4010ES
Fire Alarm System

Simplex

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Cautions, Warnings and Regulatory Information

READ AND SAVE THESE INSTRUCTIONS- Follow the instructions in this installation manual. These instructions must be followed to avoid damage to this product and associated equipment. Product operation and reliability depend upon proper installation.

DO NOT INSTALL ANY SIMPLEX® PRODUCT THAT APPEARS DAMAGED- Upon unpacking your Simplex product, inspect the contents of the carton for shipping damage. If damage is apparent, immediately file a claim with the carrier and notify an authorized Simplex product supplier.

ELECTRICAL HAZARD - Disconnect electrical field power when making any internal adjustments or repairs. All repairs should be performed by a representative or authorized agent of your local Simplex product supplier.

STATIC HAZARD - Static electricity can damage components. Handle as follows:

- Ground yourself before opening or installing components.

- Prior to installation, keep components wrapped in anti-static material at all times.

EYE SAFETY HAZARD - Under certain fiber optic application conditions, the optical output of this device may exceed eye safety limits. Do not use magnification (such as a microscope or other focusing equipment) when viewing the output of this device.

FCC RULES AND REGULATIONS – PART 15 - 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.

SYSTEM REACCEPTANCE TEST AFTER SOFTWARE CHANGES - To ensure proper system operation, this product must be tested in accordance with NFPA 72® after any programming operation or change in site-specific software. Re-acceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring.

All components, circuits, system operations, or software functions, known to be affected by a change must be 100% tested. In addition, to ensure that other operations are not inadvertently affected, at least 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, must also be tested and proper system operation verified.

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Chapter 1

Overview

Introduction   The 4100ES FACP panel is an expandable fire alarm panel, which can be used as a standalone system, or can be networked with the following panels to create a larger network:

- 4002
- 4010
- 4020
- 4100
- 4100U
- 4100ES
- 4010ES
- 4007ES
- 4190 TrueSite Workstation
- 4190 TrueSite Incident Commander
- 4190 Network System Integrator

The 4100ES comes with basic system components pre-installed. This chapter provides an overview of standalone and network 4010ES panel concepts:

Standalone. Comprised of one 4010ES FACP and its assorted notification appliances, initiating devices, and signaling line circuit devices.

Network. Multi-FACP systems connected by 4120 network cards. Each panel maintains the status and control of its own circuit points, while monitoring and controlling activity at other locations. Network nodes may perform similar tasks, or may be dedicated to specific functions.

In this chapter   This chapter covers the following topics:

Topic	Page
Standalone configuration	1-2
Network configuration	1-3

Standalone configuration

Overview

The standalone version of the 4010ES is used for smaller, or single-building applications. A standalone system is ideally placed into a small building that requires a limited number of notification appliances and initiating devices.

If a small building is being expanded, or if other buildings are being constructed in the same general area, as in a campus application, the standalone 4010ES can be upgraded to a network system and linked with other 4010, 4100, 4100U, 4100ES and 4010ES panels to create a larger network.

Note: You must order and install the 4010-9902 and the 4010-9922 network cards into the standalone system to enable network functionality.

Standalone system layout

Figure 1-1 below shows the layout of the 4010ES standalone configuration.
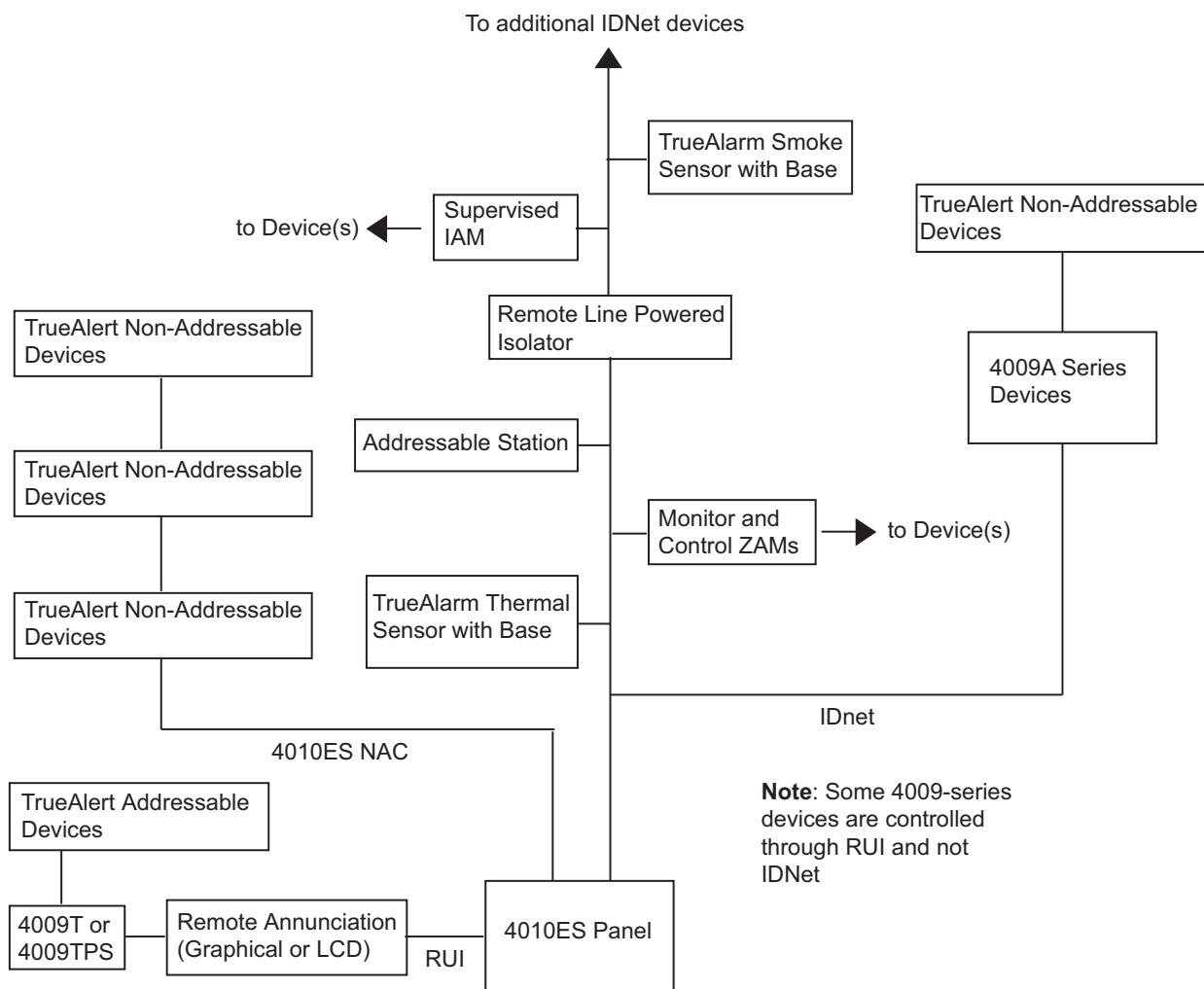
Figure 1-1. Standalone 4010ES system

