1) is a Signature Series component consisting of:

- Two supervised release circuits
- Two supervised prerelease circuits
- One supervised manual release input circuit
- One zone relay output (Form C contact)
- One supervised abort circuit for a normally-open abort switch

Figure 1: SIGA-REL Releasing Module



The SIGA-REL controls operations for deluge, preaction, and automatic fire extinguishing systems. The release circuits control the release of gas and other fire suppression agents by controlling the release solenoids. The release circuits operate in unison and cannot be controlled separately.

Prerelease circuit 1 supports audible notification appliances that sound alert, prerelease, and release signals. Prerelease circuit 2 supports visual notification appliances.

Features

The SIGA-REL includes an intelligent microprocessor that supports:

- Deluge sprinkler operation
- Preaction sprinkler operation
- Automatic fire extinguishing operation
- Selectable abort modes

Fire suppression systems

Sprinkler systems

The SIGA-REL works with two types of sprinkler systems: deluge and preaction. The primary difference between these systems is the type of sprinkler head (or nozzle) that terminates the pipes. Table 1 outlines the Factory Mutual Research Corporation (FM) requirements for deluge and preaction systems. FM also requires FM Approved compatible release valves. See Table 4 in the topic “Compatible panels and devices.”

Table 1: FM requirements for deluge and preaction systems

Specification	Value
Standby operation	90 hours
Alarm operation	10 minutes
NFPA style	Class A (Style D or E) Class A (Style 2α, 5, 6, or 7)

Deluge sprinkler systems

In *deluge* sprinkler systems, open-valve sprinkler heads terminate pipes connected to a water supply controlled by a single valve. When the system detects a fire, it automatically opens the valve to allow the water to flow through all of the sprinkler heads. Deluge sprinklers are useful for applications that require the simultaneous discharge of water through every sprinkler.

The following fire detection systems meet FRMC requirements for deluge systems:

- Wet pilot sprinkler line
- Dry pilot sprinkler line
- Hydraulic rate-of-rise
- Pneumatic rate-of-rise
- Electric

Preaction sprinkler systems

In *preaction* sprinkler systems, closed-valve sprinkler heads terminate pipes connected directly to a water supply. The water supply is usually in the same area as the sprinklers, and the pipes are supervised for air pressure. Preaction sprinklers are useful where it is important to prevent the accidental discharge of water.

The following fire detection systems meet FRMC requirements for preaction systems:

- Hydraulic rate-of-rise
- Pneumatic rate-of-rise
- Electric

Automatic fire extinguishing systems

Automatic fire extinguishing systems automatically detect and extinguish fires. They require no manual input because detectors automatically activate releasing solenoids or sprinkler valves.

Improper application of fire suppression agents can lead to property damage, injury, or loss of life. Consult the applicable NFPA documents and the AHJ for more information.

Table 2 provides a list of the fire suppression agents and the applicable NFPA documents.

Table 2: Fire suppression agents and NFPA standards

Agent	NFPA standard
Low-expansion foam	NFPA 11
Medium- and high-expansion foam	NFPA 11A
Carbon dioxide	NFPA 12
Halon 1301	NFPA 12A

Agent	NFPA standard
Sprinklers	NFPA 13
Water spray	NFPA 15
Foam-water	NFPA 16
Dry chemicals	NFPA 17
Clean agent	NFPA 2001

Table 3 outlines the FM requirements for automatic fire extinguishing systems.

Table 3: FM requirements for automatic fire extinguishing systems

Specification	Value
Standby operation	24 hours
Alarm operation	10 minutes
NFPA style	B or D
FM documentation	FMRC Approval Guide (Volume 1)

Compatible panels and devices

Panels

The SIGA-REL is compatible with EST2, EST3, and QuickStart fire alarm control panels.

Note: The SIGA-REL has not been tested with the QuickStart fire alarm control panel for UL 864 9th edition, and may not comply with the latest editions of NFPA 72 and UL 864. This application requires the approval of the local authority having jurisdiction (AHJ).

The SIGA-REL must be installed in an enclosure dedicated to the releasing system. No other devices may be installed in the enclosure. You can install the SIGA-REL in any of the following enclosures:

- 2-WB series
- 3-RCC series
- 3-CAB series
- MFC-A

- RACCR series

Maintain a 1-inch (25.4 mm) minimum clearance all around the SIGA-REL. The clearance space must also comply with NFPA 70, the *National Electrical Code*.

Software

You will need the latest version of the system definition utility or configuration utility for your EST2, EST3, or QuickStart system. These are available from our website:

- For EST2: 2-SDU
- For EST3: 3-SDU
- For QuickStart: QS-CU

Power supplies

The SIGA-REL is compatible with the following power supplies:

- 2-PPS, 2-PPS/220
- 2-PPS/6A, 2-PPS/6A-220
- 3-BPS/M, 3BPS/M-230
- 3-PPS/M, 3-PPS/M-230
- BPS6A*, BPS6A/230*
- BPS10A*, BPS10A/230*

* Not compatible with FM sprinkler applications that require 90 hours of standby.

Note: The SIGA-REL is not compatible with the QuickStart power supply (PS6 Power Supply Card).

Notification appliances

The SIGA-REL prerelease circuits support audible and visible notification appliances. You must use appliances that are compatible with the fire alarm control panel. Refer to the control panel documentation for a list of compatible appliances.

Note that the SIGA-REL is not designed to generate an ANSI S3.41 tone, and does not meet UL 864 requirements for an audible alarm notification circuit intended for evacuation.

Solenoid control relays

To activate the releasing solenoids, you must use RELA-EOL relays as solenoid control relays. These relays buffer the SIGA-REL from valve solenoid spikes. For more information, see the RELA-EOL installation sheet.

Manual release stations

For manual release stations, the SIGA-REL requires normally-open, dry contact signal initiating devices. The manual release station controls only the SIGA-REL to which it is connected.

Manual release stations must be listed with the appropriate agencies in your area. See the heading “Listing agencies,” later in this topic.

The following manual release stations are approved by FM for use with the SIGA-REL:

- 276A-REL - Manual Release Station
- 278A-REL - Double Action Manual Release Station

When using NFPA 12A and NFPA 2001 suppression agents, a separate, mechanical manual release is required in addition to the release station connected to the SIGA-REL.

Abort stations

The SIGA-REL requires normally-open, momentary-action abort stations. The abort station controls only the SIGA-REL to which it is connected.

Abort stations must be listed with the appropriate agencies in your area. See the heading “Listing agencies,” later in this topic.

The RELA-ABT - Manual Abort Station is approved by FM for use with the SIGA-REL.

Service disconnect stations

The SIGA-REL requires listed service disconnect stations that are normally closed (minimum 2.0 Amps).

Service disconnect stations must be listed with the appropriate agencies in your area. See the heading “Listing agencies,” later in this topic.

The RELA-SRV-1 - Service Disconnect Switch is approved by FM for use with the SIGA-REL.

Releasing solenoid valves

Releasing solenoid valves must be listed with the appropriate agencies in your area. FM requires FM Approved release valve solenoids. Table 4 lists the FM Approved solenoid release valves that work with the SIGA-REL.

Table 4: FM Approved solenoid release valves

Group	Manufacturer	Model
A	Skinner	LV2LBX25
B	ASCO	T8210A107 R8210A107 8210A107
D	ASCO	8210G207 HV2648571 HV2648581
E	Skinner	73218BN4UNLVNOC111C2 73212BN4TN00N0C111C2
F	Skinner	73212BN4TNLVNOC322C2
G	Skinner	71395SN2ENJ1NOH111C2
H	Viking	HV-274-060-001

Table 5: UL/ULC Listed solenoid release valves

Manufacturer	Model
Ansul	73327
ASCO	T8210A107 R8210A107 8210A107 8210G207
Skinner	LV2LBX25 73218BN4UNLVNOC111C2 73212BN4TNLVNOC322C2 71395SN2ENJ1NOH111C2

Listing agencies

Listing agencies whose codes and standards may apply in your area include:

- Factory Mutual Research Corporation (FM)
- Underwriters Laboratories, Inc. (UL)
- Underwriters Laboratories Canada (ULC)

Specifications

Table 6: SIGA-REL specifications

Power riser	Input voltage: 18.4 to 27.4 VDC
	Supervisory current: 17 mA, max.
	Alarm current: 190 mA min., 4 A max. (depends on output circuit loading)
	Line resistance: See Table 7.
	UL rating: must be power-limited
Release circuits, TB4	Release circuit 1: TB4-1 and TB4-2, 2 A at 24 VDC max. [1]
	Release circuit 2: TB4-3 and TB4-4, 2 A at 24 VDC, max. [1]
	Valves per circuit: 4 valves, max.
	Line resistance: See Table 8
	End of line device: 47 kΩ resistor
	Supervision: Open, short, and ground
	UL rating: Special application, supervised and power-limited
Prerelease circuits, TB5	Prerelease circuit 1: TB5-1 and TB5-2, 2 A at 24 VDC, max. [1]
	Prerelease circuit 2: TB5-3 and TB5-4, 2 A at 24 VDC, max. [1]
	Line resistance: See Table 8
	End of line device: 47 kΩ resistor
	Supervision: Open, short, and ground
	UL rating: Special application, supervised and power-limited
Manual release input circuit, TB3-1 and TB3-2	Line resistance: 25 Ω/wire, 18 AWG = 3,800 ft (0.75 sq mm = 1,158 m)
	End of line device: 47 kΩ resistor
	Circuit capacitance: 0.1 μF, max.
	Supervision: Open and ground
Abort circuit, TB3-3 and TB3-4	Line resistance: 25 Ω/wire, 18 AWG = 3,800 ft (0.75 sq mm = 1,158 m)
	End of line device: 47 kΩ resistor
	Circuit capacitance: 0.1 μF, max.
	Supervision: Open and ground
Zone relay output, TB2	Zone relay output
	Contact rating: 3 A at 24 VDC, (resistive load) Form C

Signature data line, TB1	Operating voltage: 15.2 to 19.95 VDC Supervisory current: 1 mA Alarm current: 1 mA Line resistance: See the installation sheet for the Signature loop controller Maximum quantity: 10 SIGA-RELs per loop
Environmental conditions	Operating temperature: 32 to 120 °F (0 to 49 °C) Storage temperature: -4 to 140 °F (-20 to 60 °C) Humidity: 0 to 93% RH, noncondensing

[1] Riser current: The total current of the prerelease and release circuits is limited to 3.83 A. This is the power riser maximum input current of 4 A, minus 170 mA.

Table 7: Power riser

Total riser current (A)	Distance from SIGA-REL to power supply				Wire resistance [1]
	12 AWG	2.5 sq mm	14 AWG	1.5 sq mm	
4.0	29 ft	8.84 m	20 ft	6.10 m	0.050
3.5	34 ft	10.36 m	23 ft	7.01 m	0.057
3.0	39 ft	11.89 m	27 ft	8.23 m	0.067
2.5	47 ft	14.33 m	32 ft	9.75 m	0.080
2.0	59 ft	17.98 m	40 ft	12.19 m	0.100
1.5	78 ft	23.77 m	53 ft	16.15 m	0.133
1.0	118 ft	35.97 m	80 ft	24.38 m	0.200

[1] Wire resistance measured in Ω per wire

Table 8: Prerelease and release circuits (per circuit)

Total riser current (A)	Distance from SIGA-REL to signals				Wire resistance [1]
	12 AWG	2.5 sq mm	14 AWG	1.5 sq mm	
2.00	176 ft	53.64 m	120 ft	36.58 m	0.300
1.75	202 ft	61.57 m	137 ft	41.76 m	0.343
1.50	235 ft	71.63 m	160 ft	48.77 m	0.400
1.25	282 ft	85.95 m	192 ft	58.52 m	0.480
1.00	353 ft	107.59 m	240 ft	73.15 m	0.600
0.50	706 ft	215.19 m	480 ft	146.30 m	1.200

[1] Wire resistance measured in Ω per wire

Table 9: Compliance requirements

Item	Requirement
Power riser	When two or more SIGA-RELs are powered from a single riser, those SIGA-RELs must be in the same notification zone.
NAC synchronization	UL 864 requires synchronization of notification appliances when they are in the same notification zone. This means that when more than one SIGA-REL is installed, the audible and visible notification appliances controlled by each SIGA-REL must operate in separate notification zones. The notification appliance output from two SIGA-RELs cannot be audible or visible within the same notification zone.
Evacuation tone	The SIGA-REL is not designed to generate an ANSI S3.41 tone, and does not meet UL 864 requirements for audible alarm notification circuits intended for evacuation. Notification zones must include additional NACs and appliances capable of producing the required evacuation tone to meet these requirements.
Horns	Horn signaling patterns are controlled by the SIGA-REL, so configurable horns must be set for steady output.
Manual release station	The manual release station controls only the SIGA-REL to which it is connected. When using NFPA 12A and NFPA 2001 suppression agents, a separate, mechanical manual release is required in addition to the release station connected to the REL.
Abort station	The abort station controls only the SIGA-REL to which it is connected. However, activation of the abort switch must be annunciated at all panels in a network. UL 864 allows only one abort station per suppression area. This means you cannot install more than one SIGA-REL per suppression area.
Zone relay output	Zone relay output contacts cannot be used for a notification appliance circuit or a nonaddressable signaling line circuit.
Service disconnect station	Activation of the service disconnect must be annunciated as a supervisory event at all panels in a network.

Application block diagrams

System overview

The SIGA-REL is a Signature Series module that interfaces a Signature loop controller with fire suppression components. The SIGA-REL module works with sprinkler systems and automatic extinguishing systems. Sprinklers include preaction and deluge systems. Automatic fire extinguishing systems include the fire suppression agents listed in Table 2.

The SIGA-REL includes two releasing circuits. These control RELA-EOL relays, which in turn control the releasing solenoids. The releasing circuits act in unison and cannot be controlled separately.

Prerelease circuit 1 supports audible notification appliances in order to sound alert, prerelease, and release signals. The alert tone sounds at 15 pulses per minute; the prerelease tone at 60 pulses per minute. The release tone is a steady tone. Prerelease circuit 2 supports visual notification appliances.

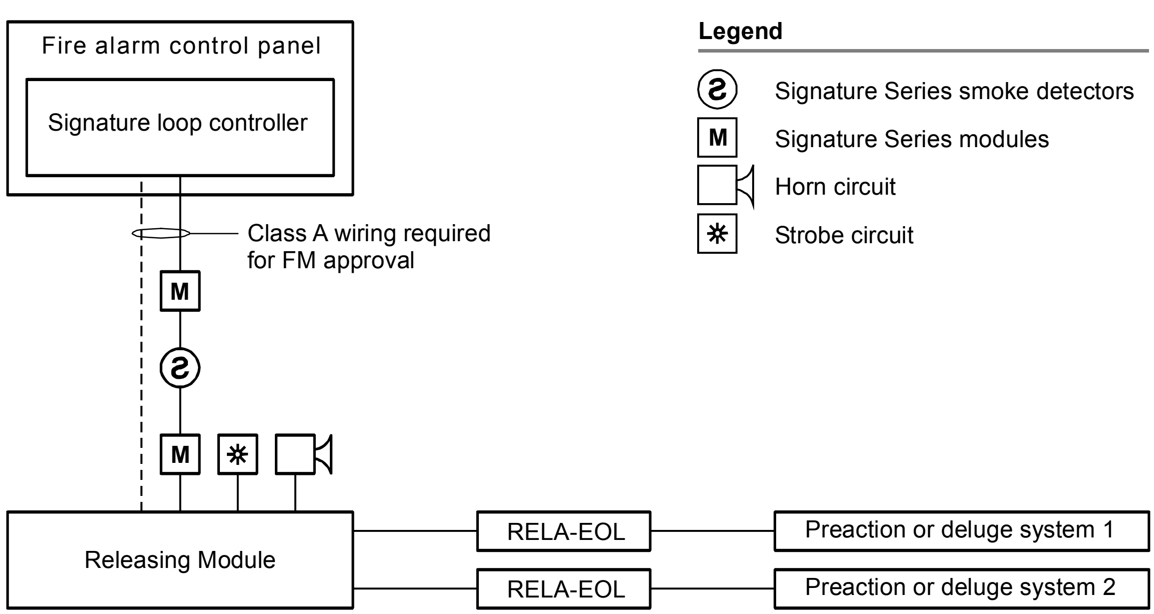
Note: These signals do not meet UL 864 requirements for audible alarm notification circuits intended for evacuation. This application requires additional NACs and audible devices capable of generating the required ANSI S3.41 audible emergency evacuation signal pattern.

See Chapter 2 “Installation” on page 19 for details about SIGA-REL wiring, specifications, mounting, and abort mode settings. For wiring resistance calculations, see the topic “Specifications,” earlier in this chapter.

Preaction or deluge sprinkler systems

Figure 2 illustrates the integration of the SIGA-REL with the fire alarm control panel and a preaction or deluge sprinkler system. Sprinkler systems do not include service disconnect stations, abort stations, or manual release stations.

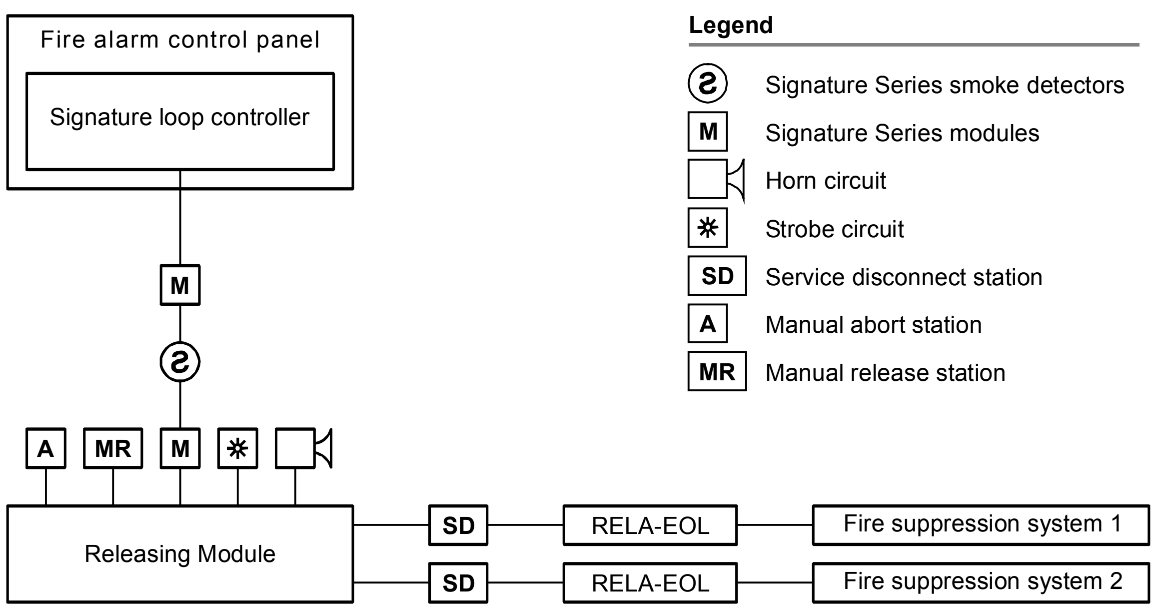
Figure 2: Integration of the SIGA-REL with a deluge or preaction sprinkler system



Automatic fire extinguishing systems

The SIGA-REL also supports automatic extinguishing systems, which provide manual actuation of abort, release, and service-disconnect functions. Figure 3 illustrates the integration of the SIGA-REL with a fire alarm control panel in an automatic fire extinguishing system.

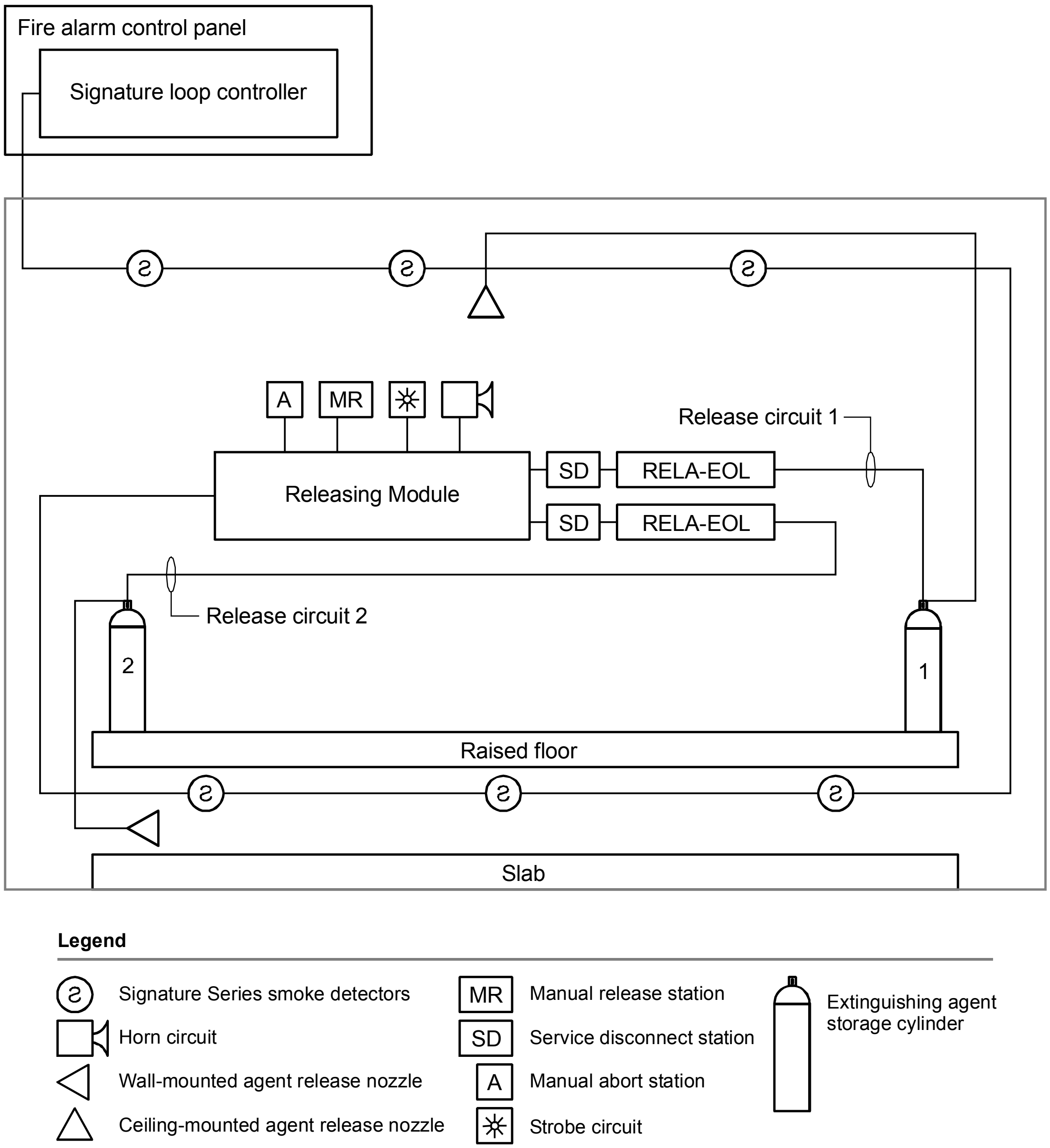
Figure 3: Integration of the SIGA-REL with an automatic extinguishing system



Fire suppression application

The SIGA-REL includes two releasing circuits, which can provide fire suppression in two separate areas. The releasing circuits operate in unison and cannot be controlled separately. The computer room illustrated in Figure 4 is a typical application for the Releasing Module.

Figure 4: Typical computer room application



Release sequences

Automatic release sequence

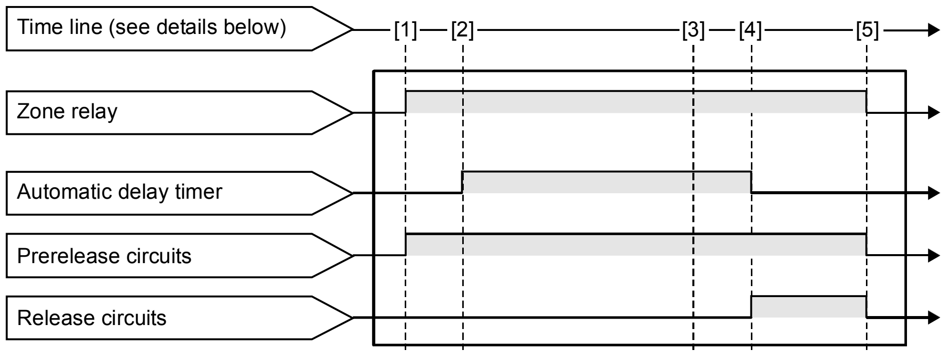
The automatic release sequence requires an AND group or a matrix group. AND groups and matrix groups require fire alarm signals from designated Signature Series devices.

These logic groups are programmed using a PC and the System Definition Utility (SDU) or Configuration Utility (CU) for your system. Figure 5 explains the automatic release sequence.

Note: EST2 systems do not support matrix groups. See Chapter 3 “Programming” on page 33 for details on AND group rules. To create AND groups, see the *EST2 System Programming Manual* and the *2-SDU Online Help.*

The SIGA-REL horn circuit is not designed to generate an ANSI S3.41 tone, and does not meet UL 864 requirements for audible alarm notification circuits intended for evacuation. Notification zones must include additional NACs and appliances capable of producing the required evacuation tone to meet these requirements.

Figure 5: Automatic release sequence



[1] A detector signals the first alarm. This event simultaneously activates the:

- Zone relay
- Strobe circuit (on steady)
- Horn circuit alert tone (15 pulses per minute)

[2] A detector in the protected area signals a second alarm and meets the AND group conditions.* After a ten-second delay, the automatic delay timer starts its countdown and the horn circuit changes to the prerelease tone (60 pulses per minute).

*AND group and matrix group conditions depend on programming.

[3] Ten seconds before the automatic delay timer expires, the horn circuit changes to the release tone (steady).

[4] The automatic delay timer expires and the release circuits activate.

[5] A manual reset at the fire alarm control panel deactivates the release solenoids and the Releasing Module returns to the normal state.

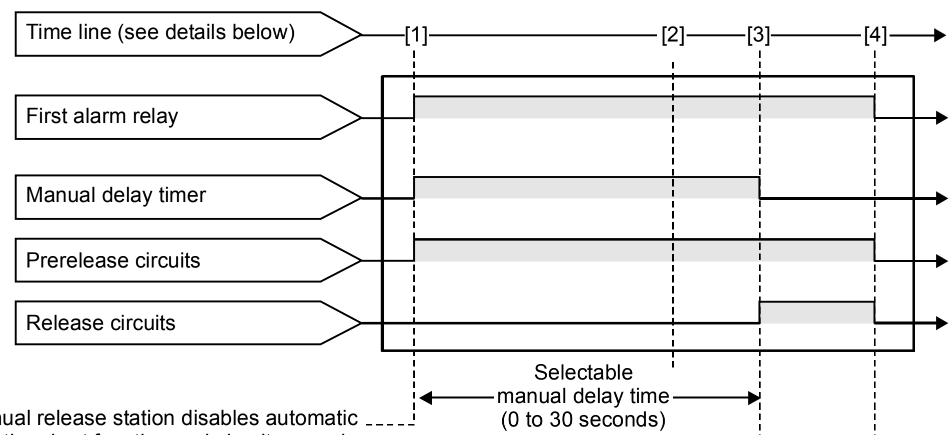
Manual release sequence

WARNING: You cannot abort the manual release sequence.

The operation of a manual release station initiates the manual release sequence. Figure 6 explains the manual release sequence.

A manual release overrides all other operations and sequences, including all modes of the abort function.

Figure 6: Manual release sequence



[1] An active manual release station disables automatic operation and the abort function and simultaneously activates the:

- Manual delay timer
- Strobe circuit (on steady)
- Horn circuit prerelease tone (60 pulses per minute)

[2] Ten seconds before the expiration of the manual delay timer, the horn changes to the release tone (steady).

[3] The manual delay timer expires and the release circuits activate.

[4] A manual reset at the fire alarm control panel deactivates the release solenoids and the Releasing Module returns to the normal state.

Chapter 2
Installation

Summary

This chapter shows you how to mount and wire the SIGA-REL. When you install the SIGA-REL, be sure to follow agency and local requirements along with the instructions in this manual.

Content

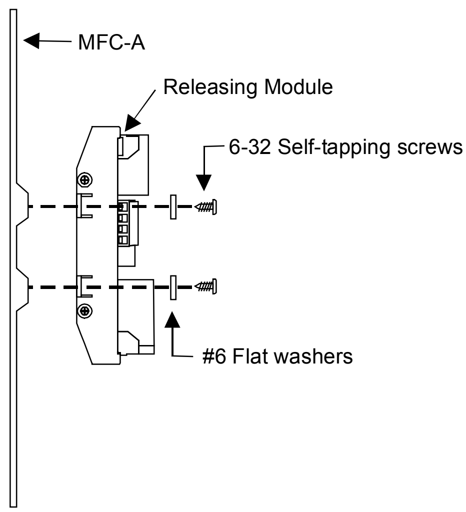
Mounting the SIGA-REL

The SIGA-REL and the MFC-A require separation between power-limited and nonpower-limited wiring. See the MFC-A installation sheet for details about power-limited wiring in that enclosure. See the topic “Wiring the SIGA-REL” later in this chapter for details about power-limited wiring on the SIGA-REL.

To mount the SIGA-REL in an MFC-A cabinet:

1. Align the SIGA-REL to the designated mounting holes in the MFC-A (Figure 7 and Figure 8).
2. Secure the SIGA-REL to the MFC-A using the screws and washers provided.
3. Run the wiring from the SIGA-REL to the fire suppression components through the conduit knockouts in the MFC-A.

Figure 7: Mounting the SIGA-REL



To mount the SIGA-REL in other enclosures:

1. Use the SIGA-REL to mark the mounting hole locations (Figure 9).
2. Drill the mounting holes at the marks made in step 1 (mounting hole diameter = 0.125 in or 3.175 mm).
3. Mount the SIGA-REL in the cabinet using the screws and washers provided.

Figure 8: MFC-A/SIGA-REL footprint

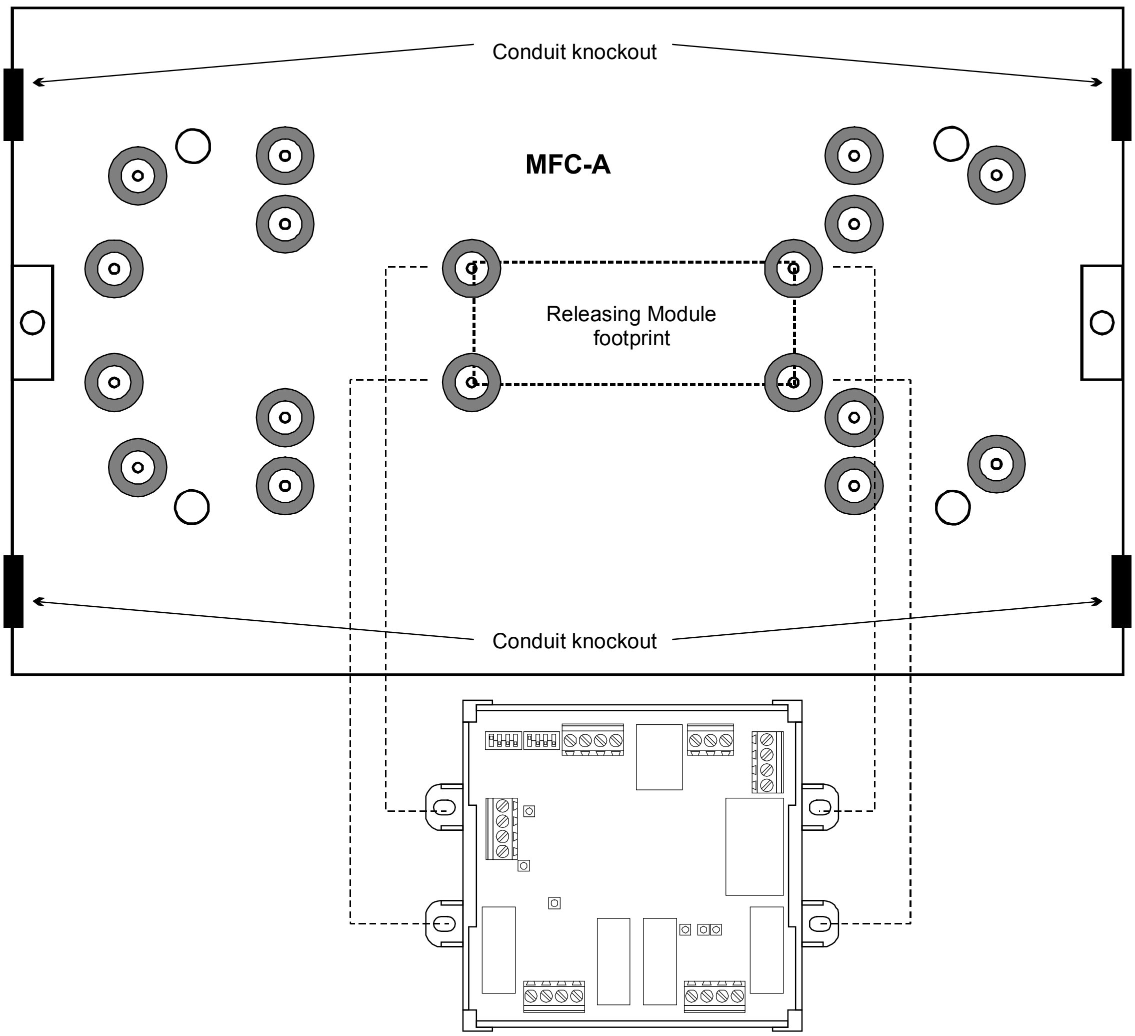
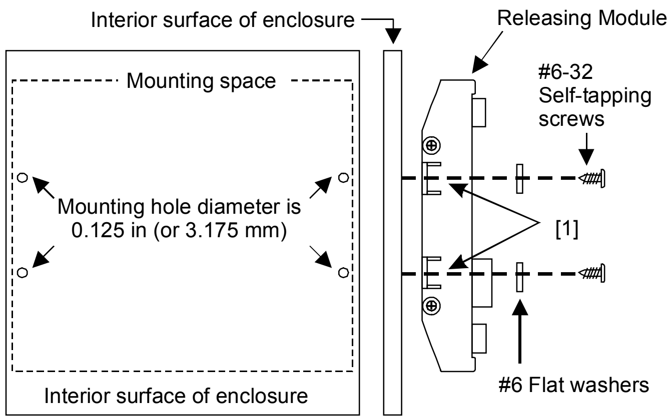


Figure 9: SIGA-REL mounting holes in compatible cabinets



Notes

[1] Mark the mounting hole locations here

2. See compatible enclosure installation sheets for the routing of power-limited and nonpower-limited wiring

Setting abort mode and delay times

Choosing the abort mode

Table 10 provides descriptions for the SIGA-REL abort modes.

Note: Abort modes 3 and 4 do not comply with UL or ULC.

Table 10: Abort mode descriptions

Mode	Description
1 (Factory default)	If the abort is initiated before the automatic delay timer expires, it prevents the releasing action. The automatic delay timer continues to run while the abort is active. When the abort is restored, the release occurs with the expiration of the automatic delay timer or the abort delay timer, whichever occurs last.
2	If the abort is initiated before the automatic delay timer expires, it prevents the releasing action. The automatic delay timer stops running. When the abort is restored, the automatic delay timer resumes and the release occurs with the expiration of the timer.
3 (Industrial Risk Insurers)	To be recognized as valid, the abort must be active when the second alarm is received. When the abort is restored, the release occurs with the expiration of the abort delay timer (set for 10 seconds). If the valid abort is held for more than 10 seconds, the automatic delay timer is inactive. If the valid abort is held for less than 10 seconds, the automatic delay timer operates as programmed.
4 (International)	If the abort is initiated before the automatic delay timer expires, it prevents the releasing action. The automatic delay timer stops running. When the abort is restored, the automatic delay timer resets and commences time from t = 0. The release occurs with the expiration of the timer setting minus 10 seconds.

Setting the DIP switches

Figure 10 shows the default DIP switch settings of the SIGA-REL. DIP switch settings for the SIGA-REL abort modes and delay time settings are shown in Table 11 through Table 14.

Note: If you change the DIP switch settings after completing your installation, programming, and testing, you'll need to reset the fire alarm control panel for the new settings to take effect.

Figure 10: SIGA-REL DIP switches

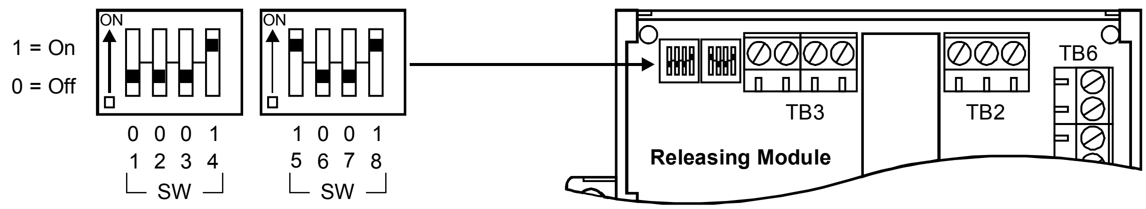


Table 11: Abort mode settings

Abort mode	SW1	SW2
1 (Default)	0	0
2	0	1
3 (IRI)	1	0
4 (International)	1	1

Table 12: Manual delay time settings

Time delay	SW3	SW4
No delay	0	0
10 seconds (Default)	0	1
20 seconds	1	0
30 seconds	1	1

Table 13: Automatic delay time settings

Time delay	SW5	SW6	SW7
10 seconds	0	0	0
20 seconds	0	0	1
30 seconds	0	1	0
40 seconds	0	1	1
50 seconds (Default)	1	0	0

Table 14: Abort delay time settings

Time delay	SW8
No delay	0
10 seconds (Default)	1

Reading the LEDs

Figure 11 shows the location of the LEDs on the SIGA-REL. These are labeled DS1 through DS7.