Network configuration

Overview
The 4010ES can be expanded to a network system by using the 4010-9902 and the 4010-9922 network interface cards (NICs). When a NIC is installed into a 4010ES host panel, it is used to connect to up to 98 other network nodes. Nodes may consist of other host 4010ES panels, or they may be completely different: 4010ES FACPs and TrueSite Workstation (TSW) are examples of what could be used as nodes. A node is a self-sufficient FACP that controls appliances and devices, which also has the capability of controlling and communicating with other nodes.

The network configuration supports two prevalent architectures or wiring configurations: **hub** (or *ring*), or **star**. A networked system can also use a combination of the two.

The hub configuration consists of a main loop with nodes connected in a radial manner. The star configuration consists of several nodes connected directly to one common node. Physical bridge cards are used for the star configuration. Physical bridges reduce the amount of wire that would otherwise be needed to connect all nodes in a loop. A combination of the two styles is illustrated in Figure 1-2.

Ring Topology

TSW

Network Display Unit
(NDU) Hub Node

Physical Bridge Links
(Star Topology)

Note: Physical Bridge
links in a 4010ES
requires a two-bay box

Distributed Remote
Node Locations
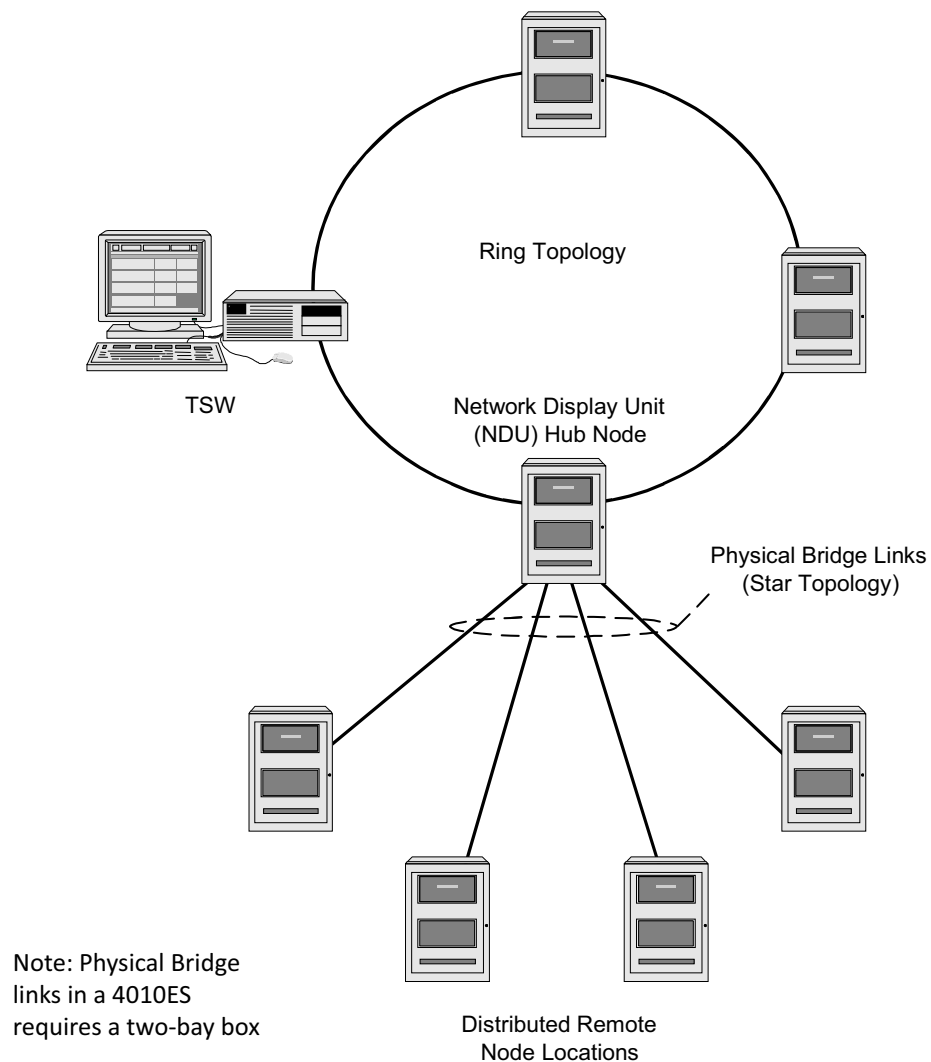
Figure 1-2. Hub/ring configuration

Network configuration, *continued*

Connecting network loops

Network loops can be joined by using physical bridge cards. There may be no more than two Style 7 network loops, two hub configurations, connected in tandem. For every two loops that are interconnected using one physical bridge, there can be a maximum of three physical bridges used in a star configuration. See Figure 1-3.
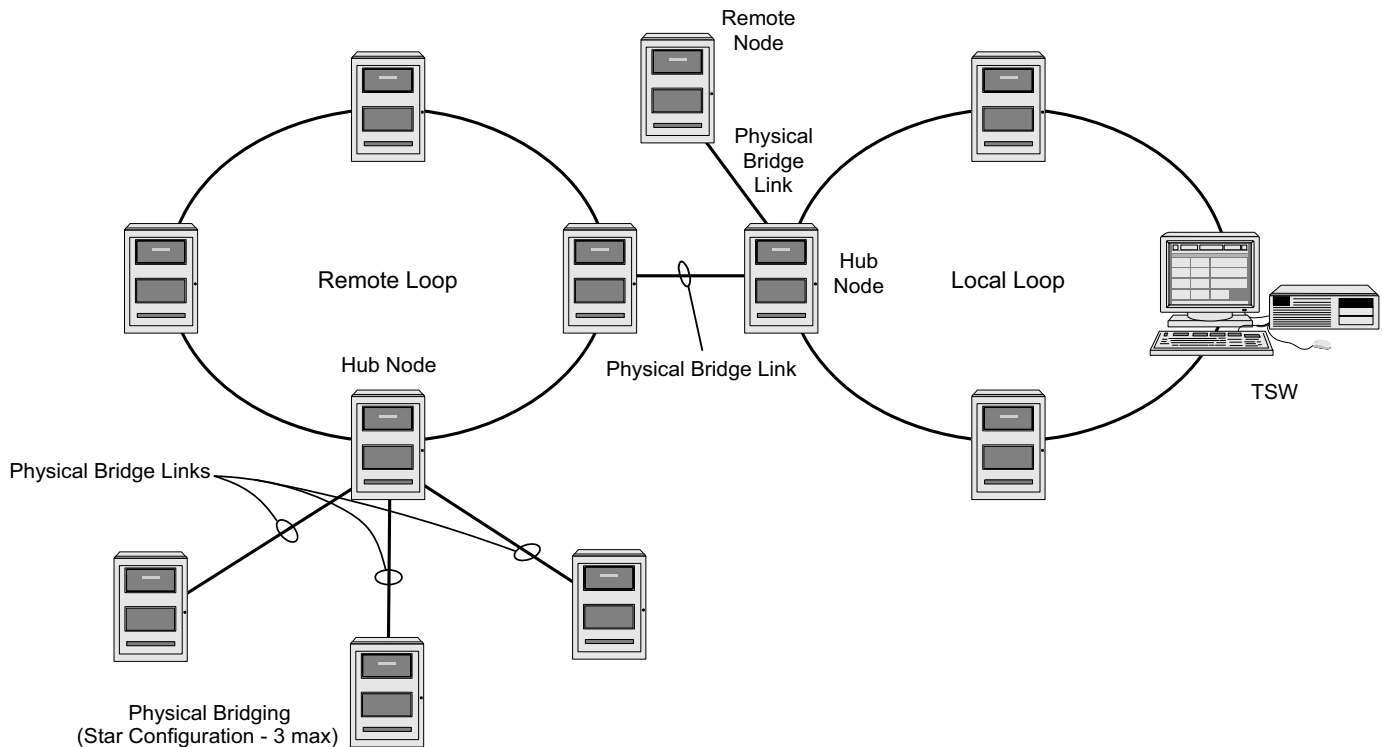
Figure 1-3. Interconnected loop configuration

Network communication

Network communication is achieved using the 4010-9902 and the 4010-9922 NICs. Each network node requires a NIC. Once the FACP is a network node, it may be programmed to be fully in control of other nodes, to be fully passive, or anywhere in between.

The 4010-9902 and the 4010-9922 NICs are option cards that use a PDI connector to communicate with the CPU. The NICs allow for communication between each panel using a fiber or twisted shielded pair wire in a Style 4 or Style 7 wiring configuration.

The NICs are designed to be connected in a point-to-point arrangement, so that one wire fault does not cause the entire system to fail. The point-to-point arrangement provides the most secure and fault-tolerant wiring possible.

Two types of media cards can be used with the NICs:

- The Fiber-Optic Media (4010-9819) card can be used for electrically noisy environments, or for connecting externally to other buildings.
- The Wired Media Card (4010-9818) is used in all other types of applications.

Up to two media cards can be plugged into each NIC. The same NIC can use a combination of different types of media boards; for example, a NIC may have a Wired Media card connected to the left port, a Fiber-Optic Media card connected to the right port.

For setup and installation of a physical bridge card, refer to document *579-184: 4100/4120/4010-Series Physical Bridges and Media Modules*.

For setup and installation of network interface cards, refer to document *579-956: 4010ES Network Interface and Media Card Installation Instructions*.

Chapter 2

Basic Hardware

Introduction   The 4010ES FACPs are one-bay or two-bay back boxes with a dead front and glass door, containing a set of pre-installed basic system components:

- Dead front-mounted CPU (2x40 character LCD or InfoAlarm)
- Operator interface
- Main system supply (MSS) (notification appliance circuits and system power)
- 48-LED Module (for some 4010ES configurations)
- IDNet+ or MX Loop circuit (for initiating and other devices)
- PDI Blocks for optional modules

In addition to the basic modules, optional modules can be installed inside the one-bay or two-bay 4010ES panels. The types of modules available depend on the panel configuration, as well as the accessibility, and availability, of the power distribution interface (PDI) blocks. The number of available PDI blocks depends on the system ordered. See Chapter 3, "Panel Configurations."

In this chapter   This chapter covers the following topics:

Topic	Page
CPU	2-2
Operator interface	2-8
Main system supply (MSS)	2-9
48-LED Module	2-14
System power	2-16

CPU

Overview   The CPU card (Figure 2-1 and Figure 2-2) is the main decision maker in the 4010ES FACP. It holds all job information, current system status, and communicates to all slaves connected to the 4010ES panel. A 4010ES CPU contains the following features:

- **2 x 40 LCD display and piezo (non-InfoAlarm systems only)** - Annunciation for supervisory, trouble, priority 2 and fire alarm signals.

- **Compact flash socket (card pre-installed) -** Alternate exec and job storage.