Figure 11: SIGA-REL LEDs

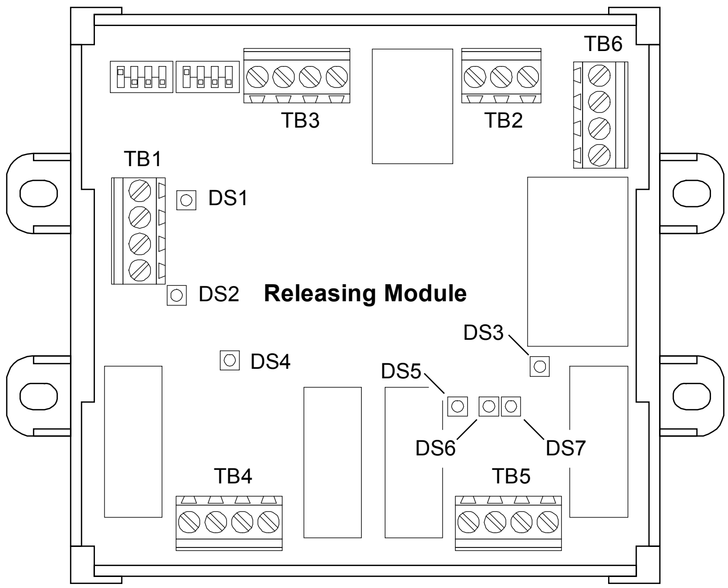


Table 15: SIGA-REL LEDs

LED	Color	Pattern	Function
DS1	Red	Flashing	Data (alarm conditions)
DS2	Green	Flashing	Data (normal conditions)
DS3	Red	Steady	Alarm
DS4	Green	Steady	Power
DS5	Yellow	Steady	Abort
DS6	Yellow	Steady	Trouble
DS7	Red	Steady	Release active

Wiring the SIGA-REL

Caution: Do not connect the releasing solenoids before the system has been programmed and tested, and the Signature loop controller and SIGA-REL have reached their normal state. See Chapter 3 "Programming" and Chapter 4, "Testing and troubleshooting" for details. Failure to follow these instructions can result in unexpected release of the fire suppression agent.

Observe static-sensitive material handling practices while installing or servicing the SIGA-REL. Electrostatic discharge may damage the equipment and activate the release circuits.

Ensure that you are using a compatible power supply, as listed in the topic "Compatible panels and devices" on page 6.

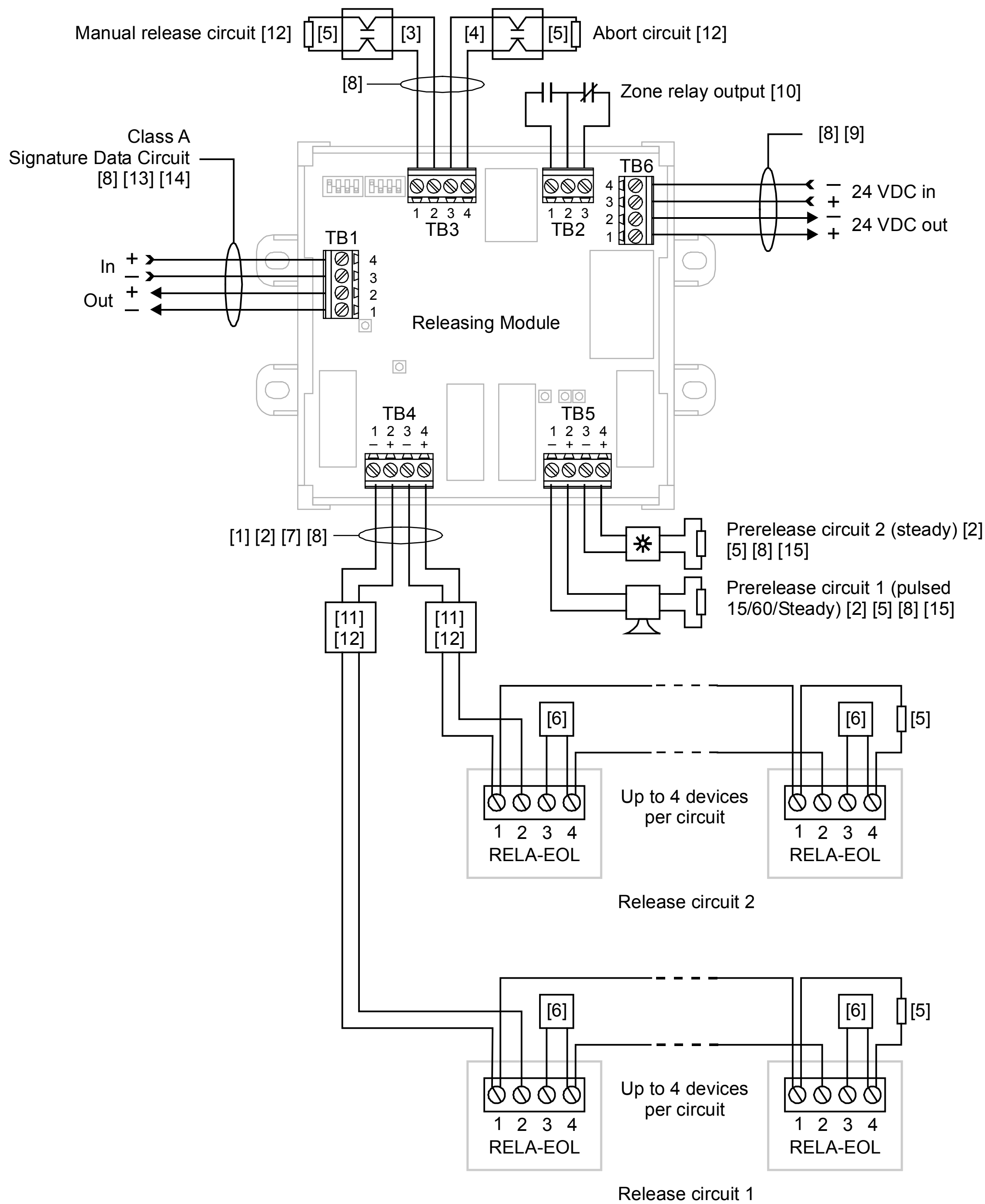
Wire the SIGA-REL according to Figure 13.

If your application requires supervision of the service disconnect station, install and wire components according to Figure 13.

EST2 and EST3 systems have a relay confirmation function that you can program to indicate activation of the prerelease and release relays at the panel. QuickStart systems do not offer relay confirmation, so additional components are required to indicate activation of the prerelease and release relays. See Figure 14 for component and wiring details.

Note: When you use monitor or supervisory event messages to indicate activation of the service disconnect station, prerelease relay, or release relay, you *must* route those messages to the panel.

Figure 12: SIGA-REL wiring



Wiring diagram notes

[1] Four RELA-EOLs per circuit, max.

[2] Class B, 24 VDC output.

[3] Class B, normally-open manual release station.

[4] Class B, normally-open abort station.

[5] Listed 47 kΩ EOL resistor.

[6] Listed 24 VDC nonpolarized valve. The releasing solenoid valve wiring is not supervised. Run the connection to the valve in conduit within 20 feet of the RELA-EOL relay.

[7] Polarity of circuit shown in supervisory state. On alarm, polarity reverses.

[8] Supervised and power-limited.

[9] See "Power supplies" on page 7 for a list of compatible power supplies.

[10] Zone relay output. Power-limited when connected to a power-limited source. If nonpower-limited, maintain 1/4 inch (6.4 mm) separation. Otherwise, use FPL, FPLR, or FPLP in accordance with the National Electric Code (NEC).

[11] Listed service disconnect station. Must be rated for regulated applications and 2A at 24 VDC. See Figure 13 on page 28 for details on supervision of the service disconnect station.

[12] Not used in preaction or deluge sprinkler systems.

[13] Ten Releasing Modules per loop, max.

[14] Class A required for FM-listed deluge or preaction systems.

[15] Compatible notification appliances as specified in the panel documentation. Configurable horns must be set for steady operation.

16. Installations that include other wiring require FPL, FPLR, FPLP, or equivalent NEC-approved wiring for all power-limited wiring.

Figure 13: Supervision of the service disconnect switch

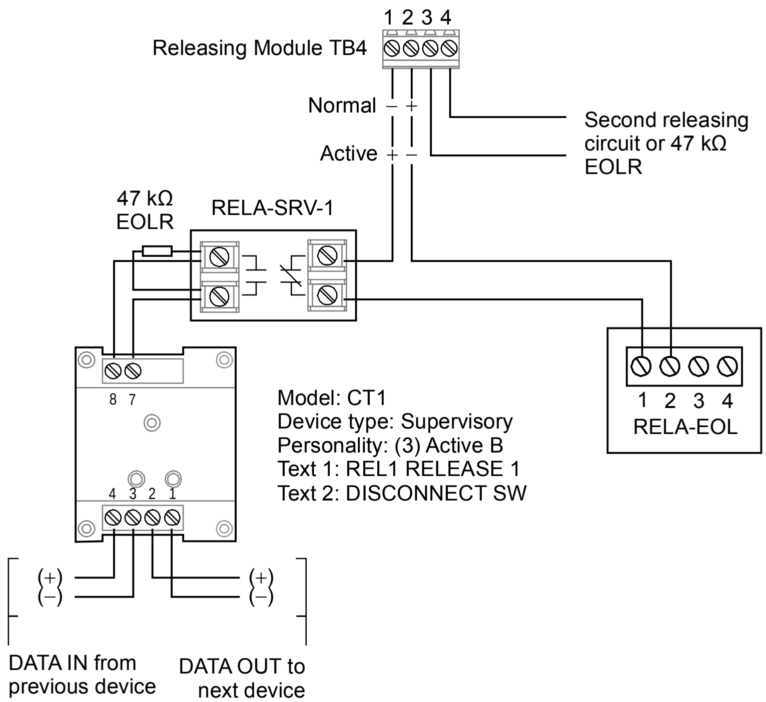
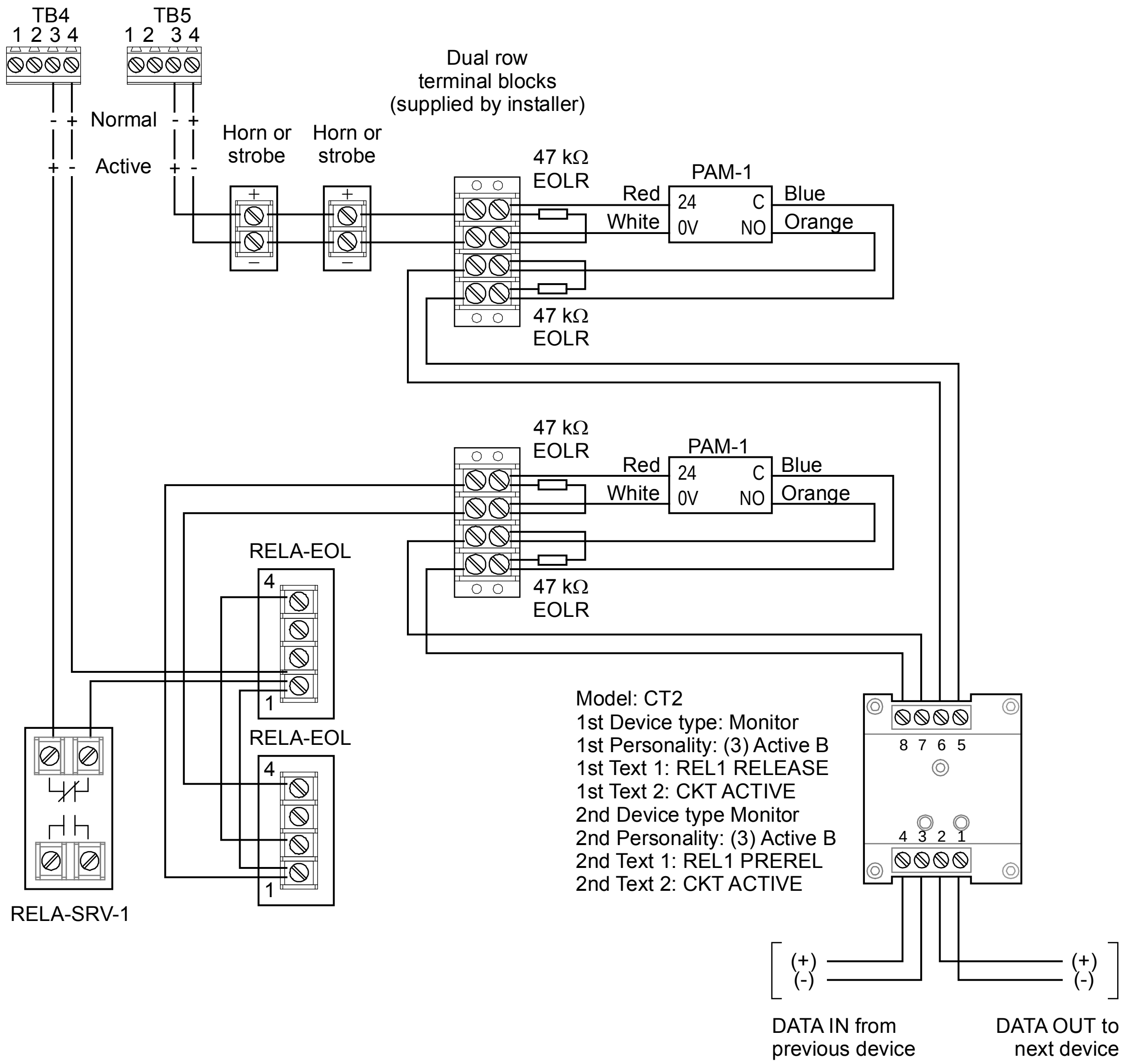


Figure 14: QuickStart annunciation of the prerelease and release relays



Warning notice placards

To ensure safety with the SIGA-REL:

- Copy Figure 15. Cut out the photocopied placard along the perforated line, and post it next to the SIGA-REL.
- Copy Figure 16. Cut out the photocopied placard along the perforated line, and post it next to the fire alarm control panel.
- Inform all appropriate personnel about the posted warnings, their locations, and their importance.
- Enforce compliance with these warnings during all installation, testing, and service procedures.

Figure 15: SIGA-REL warning notice

WARNING!

Disconnect all wiring on TB4 of the Releasing Module (release circuits 1 and 2) during system service.

Disabled points will not prevent activation of the release circuits.

Failure to follow these instructions may result in loss of life, serious injury, or property damage.

Figure 16: Panel warning notice

WARNING!

This system includes a fire supression agent releasing module.

Building occupants must be notified prior to any system test or service.

All releasing circuits must be manually disconnected prior to any system test or service.

All releasing circuits must be returned to their normal operating conditions upon completion of system test or service.

Failure to follow these instructions may result in loss of life, serious injury, or property damage.

Chapter 3
Programming

Summary

This chapter contains configuration and programming instructions for system programmers. Read the configuration and programming topics that apply to your fire alarm system.

SIGA-REL programming is almost identical for all systems. The greatest differences exist in the rules required and the configuration of AND groups. The SIGA-REL programming steps require strict adherence. Follow each instruction carefully.

Content

Programming the SIGA-REL in the 2-SDU

Adding the SIGA-REL to the database

WARNING: This information was prepared for users who are proficient in every aspect of 2-SDU programming. Do not attempt to program the SIGA-REL if your certification is not current. Incorrect programming may result in loss of life, serious injury, or property damage.

The SIGA-REL is a single module with six serial numbers. Addresses will differ for each installation, but they must be consecutive.

Note: If you are adding other Signature Series devices to the project database, add the SIGA-REL last. Adding devices after the SIGA-REL may disrupt the addressing scheme.

The SIGA-REL has six addressable circuits. To add the SIGA-REL to the project database, you must add three SIGA-RELs. The first SIGA-REL is for the abort switch and manual release switch circuits, the second for the two release circuits, and the third for the two prerelease circuits.

Note: You cannot have more than 10 SIGA-RELs on one Signature loop.

The SIGA-REL provides only one serial number label. When you scan in the SIGA-REL, only the first two serial numbers appear in the database.

Caution: Do not use the Accept Actual function in the Signature Mapping tool. Accepted data may corrupt the database by causing it to see every device as two devices.

To add the SIGA-REL to the database:

1. Use the SDC Configuration dialog box to add three SIGA-REL modules:

   Device type = Monitor
   Model = SIGA-REL
   Personality code = 3
   Quantity = 3

2. Scan or enter the SIGA-REL serial number label in the first address slot.
3. Complete each SIGA-REL address as shown in Table 16. You don’t need to enter serial numbers for all addresses. This happens in a later step.
4. Use the Object Configuration dialog box to assign labels and messages to each SIGA-REL address, as shown in Table 17.

5. Connect to the panel and use the Communication Functions dialog box to upload the Signature loop.
6. In the Signature Series mapping tool, open the Actual vs. Expected Data dialog box (F9 key).
7. For the first two SIGA-REL devices, click Commit Expected.
8. For the third SIGA-REL device, click Break Chain, select the first available address (the release circuit), and click Commit Expected.

Break chain button

9. For the fifth SIGA-REL device, click Break Chain, select the next available address (the prerelease circuit), and click Commit Expected.
10. Close all Signature Series mapping tool dialog boxes and windows.
11. Perform a Signature Series conversion and download the database to the panel.

Table 16: SIGA-REL configuration settings

Typical address [1]	Typical serial number [1]	Device type	Model	Personality code
0207	5300411525	Monitor	SIGA-REL	N/O Active Nonlatching (Class B)
0208	5300411532	Pull	SIGA-REL	N/O Alarm Latching (Class B)
0209	5300411549	DoorControl	SIGA-REL	Signal Output (Class B)
0210	5300411556	LocalTrouble	SIGA-REL	No personality
0211	5300411563	DoorControl	SIGA-REL	Signal Output (Class B)
0212	5300411570	LocalTrouble	SIGA-REL	No personality

[1] Actual addresses in your system may differ, but they must be consecutive. Serial numbers must also be consecutive up to the second-to-last digit.

Table 17: SIGA-REL labels and messages

Device type	Example address [1]	Label	Message	Model
Monitor	0207	Abort	Abort	SIGA-REL
Pull	0208	Manual	Manual	SIGA-REL
DoorControl	0209	Release_1	Release_1	SIGA-REL
None	0210	Release_2	Release_2	SIGA-REL
DoorControl	0211	Prerelease_1	Prerelease_1	SIGA-REL
None	0212	Prerelease_2	Prerelease_2	SIGA-REL

[1] These addresses illustrate that the SIGA-REL should occupy six consecutive addresses. The actual addresses in your system may differ.

Creating an abort confirmation LED

WARNING: If the abort circuit is shorted, the system interprets this as a manual abort. This would prevent release of the fire suppression agent in the event of an actual fire alarm.

To guarantee supervision of the manual abort circuit, we suggest that you program an LED to light when the abort circuit is activated. This has the benefit of providing a clear visual indication to untrained site personnel that the abort circuit has been compromised due to a short circuit.

Programming an AND group

AND groups function as counting groups. For more information about programming AND groups, see the *EST2 System Programming Manual* and the *2-SDU Help*.

Every device contained in each (SIGA-REL) AND group must include a rule with an output statement like the one in [ALARM1]. See Figure 17 for the details.

Note: To comply with NFPA 72, you must program an AND Group with at least two smoke detectors and a minimum activation count of 2. The smoke detectors must have their Primary and Alternate Verification properties set to None (verified smoke detectors are not allowed).

Reconciling the Signature map

Do not use the Accept Actual function in the Signature Series mapping tool. Accepted devices may appear as two devices in the SDC database and corrupt it. Use the Break Chain and Commit Expected functions to reconcile the Signature map.

Writing rules for the SIGA-REL

To write the rules:

1. In the Rules Editor, write the rules shown in Figure 17.
2. Compile the rules and run the required conversions.
3. Download the new information.

Figure 17: EST2 rules for the SIGA-REL

```
[ALARM1]
ALARM SMK 'ALARM_1' : ON DOORCONTROL 'PRERELEASE_1';

[ALARM2]
ALARM SMK 'ALARM_2' : ON DOORCONTROL 'PRERELEASE_1';

[RELEASE]
DEFINE AND 'AND_GROUP1' : DELAY 10,
                          ON DOORCONTROL 'RELEASE_1';

[RESET]
DEFINE SYSRESET 'MCMN1' : OFF DOORCONTROL 'PRERELEASE_1',
                          OFF DOORCONTROL 'RELEASE_1';

[DUMP]
ALARM PULL 'MANUAL' : ON DOORCONTROL 'RELEASE_1';

[LED1]
CONFIRMATION DOORCONTROL 'PRERELEASE_1' : ON LED 'LED_1_1';

[LED2]
CONFIRMATION DOORCONTROL 'RELEASE_1' : ON LED 'LED_1_2';

[ABORT LED]
MONITOR MONITOR 'ABORT' : ON LED 'LED_1_3';
```

Caution: Do not program the Drill switch to test the SIGA-REL.

Notes

- [ALARM_1] and [ALARM_2] require the addition of two Signature Series alarm devices to the SDC Configuration. Make sure that the object labels in the rules match the labels assigned in the Object Configuration.
- [LED1] and [LED2] require the addition of an LED module to the MCM Configuration. Make sure that the labels for the LEDs match the labels assigned to them in the Object Configuration.

See “System testing” on page 52 for instructions on checking your work and testing your system.

Programming the SIGA-REL in the 3-SDU

Adding the SIGA-REL to the database

WARNING: This information was prepared for users who are proficient in every aspect of 3-SDU programming. Do not attempt to program the SIGA-REL if your certification is not current. Incorrect programming may result in loss of life, serious injury, or property damage.

The SIGA-REL is a single module with six serial numbers. Addresses will differ for each installation, but they must be consecutive.

Note: If you are adding other Signature Series devices to the project database, add the SIGA-REL last. Adding devices after the SIGA-REL may disrupt the addressing scheme.

The SIGA-REL has six addressable circuits. To add the SIGA-REL to the project database, you must add three SIGA-RELs. The first SIGA-REL is for the abort switch and manual release switch circuits, the second for the two release circuits, and the third for the two prerelease circuits.

Note: You cannot have more than 10 SIGA-RELs on one Signature loop.

The SIGA-REL provides only one serial number label. When you scan in the SIGA-REL, only the first two serial numbers appear in the database.

WARNING: Do not configure the third and fifth SIGA-REL addresses as common outputs or audio amplifiers. Any off-normal condition activates the automatic release sequence if these addresses are common outputs. The Drill switch activates the prerelease and the release circuits if they are audio amplifiers. You must select the device types and personality codes exactly as prescribed in Table 18.

To add the SIGA-REL to the database:

1. Use the Signature Series Configuration dialog box to add three SIGA-REL modules:

   Device type = Monitor
   Model = SIGA-REL
   Personality code = 3
   Quantity = 3

2. Scan or enter the SIGA-REL serial number label in the first address slot.

3. Complete each SIGA-REL address in strict accordance with Table 18. You don’t need to enter serial numbers for all addresses. This happens in a later step.
4. Use the Object Configuration dialog box to assign labels and messages to each SIGA-REL address, as shown in Table 19.
5. Connect to the panel and use the Communication Functions dialog box to upload the Signature loop.
6. In the Signature Series mapping tool, open the Actual vs. Expected Data dialog box (F9 key).
7. For the first two SIGA-REL devices, click Commit Expected.
8. For the third SIGA-REL device, click Unmatched, select the first available address (the release circuit), and click Accept Actual.
9. For the fifth SIGA-REL device, click Unmatched, select the next available address (the prerelease circuit), and click Accept Actual.
10. Close all Signature Series mapping tool dialog boxes and windows.
11. Perform a Signature Series conversion and download the database to the panel.

Table 18: SIGA-REL configuration settings

Typical address [1]	Typical serial number [1]	Device type	Model	Personality code
126	5300411525	Monitor	SIGA-REL	(3) N/O Active Nonlatching (Class B)
127	5300411532	Pull	SIGA-REL	(1) N/O Alarm Latching (Class B)
128	5300411549	SupervisedOutput	SIGA-REL	(16) Signal Output (Class B)
129	5300411556	None	SIGA-REL	(0) No personality
130	5300411563	SupervisedOutput	SIGA-REL	(16) Signal Output (Class B)
131	5300411570	None	SIGA-REL	(0) No personality

[1] Actual addresses in your system may differ, but they must be consecutive. Serial numbers must also be consecutive up to the second-to-last digit.

Table 19: SIGA-REL labels and messages

Device type	Example address [1]	Label	Message	Model
Monitor	126	Abort	Abort	SIGA-REL
Pull	127	Manual	Manual	SIGA-REL

Device type	Example address [1]	Label	Message	Model
SupervisedOutput	128	Release_1	Release_1	SIGA-REL
None	129	Release_2	Release_2	SIGA-REL
SupervisedOutput	130	Prerelease_1	Prerelease_1	SIGA-REL
None	131	Prerelease_2	Prerelease_2	SIGA-REL

[1] The addresses in this table demonstrate the importance of ensuring that the SIGA-REL occupies six consecutive addresses. The actual addresses in your system may differ.

Programming an AND group

WARNING: Set the AND group activation number to 2 or greater. An activation number of 1 will cause the AND group to become an OR group, and any activation of Alarm_1 or Alarm_2 will activate the release sequence. Check only Q1 for each device in the list box labeled “Devices in Selected Group.” For Q1, only a detector in alarm will count as a device activation. If you check Q2, Q3, or Q4 the release circuit may accidentally activate for maintenance events.

AND groups function as counting groups; matrix groups function as counting zones. For more information about programming AND groups and matrix groups, see the 3-SDU Online Help.

Note: Every device contained in each (SIGA-REL) AND group must include a rule with an output statement like the one in [ALARM1]. See Figure 18 for the details.

Note: For preaction operation, set the activation number to 1. This will cause the AND group to become an OR group. Any activation of Alarm_1 or Alarm_2 will then activate the release sequence.

Note: To comply with NFPA 72, you must program an AND Group with at least two smoke detectors and a minimum activation count of 2. The smoke detectors must have their Primary and Alternate Verification properties set to None (verified smoke detectors are not allowed).

Writing rules for the SIGA-REL

To write the rules:

1. In the Rules Editor, write the rules shown in Figure 18.
2. Compile the rules and run the required conversions.
3. Download the new information.
4. See “System testing” on page 52 before you test your system.

Figure 18: EST3 rules for the SIGA-REL

```
[RESET]
RESET:
   OFF -HIGH 'PRERELEASE_1', {turn off prerelease 1}
   DLYR 10; {delay after reset}

[PRERELEASE 1]
ALARM 'ALARM_1':
   ON 'PRERELEASE_1'; {turn on prerelease 1 on alarm}

[AND GROUP RELEASE]
ALARM 'AND_GROUP':
   DLYA 10, {delay time (user setting)}
   ON SUP 'RELEASE_1'; {turn on release}

[MANUAL RELEASE]
ALARM 'MANUAL':
   ON -HIGH 'RELEASE_1'; {turn on release}

[LED1]
RLYCFG 'PRERELEASE_1':
   ON 'LED_1_1';

[LED2]
RLYCFG 'RELEASE_1':
   ON 'LED_1_2';
```

Notes

- RESET rule: On reset, the prerelease circuit is forced to deactivate, which also deactivates the release circuit. The system determines whether an alarm is still present before making the decision to activate the releasing sequence again. In this situation, the system delay (the time necessary to test and analyze alarms) overrides the rule delay. When the system is reset and the alarm restored, the SIGA-REL turns off both the prerelease and release circuits (in that order).
- PRERELEASE rule: On alarm, the PRERELEASE rules activate the prerelease circuits. These rules require the addition of alarm devices to the panel configuration. Make sure that the object labels match the labels assigned to them in the Object Configuration.
- AND GROUP RELEASE rule: When the AND_GROUP activates, the release circuit is activated after the programmed delay, as per the rule.
- MANUAL RELEASE rule: If the manual release circuit on the SIGA-REL is activated, the SIGA-REL independently activates its releasing circuits. The MANUAL RELEASE rule forces the panel output to match the SIGA-REL output.
- [LED1] and [LED2] require the addition of an LED module to the Cabinet Configuration (Modules tab, operator layer). Make sure that the labels for the LEDs match the labels assigned to them in the Object Configuration.

If your application requires use of the Drill switch to test the SIGA-REL, write a custom rule to accomplish this. See Figure 19 for an example of the rules required.

Caution: Do not program the Drill switch to test the SIGA-REL.

Figure 19: Optional rules for using the Drill switch

```
[DRILL]
DRILL:
   ON 'PRERELEASE_1'; {turn on prerelease 1}
```

See "System testing" on page 52 for instructions on checking your work and testing your system.

Programming the SIGA-REL in the QS-CU

Minimum system requirements

- A QS1 with an SLIC card and appropriately sized standby batteries
- A compatible power supply with appropriately sized standby batteries to supply 24 VDC to the SIGA-REL
- The SIGA-REL, mounted in an MFC-A enclosure
- A SIGA-CT1 module to supervise the service disconnect switch
- A SIGA-CT2 module to indicate activation of the prerelease and release relays

When you use monitor or supervisory event messages to indicate activation of the service disconnect station, prerelease relay, or release relay, you must route those messages to the panel.

Note: You cannot have more than 10 SIGA-RELs on one SLIC loop.

Step 1: Read this first

WARNING: This information was prepared for users who are proficient in every aspect of QS-CU programming. Do not attempt to program the SIGA-REL without a complete understanding of QS-CU and SIGA-REL operation. Incorrect programming may result in loss of life, serious injury, or property damage.

This application requires the operation of at least two automatic detectors to activate the fire suppression system. In order to meet NFPA 72 requirements, you must program an AND group with at least two smoke detectors and a minimum activation count of 2. The smoke detectors must have their primary and alternate verification properties set to None.

The SIGA-REL has six addressable circuits. To add the SIGA-REL to the loop controller database, you must add three SIGA-RELs. The first SIGA-REL is for the abort switch and manual release switch circuits, the second for the two release circuits, and the third for the two prerelease circuits.

Using the QS-CU, perform the instructions that follow in order from beginning to end.

As a safety precaution, disconnect releasing devices from SIGA-REL TB4 before downloading setup data to the loop controller.

The SIGA-REL provides only one serial number label. When you scan in the SIGA-REL, only the first two serial numbers appear in the database.

Step 2: Add the abort and manual release switch circuits

Note: Enter the information exactly as shown to ensure that you program the application according to the manufacturer’s specifications.

1. Click Configure, and then click Cabinets.
2. Select the SLIC connected to the SIGA-REL, and then click Configure.
3. Click the Modules tab, and then set the Quantity box to 1.
4. Enter the following information:

   First address
   Device type: Monitor
   Model: REL
   Personality: (3) Active B
   Message text: SIGA-REL1 A001 and ABORT SW

   Second address
   Device type: Pull
   Personality: (1) Alarm B
   Message text: SIGA-REL1 A002 and MAN RELEASE
5. Click Add.

Step 3: Add the two releasing circuits

1. Set the Quantity box to 1.

2. Enter the following information:

   First address
   Device type: Output
   Model: REL
   Personality: (16) Output B
   Message text: SIGA-REL1 A003 and RELEASE 1 & 2

   Second address
   Device type: Monitor
   Personality: (0) None
   Message text: SIGA-REL1 A004 and NOT USED

3. Click Add.

Step 4: Add the two prerelease circuits

1. Set the Quantity box to 1.
2. Enter the following information:

   First address
   Device type: Output
   Model: REL
   Personality: (16) Output B
   Message text: SIGA-REL1 A005 and PRERELEASE 1 & 2

   Second address
   Device type: Monitor
   Personality: (0) None
   Message text: SIGA-REL1 A006 and NOT USED

3. Click Add.

Table 20 shows how your entries in the Modules table should look. Your addresses may be different.

Table 20: SIGA-REL configuration settings

Address	Serial number	Device type	Model	Text 1	Text 2	Personality
126		Monitor	REL	SIGA-REL1 A001	ABORT SW	(3) Active B
127		Pull	REL	SIGA-REL1 A002	MAN RELEASE	(1) Alarm B
128		Output	REL	SIGA-REL1 A003	RELEASE 1 & 2	(16) Output B

Address	Serial number	Device type	Model	Text 1	Text 2	Personality
129		Monitor	REL	SIGA-REL1 A004	NOT USED	(0) None
130		Output	REL	SIGA-REL1 A005	PRERELEASE 1 & 2	(16) Output B
131		Monitor	REL	SIGA-REL1 A006	NOT USED	(0) None

Step 5: Create a prerelease response

In this step, you create a response that activates the prerelease circuits when any one detector in the protected area signals an alarm.

1. Click Configure > Correlations.
2. Click the Zones tab, and then click Add Zones.
3. Click the Members tab, and then click Add Device.
4. Select only the devices required to activate the SIGA-REL prerelease circuits, and then click OK.
5. Click the Responses tab, click the Response Type arrow, and then select Active.

Caution: Do not include the releasing circuits (RELEASE 1 & 2) in this response.

6. Click Outputs, select the device labeled SIGA-REL1 A005 PRERELEASE 1 & 2, and then click OK.

   Make sure you select the PRERELEASE device, not the RELEASE device.

Step 6: Create an AND group release response

Here, you create a release response that activates the release circuits when two or more detectors in the protected area signal an alarm.

Note: To comply with NFPA 72, you must program an AND Group with at least two smoke detectors and a minimum activation count of 2. The smoke detectors must have their Primary and Alternate Verification properties set to None (verified smoke detectors are not allowed).

1. Click the AND Groups tab, and then click Add AND Group.
2. Set the Activation Count box for 2.
3. Click the Members tab, and then click Add Device.

4. Select only the detectors required to activate the SIGA-REL release circuits then click OK.
5. Click the Responses tab, click the Response Type arrow, and then select Active.
6. Click Delays.
7. In the Delay On list, click Activation and Restoration.
8. Set the Seconds box to 10.
9. Click Outputs, select the device labeled SIGA-REL1 A003 RELEASE 1 & 2, and then click OK.

Step 7: Create a manual release response

In this step, you create a manual release response that activates the release circuits when someone presses the manual release switch. Add the prerelease response, create the delay, and then add the release response in that order.

1. Click the Devices tab, and then select the circuit labeled SIGA-REL A002 MAN RELEASE.
2. Click the Responses tab, click the Response Type arrow, and then select Active.
3. Click Outputs, select the device labeled SIGA-REL1 A005 PRERELEASE 1 & 2, and then click OK.
4. Click Delays and set the delay options as follows:

   Delay On: Activation and Restoration
   Seconds: 0
5. Click Outputs, select the device labeled SIGA-REL1 A003 RELEASE 1 & 2, and then click OK.

Note: The delay is required so that the prerelease and release responses occur in the correct order. Prerelease must come before release.

Step 8: Supervise the service disconnect switch

If your application requires supervision of the service disconnect station, install and wire components according to Figure 13. A SIGA-CT1 module supervises the RELA-SRV-1 switch. Configure the SIGA-CT1 as follows:

Device Type: Supervisory
Personality: (3) Active B
Text 1: SIGA-REL1 RELEASE 1

Text 2: DISCONNECT SW

No further programming is necessary.

Step 9: Indicate active prerelease and release circuits

Two PAM-1 control relays and a SIGA-CT2 module are used to indicate activation of the prerelease and release relays.

Install and wire the components according to Figure 14. In this case, the 1st Device represents terminals 7 and 8, the release relay. The 2nd Device represents terminals 5 and 6, the prerelease relay.

Configure the SIGA-CT2 module as follows:

1st Device represents

1st Device Type: Monitor
1st Personality:(3) Active B
1st Text 1: REL1_RELEASE
1st Text 2: CKT_ACTIVE

2nd Device Type: Monitor
2nd Personality:(3) Active B
2nd Text 1: REL1_PREREL
2nd Text 2: CKT_ACTIVE

When a circuit is activated, the SIGA-CT2 module activates a monitor event. The corresponding event message identifies which circuit was activated. No further programming is necessary.

Step 10: Create a drill prerelease response

Here, you create a response that activates the prerelease circuits when someone presses the Drill switch.

Note: Create this response only if required. Pressing Drill will activate the prerelease circuits, but pressing Drill a second time will not restore the prerelease circuits. You must press Reset to silence the prerelease circuits.

1. Click Configure > Correlations.
2. Click the Devices tab, and then select the Show Pseudo Points check box.
3. Select the circuit labeled Drill (address 007).
4. Click the Responses tab, click the Response Type arrow, and then select Active.

Caution: Do not include the releasing circuits (RELEASE 1 & 2) in this response.

5. Click Outputs, select the device labeled SIGA-REL1 A005 PRERELEASE 1 & 2, and then click OK.

Step 11: Retrieve the loop data from the SLIC

1. Click Configure, and then click Cabinets.
2. Select the SLIC connected to the SIGA-REL, and then click Configure.
3. Set the Communications Port setting for the COM port used to connect the service computer to the control panel.
4. Click Retrieve Signature Data.
5. After the upload has finished, click OK.

Step 12: Reconcile the actual and expected data

Caution: Clicking Accept Actual enters the selected device into the database with its current programmed parameters. This corrupts the database if you have already entered the device.

1. Click the Mapping tab, and then click Model.
2. Look for a string of at least six RELs marked with red backgrounds and double-click the first REL in the string.
3. If the serial number displayed in the Module Properties dialog is not the same as the serial number shown on the bar code attached to the SIGA-REL, click Close, and then double-click the next REL in the string.
4. If the serial numbers are the same:

   Click Select Expected.

   In the Module Selection dialog, select the row that has the REL with the Monitor device type and marked SIGA-REL1 A001 Abort SW, and then click OK.

   Click Close.
5. Select the next REL, and then click Select Expected.

   In the Module Selection dialog, select the row that has the REL with the Output device type and marked SIGA-REL1 A003 Release 1 & 2, and then click OK.

   Click Close.

6. Select the next REL, and then click Select Expected.

   In the Module Selection dialog, select the row that has the REL with the Output device type and marked SIGA-REL1 A005 Prerelease 1 & 2, and then click OK.

   Click Close.

Step 13: Send the reconciled data to the loop controller

Click the Controller tab, and then click Send Signature Data.

See "System testing" on page 52 for instructions on checking your work and testing your system.

Chapter 4
Testing and troubleshooting

Summary

This chapter contains testing instructions for system programmers. Read the testing topics that apply to your fire alarm system.

Content

Code requirements for testing

It is important that you understand and are familiar with the applicable code requirements for system testing. Perhaps the most important code is found in NFPA 72 *National Fire Alarm Code*, Chapter 7, “Inspection, Testing, and Maintenance.” Here are excerpts from this standard.