- **Ethernet service port** - PC connection used by Simplex service personnel.

- **Serial service port** - Interface for service equipment or Simplex service personnel.

- **Style 4/7 Remote Unit Interface** - Remote connection to system components not located within 4010ES box.
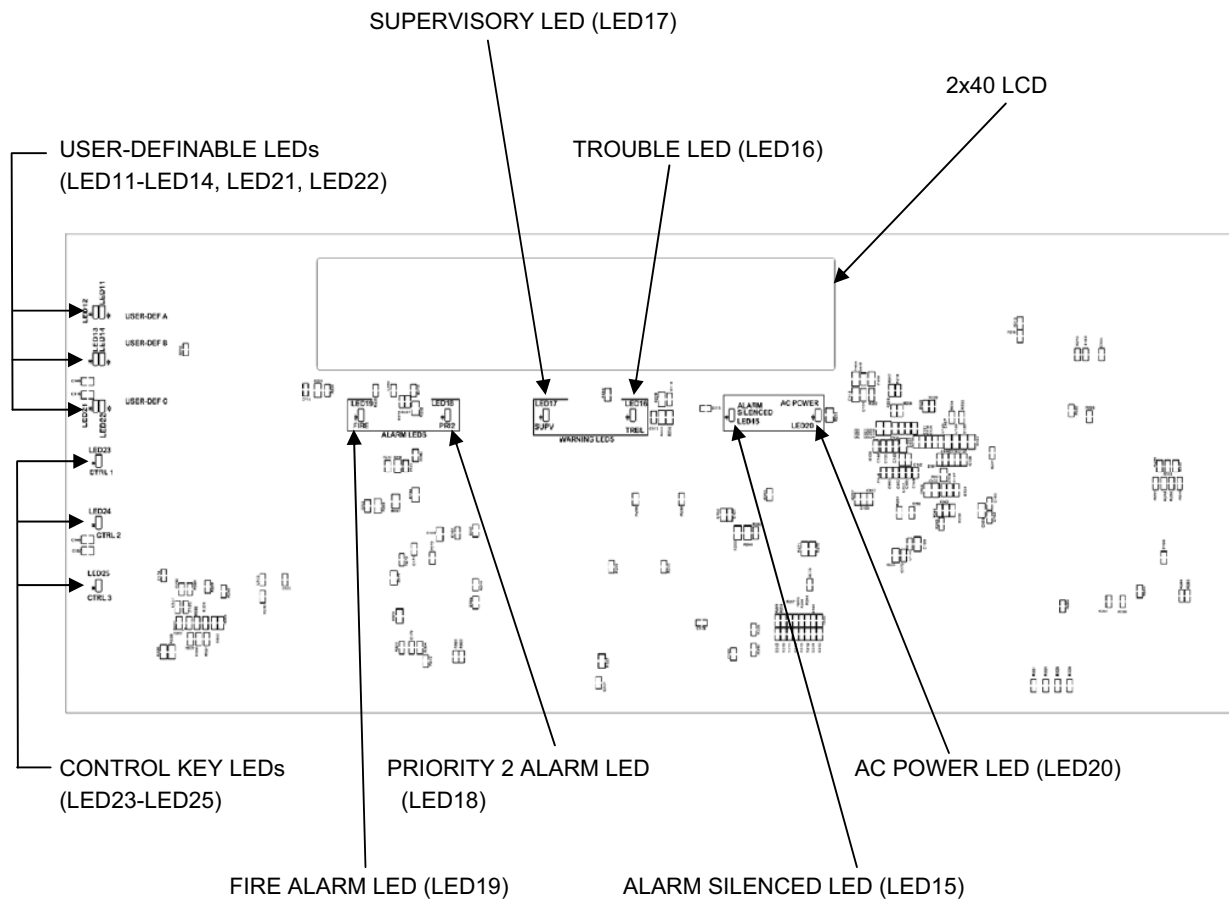
Note: All LEDs on the front side of the board are used for standard fire alarm functions and are visible through the dead front membrane.

Figure 2-1. Dead front-mounted CPU with a 2 x 40 display (front view)

Overview

Figure labels:
- RUI TROUBLE LEDs (LED1-LED3)
- RUI ENABLE JUMPER (P1)
- BATTERY (BT1)
- PIEZO CONNECTION (BUZ1)
- BATTERY ENABLE JUMPER (P5)
- LCD CONTRAST ADJUST (R23)
- RUI SHIELD JUMPER (P2)
- COMPACT FLASH (P3)
- COLD START SWITCH (SW3)
- KEYPAD MEMBRANE CONNECTOR (P8)
- 24V POWER/COMMS CONNECTORS (P9 & P10)
- BOOTLOADER STATUS LEDs (LED7-LED10)
- SERIAL SERVICE PORT (P11)
- RESET SWITCH (SW1)
- ETHERNET SERVICE PORT (J7)
- ETHERNET STATUS LED (LED5) & ACTIVITY LED (LED6)
- RUI PLUGGABLE TERMINAL BLOCK (TB1)

Figure 2-2. Dead front-mounted CPU with a 2 x 40 display (back view)

CPU LEDs   The tables below outline the functions of the LEDs on the CPU card.

Table 2-1. Reset LED

Reference designator	Silkscreen name	Color	Status
LED4	RESET	Yellow	ON = CPU is in reset FLASHING = Board is unable to come out of reset. Possibly corrupt CFIG, or board needs to be replaced. OFF = CPU is running normally

CPU LEDs

Table 2-2. Ethernet LEDs

Reference designator	Silkscreen name	Color	Status
LED5	STATUS	Green	ON = Cable connected
LED6	ACTIVITY	Red	FLASHING = Ethernet activity

Table 2-3. RUI trouble LEDs

Reference designator	Silkscreen name	Color	Status
LED1	OPEN	Yellow	ON = Class A fault (open-circuit) or a short
LED2	B SHORT	Yellow	ON = Short-circuit on the primary side
LED3	A SHORT	Yellow	ON = Short-circuit on the secondary side

Table 2-4. Front panel LEDs

Reference designator	Silkscreen name	Color	Status
LED11	USER-DEF A	Red	ON = User-definable key A active (Note)
LED12		Yellow	ON = User-definable key A active (Note)
LED13	USER-DEF B	Yellow	ON = User-definable key B active (Note)
LED14		Red	ON = User-definable key B active (Note)
LED15	ALARM SILENCED	Yellow	ON = Alarm silenced
LED16	TRBL	Yellow	ON = Trouble
LED17	SUPV	Yellow	ON = Supervisory
LED18	PRI2	Red	ON = Priority 2 alarm
LED19	FIRE	Red	ON = Alarm
LED20	AC POWER	Green	ON = System power is functioning properly
LED21	USER-DEF C	Yellow	ON = User-definable key C active (Note)
LED22		Green	ON = User-definable key C active (Note)
LED23	CTRL 1	Yellow	ON = Control key 1 active
LED24	CTRL 2	Yellow	ON = Control key 2 active
LED25	CTRL 3	Yellow	ON = Control key 3 active

Note: Only one LED in each user-definable pair will be on at a time, never both.

CPU, *Continued*

CPU LEDs

Table 2-5. Bootloader status LEDs

	Reference designator	LED7	LED8	LED9	LED10
	Silkscreen Name	A	B	C	D
	Color	Green	Green	Green	Green
Status	**Bootloader Initialization**	On (0.25 s) Off (0.25 s)	On (0.25 s) Off (0.25 s)	On (0.25 s) Off (0.25 s)	On (0.25 s) Off (0.25 s)
	Bad Master CRC or No Master Present	Off	Off	Off	On
	Diagnostic Fail - RAM	On	Off	Off	On
	Diagnostic Fail - Bootloader CRC	Off	On	Off	On
	Downloading Master	On	On	Off	On
	Downloading CFIG	Off	Off	On	On
	Downloading MsgLib	On	Off	On	On
	Downloading Bootloader	Off	On	On	On
	Download Successful	On	On	On	On

CPU jumper settings

Table 2-6. CPU settings

Reference designator	Silkscreen name	Position	Function
P5	BATTERY	1-2	Enable RAM battery backup
		2-3 (default)	Disable RAM battery backup
P1	RUI CKT	1-2 (default)	Disable RUI
		2-3	Enable RUI
P2	RUI SHIELD	1-2 (default)	RUI shield tied to 24C (Note)
		2-3	RUI shield tied to earth

Note: Some devices that connect to RUI have inherently grounded shield terminals, in which case, 24C cannot be used. If 24C is used, a negative earth fault will occur.

CPU switches

Table 2-7. Switches

Reference designator	Silkscreen name	Function
SW1	RESET	Short press (< 3 seconds) to activate a software-controlled reset (warm start). Press and hold (> 3 seconds) to force a hardware reset (also a warm start). Generally, unless the CPU card appears to be locked up, you should always use the software-controlled reset. A warm start preserves the logs and the disabled status of any points that are in the disabled state.
SW3	COLD START	During startup, press and hold this button to clear all history logs and enable any points that were previously disabled.

**CPU connectors/
ports/terminal
block**

Table 2-8. Connectors/ports/terminal block

Reference designator	Silkscreen name	Function
P3	COMPACT FLASH	Used for alternative job/exec storage. Card does not "run" out of compact flash.
P8	KEYPAD MEMBRANE	Used to communicate user inputs from the keypad membrane to the CPU card.
P9 & P10	24 V POWER/ INTERNAL COMMS	Used to provide the necessary connections to daisy chain 4100 comms and 24 VDC card power in an in-out fashion. 24 VDC card power originates from the MSS. 4100 comms originates from the CPU card.
P11	SERIAL SERVICE PORT	Used to connect the CPU card to the remote service gateway. It may also be used as a service port if the Ethernet service port is not available.
J7	Ethernet SERVICE PORT	Used to connect the panel to a local PC through the front panel Ethernet connection board, or 4010-9914 BNIC.
TB1	RUI A-, RUI A+, SHIELD, RUI B-, RUI B+	Remote user interface (RUI) used for communication between the CPU and remote slaves.

CPU, *continued*

CPU card specifications

Table 2-9 shows the battery current draw for the CPU card.

Table 2-9. Battery standby (24 V)

Configuration	Supervisory current draw	Alarm current draw
RUI disabled	124 mA	173 mA
RUI enabled - no load	149 mA	198 mA
RUI enabled - full load	176 mA	225 mA

Table 2-10 shows the maximum draw over the voltage range.

Table 2-10. Maximum draw over voltage range

Configuration	Supervisory current draw	Alarm current draw
RUI disabled	144 mA	208 mA
RUI enabled - no load	167 mA	226 mA
RUI enabled - full load	186 mA	248 mA

Note: CPU InfoAlarm supervisory and alarm current draws are both the same as the supervisory current draw.

Operator interface

Overview

The two operator interfaces which are available with the 4010ES are shown below.

The operator interface is used to obtain fire alarm, priority 2, supervisory, trouble, and other statuses through the display and LEDs. Control functions are accessed using dedicated and user-programmable keys.

Figure 2-3 is the standard 2 x 40 LCD operator interface. This model includes a 2 line by 40 character liquid crystal display. The membrane is available in both English and French.

Figure 2-3. Standard operator interface

Figure 2-4 is the InfoAlarm operator interface. This model includes a larger graphical display, which can display more information simultaneously.