7-1.5.1: Testing personnel shall be qualified and experienced in the specific arrangement and operation of suppression systems and releasing functions and cognizant of the hazards associated with inadvertent system discharge.

7-1.5.2: Occupant notification shall be required whenever a fire alarm system configured for releasing service is being serviced or tested.

7-1.5.3: Discharge testing of suppression systems shall not be required by this code. Suppression systems shall be secured from inadvertent actuation, including disconnection of releasing solenoids or electric actuators, closing of valves, other actions, or combinations thereof, for the specific system, for the duration of the fire alarm system testing.

7-1.5.4: Testing shall include verification that the releasing circuits and components energized or actuated by the fire alarm system are electrically supervised and operate as intended on alarm.

7-1.5.5: Suppression systems and releasing components shall be returned to their functional operating condition upon completion of system testing.

Further, both NFPA 2001 *Standard on Clean Agent Fire Extinguishing Systems*, which covers FM-200 releasing systems, and NFPA 12A *Halon 1301 Fire Extinguishing Systems*, require a manual disconnect mechanism for use when testing the fire system.

System testing

Checking your work

Caution: Some events after a download or an upload may destabilize the system enough to activate the release circuits. Do not connect the releasing solenoids until system testing is complete and the system is stable.

Check your installation and programming work before you connect the releasing solenoids.

Verify that the ‘Prerelease_1’ and ‘Prerelease_2’ LEDs extinguish after a panel reset. If not, a second Reset switch activation may be necessary.

Avoid using the Drill switch to test the SIGA-REL. If you activate a Drill, press the Reset switch to deactivate it. The deactivation of the Drill switch, alone, does not silence the prerelease tones.

Testing EST2 systems

Allow the system sufficient time to stabilize after the initial startup or download. Before you test the system, access the SDC Status tool in the 2-SDU. Do not test the system if the status LEDs indicate activity that is in progress or pending. This includes:

- Mapping
- Device new starts
- Resets
- Restarts

Testing EST3 systems

Allow the system sufficient time to stabilize after the initial startup or download. Before you test the system, check the Current Status tab of the Signature Series Status / Diagnostics tool in the 3-SDU. Do not test the system if the status LEDs indicate activity that is in progress or pending. This includes:

- Mapping
- Device new starts
- Resets
- Restarts

In the 3-SDU, you can test the system while the Device Supervision LED is on. The Device Supervision LED may remain on longer for large loops.

Testing QuickStart systems

Allow the system sufficient time to stabilize after the initial startup or download. Before you test the system, check the Status tab of the Signature Series Configuration Form in the QS-CU. Do not test the system if the counters or Current Status messages indicate activity that is in progress or pending.

Connecting the releasing solenoids

Caution: Do not connect the releasing solenoids until the system has been programmed and tested, and the Signature loop controller and SIGA-REL have reached their normal state. Failure to follow the instructions given below can result in unexpected release of the fire suppression agent.

Follow these steps before you connect the releasing solenoids.

Before you connect the releasing solenoids:

1. After connecting all devices to the Signature data line (including the SIGA-REL), verify that you have downloaded the database to the correct panel and Signature loop controller.
2. Using your SDU or CU, browse to the Signature Series status tool. Verify that the loop is in its normal, inactive state.

   In the 2-SDU choose Tools > Signature Series > Status, then select the Current Status tab. All LEDs should be off.

   In the 3-SDU choose Tools > Signature Series > Status / Diagnostics, then select the Current Status tab. All LEDs should be off. Note that the Device Supervision LED may take up to 20 minutes to extinguish, depending on the number of devices connected to the Signature loop.

   In the QS-CU choose Configure > Cabinet, then select the Cards tab. Select the Signature loop controller card, then choose Configure to open the Signature Series Configuration Form. Select the Status tab. In the Mapping Progress group, the Expected and Actual numbers should match.
3. Check the DS1, DS3, and DS7 LEDs on the SIGA-REL to make sure that it is not active. There should be no red or yellow LEDs. Check the output terminals with a voltmeter prior to connecting the releasing solenoids. The voltage should be 10 VDC or less.

   When all yellow and red LEDs are off and all output voltages are 10 VDC or less, it is safe to connect the releasing solenoids to the RELA-EOL relays.

Note: When testing the system, make sure that it is safe to do so and that testing will not result in the release of agent.

SIGA-REL fault messages on EST2 panels

WARNING: Disconnect all wiring on TB4 of the SIGA-REL (release circuits 1 and 2) when servicing the system. Disabling points does not prevent activation of the release circuits. Failure to follow these instructions may result in loss of life, serious injury, or property damage.

After the successful completion of the programming process, the fire alarm control panel resets itself. Upon reset, device supervision may cause the panel to generate a Dev/Line fault for each SIGA-REL circuit. This is a normal indication, and it should go away within minutes. Table 21 lists the indications you may see for the SIGA-REL on the 2-LCD.

Table 21: SIGA-REL fault messages

Device	Condition	LED	2-LCD message
Abort	Short	Monitor	None, unless there is another event
	Open	Trouble	Open Fault Abort [1]
Manual	Short	Alarm	1st Fire Alarm Manual [1]
	Open	Trouble	Open Fault Manual [1]
Prerelease_1	Short	Trouble	Short Fault Prerelease_1 [1]
	Open	Trouble	Open Fault Prerelease_1 [1]
Prerelease_2	Short	Trouble	Dev/Line Flt Prerelease_2 [1]
	Open	Trouble	Open Fault Prerelease_2 [1]
Abort Manual Prerelease_1 Prerelease_2 Release_1 Release_2	No riser	Trouble	Dev/Line Flt Device (Abort, Manual, Prerelease_1, Prerelease_2, Release_1, or Release_2) [1]
Release_1	Short	Trouble	Short Fault Release_1 [1]
	Open	Trouble	Open Fault Release_1 [1]
Release_2	Short	Trouble	Dev/Line Flt Release_2 [1]

Device	Condition	LED	2-LCD message
	Open	Trouble	Open Fault Release_2 [1]

[1] Message requires user programming

SIGA-REL fault messages on EST3 panels

WARNING: Disconnect all wiring on TB4 of the SIGA-REL (release circuits 1 and 2) when servicing the system. Disabling points does not prevent activation of the release circuits. Failure to follow these instructions may result in loss of life, serious injury, or property damage.

When programming is complete, the fire alarm control panel resets itself, reconstruct the line data card, and map it. Upon reset, device supervision may cause the panel to generate a common trouble active for each SIGA-REL circuit. This is a normal indication, and it should go away within minutes. Table 22 lists the indications you may see for the SIGA-REL on the 3-LCD.

Table 22: SIGA-REL fault messages

Device	Condition	LED	3-LCD message
Abort	Short	Monitor	MONITOR ACT (Abort)
	Open	Trouble	COMMON TRBL ACT Abort [1] Expanded message: TROUBLE OPEN ACT
Manual	Short	Alarm	PULL STATION ACT Manual [1] Expanded message: TROUBLE SHRT ACT
	Open	Trouble	COMMON TRBL ACT Manual [1] Expanded message: TROUBLE OPEN ACT
Prerelease_1	Short	Trouble	COMMON TRBL ACT Prerelease_1 [1] Expanded message: TROUBLE SHRT ACT
	Open	Trouble	COMMON TRBL ACT Prerelease_1 [1] Expanded message: TROUBLE OPEN ACT
Prerelease_2	Short	Trouble	COMMON TRBL ACT Prerelease_2 [1] Expanded message: TROUBLE SHRT ACT

Device	Condition	LED	3-LCD message
	Open	Trouble	COMMON TRBL ACT Prerelease_2 [1] Expanded message: TROUBLE OPEN ACT
Abort Manual Prerelease_1 Prerelease_2 Release_1 Release_2	No riser	Trouble	COMMON TRBL ACT Device (Abort, Manual, Prerelease_1, Prerelease_2, Release_1, or Release_2) [1] Expanded message: INTRNL TRBL ACT
Release_1	Short	Trouble	COMMON TRBL ACT Release_1 [1] Expanded message: TROUBLE SHRT ACT
	Open	Trouble	COMMON TRBL ACT Release_1 [1] Expanded message: TROUBLE OPEN ACT
Release_2	Short	Trouble	COMMON TRBL ACT Release_2 [1] Expanded message: TROUBLE SHRT ACT
	Open	Trouble	COMMON TRBL ACT Release_2 [1] Expanded message: TROUBLE OPEN ACT

[1] Message requires user programming

SIGA-REL fault messages on QuickStart panels

WARNING: Disconnect all wiring on TB4 of the SIGA-REL (release circuits 1 and 2) when servicing the system. Disabling points does not prevent activation of the release circuits. Failure to follow these instructions may result in loss of life, serious injury, or property damage.

When programming is complete, the control panel resets itself and maps the line controller card. During the reset, device supervision may cause the panel to generate a common trouble message for each SIGA-REL circuit. This is a normal indication, and should clear within minutes. Table 23 lists other messages related to the SIGA-REL.

Table 23: SIGA-REL fault messages

Device	Condition	LED	LCD message
Abort	Short	Monitor	Monitor (Abort)
	Open	Trouble	Trouble ABORT SW [1] Help message: TROUBLE OPEN
Manual	Short	Alarm	Alarm Active MAN RELEASE [1]
	Open	Trouble	Trouble MAN RELEASE [1] Help message: TROUBLE OPEN
Prerelease_1	Short	Trouble	Trouble PRERELEASE 1 [1] Help message: TROUBLE SHRT
	Open	Trouble	Trouble PRERELEASE 1 [1] Help message: TROUBLE OPEN
Prerelease_2	Short	Trouble	Trouble PRERELEASE 2 [1] Help message: TROUBLE SHRT
	Open	Trouble	Trouble PRERELEASE 2 [1] Help message: TROUBLE OPEN
Abort Manual Prerelease_1 Prerelease_2 Release_1 Release_2	No riser	Trouble	Trouble Device (ABORT, MAN RELEASE, RELEASE 1, RELEASE 2, PRERELEASE 1 PRERELEASE 2) [1] Help message: INTRNL TBL
Release_1	Short	Trouble	Trouble RELEASE 1 [1] Help message: TROUBLE SHRT
	Open	Trouble	Trouble RELEASE 1 [1] Help message: TROUBLE OPEN
Release_2	Short	Trouble	Trouble RELEASE 2 [1] Help message: TROUBLE SHRT
	Open	Trouble	Trouble RELEASE 2 [1] Help message: TROUBLE OPEN

[1] Message requires user programming

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R

S

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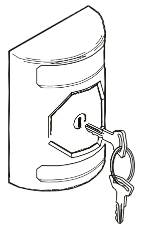
RELA-SRV-1 Service Disconnect Switch



The RELA-SRV-1 Service Disconnect Switch is a key operated, manual switch station. It has both a normally closed and normally open dry contact relay. The switch is used to disconnect the releasing module for servicing.

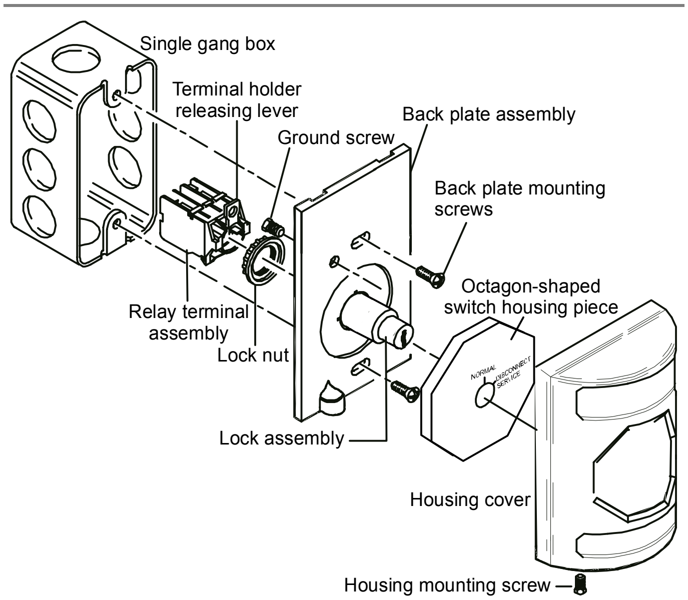
Specifications

Voltage and rated average current
    30 Vdc at 2 A, 250 Vdc at 1 A, 600 Vac at 3 A
Wire: 12 to 18 AWG
Dimensions: 3.25 x 4.87 x 3.87 in (82 x 124 x 98 mm) (W x H x D)

Installation instructions

To install the RELA-SRV-1:

1. Install the ground screw in the back of the back plate assembly.
2. Connect the lock assembly to the back plate. Pass the threaded portion of the lock assembly through the back plate and secure it with the lock nut. Make sure the keyhole is in a vertical position.
3. Push the relay holder onto the back of the lock assembly until it snaps into place. Make sure the releasing lever is pointed up.
4. Wire the relays. See the “Wiring diagram” for details.
5. Mount the back plate assembly to an existing single gang electrical box using the #6-32 screws provided.
6. Push the octagon-shaped switch housing piece onto the lock assembly with “Normal” at the top of the keyhole.
7. Connect the housing cover to the back plate assembly using the housing screw provided.



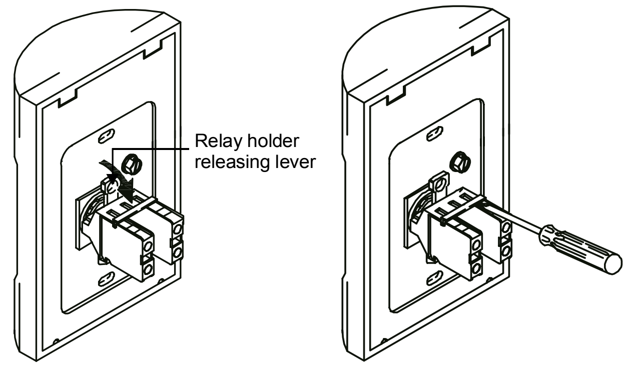
You may need to remove the relay holder or a relay to make wiring easier or you may need to install a different relay. Use the installation instructions that follow to perform these tasks.

To remove the relay holder:

1. Hold the housing firmly in one hand.
2. Apply downward pressure on the relay holder releasing lever.
3. Remove the relay holder and relays.

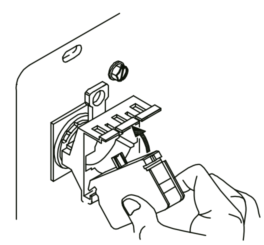
To remove a relay:

1. Insert a small screwdriver where the relay connects into the relay holder.
2. Pry upward to release the relay from the holder.



To install a relay:

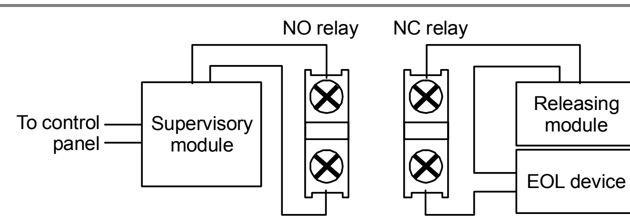
1. Insert the bottom of the relay in the bottom slot on the relay holder.
2. Push upward to lock the relay in place in the top of the relay holder.



Wiring diagram

A normally closed (NC) and a normally open (NO) relay are provided. Wire the normally closed relay to the releasing module circuit. Wire the normally open relay to a supervisory module.

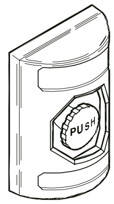
Note: UL requires that the supervisory module must be configured as a supervisory point and must report to the control panel.



Operation

A key is required to operate the RELA-SRV-1. Two keys are provided with the switch. The key is used to activate and reset the switch. The key can be removed from the switch in either mode. The switch disconnects the releasing module for servicing. When activated, an open event and a supervisory event are indicated at the control panel.

RELA-ABT Abort Switch



The RELA-ABT Abort Switch is a normally open dry contact device, which is used to stop the release of an agent. A push button is used to close the switch and abort the agent release.

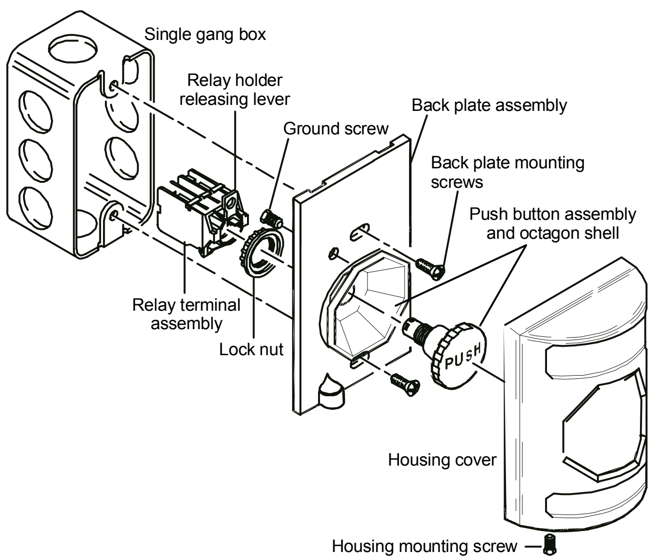
Specifications

Voltage and rated average current
30 Vdc at 2 A, 250 Vdc at 1 A, 600 Vac at 3 A
Wire: 12 to 18 AWG
Dimensions: 3.25 x 4.87 x 3.87 in (82 x 124 x 98 mm) (W x H x D)

Installation instructions

To install the RELA-ABT:

1. Install the ground screw in the back of the back plate assembly.
2. Place the push button assembly into the octagon shell so that the threads pass through the back of the shell.
3. Connect the push button assembly and octagon shell to the back plate. Pass the threaded portion of the push button assembly through the back plate and secure it with the lock nut. Make sure the push button is oriented correctly.
4. Push the relay holder onto the back of the lock assembly until it snaps into place. Make sure the releasing lever is pointed up.
5. Wire the relays. See the “Wiring diagram” for details.
6. Mount the back plate assembly to an existing single gang electrical box using the #6-32 screws provided.
7. Connect the housing cover to the back plate assembly using the housing screw provided.



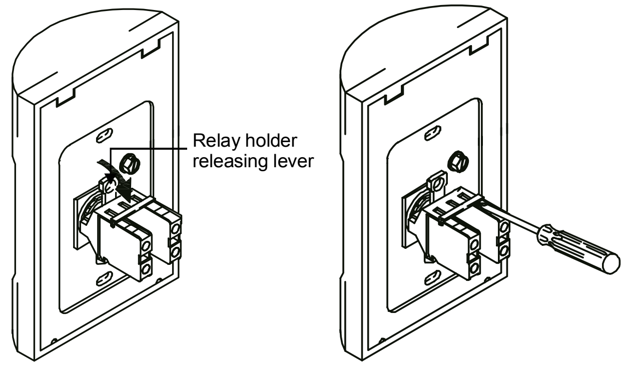
You may need to remove the relay holder or a relay to make wiring easier or you may need to install a different relay. Use the installation instructions that follow to perform these tasks.

To remove the relay holder:

1. Hold the housing firmly in one hand.
2. Apply downward pressure on the relay holder releasing lever.
3. Remove the relay holder and relays.

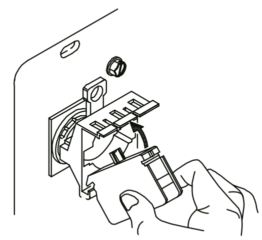
To remove a relay:

1. Insert a small screwdriver where the relay connects into the relay holder.
2. Pry upward to release the relay from the holder.



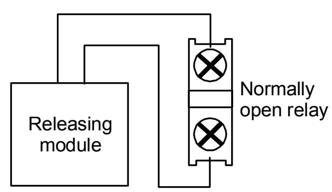
To install a relay:

1. Insert the bottom of the relay in the bottom slot on the relay holder.
2. Push upward to lock the relay in place in the top of the relay holder.



Wiring diagram

A normally open (NO) relay is provided.



Operation

The push button on the RELA-ABT is used to abort (stop) the release of the fire agent within its controlled area.

Push and hold the “PUSH” button to stop the release of the agent. When the push button is released, operation is controlled according to the releasing module’s configuration. If you are using the SIGA-REL releasing module, refer to the *SIGA-REL Technical Reference Manual* for specific push button operation.

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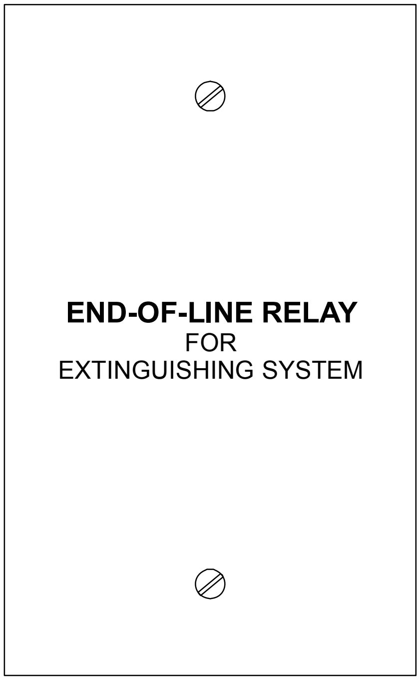
Product description



The End-of-Line Relay facilitates the connection of a nonpolarized releasing solenoid to a supervised, polarized releasing circuit.

Specifications

Operating voltage: 18.4 to 27.4 VDC

Operating current: 26 mA

Supervisory current: 0.2 mA

Solenoid current: 2 A max.

Construction: Metal faceplate

Maximum wire size: 12 AWG

Mounting
North American 2.5 in. (64 mm) deep 1-gang box
Standard 4 in. square box, 1.5 in. (38 mm) deep box with 1-gang cover

Installation instructions

WARNINGS

- Disconnect power before installing or removing components. Failure to do so may result in serious injury or loss of life.
- This device will not operate without electrical power. As fires frequently cause power interruption, we suggest you discuss further safeguards with your local fire protection specialist.

To install the RELA-EOL:

1. Verify that all field wiring is free of opens, shorts, and ground faults.
2. Make the wiring connections shown in the wiring diagram.
3. Mount the relay and faceplate to the electrical box with the 6-32 screws provided.

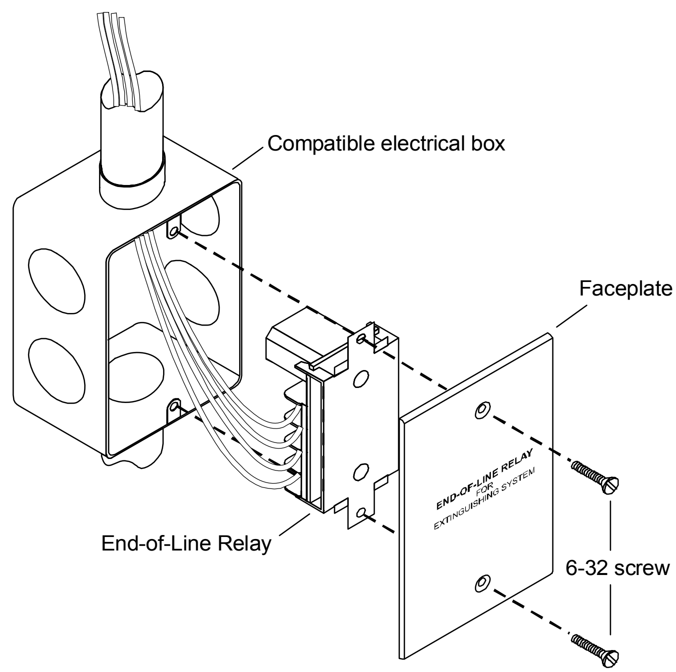


Figure 1: Installing the RELA-EOL

Wiring diagram

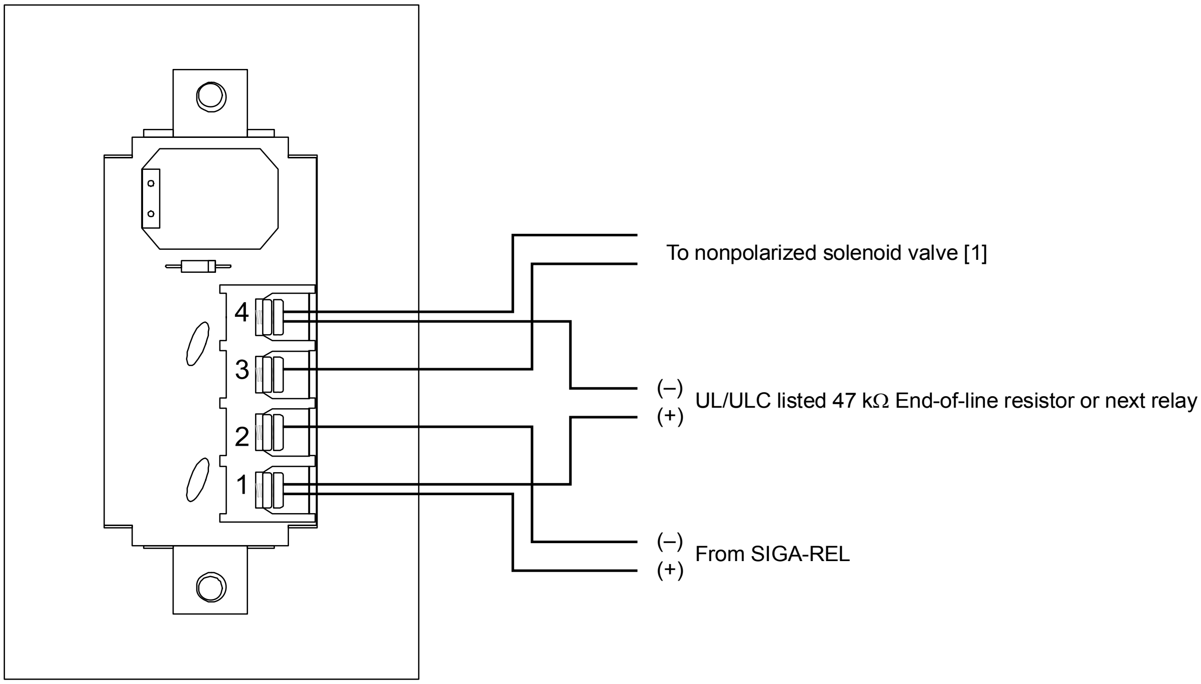


Figure 2: Rear view of the RELA-EOL showing wiring

Notes

[1] Must be in conduit and within 20 feet.

2. Polarity shown is for release active.

3. All circuits are supervised.

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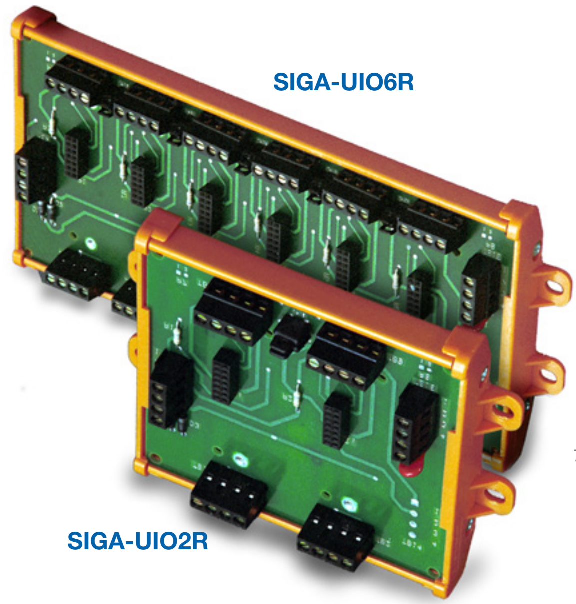
UNIVERSAL INPUT/OUTPUT MODULE MOTHERBOARD

Operations & Maintenance Manual
December 2015

EST Life Safety & Communications

Universal Input/ Output Module Motherboards

SIGA-UIO2R, SIGA-UIO6R,



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Overview

Signature Series Universal Input-Output Module Motherboards provide mounting and wiring terminations for up to six Signature Series plug-in UIO (SIGA-“M” series) modules. UIO motherboards slide into a rigid extruded track (included) with mounting pads for convenient mounting into a variety of equipment enclosures. UIO modules plug into the board and are held securely in place with captive machine screws. All field wiring connects to terminal blocks on the motherboard, which permits rapid removal and replacement of modules for troubleshooting.

The **SIGA-UIO2R** provides mounting and wiring terminations for up to two UIO modules, and the **SIGA-UIO6R** provides mounting and wiring terminations for up to six UIO modules. Both mother-boards feature a riser #1 input and a riser #2 input bus. Jumpers on riser #1 input, between modules, facilitate sharing a single riser among more than one module. This significantly reduces wiring requirements. Removing the jumpers provide separate riser inputs to each adjacent module. Riser #2 input is fixed to each module position and cannot be split.

The **SIGA-UIO6** provides mounting and wiring terminations for up to six UIO modules. This motherboard provides two riser inputs that are common to all modules.

Standard Features

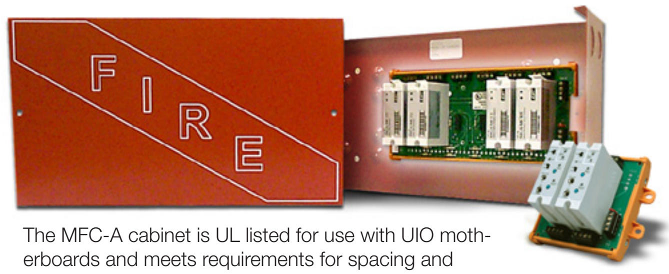
- **Modular flexibility**
  Wide assortment of multi-function plug-in modules provides total flexibility.
- **Minimum wiring requirements**
  Integral jumpers between modules allow sharing of risers to reduce installation wiring.
- **Easy installation**
  #12 AWG (2.5 mm2) terminal blocks and sturdy mounting pads ensure quick installation into Edwards enclosures.
- **Supports automatic device mapping**
  All compatible UIO modules transmit information to the loop controller regarding their circuit locations with respect to other Signature devices on the wire loop.
- **Supports intelligent devices**
  On-board modules make decisions and input an alarm from initiating devices connected to them even if the loop controller’s polling interrogation stops.
- **Twisted or shielded wire not required**
  Because all decisions are made at the on-board modules, lower communication speeds are possible. This results in substantially improved control panel response time and less sensitivity to line noise and loop wiring properties.
- **Supports electronic addressing**
  Programmable addresses are downloaded to compatible UIO modules from the loop controller, a PC, or the SIGA-PRO Signature Program/Service Tool. There are no switches or dials to set.

Mounting and Installation

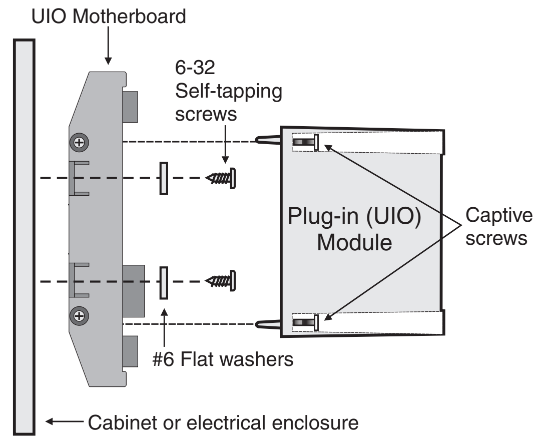
Mount the UIO motherboard inside a Edwards MFC-A cabinet or other suitable electrical enclosure with screws and washers provided. Each MFC-A will hold one UIO2R motherboard or one UIO6 or UIO6R motherboard complete with their full complement of modules.

Plug a Signature Series UIO module into any available position on the motherboard and secure the module to the motherboard with the captive screws. Wiring connections are made to the terminals on the motherboard (see wiring diagram). UIO motherboard terminals are suited for #12 to #18 AWG (2.5 mm^2 to 0.75 mm^2) wire size.

Edwards recommends that all boards and modules be installed according to latest recognized edition of national and local fire alarm codes.



The MFC-A cabinet is UL listed for use with UIO motherboards and meets requirements for spacing and clearance around the components.



Testing & Maintenance

The module's automatic self-diagnosis identifies when it is defective and causes a trouble message. The user-friendly maintenance program shows the current state of each module and other pertinent messages. Single modules may be turned off (de-activated) temporarily, from the control panel.

Scheduled maintenance (Regular or Selected) for proper system operation should be planned to meet the requirements of the Authority Having Jurisdiction (AHJ). Refer to current NFPA 72 and ULC CAN/ULC 536 standards.

Compatibility

Signature Series Universal Input/Output Module Boards are compatible only with SIGA-"M" Series I/O Modules, which require a Signature Data Controller.

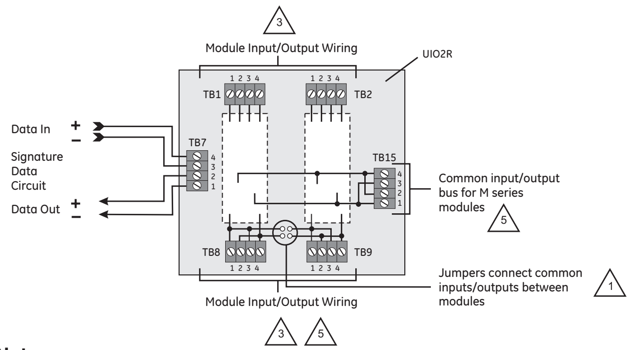
Warnings & Cautions

Signature devices will not operate without electrical power. As fires frequently cause power interruption, we suggest you discuss further safeguards with your fire protection specialist.

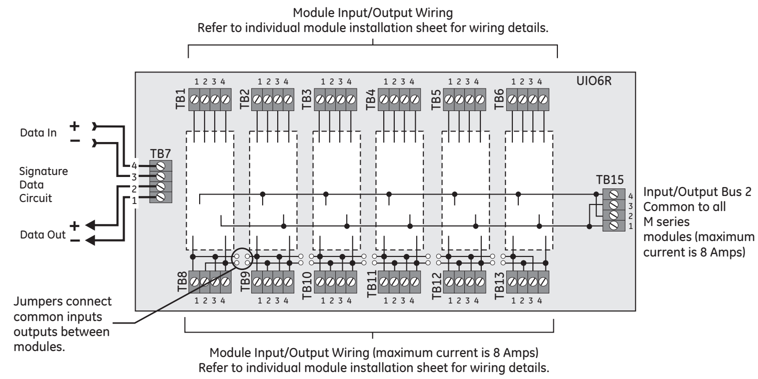
Typical Wiring

Signature Series Universal Input/Output Motherboards have terminal blocks to accept #18 AWG (0.75mm^2), #16 AWG (1.0mm^2), #14 AWG (1.5mm^2), and #12 AWG (2.5mm^2) wire sizes. See Signature Data Controller catalog sheets for detailed wiring requirements and specifications.

SIGA-UIO2R



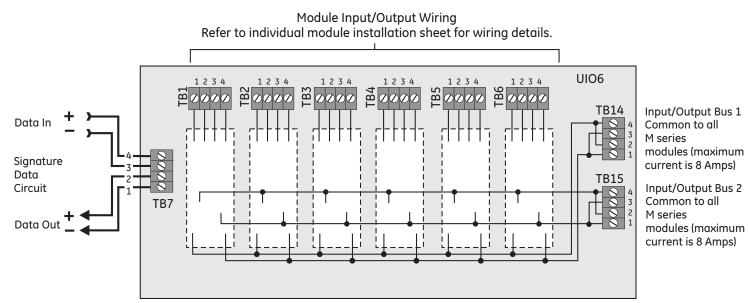
SIGA-UIO6R



Notes

1. Jumpers may be used to make the inputs/outputs between modules common.
2. Not all modules use the SIGA-UIO2R terminals for the same functions.
3. Refer to individual SIGA-M series installation sheets for jumper settings and wiring information. Installations with multiple SIGA-UIO motherboards or enclosures (which include other wiring) require FPL, FPLR, FPLP, or equivalent NEC-approved wire for all power limited wiring. Observe the details of supervision and power limited versus non-power limited circuits. Refer to the SIGA-M series installation sheets.
4. Do not mix incompatible signals.
5. Maximum current is 8 Amps.
7. Refer to Signature Data Controller Installation Sheets for wiring specifications.

SIGA-UIO6



EDWARDS
United Technologies

Contact us...
Email: edwards.fire@fs.utc.com
Web: www.est-fire.com

EST is an EDWARDS brand.
1016 Corporate Park Drive
Mebane, NC 27302

In Canada, contact Chubb Edwards...
Email: inquiries@chubbedwards.com
Web: www.chubbedwards.com

Specifications

Catalog Number	SIGA-UIO2R	SIGA-UIO6R	SIGA-UIO6
Module Capacity	Two	Six	Six
Dimensions (with module installed)	5.4 inch L (across mounting feet) x 4.3 inch W x 3.2 inch H	9.56 inch L (across mounting feet) x 4.3 inch W x 3.2 inch H	
Address Requirements	no address required		
Type Code	none		
Compatible Modules	All SIGA-Mxxx Signature Series		
Operating Voltage	15.2 to 19.95 Vdc (19 Vdc nominal)		
Mounting (cabinets)	Directly into suitable enclosures (e.g.: MFC-A) - Notes 1, 2, 3.		
Wiring Terminals	#12 AWG (2.5mm²) to #18 AWG (0.75mm²)		
Storage and Operating Environment	Operating Temperature: 32°F to 120°F (0°C to 49°C) Storage Temperature: -4°F to 140°F (-20°C to 60°C) Operating and Storage Humidity: 0 to 93% RH		
Agency Listing	UL, ULC, MEA, CSFM		

Notes:
1. Allow a minimum clearance of one inch around all sides of the UIO motherboard.
2. On-site drilling of mounting holes may be required. Self-tapping mounting screws are provided.
3. Suitable cabinets: MFC-A, 2-WB, 2-WB3, 2-WB7, CAB2, 3-CAB5, 3-CAB7, 3-CAB14, 3-CAB21, 3-RCC series, RACC series.

Ordering Information

Catalog Number	Description	Ship Wt. - lb (kg)
SIGA-UIO2R	Universal Input-Output Module Board w/Riser Inputs - Two Module Positions	0.32 (0.15)
SIGA-UIO6R	Universal Input-Output Module Board w/Riser Inputs - Six Module Positions	0.62 (0.28)
SIGA-UIO6	Universal Input-Output Module Board - Six Module Positions	0.56 (0.25)
MFC-A	UL listed cabinet for mounting UIO motherboards, red with white “FIRE” 8 inch H X 14 inch W X 3.5 inch D (203 mmH X 356 mm W X 89 mm D)	7.0 (3.1)

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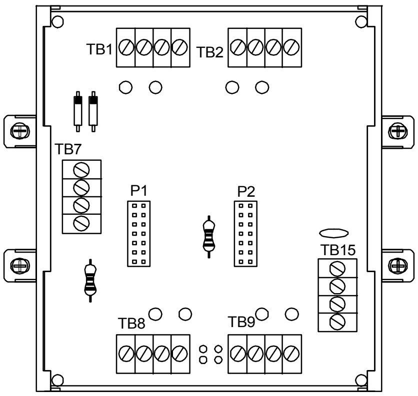
Product description



The Signature Series Universal Input/Output Motherboard (model UIO2R) provides mounting and wiring terminations for up to two Signature M series modules. The motherboard features individual inputs/outputs and a common input/output bus. Jumpers, located between the modules, facilitate sharing of common inputs/outputs between the two modules to reduce wiring. See Table 1 for a list of model numbers.

The motherboard mounts in an MFC-A cabinet or other suitable equipment enclosure with screws and washers provided. Each MFC-A will hold one UIO2RF motherboard complete with their full complement of modules. See "Specifications" for a list of compatible enclosures.

Modules plug into the motherboard in either location, and captive screws fasten them to the motherboard. All module field wiring goes to terminal blocks on the motherboard to permit rapid removal and replacement for troubleshooting.

Table 1: Models

Description	Number
Universal input/output motherboard	GSA-UIO2R SIGA-UIO2R SIGA-UIO2R-LG

Specifications

Capacity: Two M series plug-in modules
Terminal capacity: 12 AWG (2.5 sq mm) to 18 AWG (0.75 sq mm)
Compatible boxes: MFC-A, 2-WB(X) series, 3-CAB series, RACCR series, 3-RCC series, or any UL listed fire alarm enclosure that meets clearance requirements below and complies with the "Installation Instructions"
Clearance space: 1 inch minimum all around the UIO2R, 1/2 inch above the M series modules, and in accordance with the National Electrical Code
Dimensions (H x W x D): 4.30 in (10.9 cm) x 5.34 in (13.5 cm) x 0.87 in (2.2 cm) + 2.25 in (5.7 cm) module depth
Storage temperature: -4 to 140 °F (-20 to 60 °C)
Operating environment
Temperature: 32 to 120 °F (0 to 49 °C)
Humidity: 93% RH, noncondensing at 90 °F (32 °C)

Installation instructions

In cabinets that house only one motherboard:

- Group all modules with nonpower-limited sources to the right of the motherboard and route their wiring to the right
- Group all modules with power-limited sources to the left of the motherboard and route their wiring to the left
- Maintain 1/4-inch separation between power-limited and nonpower-limited wiring, or use FPL, FPLR, FPLP, or an equivalent in accordance with the National Electric Code

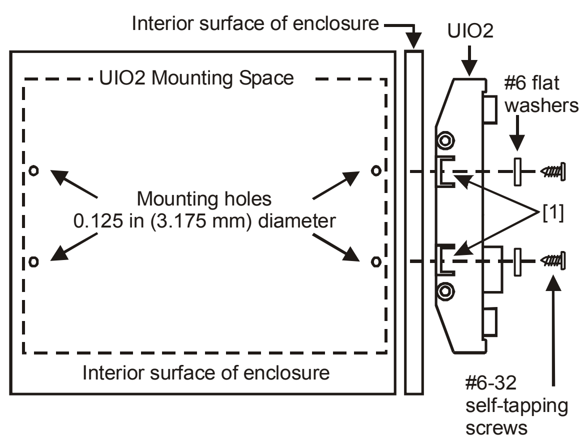
Installations with multiple motherboards or enclosures that include other wiring require FPL, FPLR, FPLP, or equivalent NEC-approved wiring for all power-limited wiring.

Observe supervision and power-limited vs. nonpower-limited circuits, as found on the M series installation sheets.

WARNING: Disconnect power to cabinets before installing or removing components. Failure to do so may result in serious injury or loss of life.

To install the UIO2R:

1. See "Specifications" to determine the correct enclosure and clearance space for the motherboard.
2. Use the motherboard to mark the mounting hole locations.
3. Drill 0.125 in (3.175 mm) mounting holes.
4. Mount the motherboard in the cabinet using the screws and washers provided.

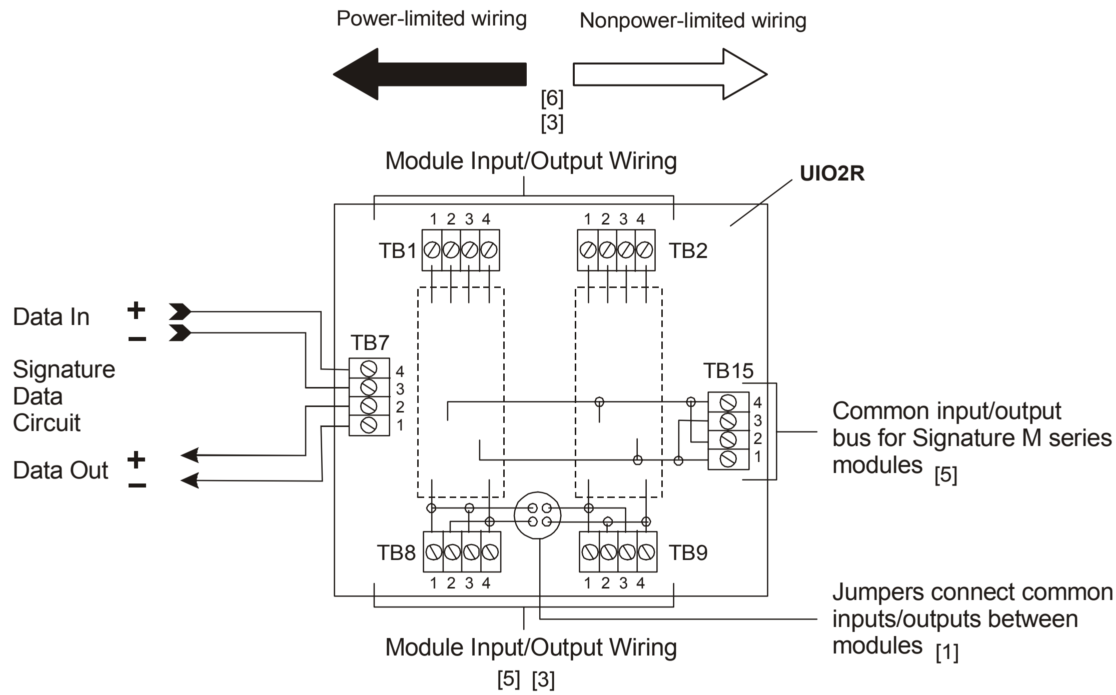


Notes

[1] Mark the mounting hole locations here

2. See the installation sheets of the individual M series modules for mounting instructions to the motherboard

Wiring diagrams



Notes

[1] Jumpers may be used to make the inputs/outputs between modules common

2. Not all modules use the motherboard terminals for the same functions

[3] Refer to individual Signature M series installation sheets for jumper settings and wiring information

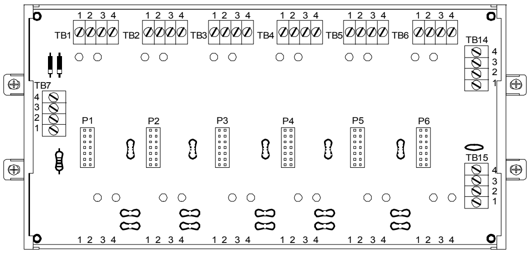
4. Do not mix incompatible signals

[5] Maximum current is 8 amps

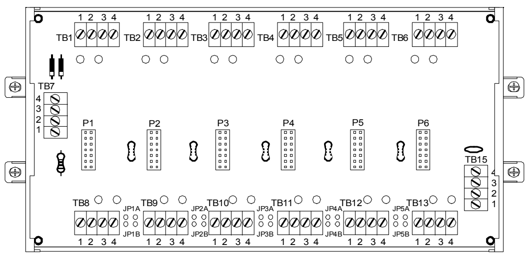
[6] Maintain 1/4 in (6.4 mm) separation between power-limited and nonpower-limited wiring

7. Wire size must be capable of handling fault current from nonpower-limited source.

Product description



UIO6



UIO6R

The Signature Series Universal Input/Output Motherboards (models UIO6 and UIO6R) provide mounting and wiring terminations for up to six M series modules. See Table 1 for a list of model numbers.

The UIO6 provides two input/output buses common to all modules (TB14 and TB15). The UIO6R provides one input/output bus common to all modules (TB15) and six individual inputs/outputs (TB8 through TB13) for flexibility. Jumpers, located between the modules, facilitate sharing of common inputs/outputs between adjacent modules to minimize wiring.

Both boards provide six terminal blocks to handle the inputs and outputs for individual modules installed on the motherboard (TB1 through TB6). The Signature Data Circuit (SDC), which provides communication to all the modules, is connected at a single location (TB7).

The motherboard mounts in an MFC-A cabinet or other suitable equipment enclosure with screws and washers provided. Each MFC-A will hold one UIO6 or UIO6R motherboard complete with their full complement of modules. See “Specifications” for a list of compatible enclosures.

Modules plug into the motherboard at any of the six locations, and captive screws fasten them to the motherboard. All module field wiring goes to terminal blocks on the motherboard to permit rapid removal and replacement for troubleshooting.

Table 1: Models

Description	Number
Universal input/output motherboard - six module positions	GSA-UIO6 SIGA-UIO6 SIGA-UIO6-LG
Universal input/output motherboard w. riser inputs - six module positions	GSA-UIO6R SIGA-UIO6R SIGA-UIO6R-LG

Specifications

Capacity: Six M series plug-in modules
Terminal capacity: 12 AWG (2.5 sq mm) to 18 AWG (0.75 sq mm)
Compatible boxes: MFC-A, 2-WB(X) series, 3-CAB series, RACCR series, 3-RCC series, or any UL listed fire alarm enclosure that meets clearance requirements below and complies with the “Installation Instructions”
Clearance space: 1 inch minimum all around the UIO6 or UIO6R, 1/2 inch above the M series modules, and in accordance with the National Electrical Code
Dimensions (H x W x D): 4.30 in (10.9 cm) x 9.56 in (24.28 cm) x 0.87 in (2.2 cm) + 2.25 in (5.7 cm) module depth
Storage temperature: -4 to 140 °F (-20 to 60 °C)
Operating environment
Temperature: 32 to 120 °F (0 to 49 °C)
Humidity: 93% RH, noncondensing at 90 °F (32 °C)

Installation instructions

In cabinets that house only one UIO6 or UIO6R motherboard:

- Group all modules with nonpower-limited sources to the right of the motherboard and route their wiring to the right
- Group all modules with power-limited sources to the left of the motherboard and route their wiring to the left
- Maintain 1/4-inch separation between power-limited and nonpower-limited wiring, or use FPL, FPLR, FPLP, or an equivalent in accordance with the National Electric Code.

Installations with multiple UIO6 or UIO6R motherboards or enclosures that include other wiring require FPL, FPLR, FPLP, or equivalent NEC-approved wiring for all power-limited wiring.

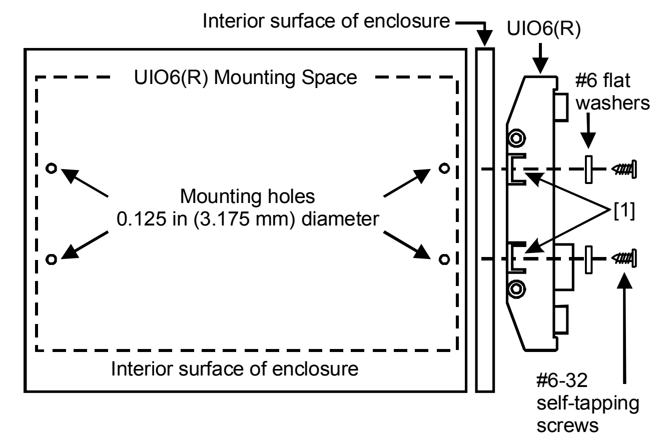
Observe supervision and power-limited vs. nonpower-limited circuits, as found on the M series installation sheets.

WARNING: Disconnect power to cabinets before installing or removing components. Failure to do so may result in serious injury or loss of life.

To install the UIO6 and UIO6R:

1. See “Specifications” to determine the correct enclosure and clearance space for a particular motherboard.
2. Use the motherboard to mark the mounting hole locations.
3. Drill 0.125 in (3.175 mm) mounting holes.

4. Mount the motherboard in the cabinet using the screws and washers provided.

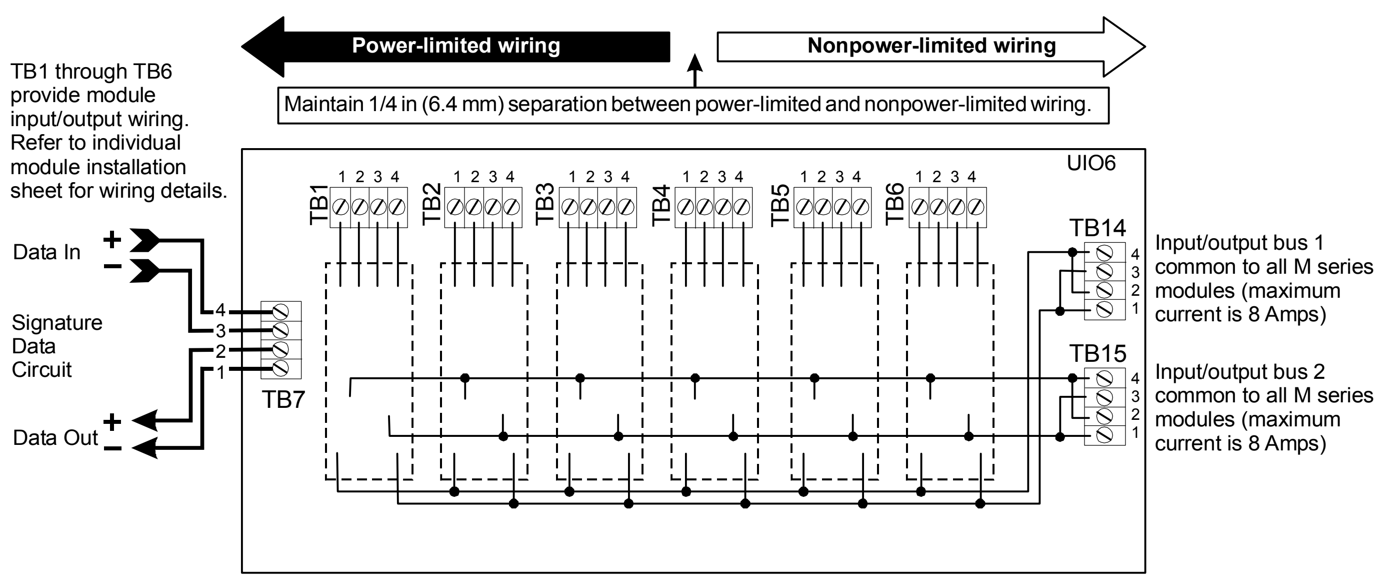


Notes

[1] Mark the mounting hole locations here

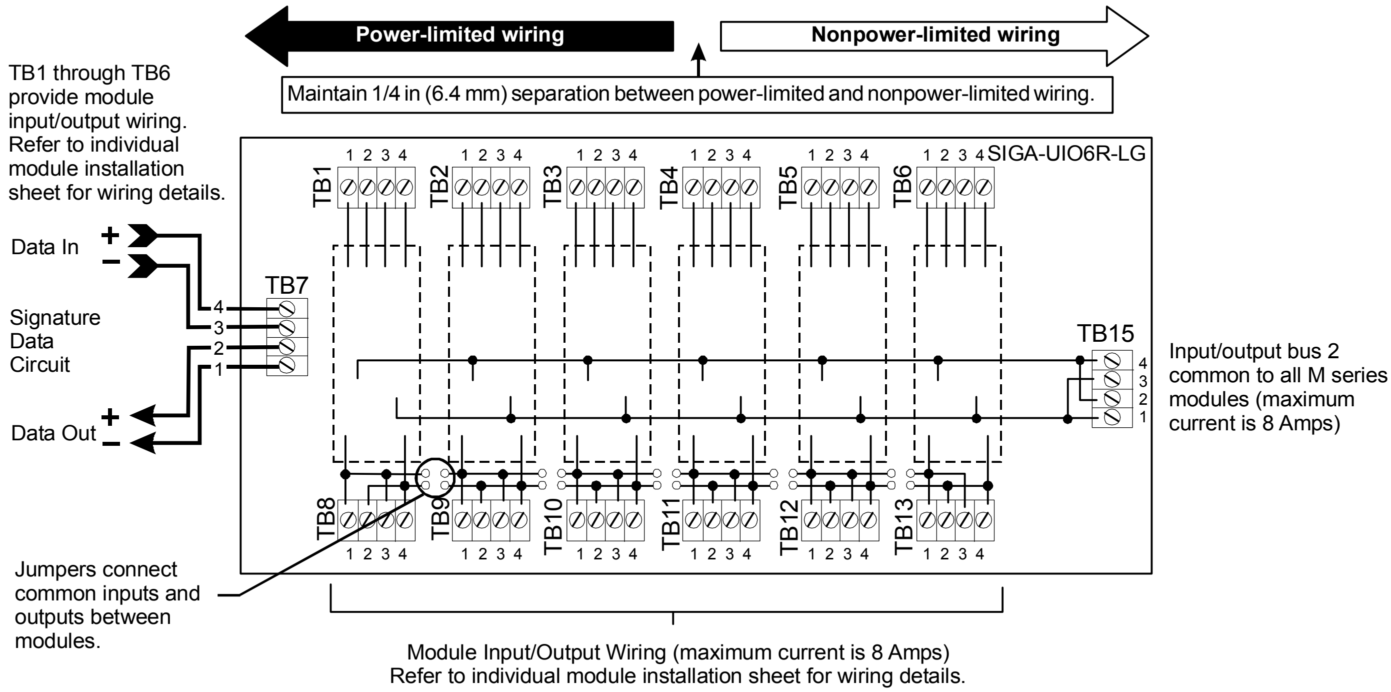
Wiring diagrams

UIO6



Wire size must be capable of handling fault current from nonpower-limited source.

2. See the installation sheets of the individual M series modules for mounting instructions to the UIO6 or UIO6R



Wire size must be capable of handling fault current from nonpower-limited source.

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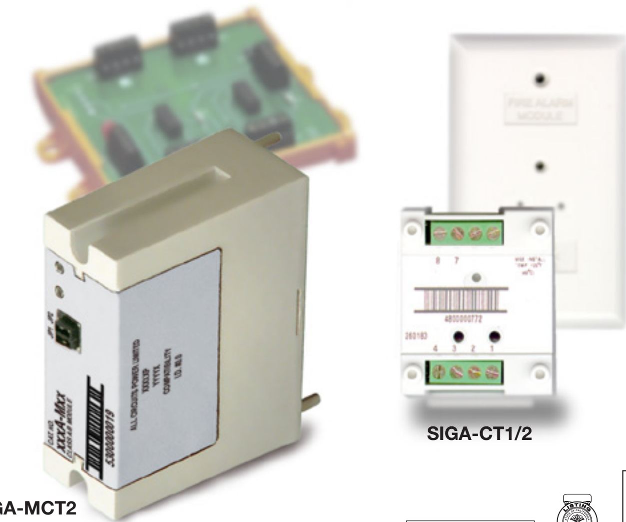
<u>INPUT MODULES</u>

Operations & Maintenance Manual
December 2015

EST Life Safety & Communications

Input Modules

SIGA-CT1, SIGA-CT1HT, SIGA-CT2, SIGA-MCT2



SIGA-CT1/2

SIGA-MCT2

FM APPROVED MEA

Application Notes Available

7300-1657: 0121

S3424

Overview

The SIGA-CT1 Single Input Module, SIGA-CT1HT High Temperature Single Input Module and SIGA-CT2/SIGA-MCT2 Dual Input Modules are intelligent analog addressable devices used to connect one or two Class B normally-open Alarm, Supervisory, or Monitor type dry contact Initiating Device Circuits (IDC).

The actual function of these modules is determined by the “personality code” selected by the installer. This code is downloaded to the module from the Signature loop controller during system configuration.

The input modules gather analog information from the initiating devices connected to them and convert it into digital signals. The module’s on-board microprocessor analyzes the signal and decides whether or not to input an alarm.

The SIGA-CT1, SIGA-CT1HT and SIGA-CT2 mount to standard North American 1-gang electrical boxes, making them ideal for locations where only one module is required. Separate I/O and data loop connections are made to each module.

The SIGA-CT1HT module operates at an expanded temperature range of 32 °F to 158 °F (0 °C to 70 °C) for those applications requiring more extreme environmental temperature variation.

The SIGA-MCT2 is part of the UIO family of plug-in Signature Series modules. It functions identically to the SIGA-CT2, but takes advantage of the modular flexibility and easy installation that characterizes all UIO modules. Two- and six-module UIO motherboards are available. All wiring connections are made to terminal blocks on the motherboard. UIO assemblies may be mounted in Edwards enclosures.

Standard Features

- **Multiple applications**
  Including Alarm, Alarm with delayed latching (retard) for waterflow applications, Supervisory, and Monitor. The installer selects one of four “personality codes” to be downloaded to the module through the loop controller.
- **SIGA-CT1HT rated for high temperature environments**
  Suitable for attic installation and monitoring high temperature heat detectors.
- **Plug-in (UIO) or standard 1-gang mount**
  UIO versions allow quick installation where multiple modules are required. The 1-gang mount version is ideal for remote locations that require a single module.
- **Automatic device mapping**
  Signature modules transmit information to the loop controller regarding their circuit locations with respect to other Signature devices on the wire loop.
- **Electronic addressing**
  Programmable addresses are downloaded from the loop controller, a PC, or the SIGA-PRO Signature Program/Service Tool. There are no switches or dials to set.
- **Stand-alone operation**
  The module makes decisions and inputs an alarm from initiating devices connected to it even if the loop controller’s polling interrogation stops. (Function availability dependent upon control panel.)
- **Ground fault detection by address**
  Detects ground faults right down to the device level.

Signature Series Overview

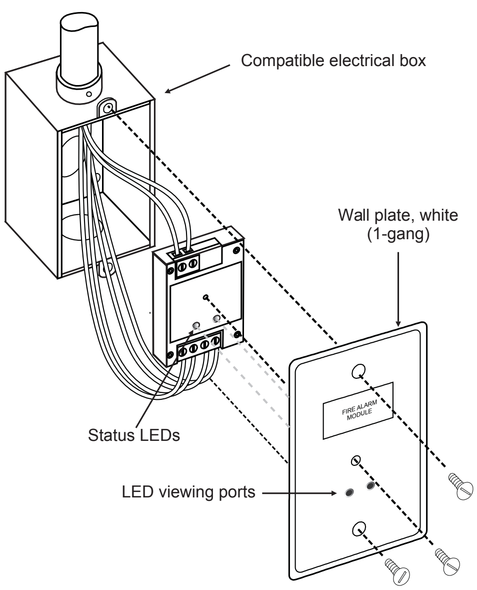
The Signature Series intelligent analog-addressable system from Edwards Security is an entire family of multi-sensor detectors and mounting bases, multiple-function input and output modules, network and non-network control panels, and user-friendly maintenance and service tools. Analog information from equipment connected to Signature devices is gathered and converted into digital signals. An onboard microprocessor in each Signature device measures and analyzes the signal and decides whether or not to input an alarm. The microprocessor in each Signature device provides four additional benefits – Self-diagnostics and History Log, Automatic Device Mapping, Stand-alone Operation and Fast, Stable Communication.

Self-diagnostics and History Log – Each Signature Series device constantly runs self-checks to provide important maintenance information. The results of the self-check are automatically updated and permanently stored in its non-volatile memory. This information is accessible for review any time at the control panel, PC, or using the SIGA-PRO Signature Program/Service Tool.

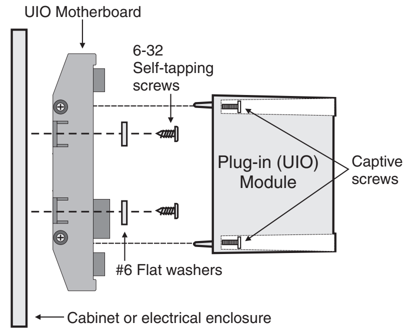
Automatic Device Mapping –The Signature Data Controller (SDC) learns where each device's serial number address is installed relative to other devices on the circuit. The SDC keeps a map of all Signature Series devices connected to it. The Signature Series Data Entry Program also uses the mapping feature. With interactive menus and graphic support, the wired circuits between each device can be examined. Layout or "as-built" drawing information showing branch wiring (T-taps), device types and their address are stored on disk for printing hard copy.

Installation

SIGA-CT1, SIGA-CT1HT and SIGA-CT2: modules mount to North American 2½ inch(64 mm) deep 1-gang boxes and 1½ inch (38 mm) deep 4 inch square boxes with 1-gang covers and SIGA-MP mounting plates. The terminals are suited for #12 to #18 AWG (2.5 mm^2 to 0.75 mm^2) wire size.



SIGA-MCT2: mount the UIO motherboard inside a suitable Edwards enclosure with screws and washers provided. Plug the SIGA-MCT2 into any available position on the motherboard and secure the module to the motherboard with the captive screws. Wiring connections are made to the terminals on the motherboard (see wiring diagram). UIO motherboard terminals are suited for #12 to #18 AWG (2.5 mm^2 to 0.75 mm^2) wire size.



Electronic Addressing - The loop controller electronically addresses each module, saving valuable time during system commissioning. Setting complicated switches or dials is not required. Each module has its own unique serial number stored in its on-board memory. The loop controller identifies each device on the loop and assigns a "soft" address to each serial number. If desired, the modules can be addressed using the SIGA-PRO Signature Program/Service Tool.

Edwards recommends that this module be installed according to latest recognized edition of national and local fire alarm codes.

Application

The duty performed by the SIGA-CT1 and SIGA-CT2/MCT2 is determined by their sub-type code or "Personality Code". The code is selected by the installer depending upon the desired application and is downloaded from the loop controller.

One personality code can be assigned to the SIGA-CT1. Two personality codes can be assigned to the SIGA-CT2/MCT2. Codes 1, 2, 3 and 4 can be mixed on SIGA-CT2/MCT2 modules only. For example, personality code 1 can be assigned to the first address (circuit A) and code 4 can be assigned to the second address (circuit B).

NORMALLY-OPEN ALARM - LATCHING (Personality Code 1) - Assign to one or both circuits. Configures either circuit A or B or both for Class B normally open dry contact initiating devices such as Pull Stations, Heat Detectors, etc. An ALARM signal is sent to the loop controller when the input contact is closed. The alarm condition is latched at the module.

NORMALLY-OPEN ALARM - DELAYED LATCHING (Personality Code 2) - Assign to one or both circuits. Configures either circuit A or B or both for Class B normally-open dry contact initiating devices such as Waterflow Alarm Switches. An ALARM signal is sent to the loop controller when the input contact is closed for approximately 16 seconds. The alarm condition is latched at the module.

NORMALLY-OPEN ACTIVE - NON-LATCHING (Personality Code 3) - Assign to one or both circuits. Configures either circuit A or B or both for Class B normally-open dry contact monitoring input such as from Fans, Dampers, Doors, etc. An ACTIVE signal is sent to the loop controller when the input contact is closed. The active condition is not latched at the module.

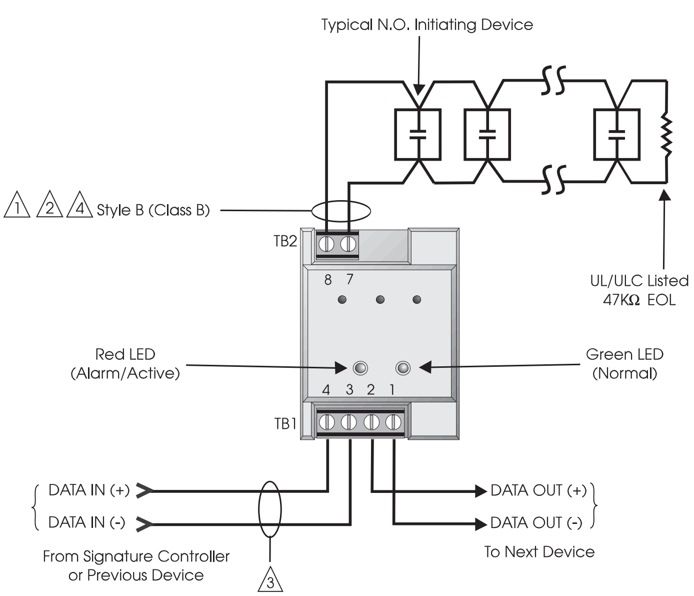
NORMALLY-OPEN ACTIVE - LATCHING (Personality Code 4) - Assign to one or both circuits. Configures either circuit A or B or both for Class B normally open dry contact monitoring input such as from Supervisory and Tamper Switches. An ACTIVE signal is sent to the loop controller when the input contact is closed. The active condition is latched at the module.

Typical Wiring

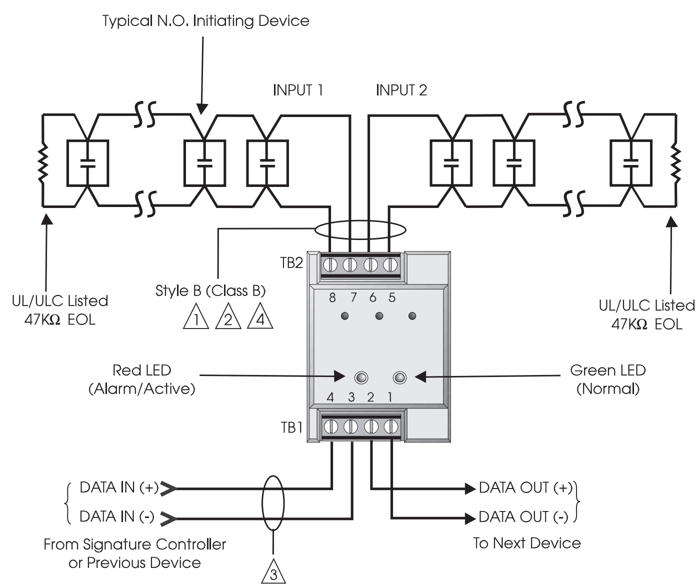
Modules will accept #18 AWG (0.75mm²), #16 (1.0mm²), and #14AWG (1.50mm²), and #12 AWG (2.50mm²) wire sizes.

Note: Sizes #16 AWG (1.0mm²) and #18 AWG (0.75mm²) are preferred for ease of installation. See Signature Loop Controller catalog sheet for detailed wiring requirement specifications.

Initiating (Slave) Device Circuit Wire Specifications		
Maximum Allowable Wire Resistance	50 ohms (25 ohms per wire) per Circuit	
Maximum Allowable Wire Capacitance	0.1µF per Circuit	
For Design Reference:	**Wire Size**	**Maximum Distance to EOLR**
	#18 AWG (0.75 mm²)	4,000 ft (1,219 m)
	#16 AWG (1.00 mm²)	
	#14 AWG (1.50 mm²)	
	#12 AWG (1.50 mm²)	



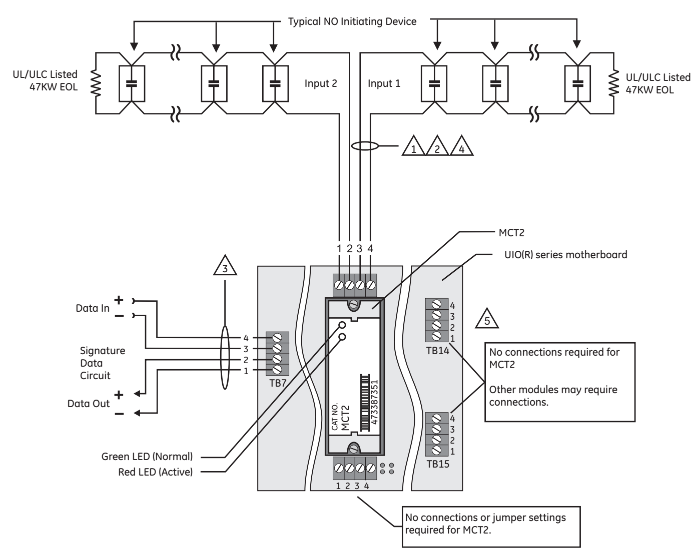
SIGA-CT1, SIGA-CT1HT



SIGA-CT2

NOTES

1. Maximum 25 Ohm resistance per wire.
2. Maximum #12 AWG (2.5 mm²) wire; Minimum #18 AWG (0.75 mm2).
3. Refer to Signature controller installation sheet for wiring specifications.
4. Maximum 10 Vdc @ 350 µA
5. The SIGA-UIO6R and the SIGA-UIO2R do not come with TB14.
6. All wiring is supervised and power-limited.
7. These modules will not support 2-wire smoke detectors.



SIGA-MCT2

Warnings & Cautions

This module will not operate without electrical power. As fires frequently cause power interruption, we suggest you discuss further safeguards with your local fire protection specialist.

Compatibility

The Signature Series modules are compatible only with EST's Signature Loop Controller.

EDWARDS
United Technologies

Contact us...
Email: edwards.fire@fs.utc.com
Web: www.est-fire.com

EST is an EDWARDS brand.

1016 Corporate Park Drive
Mebane, NC 27302

In Canada, contact Chubb Edwards...
Email: inquiries@chubbedwards.com
Web: www.chubbedwards.com

Specifications

Catalog Number	SIGA-CT1HT	SIGA-CT1	SIGA-CT2	SIGA-MCT2
Description	Single Input Module		Dual Input Module	
Type Code	48 (factory set) Four sub-types (personality codes) are available		49 (factory set) Four sub-types (personality codes) are available	
Address Requirements	Uses One Module Address		Uses Two Module Addresses	
Operating Current	Standby = 250µA; Activated = 400µA		Standby = 396µA; Activated = 680µA	
Operating Voltage	15.2 to 19.95 Vdc (19 Vdc nominal)			
Construction	High Impact Engineering Polymer			
Mounting	North American 2½ inch (64 mm) deep one-gang boxes and 1½ inch (38 mm) deep 4 inch square boxes with one-gang covers and SIGA-MP mounting plates			UIO2R/6R/6 Motherboard
Operating Environment	32°F to 158°F (0°C to 70°C)	32°F to 120°F (0°C to 49°C)		
Storage Environment	-4°F to 140°F (-20°C to 60°C); Humidity: 0 to 93% RH			
LED Operation	On-board Green LED - Flashes when polled; On-board Red LED - Flashes when in alarm/active. Both LEDs - Glow steady when in alarm (stand-alone)			
Compatibility	Use with Signature Loop Controller			
Agency Listings	UL, ULC, MEA, CSFM			

Ordering Information

Catalog Number	Description	Ship Wt. lbs (kg)
SIGA-CT1	Single Input Module — UL/ULC Listed	0.4 (0.15)
SIGA-CT1HT	Single Input Module High Temperature Operation UL/ULC Listed	0.4 (0.15)
SIGA-CT2	Dual Input Module — UL/ULC Listed	0.4 (0.15)
SIGA-MCT2	Dual Input Plug-in (UIO) Module — UL, ULC Listed	0.1 (0.05)

Related Equipment		
27193-11	Surface Mount Box - Red, 1-gang	1.0 (0.6)
27193-16	Surface Mount Box - White, 1-gang	1.0 (0.6)
SIGA-UIO2R	Universal Input-Output Module Board w/Riser Inputs — Two Module Positions	0.32 (0.15)
SIGA-UIO6R	Universal Input-Output Module Board w/Riser Inputs — Six Module Positions	0.62 (0.28)
SIGA-UIO6	Universal Input-Output Module Board — Six Module Positions	0.56 (0.25)
MFC-A	Multifunction Fire Cabinet — Red, supports Signature Module Mounting Plates	7.0 (3.1)
SIGA-MB4	Transponder Mounting Bracket (allows for mounting two 1-gang modules in a 2-gang box)	0.4 (0.15)
SIGA-MP1	Signature Module Mounting Plate, 1 footprint	1.5 (0.70)
SIGA-MP2	Signature Module Mounting Plate, 1/2 footprint	0.5 (0.23)
SIGA-MP2L	Signature Module Mounting Plate, 1/2 extended footprint	1.02 (0.46)

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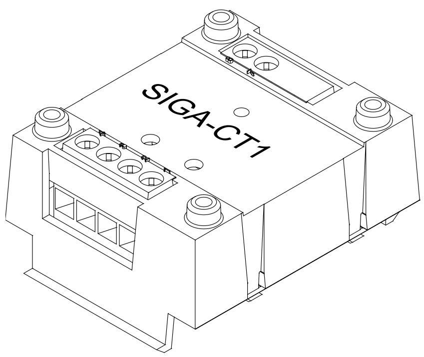
SIGA-CT1 Single Input Module Installation Sheet



Description

The SIGA-CT1 Single Input Module is an addressable device used to connect a Class B initiating device circuit (IDC) to a Signature loop controller.

The module requires one address on the signaling line circuit (SLC). Addresses are assigned electronically. There are no address switches.

Diagnostic LEDs provide visible indication of the state of the module:

- Normal: green LED flashes
- Alarm/active: red LED flashes

Personality codes

The module requires the loop controller to download a personality code that determines how the module operates. Personality codes determine the operation of the circuit and whether the activation is latched or not. Table 1 lists the personality codes available for this module.

Table 1: Personality codes

Code	Description	UL/ULC	EN 54-18
1	Alarm – NO latching (Class B) (default)	P	
2	Alarm – NO delayed latching (Class B)	P	
3	Active - NO nonlatching (Class B)	P	P
4	Active - NO latching (Class B)	P	P
18	Alarm - soft short latching, European Style C (Class B)		P

Installation

Install this device in accordance with applicable requirements of the latest editions of the local codes and standards and the local authority having jurisdiction.