Note: The InfoAlarm operator interface can only be installed on two-bay 4010ES panels. See Chapter 3, "Panel Configurations," for details on two-bay panels.
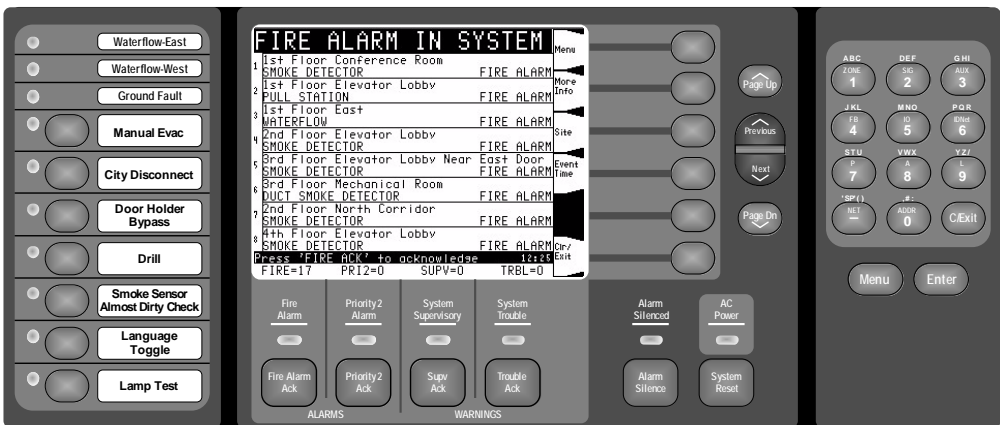
Figure 2-4. InfoAlarm operator interface

Main system supply (MSS)

Overview The MSS is the power source for the FACP. It provides 24 VDC card power to the 4010ES. Table 2-11 lists the MSS capabilities.

The MSS also performs standard fire alarm functions, such as brownout detect, battery transfer, battery recharge, earth fault detection, and power limiting per UL 864. It is shipped, installed, and connected in the 4010ES panel. Figures 2-5 and 2-6 illustrate a 4010ES MSS.

Table 2-11. MSS capabilities

MSS with IDNet	MSS without IDNet
8 A of available power	8 A of available power
4 Class A NACs	4 Class A NACs
Battery charger (Note)	Battery charger (Note)
1 AUX relay (2 A, 32 V)	1 AUX relay (2 A, 32 V)
1 AUX power tap (2 A)	1 AUX power tap (2 A)
Single channel, Dual Isolated Loop IDNet+	

Note: The 4010ES can hold a maximum of 33 Ah batteries in the one-bay box and 50 Ah in the two-bay box. The MSS charger is listed for 110 Ah UL and 50Ah ULC.

Note: The type of MSS you get depends on the base panel selected. See Chapter 3, "Panel Configurations."
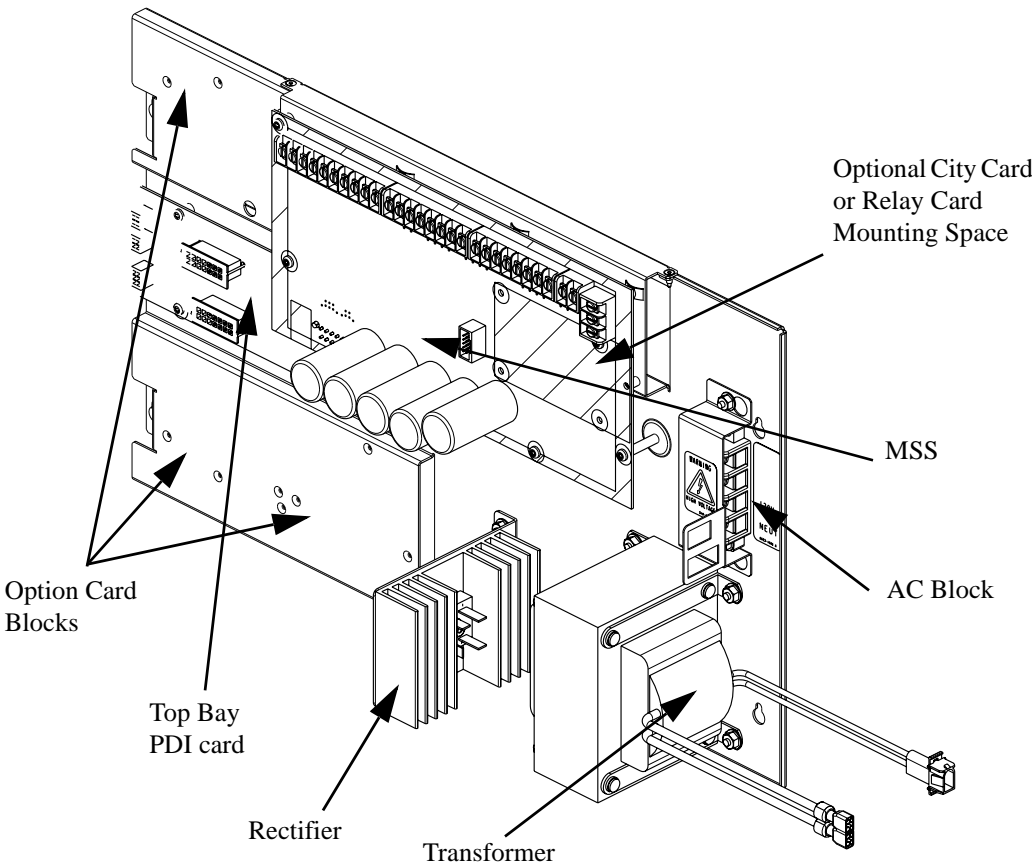
Figure 2-5. MSS shown with IDNet