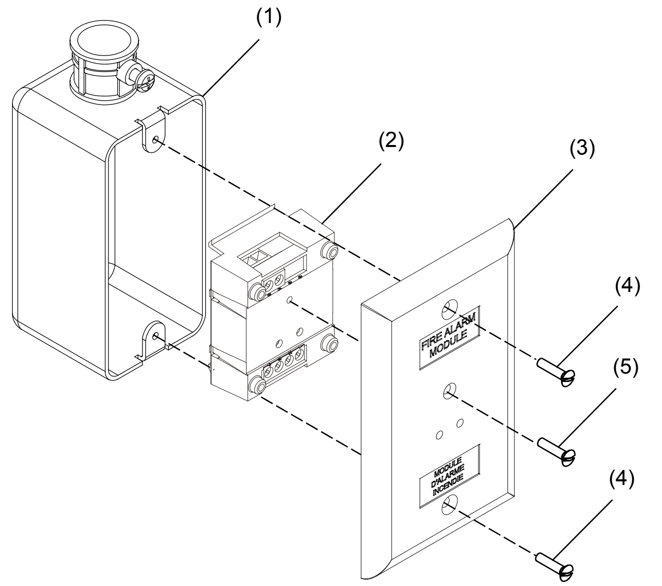
Notes

- The module is shipped from the factory as an assembled unit; it contains no user-serviceable parts and should not be disassembled.
- This module does not operate without electrical power. As fires frequently cause power interruption, discuss further safeguards with the local fire protection specialist.
- This module does not support conventional smoke detectors.

To install the module:

1. Write the address assigned to the module on the label provided, and then apply the label to the module. Remove the serial number label from the detector, and then attach it to the project documentation.
2. Wire the module as shown in “Wiring” on page 2.
3. Using the self-tapping screw provided, mount the wall plate to the module. Refer to Figure 1.
4. Using the two machine screws provided, mount the wall plate (with the module attached) to one of the compatible electrical boxes listed in “Specifications” on page 2.

Figure 1: Mounting the SIGA-CT1 module



(1) Compatible electrical box
(2) SIGA-CT1 module
(3) Wall plate, white (single-gang)
(4) #6-32 × 5/8 in. (16 mm) screw
(5) #4 × 1/2 in. (13 mm) screw

Wiring

Wire in accordance with applicable requirements of the latest editions of the local codes and standards and the local authority having jurisdiction.

Note: When stripping wire ends, exposing more wire may cause a ground fault; exposing less wire may result in a faulty connection.

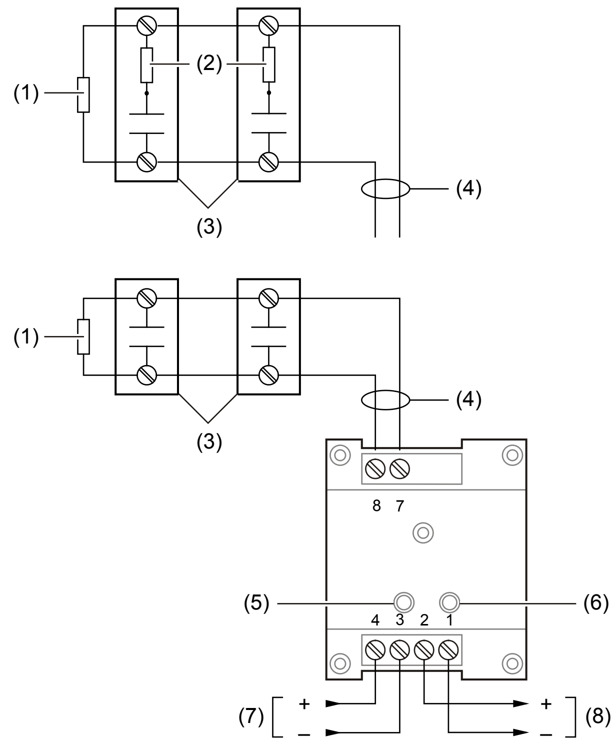
To wire the module:

1. Verify that all field wiring is free of opens, shorts, and ground faults.
2. Strip 1/4 in. (about 6 mm) from the ends of all wires that connect to the terminal block of the module.
3. Make all wiring connections as shown in Figure 2.

Notes

- Refer to the Signature loop controller installation sheet for SLC wiring specifications for additional details.
- All wiring is power-limited and supervised.
- A test resistor is supplied with the SIGA-CT1 to prevent trouble signals on unused circuits during installation. When connecting field wires, remove the test resistors and install a UL/ULC Listed 47 KΩ EOLR at the end of the circuit.

Figure 2: Wiring diagram



(1) EOL resistor (PN EOL-47)
(2) 22 kΩ resistor for use with personality code 18
(3) Typical NO initiating device
(4) Max. 10 VDC @ 350 µA
(5) Red LED (alarm/active)
(6) Green LED (normal)
(7) Signaling line circuit (from previous device)
(8) Signaling line circuit (to next device)

Specifications

Operating voltage	15.20 to 19.95 VDC
Current	
Standby	300 µA
Activated	450 µA
Ground fault impedance	10 kΩ
Initiating device circuit (IDC)	
EOL resistor value	47 kΩ, UL/ULC Listed
Circuit resistance	50 Ω (25 Ω per wire), max.
Circuit capacitance	0.1 µF max.
Circuit designation	
Signaling line circuit	Class A, Style 6 or Class B, Style 4
Notification line circuit	Class B, Style B
Wire sizes	12 to 18 AWG wire (0.75 to 2.5 mm²)
Compatible electrical boxes	2-1/2 in. (64 mm) deep single-gang box; 4-in. square box 1-1/2 in (38 mm) deep with single-gang cover
LPCB/CPD electrical box	
Requirements	Plastic box with cover plate, no gaps or unused holes
Minimum (W × H × D)	2.4 × 3.5 × 1.5 in. (60 × 85 × 38 mm)
Operating environment	
Temperature	32 to 120°F (0 to 49°C)
Relative humidity	0 to 93%, noncondensing
Storage temperature range	−4 to 140°F (−20 to 60°C)

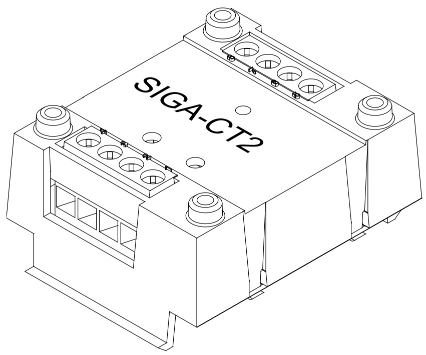
Regulatory information

Manufacturer	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA Authorized EU manufacturing representative: UTC Fire & Security B.V. Kelvinstraat 7, 6003 DH Weert, Netherlands
Year of manufacture	The first two digits of the DATE MFG number (located on the product identification label) are the year of manufacture.
North American standards	CAN/ULC-S527, UL 864, UL 1638, CE; FCC Part 15, Subpart J, Class B; DOCClass/MDC class B
FCC compliance	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
EU compliance	CE
LPCB	EN 54-18: 2005 Input/output devices
CPD certificates	0832-CPD-1019
LPCB reference	262y/08
	2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.

Contact information

For contact information, see www.est-fire.com.

SIGA-CT2 Dual Input Module Installation Sheet



Description

The SIGA-CT2 Dual Input Module is an addressable device that is used to connect one or two Class B, normally open, alarm, supervisory, or monitor type dry contact initiating device circuits (IDCs) to a Signature loop controller.

The module can be used for alarm, supervisory, or monitor type applications depending on the personality code assigned to it. The personality code downloaded to the module by the loop controller during system configuration determines the module's function.

The module requires two addresses on the signaling line circuit (SLC). Addresses are assigned electronically. There are no address switches.

Diagnostic LEDs show the state of the module:

- Normal: green LED flashes
- Alarm/active: red LED flashes

Personality codes

Personality codes determine the operation of the circuit and whether the activation is latched or not. Table 1 lists the personality codes available for this module.

Table 1: Personality codes

Code	Description	UL/ULC	EN 54-18
1	Alarm – NO latching (Class B) (default)	P	
2	Alarm – NO delayed latching (Class B)	P	
3	Active - NO nonlatching (Class B)	P	P
4	Active - NO latching (Class B)	P	P
18	Alarm - soft short latching, European Style C (Class B)		P

Installation

Install this device in accordance with applicable requirements of the latest editions of the local codes and standards and the local authority having jurisdiction.

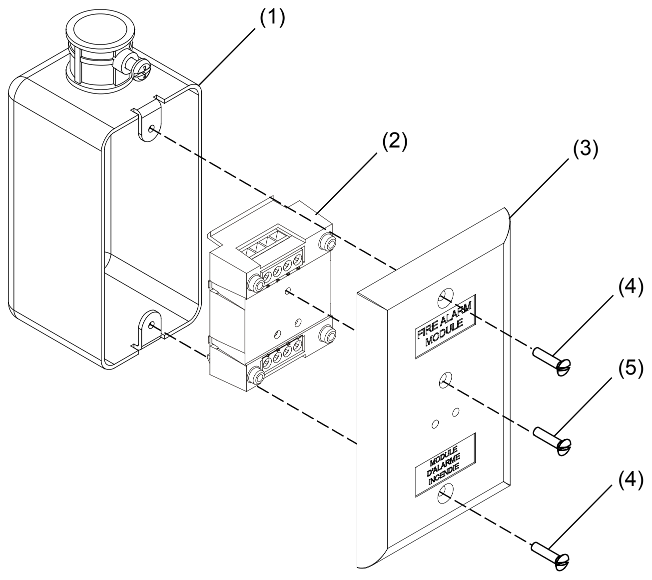
Notes

- The module is shipped from the factory as an assembled unit; it contains no user-serviceable parts and should not be disassembled.
- This module does not operate without electrical power. As fires frequently cause power interruption, discuss further safeguards with the local fire protection specialist.
- This module does not support conventional smoke detectors.
- When using a 2 in. (51 mm) single-gang box, bring the conduit through only one knockout hole.
- When using a 2-1/2 in. (64 mm) single-gang box, bring the conduit through either one or both knockout holes.

To install the module:

1. Write the address assigned to the module on the label provided, and then apply the label to the module. Remove the serial number label from the detector, and then attach it to the project documentation.
2. Wire the module as shown in "Wiring" on page 2.
3. Using the self-tapping screw provided, mount the wall plate to the module. Refer to Figure 1.
4. Using the two machine screws provided, mount the wall plate (with the module attached) to one of the compatible electrical boxes listed in "Specifications" on page 3.

Figure 1: Mounting the SIGA-CT2 module



(1) Compatible electrical box
(2) SIGA-CT2 module
(3) Wall plate, white (single-gang)
(4) #6-32 × 5/8 in. screw (2X)
(5) #4 × 1/2 in. screw

Wiring

Wire in accordance with applicable requirements of the latest editions of the local codes and standards and the local authority having jurisdiction.

Note: When stripping wire ends, exposing more wire may cause a ground fault; exposing less wire may result in a faulty connection.

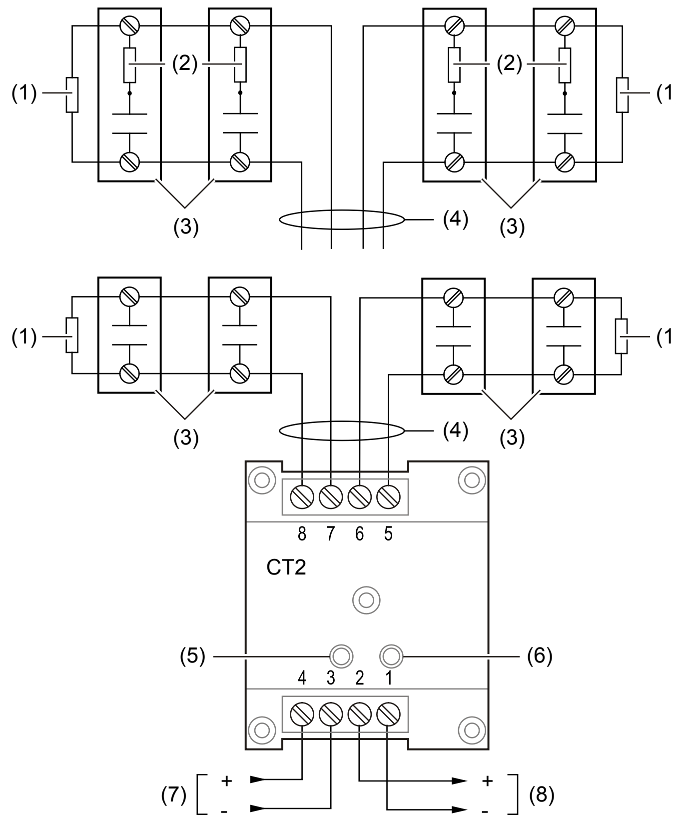
To wire the module:

1. Verify that all field wiring is free of opens, shorts, and ground faults.
2. Strip 1/4 in. (about 6 mm) from the ends of all wires that connect to the terminal block of the module.
3. Make all wiring connections as shown in Figure 2.

Notes

- Refer to the Signature loop controller installation sheet for SLC wiring specifications.
- All wiring is power-limited and supervised.
- Test resistors are supplied with the SIGA-CT2 to prevent trouble signals on unused circuits during installation. Remove the test resistors and install a 47 KΩ UL/ULC Listed EOLR at the end of the circuit.

Figure 2: Wiring diagram



(1) EOL resistor (P/N EOL-47)
(2) 22 kΩ resistor for use with personality code 18
(3) Typical NO initiating device
(4) 10 VDC max. at 350 μA
(5) Red LED (alarm/active)
(6) Green LED (normal)
(7) SLC (from previous device)
(8) SLC (to next device)

Specifications

Operating voltage	15.20 to 19.95 VDC
Current	
Standby	45 μA
Activated	700 μA
Ground fault impedance	10 kΩ
Initiating device circuit (IDC)	
EOL resistor value	47 kΩ, UL/ULC Listed
Circuit resistance	50 Ω (25 Ω per wire) max.
Circuit capacitance	0.1 μF max.
Circuit designation	
Signaling line circuits	Class A, Style 6 or Class B, Style 4
Initiating line circuits	Class B, Style B
Wire sizes	12 to 18 AWG wire (0.75 to 2.5 mm²)
Compatible electrical boxes	2-1/2 in. (64 mm) deep single-gang box 4 in. square box 1-1/2 in. (38 mm) deep. with single-gang cover
LPCB/CPD electrical box	
Requirements	Plastic box with cover plate, no gaps or unused holes
Minimum (W × H × D)	2.4 × 3.5 × 1.5 in. (60 × 85 × 38 mm)
Operating environment	
Temperature	32 to 120°F (0 to 49°C)
Relative humidity	0 to 93%, noncondensing
Storage temperature range	−4 to 140°F (−20 to 60°C)

Regulatory information

Manufacturer	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA Authorized EU manufacturing representative: UTC Fire & Security B.V. Kelvinstraat 7, 6003 DH Weert, Netherlands
Year of manufacture	The first two digits of the DATE MFG number (located on the product identification label) are the year of manufacture.
North American standards	CAN/ULC-S527; UL 864, CE; FCC Part 15, Subpart J, Class B; DOCClass/MDC class B
FCC compliance	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
EU compliance	CE
LPCB	EN 54-18: 2005 Input/output devices
CPD certificates	0832-CPD-1020
LPCB reference	262y/09
	2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info.

Contact information

For contact information, see www.est-fire.com.

CONTROL RELAY MODULE

Operations & Maintenance Manual
December 2015

Control Relay Modules

SIGA-CR, SIGA-MCR, SIGA-CRR, SIGA-MCRR

SIGA-MCR

SIGA-CR

MEA 7300-1657: 0121 S3424

Overview

The Control Relay Module and the Polarity Reversal Relay Module are part of the Signature Series system. They are intelligent analog addressable devices available in either plug-in (UIO) versions, or standard 1-gang mount versions.

The SIGA-CR/MCR Control Relay Module provides a Form "C" dry relay contact to control external appliances such as door closers, fans, dampers etc. This device does not provide supervision of the state of the relay contact. Instead, the on-board microprocessor ensures that the relay is in the proper ON/OFF state. Upon command from the loop controller, the SIGA-CR/MCR relay activates the normally open or normally-closed contact.

The SIGA-CRR/MCRR Polarity Reversal Relay Module provides a Form "C" dry relay contact to power and activate a series of SIGA-AB4G Audible Sounder Bases. Upon command from the Signature loop controller, the SIGA-CRR reverses the polarity of its 24 Vdc output, thus activating all Sounder Bases on the data loop.

Standard-mount versions (SIGA-CR and SIGA-CRR) are installed to standard North American 1-gang electrical boxes, making them ideal for locations where only one module is required. Separate I/O and data loop connections are made to each module.

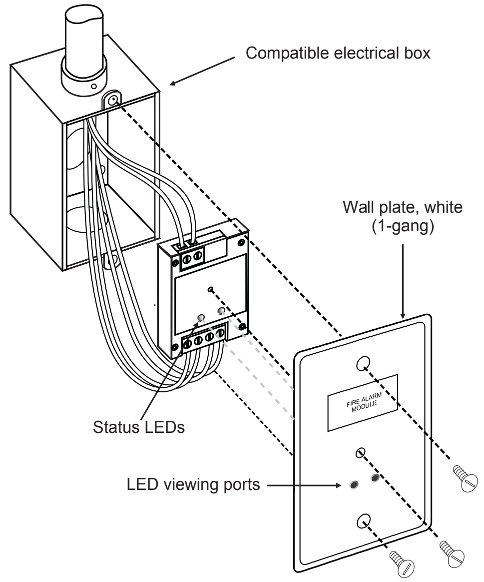
Plug-in UIO versions (SIGA-MCR and SIGA-MCRR) are part of the UIO family of plug-in Signature Series modules. They function identically to the standard mount versions, but take advantage of the modular flexibility and easy installation that characterizes all UIO modules. Two- and six-module UIO motherboards are available. All wiring connections are made to terminal blocks on the motherboard. UIO assemblies may be mounted in Edwards enclosures.

Standard Features

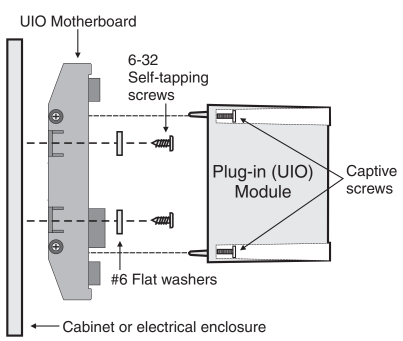
- **Provides one no/nc contact (SIGA-CR/MCR)**
  Form "C" dry relay contact can be used to control external appliances such as door closers, fans, dampers etc.
- **Allows group operation of sounder bases**
  The SIGA-CRR/MCRR reverses the polarity of its 24 Vdc output, thus activating all Sounder Bases on the data loop.
- **Plug-in (UIO) or standard 1-gang mount**
  UIO versions allow quick installation where multiple modules are required. The 1-gang mount version is ideal for remote locations that require a single module.
- **Automatic device mapping**
  Signature modules transmit information to the loop controller regarding their circuit locations with respect to other Signature devices on the wire loop.
- **Electronic addressing**
  Programmable addresses are downloaded from the loop controller, a PC, or the SIGA-PRO Signature Program/Service Tool; there are no switches or dials to set.
- **Intelligent device with microprocessor**
  All decisions are made at the module to allow lower communication speed with substantially improved control panel response time and less sensitivity to line noise and loop wiring properties; twisted or shielded wire is not required.
- **Ground fault detection by address**
  Detects ground faults right down to the device level.

Installation

SIGA-CR and SIGA-CRR: modules mount to North American 2½ inch (64 mm) deep 1-gang boxes and 1½ inch (38 mm) deep 4 inch square boxes with 1-gang covers and SIGA-MP mounting plates. The terminals are suited for #12 to #18 AWG (2.5 mm^2 to 0.75 mm^2) wire size.



SIGA-MCR and SIGA-MCRR: mount the UIO motherboard inside a suitable Edwards enclosure with screws and washers provided. Plug the module into any available position on the motherboard and secure the module to the motherboard with the captive screws. Wiring connections are made to the terminals on the motherboard (see wiring diagram). UIO motherboard terminals are suited for #12 to #18 AWG (2.5 mm^2 to 0.75 mm^2) wire size.



Electronic Addressing - The loop controller electronically addresses each module, saving valuable time during system commissioning. Setting complicated switches or dials is not required. Each module has its own unique serial number stored in its onboard memory. The loop controller identifies each device on the loop and assigns a "soft" address to each serial number. If desired, the modules can be addressed using the SIGA-PRO Signature Program/Service Tool.

Edwards recommends that this module be installed according to latest recognized edition of national and local fire alarm codes.

Application

The operation of Signature Series control relays is determined by their sub-type code or "Personality Code."

Personality Code 8: CONTROL RELAY (SIGA-CR/MCR) - Dry Contact Output. This setting configures the module to provide one Form "C" DRY RELAY CONTACT to control Door Closers, Fans, Dampers, etc. Contact rating is 2.0 amp @ 24 Vdc; 0.5 amp @ 120 Vac (or 0.25A @ 220 Vac for non-UL applications). Personality Code 8 is assigned at the factory. No user configuration is required.

Personality Code 8: POLARITY REVERSAL RELAY MODULE (SIGA-CRR/MCRR). This setting configures the module to reverse the polarity of its 24 Vdc output. Contact rating is 2.0 amp @ 24 Vdc (pilot duty). Personality Code 8 is assigned at the factory. No user configuration is required.

Compatibility

The Signature Series modules are compatible only with EST's Signature Loop Controller.

Warnings & Cautions

This module will not operate without electrical power. As fires frequently cause power interruption, we suggest you discuss further safeguards with your local fire protection specialist.

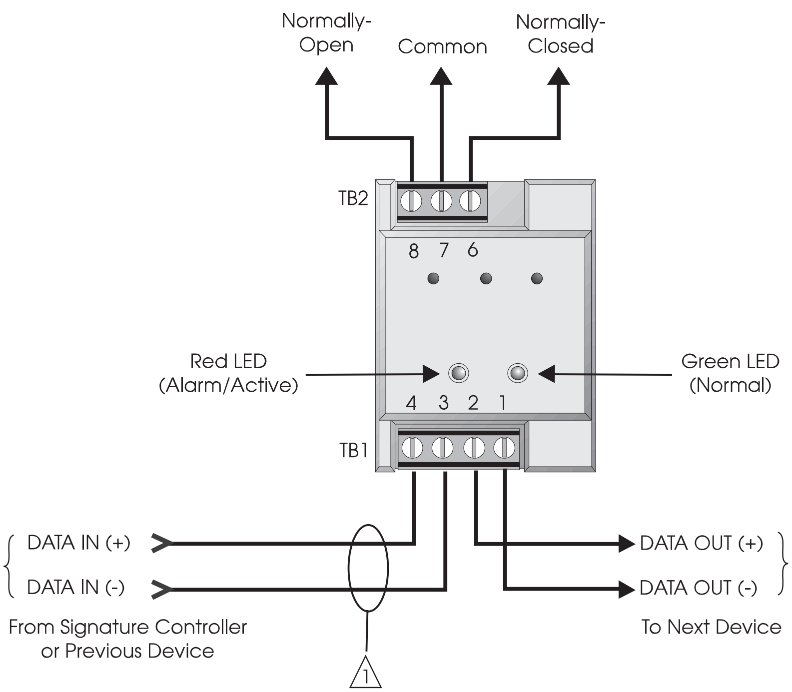
Testing & Maintenance

The module's automatic self-diagnosis identifies when it is defective and causes a trouble message. The user-friendly maintenance program shows the current state of each module and other pertinent messages. Single modules may be turned off (deactivated) temporarily, from the control panel. Availability of maintenance features is dependent on the fire alarm system used. Scheduled maintenance (Regular or Selected) for proper system operation should be planned to meet the requirements of the Authority Having Jurisdiction (AHJ). Refer to current NFPA 72 and ULC CAN/ULC 536 standards.

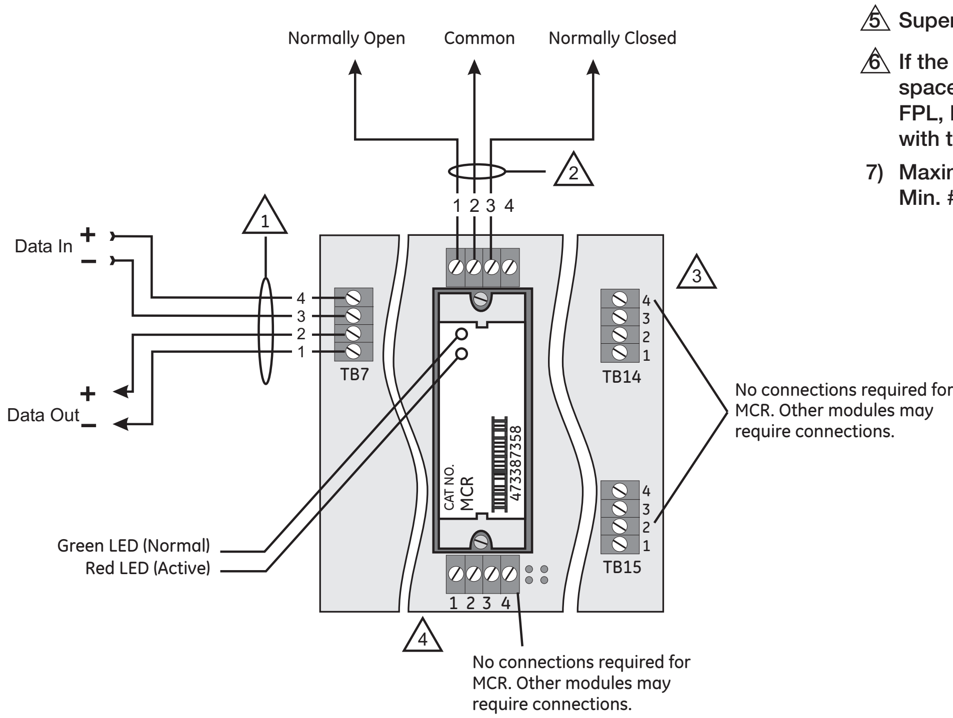
Typical Wiring

Modules will accept #18 AWG (0.75mm²), #16 (1.0mm²), #14 AWG (1.50mm²) and #12 AWG (2.5mm²) wire sizes.

Note: Sizes #16 AWG (1.0mm²) and #18 AWG (0.75mm²) are preferred for ease of installation. See Signature Loop Controller catalog sheet for detailed wiring requirement specifications.



SIGA-CR Control Relay



SIGA-MCR Control Relay

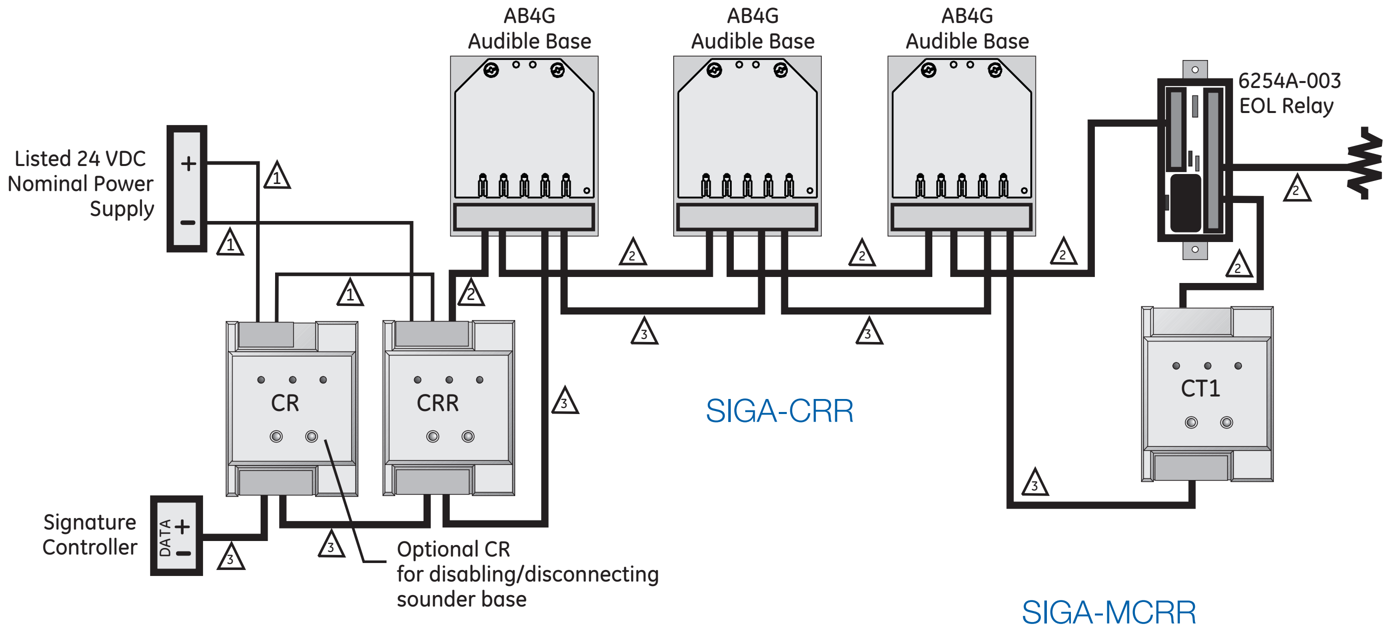
Notes

1. Refer to Signature Loop Controller Installation Sheet for wiring specifications.
2. NFPA 72 requires that the SIGA-CR/SIGA-MCR be installed in the same room as the device it is controlling. This requirement may not apply in all markets. Check with your local AHJ for details.
3. The SIGA-UIO6R and the SIGA-UIO2R do not come with TB14.
4. The SIGA-UIO6 does not come with TB8 through TB13.
5. Supervised and power-limited.
6. If the source is nonpower-limited, maintain a space of 1/4 inch from power-limited wiring or use FPL, FPLP, FPLR, or an equivalent in accordance with the National Electrical Code.
7. Maximum #12 AWG (2.5mm²) wire. Min. #18 (0.75mm²).

Typical Wiring

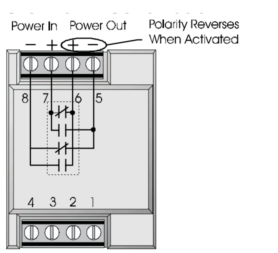
Modules will accept #18 AWG ($0.75mm^2$), #16 ($1.0mm^2$), #14 AWG ($1.50mm^2$) and #12 AWG ($2.50mm^2$) wire sizes.

Note: Sizes #16 AWG ($1.0mm^2$) and #18 AWG ($0.75mm^2$) are preferred for ease of installation. See Signature Loop Controller catalog sheet for detailed wiring requirement specifications.

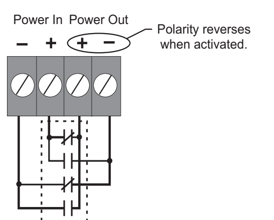


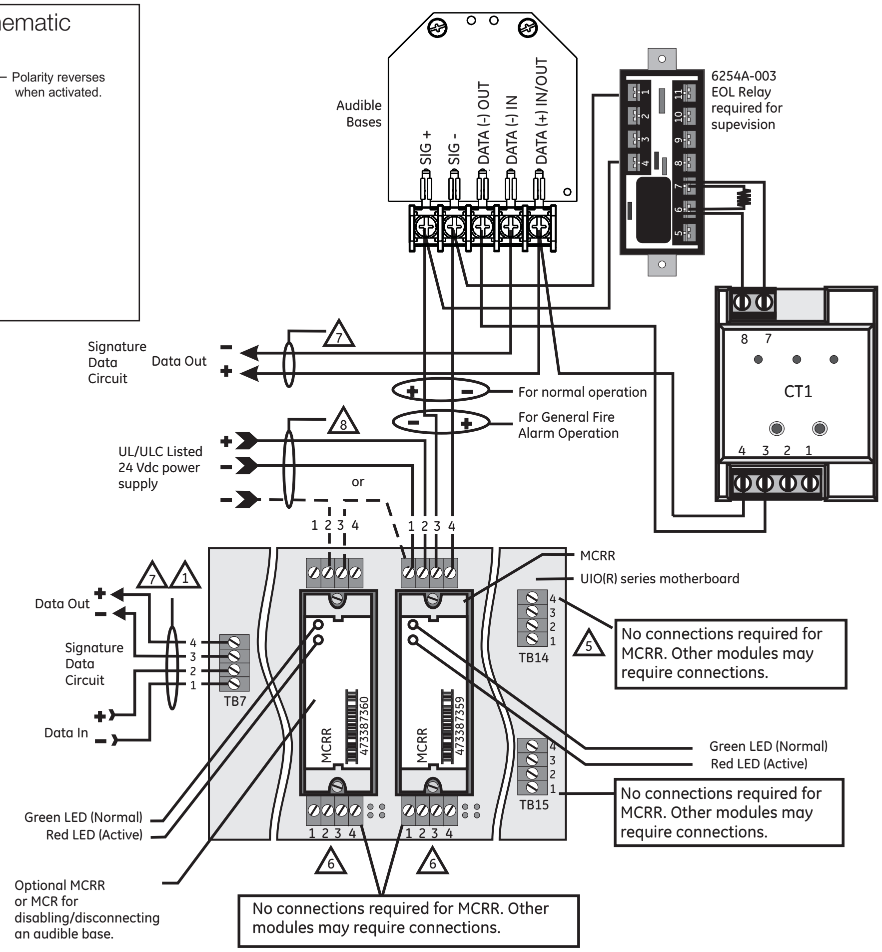
SIGA-MCRR

SIGA-CRR Schematic



SIGA-MCRR Schematic





Notes

1. Refer to the Signature controller installation sheet for wiring.
2. One Pair of Wires (24 Vdc power).
3. One Pair of Wires (Signature Data).
4. Single Wire (24 Vdc power).
5. The SIGA-UIO6R and the SIGA-UIO2R do not come with TB14.
6. The SIGA-UIO6 does not come with TB8 through TB13.
7. Supervised and power-limited.
8. If the source is nonpower-limited, maintain a space of 1/4 inch from power-limited wiring or use FPL, FPLP, FPLR, or an equivalent in the National Electrical Code.
9. Maximum #12 AWG ($2.5 mm^2$) wire; Minimum #18 AWG ($0.75 mm^2$).
10. End-of-Line Relay must monitor and report power supply trouble to control panel.
11. Class B Data wiring may be “T-tapped.”

Specifications

Catalog Number	SIGA-CR	SIGA-MCR	SIGA-CRR	SIGA-MCRR
Description	Control Relay		Polarity Reversal Relay	
Type Code	Personality Code 8 (Factory Set)		Personality Code 8 (Factory Set)	
Address Requirements	Uses 1 Module Address			
Operating Current	Standby = 75 µA Activated = 75 µA			
Operating Voltage	15.2 to 19.95 Vdc (19 Vdc nominal)			
Relay Type and Rating	Form C, 2 Amps @ 24 Vdc (pilot duty), 0.5 Amps @ 120 Vac and 0.25 Amps @ 220 Vac (220 Vac is non-UL) Not rated for capacitive loads.			
Mounting	North American 2½ inch (64 mm) deep 1-gang boxes and 1½ inch (38 mm) deep 4 inch square boxes with 1-gang covers and SIGA-MP mounting plates	Plugs into UIO2R, UIO6R or UIO6 Motherboards	North American 2½ inch (64 mm) deep 1-gang boxes and 1½ inch (38 mm) deep 4 inch square boxes with 1-gang covers and SIGA-MP mounting plates	Plugs into UIO2R, UIO6R or UIO6 Motherboards
Construction & Finish	High Impact Engineering Polymer			
Storage and Operating Environment	Operating Temperature: 32°F to 120°F (0°C to 49°C) Storage Temperature: -4°F to 140°F (-20°C to 60°C) Humidity: 0 to 93% RH			
LED Operation	On-board Green LED - Flashes when polled On-board Red LED - Flashes when in alarm/active			
Compatibility	Use With: Signature Loop Controller			
Agency Listings	UL, ULC, CSFM, MEA			

Ordering Information

Catalog Number	Description	Ship Weight - lbs (kg)
SIGA-CR	Control Relay Module (Standard Mount)	0.4 (0.15)
SIGA-MCR	Control Relay Module (UIO Mount)	0.18 (0.08)
SIGA-CRR	Polarity Reversal Relay Module (Standard Mount)	0.4 (0.15)
SIGA-MCRR	Polarity Reversal Relay Module (UIO Mount)	0.18 (0.08)

Related Equipment		
27193-11	Surface Mount Box - Red, 1-gang	1 (0.6)
27193-16	Surface Mount Box - White, 1-gang	1 (0.6)
SIGA-UIO2R	Universal Input-Output Module Board w/Riser Inputs - Two Module Positions	0.32 (0.15)
SIGA-UIO6R	Universal Input-Output Module Board w/Riser Inputs - Six Module Positions	0.62 (0.28)
SIGA-UIO6	Universal Input-Output Module Board - Six Module Positions	0.56 (0.25)
SIGA-AB4G	Audible (Sounder) Detector Base	0.3 (0.15)

Accessories		
MFC-A	Multifunction Fire Cabinet - Red, supports Signature Module Mounting Plates	7.0 (3.1)
SIGA-MB4	Transponder Mounting Bracket (allows for mounting two 1-gang modules in a 2-gang box)	0.4 (0.15)
SIGA-MP1	Signature Module Mounting Plate, 1 footprint	1.5 (0.70)
SIGA-MP2	Signature Module Mounting Plate, 1/2 footprint	0.5 (0.23)
SIGA-MP2L	Signature Module Mounting Plate, 1/2 extended footprint	1.02 (0.46)

Contact us...

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Web: www.chubbedwards.com

Signature Series Overview

The Signature Series intelligent analog-addressable system from Edwards is an entire family of multi-sensor detectors and mounting bases, multiple-function input and output modules, network and non-network control panels, and user-friendly maintenance and service tools. Analog information from equipment connected to Signature devices is gathered and converted into digital signals. An onboard microprocessor in each Signature device measures and analyzes the signal and decides whether or not to input an alarm. The microprocessor in each Signature device provides four additional benefits – Self-diagnostics and History Log, Automatic Device Mapping, Stand-alone Operation and Fast, Stable Communication.