Continued on next page

Main system supply (MSS), *continued*

Overview
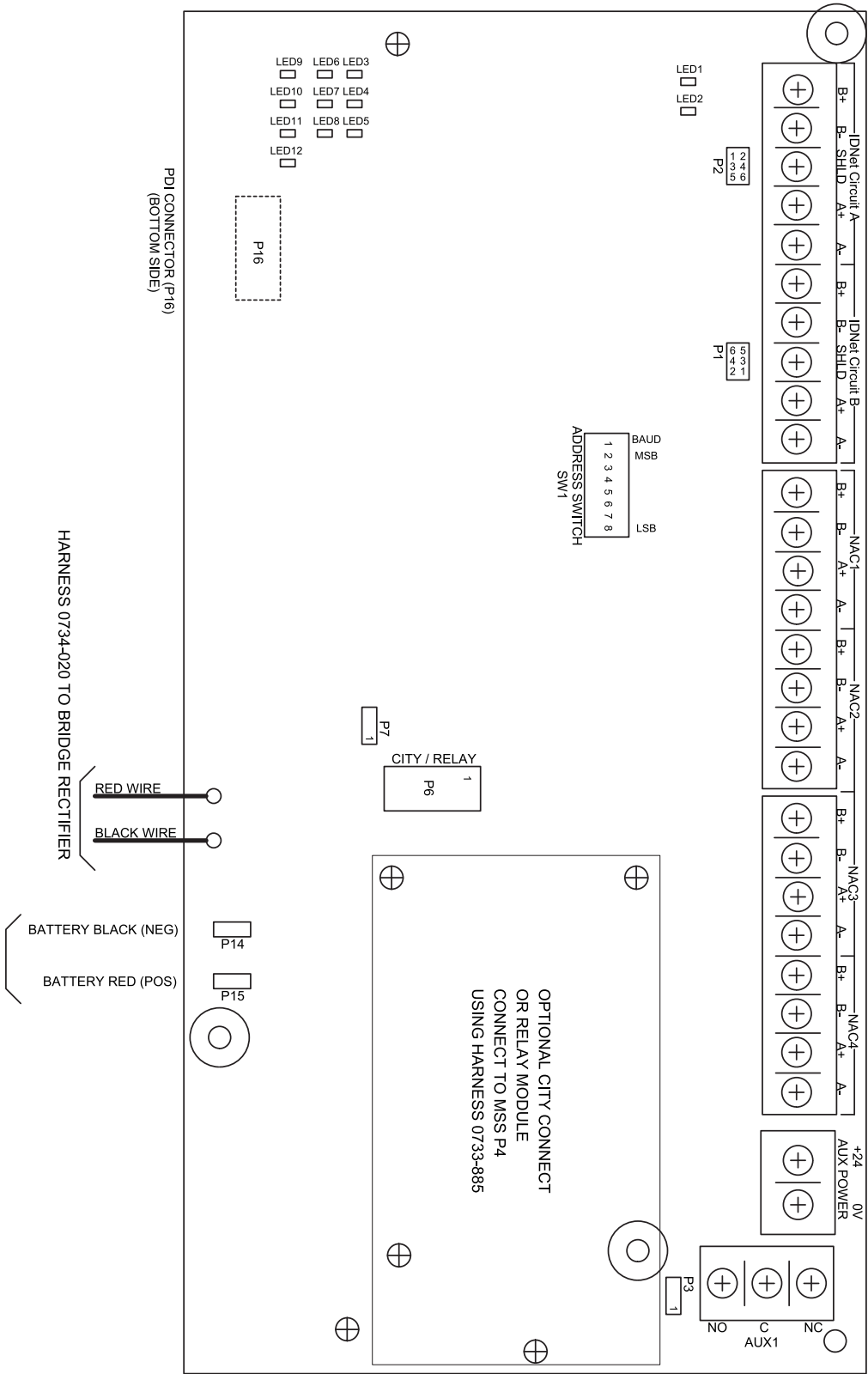
Figure 2-6. MSS LEDS and switches

Main system supply (MSS), *Continued*

MSS LEDs and jumpers

Tables 2-12 and 2-13 list the details associated with the LEDs and jumpers on the MSS.

Table 2-12. MSS LED Functions and Indications

LED number	Silkscreen name	Status
LED1	IDNet POS. EARTH	ON = IDNet POS. EARTH (Note)
LED2	IDNet NEG. EARTH	ON = IDNet NEG. EARTH (Note)
LED3	IDNet	STEADY = NO DEVICE DETECTED BLINK = SHORT CIRCUIT TRBL
LED4	IDNet CIRCUIT A	ON = CLASS A / OPEN TRBL
LED5	IDNet CIRCUIT B	ON = CLASS A / OPEN TRBL
LED6	4100 COMMS	ON = COMM LOSS
LED7	GENERAL POWER TRBL	STEADY = OVERCURRENT SINGLE BLINK = POS. EARTH DOUBLE BLINK = NEG. EARTH TRIPLE BLINK = BATTERY TRBL QUAD BLINK = CHARGER TRBL
LED8	AC POWER	ON = MSS POWER FROM AC MAIN
LED9	NAC1	NAC1 TRBL or NAC1 "ON"
LED10	NAC2	NAC2 TRBL or NAC2 "ON"
LED11	NAC3	NAC3 TRBL or NAC3 "ON"
LED12	NAC4	NAC4 TRBL or NAC4 "ON"

Note: The IDNet circuit on the MSS is electrically isolated and has its own earth fault detection circuit. The IDNet earth fault detection circuit detects a 10K Ohms (or less) stray impedance to earth ground.

Table 2-13. MSS Jumper Functions

Jumper number	Silkscreen name	Position	Function
P1	IDNet CIRCUIT B	CLASS B (STYLE 4) (Note 1) CLASS A (STYLE 7)	1-3, 2-4 3-5, 4-6 (DEFAULT)
P2	IDNet CIRCUIT A	CLASS B (STYLE 4) (Note 1) CLASS A (STYLE 7)	1-3, 2-4 3-5, 4-6 (DEFAULT)
P3	EARTH DETECT (Note 2)	ENABLE DISABLE	1-2 (DEFAULT) 2-3
P7	LOW BATTERY DISCONNECT	DISABLE (DOMESTIC) ENABLE (CANADA)	1-2 (DEFAULT) 2-3

Note 1. When jumpers are set for Class B (Style 4) on IDNet, you may use both the B-side and the A-side to wire devices. Thus, for Circuit B, you can have two pairs of wires per side or four branches per circuit.

2. Only one power module should be set for earth fault monitoring for each location within a system. Normally, the MSS is set to monitor for earth faults. The earth fault detection circuit will detect a 10K Ohms (or less) stray impedance to earth ground. The expansion battery charger (XBC, 4081-9306, -9308) may also be set to monitor for earth faults. When an XBC is used to provide battery backup for a 4010ES panel, disable the earth fault detection on the XBC.