Self-diagnostics and History Log – Each Signature Series device constantly runs self-checks to provide important maintenance information. The results of the self-check are automatically updated and permanently stored in its non-volatile memory. This information is accessible for review any time at the control panel, PC, or using the SIGA-PRO Signature Program/Service Tool. The information stored in device memory includes:

- Device serial number, address, and type
- Time and date of last alarm
- Most recent trouble code logged by the detector — 32 possible trouble codes may be used to diagnose faults.

Automatic Device Mapping –The Signature Data Controller (SDC) learns where each device's serial number address is installed relative to other devices on the circuit. The SDC keeps a map of all Signature Series devices connected to it. The Signature Series Data Entry Program also uses the mapping feature. With interactive menus and graphic support, the wired circuits between each device can be examined. Layout or "as-built" drawing information showing branch wiring (T-taps), device types and their address are stored on disk for printing hard copy. This takes the mystery out of the installation. The preparation of as-built drawings is fast and efficient.

Device mapping allows the Signature Data Controller to discover:

- Unexpected additional device addresses
- Missing device addresses
- Changes to the wiring in the circuit.

Most Signature modules use a personality code selected by the installer to determine their actual function. Personality codes are downloaded from the SDC during system configuration and are indicated during device mapping.

Standalone Operation – A decentralized alarm decision by the device is guaranteed. Onboard intelligence permits the device to operate in standalone (degrade) mode. If Signature loop controller CPU communications fail for more than four seconds, all devices on that circuit go into standalone mode. The circuit acts like a conventional alarm receiving circuit. Each Signature device on the circuit continues to collect and analyze information from its slave devices. When connected to a panel utilizing standalone operation, modules with their "personality" set as alarm devices (IDC) will alarm should their slave alarm-initiating device activate.

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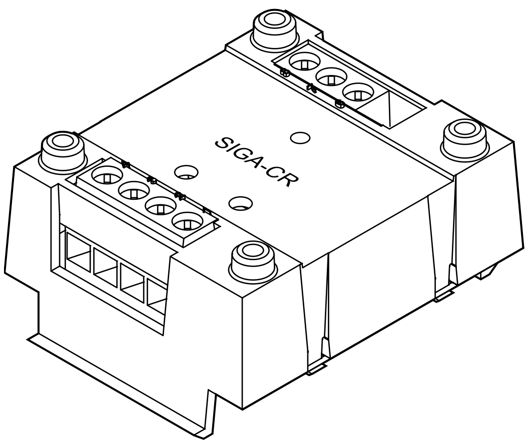
SIGA-CR Control Relay Module Installation Sheet



Description

The SIGA-CR Control Relay Module is an addressable device that provides one Form C dry contact output relay. The relay contacts transfer when the module is activated.

The module requires one address on the signaling line circuit (SLC). Addresses are assigned electronically. There are no address switches.

Diagnostic LEDs provide visible indication of the state of the module through the cover plate:

- Normal: Green LED flashes
- Alarm/active: Red LED flashes

Personality codes

Use the personality codes described below to configure the SIGA-CR module. See Table 1 for listing information.

Table 1: Personality code listing information

Code	Description	UL 864	CAN/ULC-S527	EN 54-18
8	Signal - dry contact output	P	P	P

Personality code 8: Signal - dry contact output. Configures the module as a dry relay contact to control external appliances (door closers, fans, dampers) or equipment shutdown.

Installation

Install this device in accordance with applicable national and local codes, ordinances, and regulations.

WARNING: Connecting a device that exceeds this module's pilot duty contact ratings may cause activation failure. This module does not support capacitive loads. See "Specifications" on page 3 for contact ratings.

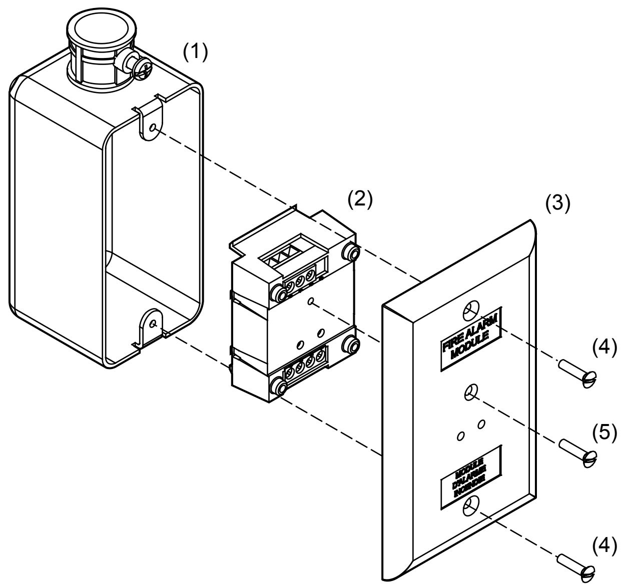
Notes

- The module is shipped from the factory as an assembled unit; it contains no user-serviceable parts and should not be disassembled.
- This module does not operate without electrical power. As fires frequently cause power interruption, discuss further safeguards with the local fire protection specialist.
- Install the module within the same room as the device it is controlling.

To install the module:

1. Write the address assigned to the module on the label provided, and then apply the label to the module. Remove the serial number label from the module, and then attach it to the project documentation.
2. Wire in accordance with "Wiring" on page 2.
3. Using the self-tapping screw provided, attach the wall plate to the module. See Figure 1.
4. Using the two machine screws provided, attach the wall plate and module to the electrical box.

Figure 1: Installing the SIGA-CR module



(1)	Compatible electrical box	(4)	#6-32 × 5/8 machine screw (2X)
(2)	SIGA-CR module		
(3)	Wall plate	(5)	#4 × 1/2 self-tapping screw

Wiring

Wire this device in accordance with applicable national and local codes, ordinances, and regulations.

Notes

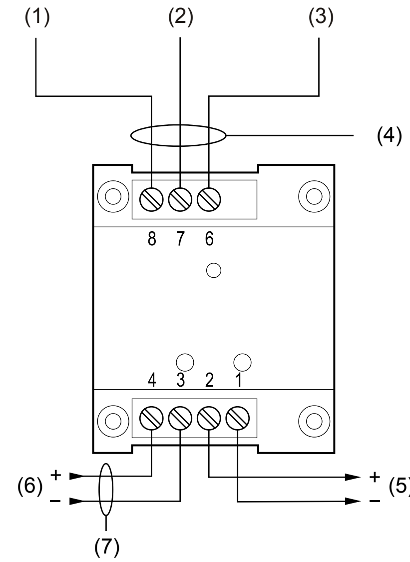
- Refer to the Signature loop controller installation sheet for SLC wiring specifications.
- Each terminal on the module is limited to a single conductor.

To wire the module:

1. Verify that all field wiring is free of opens, shorts, and ground faults.
2. Strip 1/4 in. (about 6 mm) from the ends of all wires that connect to the terminal block of the module.

   When stripping wire ends, exposing more wire may cause a ground fault; exposing less wire may result in a faulty connection.
3. Make all wiring connections as shown in Figure 2.

Figure 2: Wiring diagram



(1) Normally open contact (NO)
(2) Common contact (C)
(3) Normally closed contact (NC)
(4) Not supervised. Power-limited unless connected to a nonpower-limited source. If the source is nonpower-limited, eliminate the power-limited mark and maintain a minimum of 0.25 in. (6.4 mm) space from power-limited wiring. For other mounting methods, see enclosure and bracket installation sheets to maintain separation of power-limited and nonpower-limited wiring. The wire size must be capable of handling fault current from nonpower-limited source.
— or —
Use type FPL, FPLR, FPLP, or permitted substitute cables, provided these power-limited cable conductors extending beyond the jacket are separated by a minimum of 0.25 in. (6.4 mm) space or by a nonconductive sleeve or nonconductive barrier from all other conductors. Refer to the NFPA 70 *National Electrical Code* for more details.
(5) Signaling line circuit (SLC) to next device
(6) Signaling line circuit (SLC) from previous device
(7) Power-limited and supervised

Specifications

Operating voltage	15.20 to 19.95 VDC

Current
  Standby
  Activated
	
	75 µA
	75 µA

Ground fault impedance	10 kΩ
Contact ratings (pilot duty)	24 VDC at 2 A 120 VAC at 0.5 A
Relay type	Form C, programmable
Circuit designation Signaling line circuits	 Class A, Style 6 or Class B, Style 4
Wire size	12 to 18 AWG (1.0 to 4.0 mm²)

LPCB/CPR electrical box
  Requirements
 	
  Minimum size W × H × D
	
	Plastic box with cover plate, no gaps or unused holes
	2.4 × 3.5 × 1.5 in. (60 × 85 × 38 mm)

Compatible electrical boxes	2-1/2 in. (64 mm) deep single-gang box; Standard 4 in. square,1-1/2 in. (38 mm) deep box

Operating environment
  Temperature
  Relative humidity
	
	32 to 120°F (0 to 49°C)
	0 to 93%, noncondensing

Storage temperature range	−4 to 140°F (−20 to 60°C)

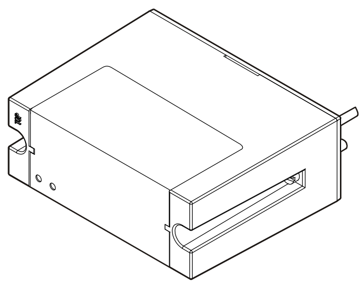
Regulatory information

Manufacturer	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA Authorized EU manufacturing representative: UTC Fire & Security B.V. Kelvinstraat 7, 6003 DH Weert, Netherlands
Year of manufacture	The first two digits of the DATE MFG number (located on the product identification label) are the year of manufacture.
FCC compliance	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
North American standards	CAN/ULC-S527, UL 864
EN 54	EN 54-18:2005 Input/output devices
EU compliance	CE
CPR certificates	0832-CPR-F0330
	2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information, see: www.recyclethis.info.

Contact information

For contact information, see www.est-fire.com.

SIGA-MCR Control Relay Module Installation Sheet



Description

The SIGA-MCR Control Relay Module is an addressable device that provides one Form C dry contact output relay. The relay contacts transfer when the module is activated.

The module requires one address on the signaling line circuit (SLC). Addresses are assigned electronically. There are no address switches.

Diagnostic LEDs provide visible indication of the state of the module through the cover plate:

- Normal: Green LED flashes
- Alarm/active: Red LED flashes

The SIGA-MCR plugs into a SIGA-UIO2R, SIGA-UIO6, or SIGA-UIO6R motherboard. Field wiring connections are made using terminals on the motherboard.

Personality codes

The module requires the loop controller to download the personality code that determines how the module operates. Use the personality codes described below to configure the SIGA-MCR.

Personality code 8: Signal - dry contact output. Configures the module as a dry relay contact to control external appliances (door closers, fans, dampers) or equipment shutdown.

Installation

WARNING: Connecting a device that exceeds this module's pilot duty contact ratings may cause activation failure. This module does not support capacitive loads. See "Specifications" on page 3 for contact ratings.

Notes

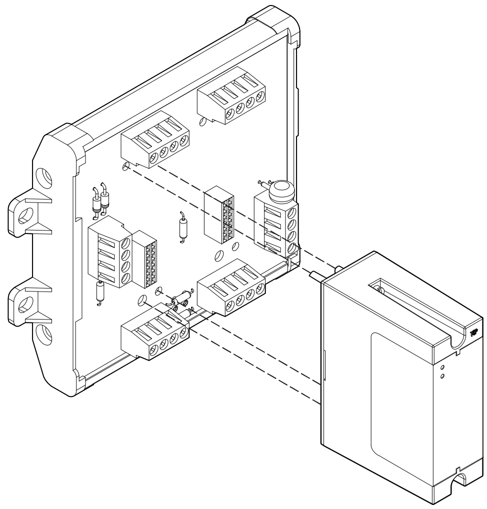
- The module is shipped from the factory as an assembled unit; it contains no user-serviceable parts and should not be disassembled.
- The module does not operate without electrical power. As fires frequently cause power interruption, discuss further safeguards with a local fire protection specialist.
- Install the module in the same room as the device it is controlling.

Install in accordance with all applicable local codes and standards and the local authority having jurisdiction.

To install the module:

1. Plug the SIGA-MCR module into any available position in the motherboard. See Figure 1.
2. Secure the module to the motherboard with the two captive screws.
3. Write the address assigned to the module on the label provided, and then apply the label to the module. Remove the serial number label from the detector, and then attach it to the project documentation.
4. Wire in accordance with "Wiring" on page 2.

Figure 1: Mounting in a SIGA-UIO2R



Wiring

Wire in accordance with applicable requirements of the latest editions of the local codes and standards and the local authority having jurisdiction.

Note: When stripping wire ends, exposing more wire may cause a ground fault or circuit malfunction on unsupervised wiring; exposing less wire may result in a faulty connection.

Strip 1/4 in. (about 6 mm) from the ends of all wires that connect to the terminal block.

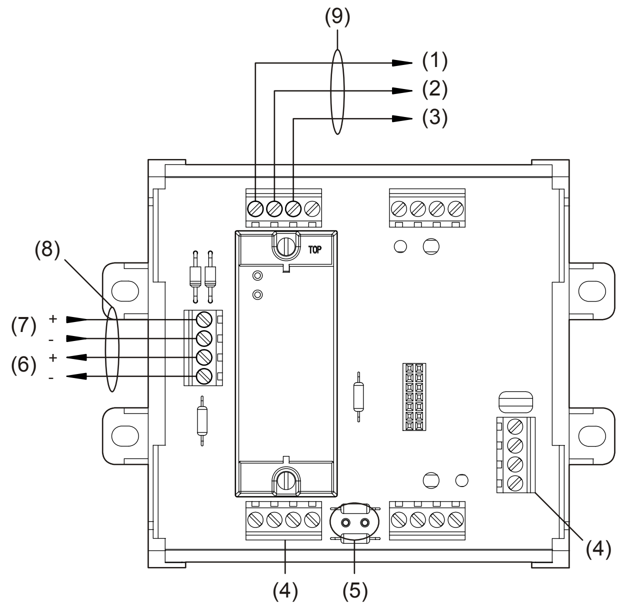
Notes

- Refer to the Signature loop controller installation sheet for SLC wiring specifications.
- Each terminal on the motherboard is limited to a single conductor.

To wire the module:

1. Verify that all field wiring is free of opens, shorts, and ground faults.
2. Make all wiring connections as shown in Figure 2.

Figure 2: Wiring



(1) Normally open contact (NO)
(2) Common contact (C)
(3) Normally closed contact (NC)
(4) No connection for the SIGA-MCR; other modules may require connection
(5) Remove motherboard jumpers on both sides of the module
(6) Signaling line circuit (SLC) to next device
(7) Signaling line circuit (SLC) from previous device
(8) Power-limited and supervised
(9) Not supervised. Power-limited unless connected to a nonpower-limited source. If the source is nonpower-limited, eliminate the power-limited mark and maintain a minimum of 0.25 in. (6.4 mm) space from power-limited wiring. For other mounting methods, see enclosure and bracket installation sheets to maintain separation of power-limited and nonpower-limited wiring. The wire size must be capable of handling fault current from nonpower-limited source.

— or —

Use type FPL, FPLR, FPLP, or permitted substitute cables, provided these power-limited cable conductors extending beyond the jacket are separated by a minimum of 0.25 in. (6.4 mm) space or by a nonconductive sleeve or nonconductive barrier from all other conductors. Refer to the NFPA 70 *National Electrical Code* for more details.

Specifications

Operating voltage	15.20 to 19.95 VDC
Current Standby Active	 75 µA 75 µA
Ground fault impedance	10 kΩ
Contact ratings (pilot duty)	24 VDC at 2 A 120 VAC at 0.5 A
Relay type	Form C, programmable
Circuit designation Signaling line circuits	 Class A, Style 6 or Class B, Style 4
Wire size	12 to 18 AWG (0.75 to 2.5 mm²)
Compatible motherboards	UIO2R, UIO6, UIO6R
Operating environment Temperature Relative humidity	 32 to 120°F (0 to 49°C) 0 to 93%, noncondensing
Storage temperature range	−4 to 140°F (−20 to 60°C)

Regulatory information

Manufacturer	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
Year of manufacture	The first two digits of the DATE MFG number (located on the product identification label) are the year of manufacture.
North American standards	CAN/ULC-S527, UL 864
FCC compliance	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Contact information

For contact information, see www.utcfireandsecurity.com.

PHOTOELECTRIC SMOKE DETECTOR

Operations & Maintenance Manual
December 2015

EST Life Safety & Communications

Intelligent Smoke Detector with Optional CO Sensor

SIGA2-PS, SIGA2-PCOS

5278-1657: 0300

S853

Overview

Signature Series SIGA2-P(CO)S photoelectric detectors bring advanced sensing technology to a practical design that increases efficiency, saves installation time, cuts costs, and extends life safety and property protection capabilities. Continuous self-diagnostics ensure reliability over the long-haul, while innovative field-replacable smoke chambers make detector maintenance literally a snap. With its modular CO sensor, this detector pulls double-duty — continually monitoring the environment for signs of smoke, as well as its invisible yet deadly companion, carbon monoxide.

Like all Signature Series detectors, the SIGA2-P(CO)S is an intelligent device that gathers analog information from its smoke and CO sensor (if present), converting this data into digital signals. To make an alarm decision, the detector's on-board microprocessor measures and analyzes sensor readings and compares this information to historical data. Digital filters remove signal patterns that are not typical of fires, thus virtually eliminating unwanted alarms.

The SIGA2-PCOS includes an advanced carbon monoxide sensor and daughterboard. When the electrochemical cell reaches its end of life after approximately six years, the detector signals a trouble condition to the control panel. The sensor/daughterboard module is field-replaceable.

Standard Features

- Optical smoke sensing technology with optional carbon monoxide sensor
- Field-replacable smoke chamber
- Field-replacable carbon monoxide sensor/daughterboard module
- Uses existing wiring
- Automatic device mapping
- Ground fault detection by module
- Up to 250 devices per loop
- Two levels of environmental compensation
- Two levels of dirty detector warning
- Twenty pre-alarm settings
- Five sensitivity settings
- Non-volatile memory
- Electronic addressing
- Environmental compensation
- Identification of dirty or defective detectors
- Automatic day/night sensitivity adjustment
- Bicolor (green/red) status LED
- Standard, relay, fault isolator, and audible mounting bases

Application

Smoke detection

The SIGA2-PS detects extremely small particles of combustion and triggers an alarm at the first sign of smoke. Thanks to its high-performance forward scattering reflective response technology, the photoelectric smoke sensor responds quickly and reliably to a wide range of fire types, especially slow burning fires fuelled by combustibles typically found in modern multi-use buildings.

Carbon monoxide detection

CO detection has rapidly become a standard part of life safety strategies everywhere. Monitored CO detection is becoming mandated with increasing frequency in all types of commercial applications, but particularly in occupancies such as hotels, rooming houses, dormitories, day care facilities, schools, hospitals, assisted living facilities, and nursing homes. In fact, more than half of the U.S. population already lives in states requiring the installation of CO detectors in some commercial occupancies. This is because carbon monoxide is the leading cause of accidental poisoning deaths in America. Known as the "Silent Killer," CO is odorless, tasteless, and colorless. It claims nearly 500 lives, and results in more than 15,000 hospital visits annually.

Installation

Signature Series detectors mount to North American 1-gang boxes, 3-1/2 inch or 4 inch octagon boxes, and to 4 inch square electrical boxes 1-1/2 inches (38 mm) deep. They mount to European BESA and 1-gang boxes with 60.3 mm fixing centers. See mounting base installation and wiring for more information.

Testing & Maintenance

Each detector automatically identifies when it is dirty or defective and causes a "dirty detector" message. The detector's sensitivity measurement can also be transmitted to the loop controller. A sensitivity report can be printed to satisfy NFPA sensitivity measurements which must be conducted at the end of the first year and every two years thereafter.

The user-friendly maintenance program shows the current state of each detector and other pertinent messages. Single detectors may be turned off temporarily from the control panel. Availability of maintenance features is dependent on the fire alarm system used. When the CO sensor's electrochemical cell reaches its end of life, the detector signals a trouble condition to the control panel. The sensor/daughterboard module is field-replaceable. Scheduled maintenance (Regular or Selected) for proper detector operation should be planned to meet the requirements of the Authority Having Jurisdiction (AHJ). Refer to current NFPA 72, NFPA 720, and ULC CAN/ULC 536 standards.

This detector will NOT sense fires that start in areas where smoke cannot reach the detector. Smoke from fires in walls, roofs, or on the opposite side of closed doors may not reach the detector to alarm it.

Sensing and reporting technology

The microprocessor in each detector provides four additional benefits - Self-diagnostics and History Log, Automatic Device Mapping, Stand-alone Operation and Fast, Stable Communication.

Self-diagnostics and History Log - Each Signature Series detector constantly runs self-checks to provide important maintenance information. The results of the self-check are automatically updated and permanently stored in the detector's non-volatile memory

Automatic Device Mapping - The loop controller learns where each device's serial number address is installed relative to other devices on the circuit. The mapping feature provides supervision of each device's installed location to prevent a detector from being reinstalled (after cleaning etc.) in a different location from where it was originally.

Stand-alone Operation - A decentralized alarm decision by the detector is guaranteed. On-board intelligence permits the detector to operate in stand-alone mode. If loop controller CPU communications fail for more than four seconds, all devices on that circuit go into stand-alone mode. The circuit acts like a conventional alarm receiving circuit.

Fast Stable Communication - On-board intelligence means less information needs to be sent between the detector and the loop controller. Other than regular supervisory polling response, the detector only needs to communicate with the loop controller when it has something new to report.

Accessories

Detector mounting bases have wiring terminals that are accessible from the "room-side" after mounting the base to the electrical box. The bases mount to North American 1-gang boxes and to 3½ inch or 4 inch octagon boxes, 1½ inches (38 mm) deep. They also mount to European BESA and 1-gang boxes with 60.3 mm fixing centers. The SIGA-SB4, SIGA-RB4, and SIGA-IB4 mount to North American 4 inch sq. electrical boxes in addition to the above boxes. They include the SIGA-TS4 Trim Skirt which is used to cover the "mounting ears" on the base. The SIGA-AB4G mounts to a 4" square box only.

SIGA-AB4G/T Audible Base | SIGA-SB Standard Base | SIGA-IB Isolator Base | SIGA-RB Relay Base | SIGA-LED Remote LED

Remote LED SIGA-LED - The remote LED connects to the SIGA-SB or SIGA-SB4 Standard Base only. It features a North American size 1-gang plastic faceplate with a white finish and red alarm LED.

SIGA-TS4 Trim Skirt - Supplied with 4 inch bases, it can also be ordered separately to use with the other bases to help hide surface imperfections not covered by the smaller bases.

SIGA-AB4G and SIGA-AB4GT - These sounder bases are designed for use where localized or group alarm signaling is required. The SIGA-AB4G is compatible with Signature Series smoke and heat detectors. The SIGA-AB4GT sounder base, when used with the SIGA-TCDR Temporal Pattern Generator module, adds an audible output function to any Signature Series detector, including fire and CO detectors.

Typical Wiring

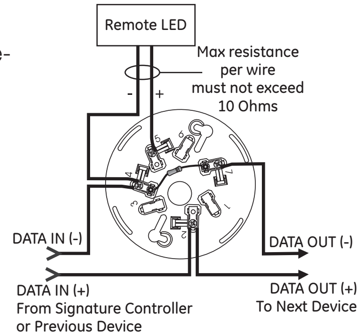
The detector mounting bases accept #18 AWG (0.75mm^2), #16 (1.0mm^2), #14 AWG (1.5mm^2), and #12 AWG (2.5mm^2) wire sizes.

Note: Sizes #16 AWG (1.0mm^2) and #18 AWG (0.75mm^2) are preferred for ease of installation. See Signature Loop Controller catalog sheet for detailed wiring requirement specifications.

Standard Detector Base, SIGA-SB, SIGA-SB4

This is the basic mounting base for Edwards Signature Series detectors. The SIGA-LED Remote LED is supported by the Standard Base.

Term	Description
1	Not Used
2	DATA IN/OUT (+)
3	Not Used
4	DATA IN (-)
5	Remote LED (-)
6	Remote LED (+)
7	Not Used
8	DATA OUT (-)



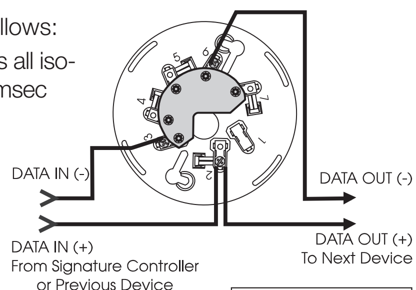
Isolator Detector Base, SIGA-IB, SIGA-IB4

This base includes a built-in line fault isolator for use on Class A circuits. A detector must be installed for it to operate. The isolator base does not support the SIGA-LED Remote LED.

The isolator operates as follows:

- a short on the line causes all isolators to open within 23 msec
- at 10 msec intervals, beginning on one side of the Class A circuit nearest the loop controller, the isolators close to provide the next isolator down the line with power
- when the isolator next to the short closes, reopens within 10 msec.

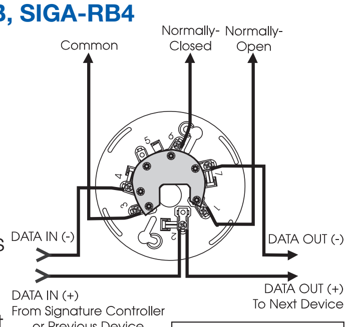
The process repeats beginning on the other side of the loop controller.



Term	Description
1	Not Used
2	DATA IN/OUT (+)
3	DATA IN (-)
4	Not Used
5	Not Used
6	DATA OUT (-)
7	Not Used

Relay Detector Base, SIGA-RB, SIGA-RB4

This base includes a relay. Normally open or closed operation is selected during installation. The dry contact is rated for 1 amp (pilot duty) @ 30 Vdc. The relay's position is supervised to avoid accidentally jarring it out of position. The SIGA-RB can be operated as a control relay if programmed to do so at the control panel (EST3 V.2 only). The relay base does not support the SIGA-LED Remote LED.

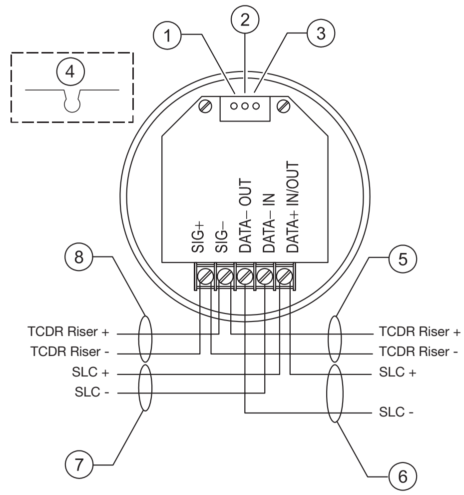


CONTACT RATING
1.0 Amp @ 30 VDC (Pilot Duty)

Term	Description
1	Normally Open
2	DATA IN/OUT (+)
3	Common
4	DATA IN (-)
5	Not Used
6	Normally-Closed
7	DATA OUT (-)

Audible Detector Base for CO and Fire Detectors, SIGA-AB4GT

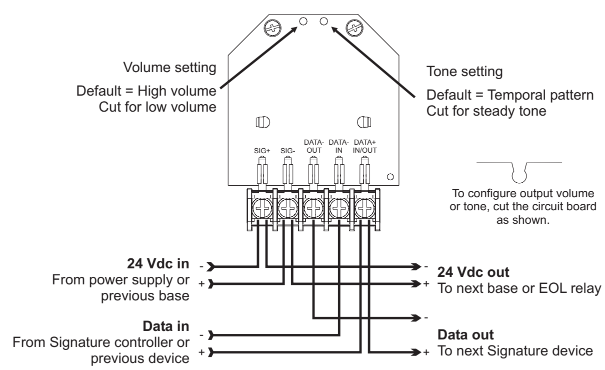
The Signature Series AB4GT sounder base, when used with the SIGA-TCDR Temporal Pattern Generator, adds an audible output function to any Signature Series detector. For more information on this device, refer to *Data Sheet 85001-0623 -- Sounder Base for CO and Fire Detectors*.



1. Volume setting. Default is high volume. For low volume, cut trace per item 4.
2. Reserved for future use. Do not cut.
3. Reserved for future use. Do not cut.
4. To configure output volume, cut trace as shown.
5. To next SIGA-AB4GT sounder base or EOL relay.
6. SLC_OUT to next intelligent addressable device.
7. SLC_IN from intelligent addressable controller or previous device.
8. From SIGA-TCDR Temporal Pattern Generator or previous SIGA-AB4GT sounder base.

Audible Detector Base, SIGA-AB4G

This base is designed for use where localized or group alarm signaling is required. When the detector senses an alarm condition, the audible base emits a local alarm signal. The optional SIGA-CRR Polarity Reversal Relay can be used for sounding to other audible bases on the same 24 Vdc circuit.



Relay and Audible Bases operate as follows:

- at system power-up or reset, the relay is de-energized
- when a detector is installed in the base with the power on, the relay energizes for four seconds, then de-energizes
- when a detector is removed from a base with the power on, the relay is de-energized
- when the detector enters the alarm state, the relay is energized.

Contact us...
Email: edwards.fire@fs.utc.com
Web: www.est-fire.com

EST is an EDWARDS brand.

1016 Corporate Park Drive
Mebane, NC 27302

In Canada, contact Chubb Edwards...
Email: inquiries@chubbedwards.com
Web: www.chubbedwards.com

Compatibility

SIGA2-P(CO)S detectors are compatible only with the Signature Loop Controller.

Warnings & Cautions

This detector will not operate without electrical power. As fires frequently cause power interruption, we suggest you discuss further safeguards with your fire protection specialist.

This detector will NOT sense fires that start in areas where smoke cannot reach the detector. Smoke from fires in walls, roofs, or on the opposite side of closed doors may not reach the detector to alarm it.

Specifications

	SIGA2-PS	SIGA2-PCOS
Normal operating current	45 µA	70 µA
Alarm current	45 µA	70 µA
Standalone alarm current	18 mA	18 mA
Operating voltage	15.20 to 19.95 VDC	
Air velocity	0 to 4,000 ft./min (0 to 20 m/s).	
Construction	High impact engineering polymer	
Wall mounting	Maximum 12 in (305 mm) from ceiling	
Mounting	Plug-in	
Shipping weight	0.44 lb. (164 g)	
Compatible bases	See Ordering Information	
Operating environment	32 to 120°F (0 to 49°C), 0 to 93% RH, noncondensing	
Storage temperature	–4 to 140°F (–20 to 60°C)	
Environmental compensation	Automatic	

Ordering Information

Catalog Number	Description	Ship Wt. lbs (kg)
SIGA2-PS	Intelligent Photoelectric Detector	0.4 (0.16)
SIGA2-PCOS	Intelligent Photoelectric Detector with carbon monoxide sensor	0.4 (0.16)
SIGA2-PCOS-CA	Intelligent Photoelectric Detector with carbon monoxide sensor (for use in Canadian markets only).	0.4 (0.16)
Accessories		
SIGA-SB	Detector Mounting Base - Standard	0.2 (.09)
SIGA-SB4	4-inch Detector Mounting Base c/w Trim Skirt	
SIGA-RB	Detector Mounting Base w/Relay	
SIGA-RB4	4-inch Detector Mounting Base w/Relay, c/w Trim Skirt	
SIGA-IB	Detector Mounting Base w/Fault Isolator	
SIGA-IB4	4-inch Detector Mounting Base w/ Fault Isolator, c/w Trim Skirt	
SIGA-LED	Remote Alarm LED (not for EN54 applications)	
SIGA-AB4G	Audible (Sounder) Base for Fire Detectors	0.3 (0.15)
SIGA-AB4GT	Audible (Sounder) Base for CO and Fire Detectors	0.3 (0.15)
SIGA-TCDR	Temporal Pattern Generator	0.3 (0.15)
SIGA-TS4	Trim Skirt (supplied with 4-inch bases)	0.1 (.04)
2-SPRC1	Replacement Smoke Chamber (for SIGA2-PS detectors)	0.1 (.04)
2-SPRC2	Replacement Smoke Chamber (for SIGA2-PCOS detectors)	0.1 (.04)
2-CORPL	Replacement CO Sensor	0.1 (.04)

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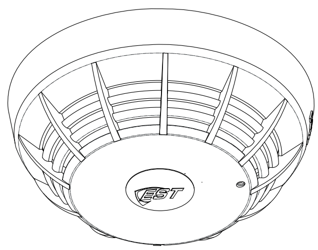
SIGA2-PS Intelligent Photoelectric Smoke Detector Installation Sheet



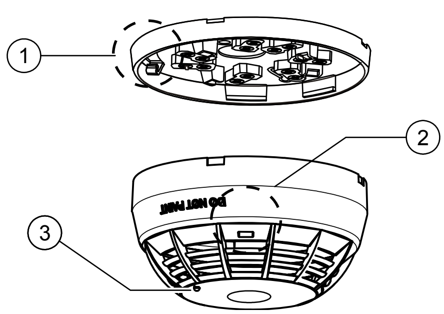
Description

The Signature Series model SIGA2-PS Intelligent Photoelectric Smoke Detector is an intelligent device that uses an optical sensing chamber to detect smoke. The detector analyzes the sensor data to determine whether to initiate an alarm.

LED indicator. The LED indicator (see Figure 1 below) displays the following states:

- Normal: Green LED indicator flashes, no action.
- Alarm/active: Red LED indicator flashes, evacuate the area.
- Stand-alone alarm: Red LED indicator turns on, evacuate the area.

Figure 1: SIGA2-PS features



1. Tamper-resist lever arm on base
2. Access slot for tamper-resist mechanism
3. LED indicator

Installation

Notes

- This detector does not operate without electrical power. As fires frequently cause power interruption, discuss further safeguards with the local fire protection specialist.
- This detector does not sense fires in areas where smoke cannot reach the detector. Smoke from fires in walls, roofs, or on the opposite side of closed doors may not reach the detector.
- Photoelectric detectors have a wide range of fire-sensing capabilities and are best suited for detecting slow, smoldering fires.
- To ensure proper operation, store the detector within the recommended ranges. Allow the detector to stabilize to room temperature before applying power.
- The dust cover (supplied) must remain on the detector during installation and be removed prior to commissioning and service. The dust cover is not a substitute for removing the detector during new construction or heavy remodeling.
- In Canada, install according to CAN/ULC-S524 *Standard for the Installation of Fire Alarm Systems,* CSA C22.1 *Canadian Electrical Code*, and the local authority having jurisdiction.
- Upon completion of the original installation and following any modifications or additions to the system, perform a calibrated sensitivity test per NFPA code. The Signature Series devices can perform this test and the panel can generate a system sensitivity report.
- To permanently disable the tamper-resist mechanism prior to placing the detector in difficult to reach locations, break and remove the plastic lever arm from the base. See Figure 1, item 1.

To install the detector:

1. Install and wire the base, as described on the installation sheet supplied with the base.
2. Remove the serial number label from the detector and attach it to the project documentation.
3. Attach the detector to the base by rotating the detector clockwise until it snaps into the locked position.

Testing

Before testing, notify the proper authorities that the fire alarm system is undergoing maintenance and will be temporarily out of service.

In the following steps, xxx indicates a variable related only to marketplace.

Make sure the SIGA2 Testifire Adapter Assembly (model SIGA2-TSTSPACER) is installed in the Testifire detector tester before testing. Refer to the *SIGA2 Testifire Adapter Assembly Installation Sheet* (P/N 3101942) for further details.

To perform an initial installation test:

1. Remove the detector from its base and verify that the proper detector address, trouble signals, and messages are reported.
2. For SIGA2-PS detectors placed in the air ducts, verify that the airflow is within specifications. See “Specifications” below.
3. If wired for Class A operation, verify that the detector continues to operate first with SLC_IN disconnected, and then with SLC_OUT disconnected. (Refer to the installation sheet for the base.)
4. Place a momentary ground fault on the SLC circuit to verify operation of ground fault detection circuitry.
5. Run a system detector sensitivity report on all detectors and verify that the readings fall within acceptable limits.
6. Perform a sensor function test, as described below.

To perform a sensor function test:

1. If desired, use the fire alarm control panel to put the detector or zone into a service group for testing. (Refer to the panel technical reference manual for instructions.)
2. Activate the smoke sensor using No Climb Products model CHEK02-xxx smoke aerosol spray, a smoke generator, or the Testifire detector tester per the manufacturer’s instructions.

Maintenance

To ensure proper operation, plan maintenance in accordance with the requirements of the authority having jurisdiction. Refer to CAN/ULC-S536 *Standard for the Inspection and Testing of Fire Alarm Systems* and NFPA *72 National Fire Alarm and Signaling Code.*

Refer to Application Bulletin P/N 270145 REV 4.0 or later for additional information and cleaning instructions.

Smoke chamber replacement

Replace the smoke chamber whenever cleaning the detector does not restore the panel to normal conditions. Replace with model number 2-SPRC1 using installation sheet P/N 3101860.

Specifications

Operating voltage	15.20 to 19.95 VDC
Current Normal operating Alarm Stand-alone alarm	 45 µA 45 µA 18.6 mA
Air velocity [1]	0 to 4,000 ft./min (0 to 20.32 m/s)
Wall mounting: distance from ceiling	12 in. (305 mm) max.
Compatible bases Standard Relay Isolator Audible	 SIGA-SB, SIGA-SB4 SIGA-RB, SIGA-RB4 SIGA-IB, SIGA-IB4 SIGA-AB4, SIGA-AB4G
Compatible detector testers [2]	Testifire 1000, Testifire 2000
Operating environment Temperature Relative humidity	 32 to 120°F (0 to 49°C) 0 to 93% noncondensing
Storage temperature	−4 to 140°F (−20 to 60°C)
Environmental compensation	Automatic

[1] For duct installation, use a SIGA-DMP duct detector mounting plate and install per P/N 387053P.

[2] Requires the SIGA2-TSTSPACER Testifire adapter assembly.

Regulatory Information

Manufacturer	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
Year of manufacture	The first two digits of the date code (located on the product identification label) are the year of manufacture.
North American standards	CAN/ULC-S529-00, UL 268, UL 268A
UL/ULC smoke sensitivity range	0.85 to 4.00 %/ft. (2.7 to 12.5 %/m) obscuration
FCC compliance	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Industry Canada compliance	This Class A digital apparatus complies with Canadian ICES-003.

Contact information

For contact information, see www.utcfireandsecurity.com.

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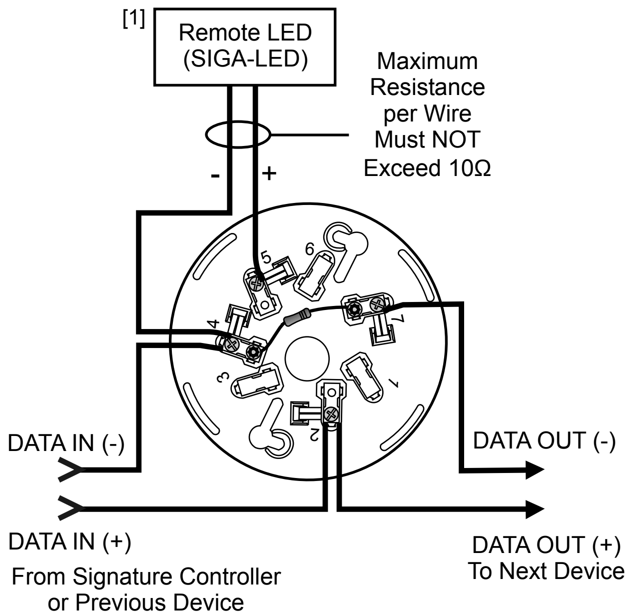
WIRING DIAGRAMS

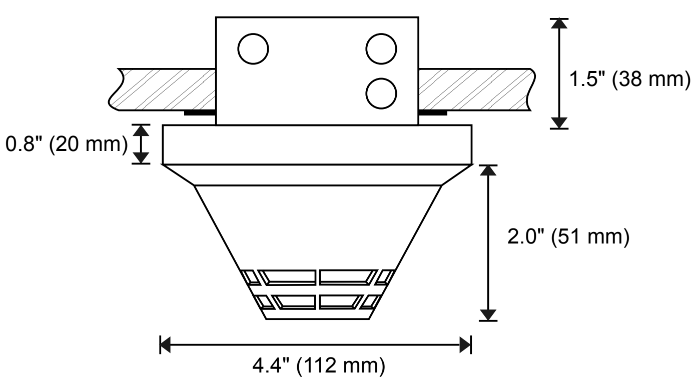
Standard Detector Base, SIGA-SB



Term	Description
1	Not Used
2	DATA IN/OUT (+)
3	Not Used
4	DATA IN (-)
4	Remote LED
5	Remote LED
6	Not Used
7	DATA OUT (-)

MOUNTING DIAGRAM

North American 1-Gang Box



SPECIFICATIONS

Operating Temperature Range	32 to 120°F (0 to 49°C)
Operating Humidity Range	0 to 93% RH
Storage Temperature Range	-4 to 140°F (-20 to 60°C)
Construction & Finish	High Impact Engineering Polymer, White
Compatible Detectors	Signature Series Detectors
Shipping Weight	
SIGA-SB	2.9 oz (82 g)
Max. Distance From Ceiling (for wall mounting)	12 in (305 mm)
Compatible Electrical Boxes North American 1-Gang Box	

NOTES:

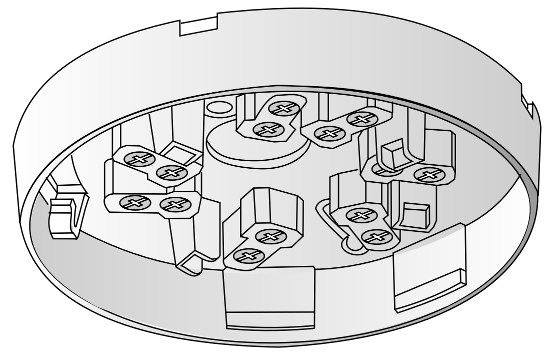
[1] The SIGA-SB provides wiring terminals for connection to the Remote LED, model SIGA-LED. The SIGA-LED is not EN54 or CE approved.

2) These bases will accept 12, 14, 16, and 18 AWG (2.05 sq mm, 1.5 sq mm, 1.0 sq mm, and 0.75 sq mm) wire. Sizes 16 and 18 are preferred.

3) Write the address assigned to the detector on the label provided and apply the label to the inside rim of the base.

4) Break wire run at each terminal. Do not loop signaling circuit field wires around terminals.

SIGA-SB



INSTALLATION SHEET

SIGA-SB
Detector Base

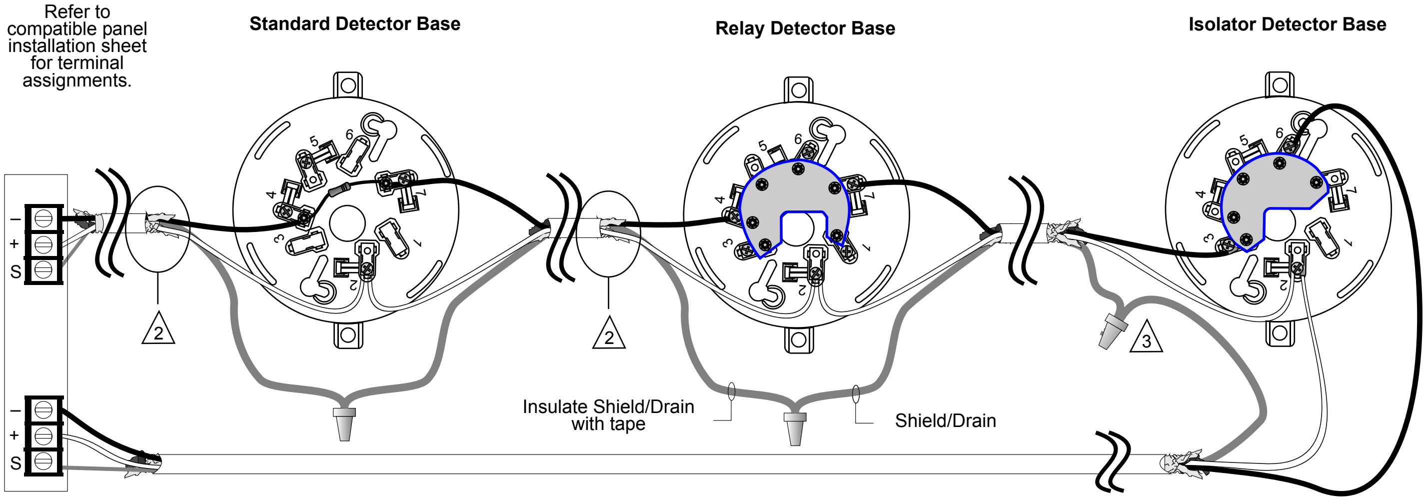
INSTALLATION SHEET P/N: 387019P	FILE NAME: 387019P.CDR
DATE: 28JUN05	
REVISION LEVEL: 9.0	
APPROVED BY: B. Right	
CREATED BY: M. Rimes	

7 93016 01977 6

8985 Town Center Parkway
Bradenton, FL 34207
USA

625 6th Street East
Owen Sound, Ontario
Canada N4K 5P8

GENERAL WIRING PRACTICES



Control Panel

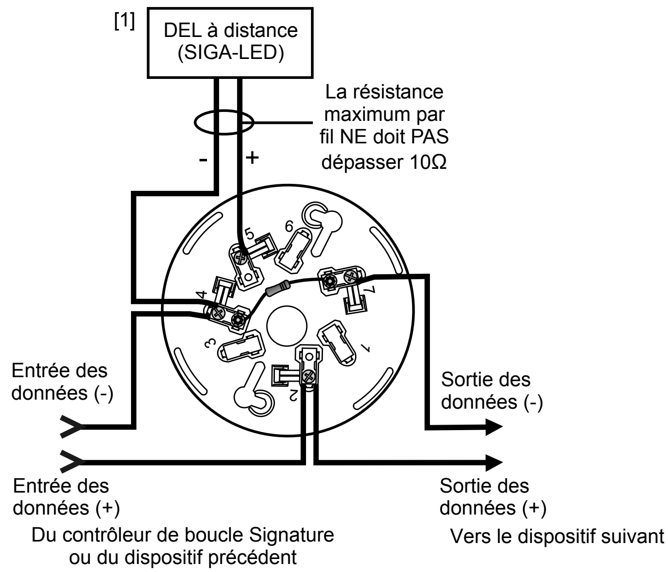
1. Shielded wire is required ONLY in environments with very high electrical noise.

△2 Shields must be continuous and insulated from ground.

△3 **For Class B wiring**, there is no shield connection to ground at the last device.

DIAGRAMMES DE CÂBLAGE

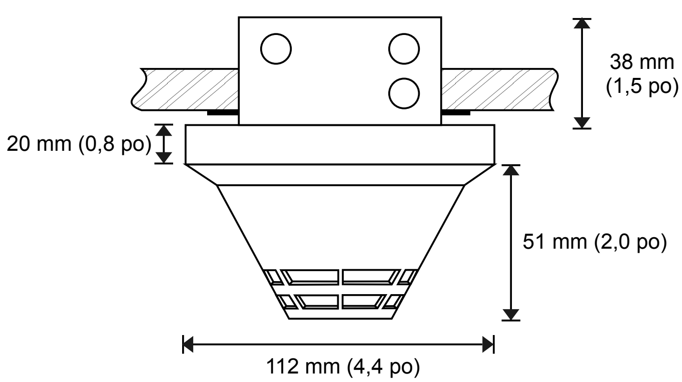
Base de détecteur standard, SIGA-SB



Borne	Description
1	Inutilisée
2	Entrée/Sortie des données (+)
3	Inutilisée
4	Entrée des données (-)
4	DEL à distance
5	DEL à distance
6	Inutilisée
7	Sortie des données (-)

SCHÉMAS DE MONTAGE

Boîte simple standard Amérique du Nord



CARACTÉRISTIQUES TECHNIQUES

Gamme de températures de fonctionnement	0 à 49 ºC (32 à 120 ºF)
Gamme d'humidités de fonctionnement	0 à 93 % HR
Gamme de températures de stockage	-20 à 60 ºC (-4 à 140 ºF)
Construction et fini	Polymère technique avec résistance élevée aux impacts, blanc
Détecteurs compatibles	Détecteurs de la série Signature
Poids à la livraison	
SIGA-SB	82 g (2,9 oz)
Distance maximale du plafond (montage mural)	305 mm (12 po)
Boîtes électriques compatibles Boîte simple standard Amérique du Nord	

NOTES:

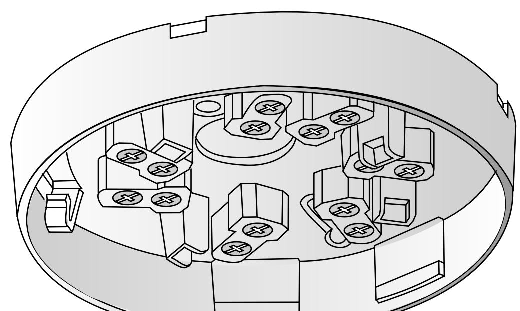
[1] Le SIGA-SB dispose de bornes de câblage pour connexion à un témoin à DEL à distance, modèle SIGA-LED. Le SIGA-LED n'est pas approuvé par EN54 ou la CE.

2) Ces bases acceptent des fils de 2,05 mm^2, 1,5 mm^2, 1 mm^2 et 0,75 mm^2 (AWG nº 12, 14, 16 ou 18). Des fils de 16 ou 18 sont préférables.

3) Écrire l'adresse assignée au détecteur sur l'étiquette fournie et coller cette dernière sur le bord intérieur de la base.

4) Interrompre le câblage au niveau de chaque borne. Ne pas enrouler les fils du circuit de signalisation autour de bornes.

SIGA-SB



FICHE D'INSTALLATION :

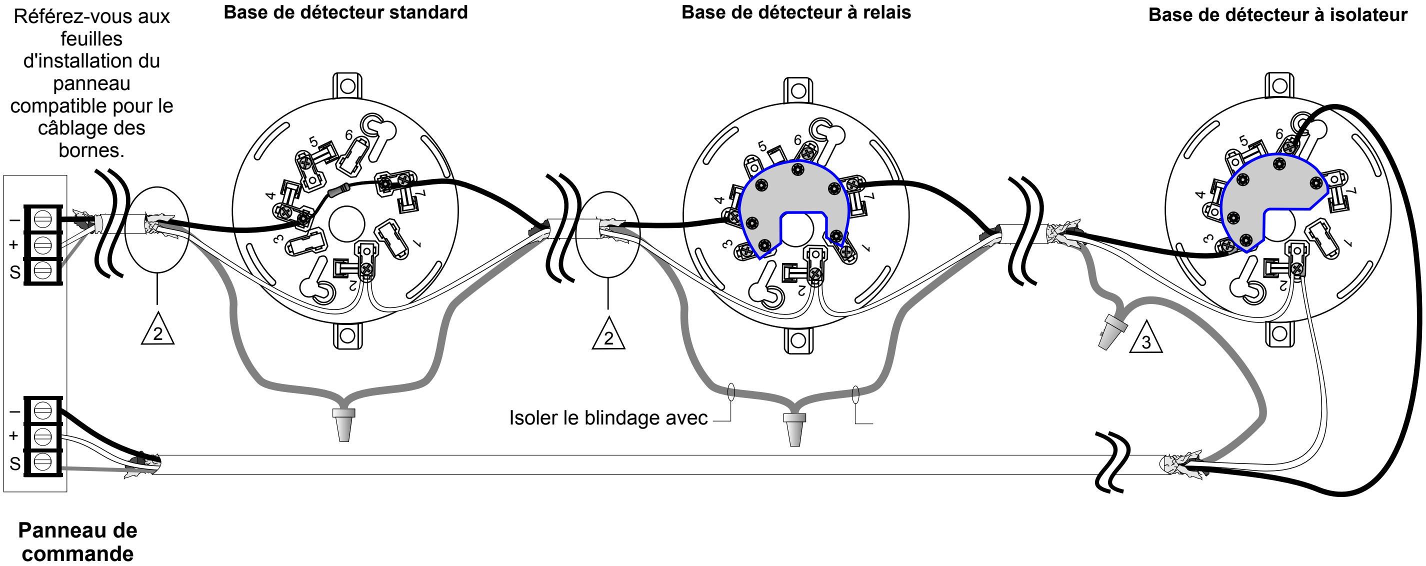
Bases De Détecteur SIGA-SB

FICHE D'INSTALLATION RÉF.: 387019P	NOM DU FICHIER: 387019P.CDR
NIVEAU DE RÉVISION: 9.0	APPROUVÉ PAR: B. Right
DATE: 28JUN05	CRÉÉ PAR: M. Rimes

8985 Town Center Parkway
Bradenton, FL 34207
USA

625 6th Street East
Owen Sound, Ontario
Canada N4K 5P8

CONSEILS GÉNÉRAUX DE CÂBLAGE



1. Un fil blindé est requis UNIQUEMENT dans les environnements à interférences électriques élevées.

2. Le blindage doit être continu et isolé de la terre.

3. **Câblage de classe B :** aucune connexion n'est effectuée entre le blindage et la terre au niveau du dernier dispositif du circuit.

<u>COMBINATION HEAT/CO DETECTOR</u>

Operations & Maintenance Manual
December 2015

EST Life Safety & Communications

Intelligent Heat Detectors with Optional CO Sensors

SIGA2-HFS, SIGA2-HRS, SIGA2-HCOS

FM APPROVED 5278-1657: 0300 S853

Overview

Signature Series fixed temperature and rate-of-rise heat detectors bring advanced sensing technology to a practical design that increases efficiency, saves installation time, cuts costs, and extends property protection capabilities. Continuous self-diagnostics ensure reliability over the long-haul, while the latest thermister technology makes these detectors ideal whereever dependable heat detection is required. With their modular CO sensor, these devices pull double-duty — continually monitoring the environment for heat from combustion, as well as its invisible yet deadly companion, carbon monoxide.

Like all Signature Series detectors, these are intelligent device that gather analog information from their heat and CO sensor (if present), converting this data into digital signals. To make an alarm decision, the detector's on-board microprocessor measures and analyzes sensor readings and compares this information to historical data. Digital filters remove signal patterns that are not typical of fires, thus virtually eliminating unwanted alarms.

The SIGA2-HCOS is a fixed temperature heat detector that includes an advanced carbon monoxide sensor and daughterboard. When the electrochemical cell reaches its end of life after approximately six years, the detector signals a trouble condition to the control panel. The sensor/daughterboard module is field-replaceable.

Standard Features

Note: *Some features described here may not be supported by all control systems. Check your control panel's Installation and Operation Guide for details.*

- Fixed temperature or rate-of-rise heat detection with optional carbon monoxide sensor
- Field-replacable carbon monoxide sensor/daughterboard module
- Uses existing wiring
- Automatic device mapping
- Ground fault detection by module
- Up to 250 devices per loop
- Non-volatile memory
- Electronic addressing
- Bicolor (green/red) status LED
- Standard, relay, fault isolator, and audible mounting bases
- 50 foot (15.2 meter) spacing
- 15 °F (9 °C) per minute rate-of-rise alarm point (HRS)
- 135 °F (57 °C) fixed temperature alarm point (HFS/HRS/HCOS)

Application

Heat detection

SIGA2-HRS combination fixed temperature/rate-of-rise heat detectors provide a 15 °F (9 °C) per minute rate-of-rise heat sensor for the detection of fast-developing fires, as well as a 135°F (57°C) fixed temperature sensor for slow building-fires. The heat sensor monitors the temperature of the air and determines whether an alarm should be initiated.

SIGA2-HFS and SIGA2-HCOS fixed temperature heat detectors provide a 135°F (57°C) fixed-temperature heat sensor for the detection of heat due to fire. The heat sensor monitors the temperature of the air and determines whether an alarm should be initiated.

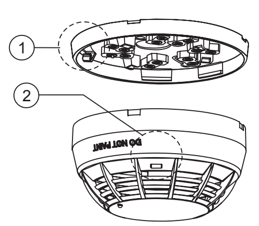
Carbon monoxide detection

The SIGA2-HCOS includes a replaceable chemical cell for the detection of carbon monoxide (CO). CO detection has rapidly become a standard part of life safety strategies everywhere. Monitored CO detection is becoming mandated with increasing frequency in all types of commercial applications, but particularly in occupancies such as hotels, rooming houses, dormitories, day care facilities, schools, hospitals, assisted living facilities, and nursing homes. In fact, more than half of the U.S. population already lives in states requiring the installation of CO detectors in some commercial occupancies. This is because carbon monoxide is the leading cause of accidental poisoning deaths in America. Known as the “Silent Killer,” CO is odorless, tasteless, and colorless. It claims nearly 500 lives, and results in more than 15,000 hospital visits annually.

Installation

Signature Series detectors mount to North American 1-gang boxes, 3-1/2 inch or 4 inch octagon boxes, and to 4 inch square electrical boxes 1-1/2 inches (38 mm) deep. They mount to European BESA and 1-gang boxes with 60.3 mm fixing centers. See mounting base installation and wiring for more information.

Installation



1. Tamper-resist lever arm on base (Break off to disable.)

2. Access slot for tamper-resist mechanism

Testing & Maintenance

The user-friendly maintenance program shows the current state of each detector and other pertinent messages. Single detectors may be turned off temporarily from the control panel. Availability of maintenance features is dependent on the fire alarm system used. When the CO sensor’s electrochemical cell reaches its end of life, the detector signals a trouble condition to the control panel. The sensor/daughterboard module is field-replaceable. Scheduled maintenance (Regular or Selected) for proper detector operation should be planned to meet the requirements of the Authority Having Jurisdiction (AHJ). Refer to current NFPA 72, NFPA 720, and ULC CAN/ULC 536 standards.

Compatibility

SIGA2 series detectors are compatible only with the Signature Loop Controller.

Sensing and reporting technology

The microprocessor in each detector provides four additional benefits - Self-diagnostics and History Log, Automatic Device Mapping, Stand-alone Operation and Fast, Stable Communication.

Self-diagnostics and History Log - Each Signature Series detector constantly runs self-checks to provide important maintenance information. The results of the self-check are automatically updated and permanently stored in the detector’s non-volatile memory

Automatic Device Mapping - The loop controller learns where each device’s serial number address is installed relative to other devices on the circuit. The mapping feature provides supervision of each device’s installed location to prevent a detector from being reinstalled (after cleaning etc.) in a different location from where it was originally.

Stand-alone Operation - A decentralized alarm decision by the detector is guaranteed. On-board intelligence permits the detector to operate in stand-alone mode. If loop controller CPU communications fail for more than four seconds, all devices on that circuit go into stand-alone mode. The circuit acts like a conventional alarm receiving circuit.

Fast Stable Communication - On-board intelligence means less information needs to be sent between the detector and the loop controller. Other than regular supervisory polling response, the detector only needs to communicate with the loop controller when it has something new to report.

Accessories

Detector mounting bases have wiring terminals that are accessible from the “room-side” after mounting the base to the electrical box. The bases mount to North American 1-gang boxes and to 3½ inch or 4 inch octagon boxes, 1½ inches (38 mm) deep. They also mount to European BESA and 1-gang boxes with 60.3 mm fixing centers. The SIGA-SB4, SIGA-RB4, and SIGA-IB4 mount to North American 4 inch sq. electrical boxes in addition to the above boxes. They include the SIGA-TS4 Trim Skirt which is used to cover the “mounting ears” on the base. The SIGA-AB4G mounts to a 4” square box only.

SIGA-AB4G/T Audible Base | **SIGA-SB** Standard Base | **SIGA-IB** Isolator Base | **SIGA-RB** Relay Base | **SIGA-LED** Remote LED

Remote LED SIGA-LED - The remote LED connects to the SIGA-SB or SIGA-SB4 Standard Base only. It features a North American size 1-gang plastic faceplate with a white finish and red alarm LED.

SIGA-TS4 Trim Skirt - Supplied with 4 inch bases, it can also be ordered separately to use with the other bases to help hide surface imperfections not covered by the smaller bases.

SIGA-AB4G and SIGA-AB4GT - These sounder bases are designed for use where localized or group alarm signaling is required. The SIGA-AB4G is compatible with Signature Series smoke and heat detectors. The SIGA-AB4GT sounder base, when used with the SIGA-TCDR Temporal Pattern Generator module, adds an audible output function to any Signature Series detector, including fire and CO detectors.

Typical Wiring

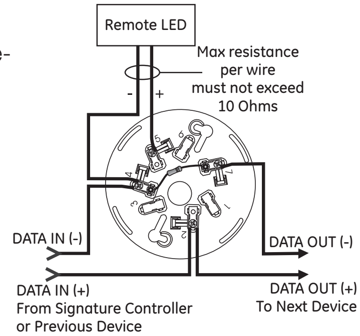
The detector mounting bases accept #18 AWG (0.75mm^2), #16 (1.0mm^2), #14 AWG (1.5mm^2), and #12 AWG (2.5mm^2) wire sizes.

Note: Sizes #16 AWG (1.0mm^2) and #18 AWG (0.75mm^2) are preferred for ease of installation. See Signature Loop Controller catalog sheet for detailed wiring requirement specifications.

Standard Detector Base, SIGA-SB, SIGA-SB4

This is the basic mounting base for Edwards Signature Series detectors. The SIGA-LED Remote LED is supported by the Standard Base.

Term	Description
1	Not Used
2	DATA IN/OUT (+)
3	Not Used
4	DATA IN (-)
5	Remote LED (-)
6	Remote LED (+)
7	Not Used
8	DATA OUT (-)



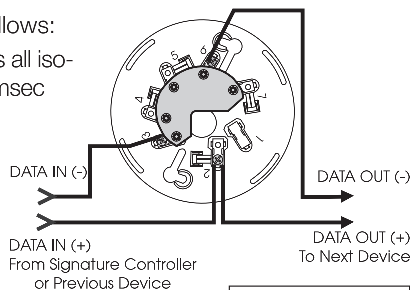
Isolator Detector Base, SIGA-IB, SIGA-IB4

This base includes a built-in line fault isolator for use on Class A circuits. A detector must be installed for it to operate. The isolator base does not support the SIGA-LED Remote LED.

The isolator operates as follows:

- a short on the line causes all isolators to open within 23 msec
- at 10 msec intervals, beginning on one side of the Class A circuit nearest the loop controller, the isolators close to provide the next isolator down the line with power
- when the isolator next to the short closes, reopens within 10 msec.

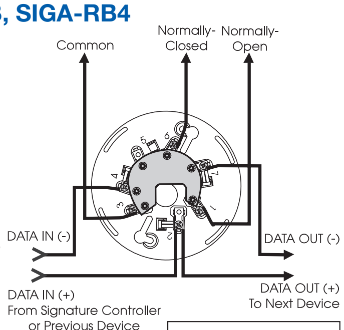
The process repeats beginning on the other side of the loop controller.



Term	Description
1	Not Used
2	DATA IN/OUT (+)
3	DATA IN (-)
4	Not Used
5	Not Used
6	DATA OUT (-)
7	Not Used

Relay Detector Base, SIGA-RB, SIGA-RB4

This base includes a relay. Normally open or closed operation is selected during installation. The dry contact is rated for 1 amp (pilot duty) @ 30 Vdc. The relay's position is supervised to avoid accidentally jarring it out of position. The SIGA-RB can be operated as a control relay if programmed to do so at the control panel (EST3 V.2 only). The relay base does not support the SIGA-LED Remote LED.

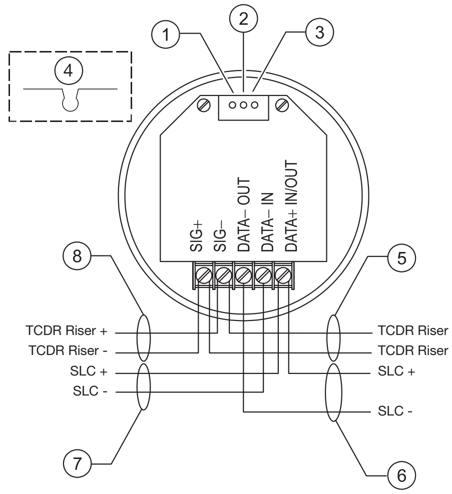


CONTACT RATING
1.0 Amp @ 30 VDC
(Pilot Duty)

Term	Description
1	Normally Open
2	DATA IN/OUT (+)
3	Common
4	DATA IN (-)
5	Not Used
6	Normally-Closed
7	DATA OUT (-)

Audible Detector Base for CO and Fire Detectors, SIGA-AB4GT

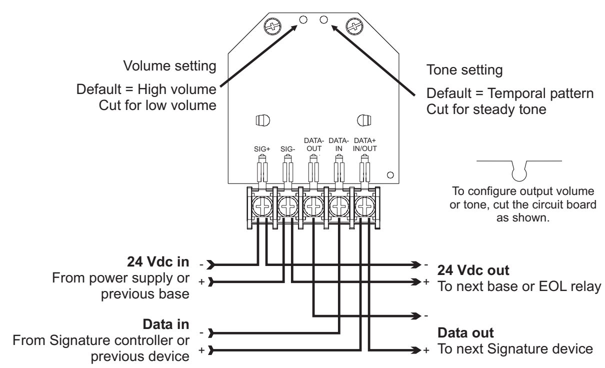
The Signature Series AB4GT sounder base, when used with the SIGA-TCDR Temporal Pattern Generator, adds an audible output function to any Signature Series detector. For more information on this device, refer to *Data Sheet 85001-0623 -- Sounder Base for CO and Fire Detectors*.



1. Volume setting. Default is high volume. For low volume, cut trace per item 4.
2. Reserved for future use. Do not cut.
3. Reserved for future use. Do not cut.
4. To configure output volume, cut trace as shown.
5. To next SIGA-AB4GT sounder base or EOL relay.
6. SLC_OUT to next intelligent addressable device.
7. SLC_IN from intelligent addressable controller or previous device.
8. From SIGA-TCDR Temporal Pattern Generator or previous SIGA-AB4GT sounder base.

Audible Detector Base, SIGA-AB4G

This base is designed for use where localized or group alarm signaling is required. When the detector senses an alarm condition, the audible base emits a local alarm signal. The optional SIGA-CRR Polarity Reversal Relay can be used for sounding to other audible bases on the same 24 Vdc circuit.



Relay and Audible Bases operate as follows:

- at system power-up or reset, the relay is de-energized
- when a detector is installed in the base with the power on, the relay energizes for four seconds, then de-energizes
- when a detector is removed from a base with the power on, the relay is de-energized
- when the detector enters the alarm state, the relay is energized.

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Web: www.chubbedwards.com

Warnings & Cautions

- This detector does not operate without electrical power. As fires frequently cause power interruption, discuss further safeguards with the local fire protection specialist.
- This detector does not sense fires in areas where heat cannot reach the detector. Heat from fires in walls, roofs, or on the opposite side of closed doors may not reach the detector.
- This heat detector by itself does not provide life safety protection Use this detector with ionization and/or photoelectric smoke detectors.
- This detector does not detect oxygen levels, smoke, toxic gases, or flames. Use this device as part of a broad-based life safety program which includes a variety of information sources pertaining to heat and smoke levels, extinguishment systems, visual and audible devices, and other safety measures.
- Independent studies indicate that heat detectors should only be used when property protection alone is involved. Never rely on heat detectors as the sole means of fire protection.

Specifications

	SIGA2-HRS	SIGA2-HFS	SIGA2-HCOS
Normal operating current	45 µA	45 µA	45 µA
Standalone alarm current	18 mA	18 mA	18 mA
Alarm Current	45 µA	45 µA	45 µA
Rate-of-rise alarm point	15°F (9°C)/min.	N/A	N/A
Fixed temperature alarm point	130 to 140°F (54 to 60°C)		
Operating voltage	15.20 to 19.95 VDC		
Maximum spacing	50 ft. (15.2 m) centers*		
Construction	High impact engineering polymer		
Mounting	Plug-in		
Shipping weight	0.44 lb. (164 g)		
Compatible bases	See Ordering Information		
Operating environment	32 °F to 100 °F (0 °C to 38 °C), 0 to 93% RH, noncondensing		
Storage temperature	– 4 °F to 140 °F (– 20 °C to 60 °C)		

*When replacing SIGA-HRS/HFS ensure spacing is 50ft or less.

Ordering Information

Catalog Number	Description	Ship Wt. lbs (kg)
SIGA2-HRS	Intelligent combination fixed temperature/rate-of-rise heat detector	0.4 (0.16)
SIGA2-HFS	Intelligent fixed temperature heat detector	0.4 (0.16)
SIGA2-HCOS	Intelligent fixed temperature heat detector with CO sensor	0.4 (0.16)
SIGA2-HCOS-CA	Intelligent fixed temperature heat detector with CO sensor (for use in Canadian markets only)	0.4 (0.16)
Accessories		
SIGA-SB	Detector Mounting Base - Standard	
SIGA-SB4	4-inch Detector Mounting Base c/w Trim Skirt	
SIGA-RB	Detector Mounting Base w/Relay	
SIGA-RB4	4-inch Detector Mounting Base w/Relay, c/w Trim Skirt	0.2 (.09)
SIGA-IB	Detector Mounting Base w/Fault Isolator	
SIGA-IB4	4-inch Detector Mounting Base w/ Fault Isolator, c/w Trim Skirt	
SIGA-LED	Remote Alarm LED (not for EN54 applications)	
SIGA-AB4G	Audible (Sounder) Base for Fire Detectors	0.3 (0.15)
SIGA-AB4GT	Audible (Sounder) Base for CO and Fire Detectors	0.3 (0.15)
SIGA-TCDR	Temporal Pattern Generator	0.3 (0.15)
SIGA-TS4	Trim Skirt (supplied with 4-inch bases)	0.1 (.04)
2-CORPL	Replacement CO Sensor	0.1 (.04)

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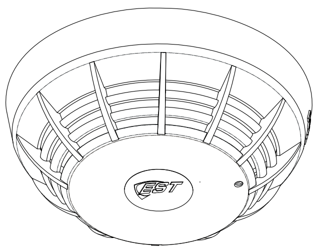
SIGA2-HCOS Intelligent Fixed-Temperature and Rate-of-Rise Heat Detector with CO Sensor Installation Sheet



Carbon monoxide alarm procedure

WARNING: The carbon monoxide (CO) alarm indicates the presence of CO, which can kill you. If the alarm signal sounds four times, pauses for five seconds, and then repeats the pattern:

1. Move to fresh air immediately — outdoors or by an open door or window. Check that all persons are accounted for. Do not reenter the premises or move away from the open door or window until emergency services responders have arrived, the premises have been aired out, and your detector remains in normal condition.
2. Call emergency services, the fire department, or 911:

Phone:

Information about carbon monoxide

WARNINGS

- Read these installation instructions in their entirety before proceeding. Leave these instructions with the owner/user of this CO detection equipment.
- This product is intended for use in indoor locations of dwelling units. It is not designed to comply with Occupational Safety and Health Administration (OSHA) commercial or industrial standards.
- The detector only indicates the presence of CO gas at the detector. Carbon monoxide gas may be present in other areas.
- Failure to properly install, test, and maintain a CO detector may cause it to fail, potentially resulting in loss of life.
- Installation of this detector is not a substitute for proper installation, use, and maintenance of fossil fuel-burning appliances, including appropriate ventilation and exhaust systems.
- To reduce the risk of CO poisoning, test the detector operation when not in use for 10 days or more.
- This detector does not operate without electrical power. As fires frequently cause power interruption, discuss further safeguards with the authority having jurisdiction (AHJ).
- Do not paint the detector.

Notes

- Regulatory code may require that the system generate a three-pulse temporal code (TC3) for fire alarms and a four-pulse temporal code (TC4) for CO alarms.
- The CO sensor is calibrated at the factory. CO sensitivity is set to conform to UL 2034 requirements and cannot be changed by the user. See “Regulatory information” on page 4 for specific sensitivity values.
- Connect this detector only to a UL Listed control panel capable of differentiating between alarm signals (fire, burglary, CO, etc.) and providing distinct identification for each.
- To reduce the likelihood of nuisance alarms, ventilate accommodation spaces when using household cleaning supplies or similar contaminants. If a detector has been exposed to such contaminants, test it promptly afterwards.

Symptoms of CO poisoning

The following symptoms related to CO poisoning should be discussed with all occupants of the protected site.

Mild exposure: Slight headache, nausea, vomiting, fatigue, runny nose, sore eyes (often described as "flu-like" symptoms).

Medium exposure: Severe throbbing headache, dizziness, drowsiness, confusion, fast heart rate.

Extreme exposure: Unconsciousness, brain damage, convulsions, cardiorespiratory failure, death.

Many cases of reported CO poisoning indicate that while victims are aware they are not well, they become so disoriented that they are unable to save themselves by either exiting the building or calling for assistance. Young children and pets may be the first affected.

CO sources

The CO sensor in this detector is designed to detect carbon monoxide gas from *any* source of combustion. It is not intended to detect fire, smoke, or any other gas. Potential CO sources include fuel-fired appliances (e.g., space heater, furnace, water heater, range, oven, clothes dryer); other sources of combustion (e.g., kerosene-burning stove or heater, or gas log fireplace); or internal combustion engines.

In addition, excessive exhaust spillage or reverse venting of fuel-burning appliances can produce dangerous transient levels of CO. This can be caused by external conditions:

- Wind direction, velocity, or a combination of both, including high gusts of wind or insufficient draft in vent pipes
- Temperature inversions that can trap exhaust gases near the ground
- Negative pressure differential resulting from the use of exhaust fans
- Simultaneous operation of several fuel-burning appliances competing for limited internal air
- Vent pipe connections vibrating loose from dryers, furnaces, or water heaters
- Obstructions in vent pipes or unconventional vent pipe designs which can amplify the above situations
- Poorly designed or maintained chimneys and/or vents
- Extended operation of unvented fossil fuel-burning devices (range, oven, fireplace, etc.)
- Idling cars in an open or closed attached garage, or near the premises

General limitations of CO detectors

This detector is designed to protect individuals from the acute affects of CO exposure. It will not fully safeguard individuals with specific medical conditions. People with special medical problems should consider using specialized detection devices with less than 30 ppm (parts per million) alarming capabilities. If in doubt, consult a medical practitioner.

If the unit is in trouble or at the end of its life, it may not sense CO and cannot be relied upon to monitor CO levels. Replace the CO module every six years from the date of manufacture or when the control panel indicates a sensor end-of-life condition, whichever comes first.

A detector installed outside a bedroom may not awaken a sleeper. Normal noise due to stereos, television, etc. may also prevent the detector from being heard if distance or closed or partly closed doors muffle the sounder. This unit is not designed for the hearing impaired.

CO detectors are not a substitute for life safety. Though these detectors will warn against increasing CO levels, we do not warrant or imply in any way that they will protect lives from CO poisoning. They should only be considered as an integral part of a comprehensive safety program.

Detector locations

Selecting a suitable location is critical to the operation of CO detectors. Figure 1 shows appropriate detector locations.

Install detectors according to applicable codes and standards. Place wall-mounted detectors at least 5 ft. (1.5 m) up from the floor. For ceiling mounted applications, place detectors at least 1 ft. (0.3 m) from any wall. For combination detectors, follow the spacing requirements for each sensor. Refer to the control panel's application bulletin for the sensor spacing requirements.

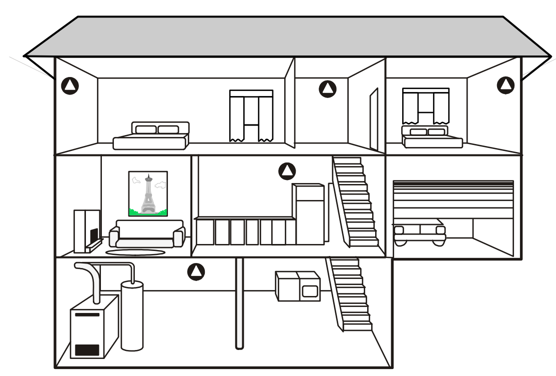
The recommended CO detector locations are:

- Outside each separate sleeping area in the immediate vicinity of the bedrooms (including areas such as hotel rooms and dorm rooms)
- On every occupiable level of a dwelling unit, including basements, but excluding attics and crawl spaces
- Centrally located on every habitable level of the building and in every HVAC zone based on an engineering evaluation considering potential sources and migration of carbon monoxide
- On the ceiling in the same room as permanently installed fuel-burning appliances
- In any area required by local building codes, legislation, or the AHJ
- In a suitable environment per the detector specifications (see "Specifications" on page 4 for details)
- On a firm, permanent surface

Do not install the CO detector:

- Within 5 ft. (1.5 m) of any cooking appliance
- Within 10 ft. (3 m) of a fuel-burning appliance
- Near air conditioners, heating registers, or any other ventilation source that may interfere with CO gas entering the detector
- Where furniture or draperies may obstruct the airflow
- In a recessed area

Figure 1: Recommended CO detector locations



Recommended CO detector location

Description

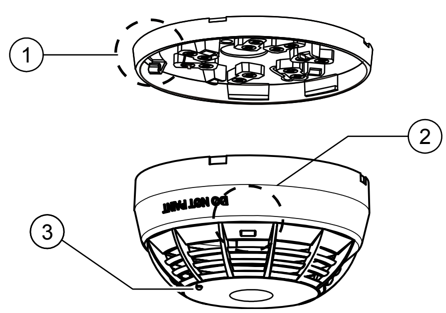
The Signature Series model SIGA2-HCOS Intelligent Fixed-Temperature and Rate-of-Rise Heat Detector with CO Sensor is an intelligent device that contains a fixed-temperature and rate-of-rise heat sensor to detect heat from fire, and a CO sensor to detect carbon monoxide from any source of combustion. The fixed-temperature heat function detects fire when the air temperature near the detector exceeds the alarm point. The rate-of-rise heat function quickly detects a fast, flaming fire. The detector analyzes the heat and CO sensors independently to determine whether to initiate a fire alarm, a CO life safety alarm, or both.

LED indicator. The LED indicator (see Figure 2 below) displays the following states:

- Normal: Green LED indicator flashes, no action.
- Alarm/active: Red LED indicator flashes, evacuate the area.
- Stand-alone alarm: Red LED indicator turns on, evacuate the area.

Sensor end-of-life indicator. The detector signals a "COMMON TRBL ACT" condition on the control panel when the CO sensor reaches its end of life. Pressing the Details button on the control panel displays "END OF LIFE ACT" providing verification that it is an end-of-life trouble of the CO sensor. This trouble remains active until the sensor is replaced, even if the panel is reset. See “CO module replacement” on page 4.

Figure 2: SIGA2-HCOS features



1. Tamper-resist lever arm on base
2. Access slot for tamper-resist mechanism
3. LED indicator

Installation

Notes

- This detector does not sense fires in areas where heat cannot reach the detector. Heat from fires in walls, roofs, or on the opposite side of closed doors may not reach the detector.
- This detector does not detect oxygen levels, smoke, or flames. Use this device as part of a broad-based life-safety program that includes a variety of information sources pertaining to heat and smoke levels, extinguishment systems, visible and audible devices, and other safety measures.
- Independent studies indicate that heat detectors should only be used when property protection alone is involved. Never rely on heat detectors as the sole means of fire protection.
- The heat sensor monitors the temperature of the air in its surroundings; by itself it does not provide life-safety protection. For life-safety situations, use ionization or photoelectric smoke detectors or a combination of these along with the SIGA2-HCOS.
- To ensure proper operation, store the detector within the recommended ranges. Allow the detector to stabilize to room temperature before applying power.
- The dust cover (supplied) must remain on the detector during installation and be removed prior to commissioning and service. The dust cover is not a substitute for removing the detector during new construction or heavy remodeling.
- Do not install detectors until after final construction cleanup (unless otherwise specified by the AHJ).
- Install per NFPA 72 *National Fire Alarm and Signaling Code,* NFPA 720 *Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment*, and UL 2075 *Standard for Gas and Vapor Detectors and Sensors*.
- To permanently disable the tamper-resist mechanism prior to placing the detector in difficult to reach locations, break and remove the plastic lever arm from the base. See Figure 2 above.

To install the detector:

1. Install and wire the base as described on the installation sheet supplied with the base.
2. Remove the serial number label from the detector and attach it to the project documentation.
3. Attach the detector to the base by rotating the detector clockwise until it snaps into the locked position.
4. If required by the AHJ or local codes, affix the supplied CO Warning Label (P/N 10634757) in proximity to the detector.

Testing

Before testing, notify the proper authorities that the fire alarm system is undergoing maintenance and will be temporarily out of service.

Test each sensor in the detector. In the following steps, xxx indicates a variable related only to marketplace.

Caution: Heat damage. Excessive heat may damage the detector outer cover. Do not apply excessive heat when using a hair dryer. When using a Testifire detector tester, you must install a SIGA2 Testifire Adapter Assembly.

Make sure the SIGA2 Testifire Adapter Assembly (model SIGA2-TSTSPACER) is installed in the Testifire detector tester before testing. Refer to the *SIGA2 Testifire Adapter Assembly Installation Sheet* (P/N 3101942) for further details.

Note: If the CO sensor is programmed as an alarm point, it must comply with the requirements of NFPA 720.

To perform an initial installation test:

1. Visually inspect each detector and verify that it is installed in the correct location. Make sure that factors not apparent on the plans do not adversely affect the detector.
2. Remove the detector from its base and verify that the proper detector address, trouble signals, and messages are reported.
3. If wired for Class A operation, verify that the detector continues to operate first with SLC_IN disconnected, and then with SLC_OUT disconnected. (Refer to the installation sheet for the base.)
4. Place a momentary ground fault on the SLC to verify operation of the ground fault detection circuitry.
5. Perform a sensor function test, as described below.

To perform CO sensor function tests:

1. Use the fire alarm control panel to put the detector into accelerated response mode. (Refer to the panel technical reference manual for instructions.)
2. Activate the CO sensor using SDI LLC model Solo C6-xxx CO aerosol spray without covering the head, or using the Testifire detector tester per the manufacturer's instructions.

To perform heat sensor function tests:

1. If desired, use the fire alarm control panel to put the detector or zone into a service group for testing. (Refer to the panel technical reference manual for instructions.)
2. Activate the heat sensor using a hair dryer (maintaining a distance of three inches) or using a Testifire detector tester per the manufacturer's instructions.

Maintenance

To ensure proper operation, plan maintenance in accordance with the requirements of the AHJ. Refer to NFPA 72 *National Fire Alarm and Signaling Code*.

Refer to application bulletin P/N 270145 REV 4.0 or later for additional information and cleaning instructions.

CO module replacement

Replace the CO module every six years from the date of manufacture or when the control panel indicates a sensor end-of-life condition, whichever comes first. Replace with model number 2-CORPL using installation sheet P/N 3101589.

Specifications

Operating voltage	15.20 to 19.95 VDC
Current Normal operating Alarm Stand-alone alarm	 45 µA 45 µA 18.5 mA
Actual alarm point	129 to 144°F (53.9 to 62.2°C)
Rate-of-rise	15°F/min (8°C/min)
Vibration level	10 to 35 Hz, with an amplitude of 0.01 in.
Maximum spacing [1]	50 ft. (15.2 m) centers
Compatible bases Standard Relay Isolator Audible	 SIGA-SB, SIGA-SB4 SIGA-RB, SIGA-RB4 SIGA-IB, SIGA-IB4 SIGA-AB4GT [2]
Compatible detector testers [3]	Testifire 1000, Testifire 2000
Operating environment Temperature Relative humidity	 32 to 100°F (0 to 38°C) 0 to 93% noncondensing
Storage temperature	−4 to 140°F (−20 to 60°C)
Environmental compensation	Automatic

[1] When replacing SIGA-HRS and SIGA-HFS detectors with the SIGA2-HCOS, ensure that the spacing is 50 ft. (15.2 m) or less.

[2] Required for those installations that must provide separate CO (TC4) and fire (TC3) patterns from the sounder base.

[3] Requires the SIGA2-TSTSPACER Testifire adapter assembly.

Regulatory information

Manufacturer	Edwards, A Division of UTC Fire & Security Americas Corporation, Inc. 8985 Town Center Parkway, Bradenton, FL 34202, USA
Year of manufacture	The first two digits of the date code (located on the product identification label) are the year of manufacture.
UL fixed-temp alarm rating	135°F (57.2°C)
UL CO alarm level	70 ppm 60 to 240 minutes [1]
North American standards	UL 521, UL 2075 Note: This detector has been evaluated to the CO alarm sensitivity limits of UL 2034.
FCC compliance	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

[1] Sensitivity per UL 2034

Contact information

For contact information, see www.utcfireandsecurity.com.

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MULTI-VOLATGE CONTROL RELAY

Operations & Maintenance Manual
December 2015

AIR PRODUCTS AND CONTROLS

You in Control

RIC SERIES

MULTI-VOLTAGE RELAY MODULES

PRODUCT DESCRIPTION

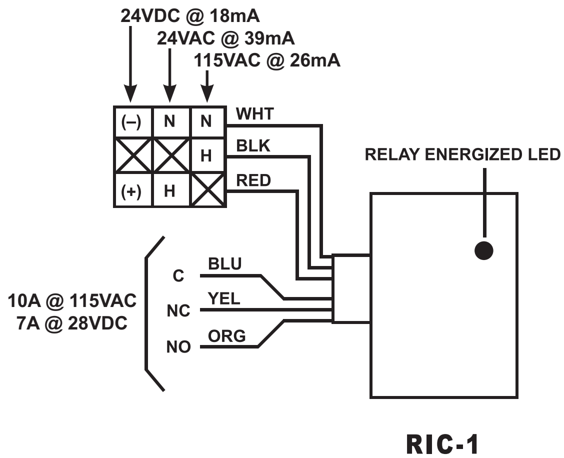
The RIC-1 and RIC-2 Series Relays are multi-voltage devices providing form “C“ contacts rated for up to 10 amps. The relays may be energized by one of three input voltages: 24VDC, 24VAC, or 115VAC. Each relay contains a red LED which indicates when the relay coil is energized. To mount the RIC-1 and RIC-2 place the spud through a 1/2 in. (12.7mm) knockout on a junction box. The relays are also packaged with wire-nuts to aid installation.

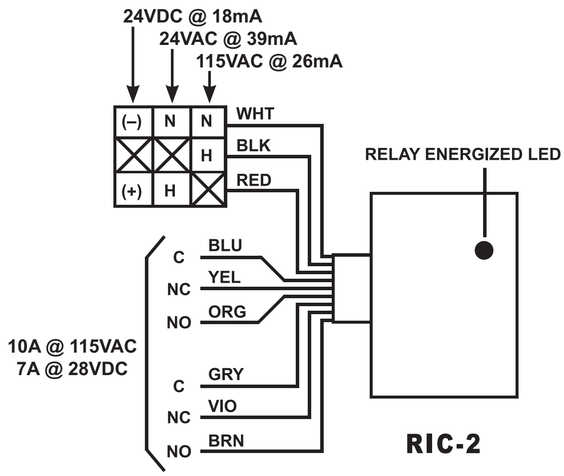
The RIC-1 and RIC-2 Relays are ideal for applications where remote relays are required for control or status feedback. They are suitable for use with HVAC, Temperature Control, Fire Alarm, Security, Energy Management and Lighting Control Systems.

RIC-1

RIC-2

WIRING





c UL us LISTED

CSFM LISTED

MEA ACCEPTED

Air Products and Controls Inc.
1749 E. Highwood
Pontiac, MI 48340
(248) 332-3900 Phone
(888) 332-2241 Toll free
(248) 332-8807 Fax
www.ap-c.com

A HALMA GROUP COMPANY

Distributed By:

PRODUCT SPECIFICATIONS

MODEL NUMBER:	RIC-1	RIC-2
POWER REQUIREMENTS:	24VAC/24VDC/115VAC	24VAC/24VDC/115VAC
POLARIZED:	No	No
ENERGIZED LED INDICATOR:	Yes	Yes
COIL REQUIREMENTS:		
@24VDC	18mA	18mA
@24VAC	39mA	39mA
@115VAC	26mA	26mA
CONTACT CONFIGURATION:	(1) SPDT dry form "C"	(1) DPDT dry form "C"
CONTACT RATINGS:		
@28VDC	7A resistive	7A resistive
@115VAC	10A resistive / 0.35PF inductive	10A resistive / 0.35PF inductive
WIRE LEADS:	6 "flying" leads 12" / 18 AWG Wire-nuts provided	9 "flying" leads 12" / 18 AWG Wire-nuts provided
AMBIENT TEMPERATURE: @ 85% RH, NON-condensing	32°F to 120°F (0°C to 49°C)	32°F to 120°F (0°C to 49°C)
MOUNTING:	Spud mounting through 1/2" conduit knockout	
DIMENSIONS:		
H	2.50" (63mm)	2.50" (63mm)
W	1.75" (44mm)	1.75" (44mm)
D	1.30" (33mm)	1.30" (33mm)
LISTINGS AND APPROVALS:		
UL*	UOXX/7.S3403	UOXX/7.S3403
MEA	73-92-E Vol. 23	73-92-E Vol. 23
CSFM	7300-1004:101	7300-1004:101

*UOXX=Control Unit Accessories, System; /7=also Certified for Canada

NOTICE: The information contained in this document is intended only as a summary and is subject to change without notice. The products described have specific instructional/installation documentation, which covers various technical, approval, code, limitation and liability information. Copies of this documentation along with any general product warning and limitation documents, which also contain important information, are provided with the product and are also available from Air Products and Controls Inc. The information contained in all of these documents should be considered before specifying or using the products. Any example applications shown are subject to the most current enforced local/national codes, standards, approvals, certifications, and/or the authority having jurisdiction. All of these resources, as well as the specific manufacturer of any shown or mentioned related equipment, should be consulted prior to any implementation. For further information or assistance concerning the products, contact Air Products and Controls Inc. Air Products and Controls Inc. reserves the right to change any and all documentation without notice.

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SURGE SUPPRESSION DEVICE, 1 PAIR

Operations & Maintenance Manual
December 2015

LVLP Series

Voice, Data and Signaling Circuit Surge Protection
General Product Specifications

DITEK's Low Voltage Line Protector series of signal, data and loop circuit surge protectors provide strong protection in a compact hard wire package. Applications include protection of 4-20mA current loops, alarm panel NAC, SLC and IDC loops, and burglar alarm panels. Models are available to protect up to 2 or 4 pairs. LVLAWG models can handle #14-#10 AWG wiring connections. Suitable for AC and DC circuits.

DTK-4LVLPD

DTK-LVLP

Application Features

- Series connection, parallel function adds no resistance to loop circuits
- Protect 1, 2, 4 or 8 pairs to match your configuration needs
- Seven voltage levels available to protect all types of voice/data/loop applications
- "SCP" model provides automatically resetting fusing and sneak current protection

Selection Guide

DTK- # #LVL# # #

SAD-Based: "Z"
Number of Pairs:: 2 or 4
Wire Gauge: "P" for #22-16, "AWG" for #14-10
Sneak Current Protection: 150mA current, "SCP"
Voltage Level: D, X, LV, OPX, SPK, SGR, RUV
(see table below for voltage ranges)

Example: DTK-4LVLPSCPD
Example: DTK-2LVLAWGRUV
Note: Not all options are available. Contact your DITEK rep to confirm availability before ordering.

Specifications

Agency Approvals: UL497B, UL497A
Connection Method: #22-#16 AWG screw terminals (LVLP), #14-#10 AWG screw terminals (LVLAWG)
Max Continuous Current: 5 Amps, 0.15 Amps (-SCP)
Max Surge Current: 2,000 Amps per pair (6V-50V)
9,000 Amps per pair (75V-130V)
Protection Modes: Line-Ground (All)
Operating Temperature: -40°F - 158°F (-40°C - 70°C)
Maximum Humidity: 95% non-condensing
Dimensions: 2LVL-4LVL – 1.6"H x 3.0"W x 1.6"D
(41mm x 76mm x 41mm)
Weight: 2.4oz (68g)
Housing: ABS
Warranty: Ten Year Limited Warranty
Accessories: DIN Rail Kit – Part Number DTK-DRK

Performance Data

Model DTK-LVL#	Service Voltage	MCOV	Clamp Voltage
D	5 V	8V	12V
X	12 V	18V	22V
LV	24 V	38V	47V
OPX	48 V	66V	82V
SPK	75 V	102V	120V
SGR	95 V	127V	150V
RUV	130 V	175V	204V

One DITEK Center
1720 Starkey Road
Largo, FL 33771

1-800-753-2345 Direct: 727-812-5000
Technical Support: 1-888-472-6100
www.ditekcorp.com

Doc. Number: SPS-100030-001 Rev 6 12/14

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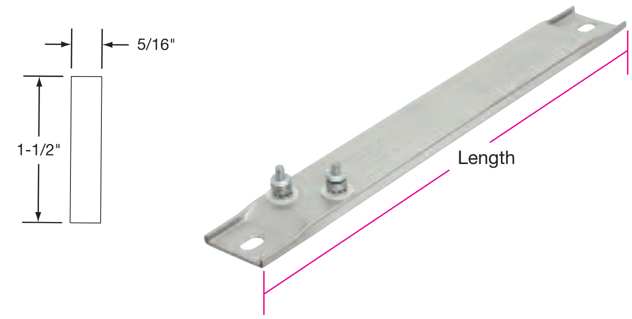
TEMPCO STRIP HEATER, 120vAC, 125W

Operations & Maintenance Manual
December 2015

Standard (Non-Stock) Sizes and Ratings

1-1/2" × 5/16" (38.1 × 7.94 mm)
Channel Strip Heaters with T4 Terminals and Mounting Tabs

Stock Items Are Shown In RED

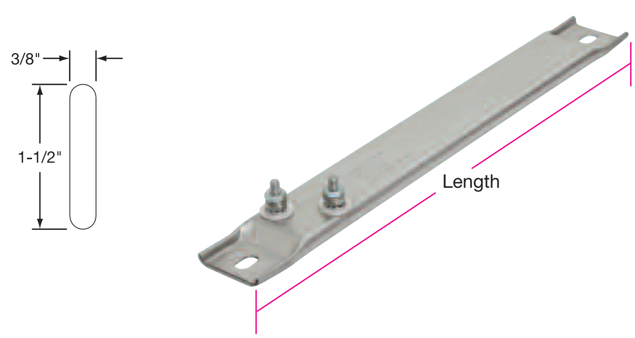


Length in	Length mm	Wattage	Watt Density W/in²	Watt Density W/cm²	Part Number 120V	Part Number 240V
5¼	133.4	125	34	5	**CSH00338**	CSH00339
5¾	???.4	300	55	8	**CSH01596**	**CSH01595**
6	152.4	150	24	4	**CSH00318**	**CSH00321**
7½	190.5	150	15	2	CSH00054	CSH00055
7½	190.5	200	20	3	CSH00056	CSH00057
8	203.2	150	13	2	**CSH00058**	**CSH00059**
8	203.2	175	15	2	CSH00060	CSH00061
8	203.2	250	21	3	**CSH00062**	**CSH00063**
8	203.2	400	31	5	CSH00064	CSH00065
8	203.2	500	42	7	**CSH00066**	**CSH00067**
10½	266.7	250	12	2	**CSH00068**	**CSH00069**
10½	266.7	350	17	3	CSH00070	CSH00071
10½	266.7	400	19	3	CSH00072	CSH00073
12	304.8	250	10	1	CSH00074	CSH00075
12	304.8	350	13	2	**CSH00076**	**CSH00077**
12	304.8	500	19	3	**CSH00078**	**CSH00079**
14	355.6	300	9	1	CSH00080	CSH00081
14	355.6	500	15	2	**CSH00082**	**CSH00083**
15¼	387.4	325	9	1	CSH00084	CSH00085
15¼	387.4	500	13	2	CSH00086	CSH00087
17⅞	454.2	350	7	1	CSH00088	CSH00089
17⅞	454.2	375	8	1	CSH00090	CSH00091
17⅞	454.2	500	11	2	CSH00092	CSH00093
17⅞	454.2	750	16	2	**CSH00094**	**CSH00095**
17⅞	454.2	1000	23	3	CSH00096	CSH00097
19½	495.3	350	7	1	CSH00098	CSH00099
19½	495.3	500	9	1	CSH00100	CSH00101
19½	495.3	750	14	2	CSH00102	CSH00103
19½	495.3	1000	19	3	CSH00104	CSH00105
19½	495.3	1200	23	4	CSH00329	**CSH00333**
21	533.4	500	8	1	CSH00106	CSH00107
21	533.4	750	13	2	CSH00108	CSH00109
23¾	603.3	500	7	1	CSH00110	CSH00111
23¾	603.3	750	11	2	**CSH00112**	**CSH00113**

Stock Items Are Shown In RED

Length in	Length mm	Wattage	Watt Density W/in²	Watt Density W/cm²	Part Number 120V	Part Number 240V
23¾	603.3	1000	15	2	CSH00114	CSH00115
23¾	603.3	1500	22	3	CSH00116	CSH00117
25½	647.7	500	7	1	CSH00118	CSH00119
25½	647.7	750	10	2	CSH00120	CSH00121
25½	647.7	1000	13	2	CSH00122	CSH00123
26¾	679.5	700	9	1	CSH00124	CSH00125
26¾	679.5	750	9	1	CSH00126	CSH00127
26¾	679.5	1000	13	2	CSH00128	**CSH00129**
29¼	743.0	750	8	1	CSH00130	**CSH00131**
30½	774.7	750	8	1	CSH00132	CSH00133
30½	774.7	1000	11	2	CSH00134	CSH00135
30½	774.7	1250	13	2	—	CSH00136
33½	850.9	750	7	1	CSH00137	CSH00138
34⅝	879.5	1000	9	1	CSH00139	**CSH00140**
35⅞	911.4	1000	9	1	CSH00141	**CSH00142**
35⅞	911.4	1500	13	2	CSH00143	CSH00144
37¼	946.2	1500	13	2	**CSH00145**	**CSH00146**
38½	977.9	800	7	1	CSH00147	CSH00148
38½	977.9	1000	8	1	CSH00149	CSH00150
38½	977.9	1500	12	2	CSH00151	CSH00152
42½	1079.5	1250	9	1	CSH00153	CSH00154
42½	1079.5	1500	11	2	CSH00155	CSH00156
47⅞	1216.2	1350	9	1	—	CSH00157
47⅞	1216.2	2250	14	2	—	CSH00158

1-1/2" × 3/8" (38.1 × 9.53 mm)
Channel Strip Heaters with T4 Terminals and Mounting Tabs



Length in	Length mm	Wattage	Watt Density W/in²	Watt Density W/cm²	Part Number 120V	Part Number 240V
7½	190.5	200	19	3	—	CSH00294
9	228.6	500	31	5	—	CSH00295
10½	266.7	250	12	2	CSH00296	—
10½	266.7	400	19	3	CSH00297	—
12	304.8	500	18	3	—	CSH00298
15¼	387.4	500	13	2	—	CSH00299
17	431.8	1000	22	3	—	CSH00300
17⅞	454.0	350	7	1	—	CSH00301
17⅞	454.0	500	10	2	—	CSH00302
18	457.2	1000	20	3	—	CSH00303
18½	469.9	500	10	2	—	CSH00304
22½	571.5	1000	15	2	—	CSH00305
24	609.6	1000	14	2	—	CSH00306
25½	647.7	1000	13	2	—	CSH00307
26	660.4	1600	20	3	—	CSH00308
26½	673.1	1500	18	3	—	CSH00309

Length in	Length mm	Wattage	Watt Density W/in²	Watt Density W/cm²	Part Number 120V	Part Number 240V
30½	774.7	750	8	1	—	CSH00310
31½	800.1	800	8	1	—	CSH00311
35⅞	911.2	1000	9	1	—	CSH00312
36	914.4	1000	9	1	—	CSH00313
50	1270.0	1000	6	1	—	CSH00314
62	1574.8	1500	7	1	—	CSH00315

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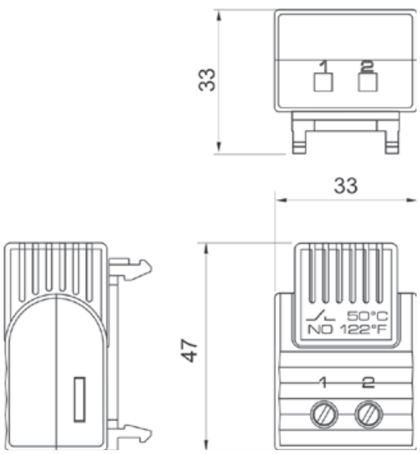
15°C
NC 59°F
50°C
NO 122°F
1 2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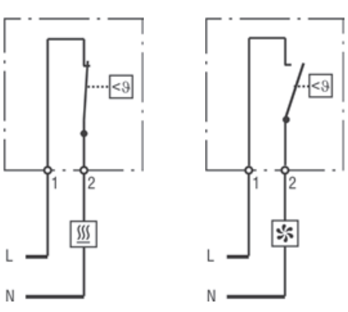
1 2
33
47
50°C
NO 122°F
1 2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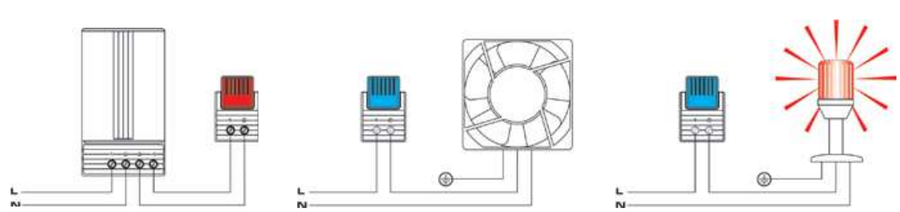
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<u>STEGO THERMOSTAT</u>

Operations & Maintenance Manual
December 2015

KT 011 Small Thermostat

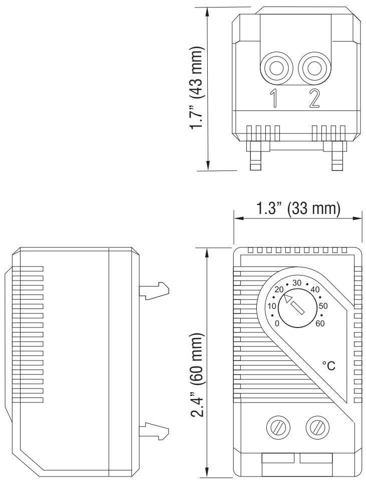
- **Compact design**
- **Wide adjustment range**
- **Color coded temperature dials**
- **DIN rail mountable**

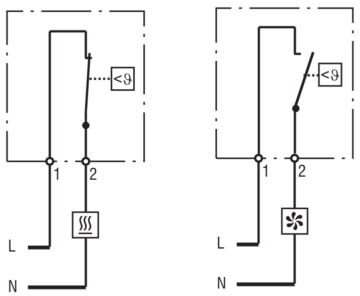
Thermostat NC (normally closed)
Thermostat opens on temperature rise - for regulating heaters or for switching signal devices. Comes with **red** temperature dial.

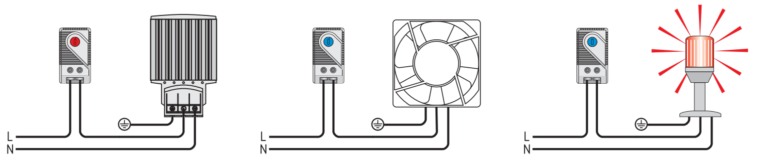
Thermostat NO (normally open)
Thermostat closes on temperature rise - for regulating filter fans and heat exchangers or for switching signal devices. Comes with **blue** temperature dial.

Technical Data

Switching difference	12.6°F ± 7°F tolerance (7K ± 4K)
Sensor element	thermostatic bimetal
Contact type	snap-action contact
Contact resistance	< 10mΩ
Service life	> 100,000 cycles
Max. switching capacity	15A resistive / 2A inductive @ 120VAC
	10A resistive / 2A inductive @ 250VAC
	DC 30W
Minimum load	20mA (all voltages)
EMC	acc. to EN 55014-1-2, EN 61000-3-2, EN 61000-3-3
Connection	2-pole terminal, clamping torque 0.5Nm max.:
	solid wire - AWG 14 max. ($2.5mm^2$)
	stranded wire (with wire end ferrule) - AWG 16 ($1.5mm^2$)
Housing	plastic, UL 94V-0, light grey
Mounting	clip for 35mm DIN rail, EN 60 715
	(or for Exhaust Filter EF 118 Series)
Mounting position	vertical
Operating / Storage temperature	-49 to +176°F (-45 to +80°C)
Dimensions	2.4 x 1.3 x 1.7" (60 x 33 x 43mm)
Weight	approx. 1.4 oz. (40g)
Protection type	IP20







Wiring examples

Setting range	Part No. (NC)	Part No. (NO)	Approvals
+32 to +140°F	01140.9-00	01141.9-00	UL File No. E164102, CSA
0 to +60°C	01146.9-00	01147.9-00	UL File No. E164102, CSA
-10 to +50°C	01142.0-00	N/A	UL File No. E164102, CSA, VDE
+10 to +70°C	N/A	01149.9-00	UL File No. E164102, CSA
-15 to +45°C	01157.0-00	01156.0-00	UL File No. E164102, CSA
+20 to +80°C	01159.0-00	01158.0-00	UL File No. E164102, CSA, VDE

KT011/06-08/US

Specifications are subject to change without notice. Suitability of this product for its intended use and any associated risks must be determined by the end customer/ buyer in its final application.

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FIRE ALARM SYSTEM TESTING & COMMISSIONING SECTION

Operations & Maintenance Manual
December 2015

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Eisenhower Johnson Memorial Tunnel
Fixed Fire Suppression System
Fire Alarm System

Testing & Maintenance Requirements

The Fire Alarm System equipment components are relatively maintenance free and require little maintenance service under normal operation.

Specific preventative maintenance recommendations for the system can be found in Chapter 7 of the EST3 Installation & Service Manual, included in this O&M.

Please note that the testing requirements described in the section are conducted as a function of the yearly Code required tests. Required testing of the Fire Alarm System, as a function of the overall fixed fire suppression system is addressed in the Short Term Operation Plan (STOP) and the Annual Maintenance Plan (AMP), which are provided under separate submittal.

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Eisenhower Johnson Memorial Tunnel
Fixed Fire Suppression System
Fire Alarm System

Testing & Commissioning Reports

To be furnished upon project completion.

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FIRE ALARM SYSTEM PARTS LIST SECTION

Operations & Maintenance Manual
December 2015

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Eisenhower Johnson Memorial Tunnel - EMJT Fixed Fire Suppression System Project Parts List		
Part #	Description	Qnty
3-CAB7B	EST3 Panel Back Box	2
3-CAB7D	EST3 Panel Door	2
3-CAB5B	EST3 Cabinet/Wallbox	1
3-PPS/M	EST3 Primary Power Supply	7
3-LCD	EST3 LCD Display Module	7
3-CPU3	EST3 CPU Central Processor Module	7
3-RS232	EST3 RS-232 Communication Card	3
3-12SR	EST3 Control/Display Module, 12 Switches, 12 Red LEDs	7
3-SSDC1	EST3 Signature Driver Controller Module	4
3-SDDC1	EST3 Signature Driver Controller Module	12
3-LRMF	EST3 Loop Rail Module Filler	9
3-FP	EST3 Filler Plate Module	25
3-CHAS7	EST3 Chassis Assembly	6
3-FIBMB2	EST3 Fiber Optic Communications Interface	7
MMXVR	Mulit Mode Fiber Transceiver Module, 8,000 ft	14
MN-COM1S	Communications Ethernet Port Device	3
PT-1S	Printer, Serial	2
FWUL5W7	Fireworks Workstation, UL Listed	3
FW-SP4I	Fireworks Serial Port Module	3
FW-NIC	Fireworks Ethernet Network Interface Card	3
SMC1500	Uninterruptable Power Source (UPS), 1500 VA	3
FW-42LCDWTS	Fireworks, 42" Touchscreen Monitor, UL Listed	3
FW-42LCDHMK1	Monitor Wall Mount Bracket kit	3
SLA-1075	Sealed Lead Acid Battery, 8AH	14
SLA-1097	Sealed Lead Acid Battery, 10AH	40
SIGA-MCT2	Dual Input Module, UIO Mt	587
SIGA-CR	Control Relay Module	9
SIGA-MCR	Control Relay Module, UIO Mt	558
SIGA-CT1	Single Input Module	8
SIGA-CT2	Dual Input Module	36
SIGA-REL	Addressable Releasing Module	183
RELA-SRV-1	Service Disconnect Switch (At Deluge System IVE Cabinet)	183
RELA-EOL	Polarized End of Line Relay (At Deluge System IVE Cabinet)	183
SIGA-UIO6	Universal Input/Output Module Motherboard, 6 Module	186
SIGA-UIO2R	Universal Input/Output Module Motherboard, 2 Module	1
BPS10A	Remote Booster Power Supply, 10 Amp	22
SIGA2-PS	Photoelectric Smoke Detector	1
SIGA2-HCOS	Combo Heat/CO Detector	1
SIGA-SB	Detector Base, Standard	2
RIC-1	Multi-Voltage Control Relay	8
DTK-2LVLP	Surge Suppression Device, 1 Pair	1
DTK-4LVLP	Surge Suppression Device, 2 Pair	1
CSH00338	Tempco Strip Heater, 120vAC, 125W	24
01160.0-00	Stego Thermostat, 41F - 59F, Heater Start	24
01161.0-02	Stego Thermostat, 77F - 95F, Heater Stop	24
01161.0-00	Stego Thermostat, 104F-122F, High Temp Alarm	24
01142.0-00	Stego Thermostat, -10C (14F) - 50C (122F) , Low Temp Alm	28
31-40SF	NEMA 4X Cabinet, Plenum FACP Panel	4
31-40SF	NEMA 4X Cabinet, 5-Zone Releasing Panel	3
41-50SF	NEMA 4X Cabinet, 8-Zone, 10-Zone Releasing Panel	17

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FIRE ALARM SYSTEM RECOMMENDED SPARE PARTS SECTION

Operations & Maintenance Manual
December 2015

Eisenhower Johnson Memorial Tunnel - EMJT
Fixed Fire Suppression System Project
Recommended Spare Parts List

Part #	Description	Qnty
3-CAB7B	EST3 Panel Back Box	0
3-CAB7D	EST3 Panel Door	0
3-CAB5B	EST3 Cabinet/Wallbox	0
3-PPS/M	EST3 Primary Power Supply	0
3-LCD	EST3 LCD Display Module	0
3-CPU3	EST3 CPU Central Processor Module	0
3-RS232	EST3 RS-232 Communication Card	0
3-12SR	EST3 Control/Display Module, 12 Switches, 12 Red LEDs	0
3-SSDC1	EST3 Signature Driver Controller Module	0
3-SDDC1	EST3 Signature Driver Controller Module	0
3-LRMF	EST3 Loop Rail Module Filler	0
3-FP	EST3 Filler Plate Module	0
3-CHAS7	EST3 Chassis Assembly	0
3-FIBMB2	EST3 Fiber Optic Communications Interface	0
MMXVR	Mulit Mode Fiber Transceiver Module, 8,000 ft	0
MN-COM1S	Communications Ethernet Port Device	0
PT-1S	Printer, Serial	0
FWUL5W7	Fireworks Workstation, UL Listed	0
FW-SP4I	Fireworks Serial Port Module	0
FW-NIC	Fireworks Ethernet Network Interface Card	0
SMC1500	Uninterruptable Power Source (UPS), 1500 VA	0
FW-42LCDWTS	Fireworks, 42" Touchscreen Monitor, UL Listed	0
FW-42LCDHMK1	Monitor Wall Mount Bracket kit	0
SLA-1075	Sealed Lead Acid Battery, 8AH	0
SLA-1097	Sealed Lead Acid Battery, 10AH	0
SIGA-MCT2	Dual Input Module, UIO Mt	10
SIGA-CR	Control Relay Module	1
SIGA-MCR	Control Relay Module, UIO Mt	10
SIGA-CT1	Single Input Module	1
SIGA-CT2	Dual Input Module	1
SIGA-REL	Addressable Releasing Module	2
RELA-SRV-1	Service Disconnect Switch (At Deluge System IVE Cabinet)	2
RELA-EOL	Polarized End of Line Relay (At Deluge System IVE Cabinet)	2
SIGA-UIO6	Universal Input/Output Module Motherboard, 6 Module	2
SIGA-UIO2R	Universal Input/Output Module Motherboard, 2 Module	1
BPS10A	Remote Booster Power Supply, 10 Amp	1
SIGA2-PS	Photoelectric Smoke Detector	0
SIGA2-HCOS	Combo Heat/CO Detector	0
SIGA-SB	Detector Base, Standard	0
RIC-1	Multi-Voltage Control Relay	1
DTK-2LVLP	Surge Suppression Device, 1 Pair	0
DTK-4LVLP	Surge Suppression Device, 2 Pair	0
CSH00338	Tempco Strip Heater, 120vAC, 125W	2
01160.0-00	Stego Thermostat, 41F - 59F, Heater Start	2
01161.0-02	Stego Thermostat, 77F - 95F, Heater Stop	2
01161.0-00	Stego Thermostat, 104F-122F, High Temp Alarm	2
01142.0-00	Stego Thermostat, -10C (14F) - 50C (122F) , Low Temp Alm	2
31-40SF	NEMA 4X Cabinet, Plenum FACP Panel	0
31-40SF	NEMA 4X Cabinet, 5-Zone Releasing Panel	0
41-50SF	NEMA 4X Cabinet, 8-Zone, 10-Zone Releasing Panel	0

Eisenhower Johnson Memorial Tunnel
Fixed Fire Suppression System
Fire Alarm Equipment & Service Providers

Local Equipment & Service Provider

Systems Group
800 East 64th Avenue, Unit 17
Denver, CO 80229

Fire Alarm System Equipment

Edwards System Technology (EST), c/o:

Edwards
1016 Corporate Park Drive
Mebane, NC 27302

FIRE ALARM SYSTEM CONSUMABLES SECTION

Operations & Maintenance Manual
December 2015

Eisenhower Johnson Memorial Tunnel
Fixed Fire Suppression System
Fire Alarm System

Consumable Supplies

The Fire Alarm System and its associated components have few required consumables for normal operations or ongoing testing and maintenance operations.

The sealed lead acid batteries installed in the RCP, FPC, and FACP Panels and the workstation UPS Systems are required to be replaced every 5 years. It is not recommended to stock these items due to shelf life limitations.

The CO element in the combination heat/CO sensor is required to be replaced every 7 years. It is not recommended to stock this item due to shelf life limitations.

The system printer utilizes standard 8-1/2” x11” tractor feed computer paper. This paper is locally available from any office supply store.