Main system supply (MSS), *continued*

MSS specifications

Table 2-14 lists the specifications for the MSS.

Table 2-14. Input and output specifications

AC input specifications	
MSS in 120V FACP	4 A maximum 120 VAC @ 60 Hz, nominal (Note 1)
MSS in 220/240V FACP	2 A maximum 220/230/240 VAC @ 50 or 60 Hz (Note 1)
DC output specifications	
All MSSs	Minimum: 19.9 VDC (special applications) Maximum: 31.1 VDC Ripple: 2 VDC p-p @ full load (8 A)
MSS with IDNet output (see note)	30V or 35V (Note 2)
Battery charger specifications (Note 3)	
Input voltage range	21-33 VDC
Output float voltage	27.4 VDC ±500 mV @ 20 ^{o}C, temperature compensated at -24 mV to -36 mV/$\times$C (32 ^{o}F to 120 ^{o}F or 0 ^{o}C to 49 ^{o}C)
High voltage output	29.1 V @ 3.3 A
Output current limit	1.4 A for 6.2 - 18 Ah battery 3.3 A (default; for 18-50 Ah battery- Canadian; for 18-110 Ah battery - U.S.)

Note: 1. The MSS detects a low or missing AC input and switches to batteries automatically. The system returns to AC when it detects the presence of acceptable AC levels for a minimum of 30 seconds. AC wiring must run from a dedicated AC branch circuit, and the breaker/wiring must be sized according to local codes.

2. When it is necessary to activate large numbers of output devices on IDNet peripherals, such as piezo sounders, the output voltage increases to 35V to provide sufficient voltage at the end of line to activate the piezo. The higher voltage state is an alarm condition for the purpose of standby battery calculation. The 30V output is the normal condition, and is used to prolong battery standby. The CPU will activate the boost feature when 10 LED, Piezo or other outputs are activated.

3. The battery circuit is supervised for overcurrent, low battery and missing or depleted battery.

Main system supply (MSS), *continued*

MSS specifications
Tables 2-15 and 2-16 list the battery current draw for the MSS. The assumed voltage is 24 VDC, which is rated battery voltage for lead-acid type batteries.

Table 2-15. MSS with IDNet current specifications

Standby conditions (Note 1)	Current (battery standby 24V)	Current (max)
No alarms (NACs normal); TBL relay activated; IDNet LED ON, No IDNet devices connected	140 mA	190 mA
Add to above for each additional set of 50 IDNet devices in standby	40 mA	
Total current for fully loaded IDNet channel (248 devices) in standby	339 mA	450mA
Alarm conditions (Note 2)	**Current (battery standby 24V)**	**Current (max)**
4 NACs ON (Note 3); TBL Relay Activated; IDNet LED ON, No IDNet devices connected	165 mA	220 mA
Add to above for each set of 50 IDNet devices in alarm	50 mA	
Add to above for 20 LEDs ON	40 mA	
Total current for a fully loaded IDNet channel (248 devices) in alarm (20 LEDs ON)	453 mA	600 mA

Table 2-16. MSS without IDNet current specifications

Standby conditions (Note 1)	Current (battery standby 24V)	Current (max)
No Alarms (NACs normal); TBL Relay activated	70 mA	110mA
Alarm Conditions (Note 2)	**Current (battery standby 24V)**	**Current (max)**
4 NACs ON (Note 3); TBL Relay activated	100 mA	150 mA

Note: 1. Additional standby conditions: Auxillary relay activated, power trouble LED on, battery charger off, auxiliary power load = 0 mA.

2. Additional alarm conditions: Auxillary relay activated, power trouble LED on, battery charger off, auxiliary power load = 0 mA, NAC alarm load = 0 mA, IDNet = 35 V.

3. Notification power must also be taken into account for alarm current. Consult the notification appliances, used installation manuals to determined the current draw for each appliance used.

The notification appliance circuits on the MSS are rated for special application and for regulated 24 VDC operation per UL864, 9th Edition.

When used with the notification appliances listed in Table C-1 (Appendix C) or Table D-1 (Appendix D), each NAC is rated for 3 A, and total MSS capacity is rated at 8 A. This rating is the UL864 special application rating. Appliances listed in Tables C-1 or D-1 are synchronized per UL864 between all NACs on the MSS, and any NACs on a MSS or 4009As within the same 4010ES system.

When using notification appliances not listed in Tables C-1 or D-1, each circuit is rated for 2 A maximum, with a total notification appliance load of 4 A per MSS. This rating is the UL864 regulated 24 VDC rating. Synchronization of strobes and other appliances requires use of the associated, listed, compatible synchronization module. Consult the supplier of notification appliances for synchronization limits and details.

Simplex appliances (Table C-1) may not be mixed with Wheelock appliances (Table D-1) on a single power supply. A 4010ES system with mix of appliances from Tables C-1 and D-1 will not meet the UL864 9th Edition requirement for visual synchronization (10 milliseconds) between power supplies. Appliances listed in Table C-1 will be consistently out of visual sync with appliances in Table D-1 by about 30 milliseconds. Appliances listed Table C-1 will be notably out of audible sync with appliances in Table D-1 by a consistent time, Wheelock leading by 1/2 second. In order to meet the requirements for visual and audible sync system wide, all appliances in the system must be exclusively from either Table C-1 or D-1. Non-pulsing, linear-type notification appliances, such as horns or bells may be used up to the full rating (3 A/NAC, 8 A total for the MSS).

48-LED Module

Overview   The 48-LED Module (Figure 2-7) comes pre-installed inside some base configurations of the 4010ES panel. Each LED can be associated with a point, or group of points. By default, the module is supplied with red LEDs, except for the last column which has yellow LEDs. All of the LEDs can be replaced by different color LEDs. Refer to Chapter 4, "LED Kits for the 48-LED Module," for a list of LED kits. Refer to Chapter 5, "Installing 4010ES Systems," for instructions on replacing LEDs.
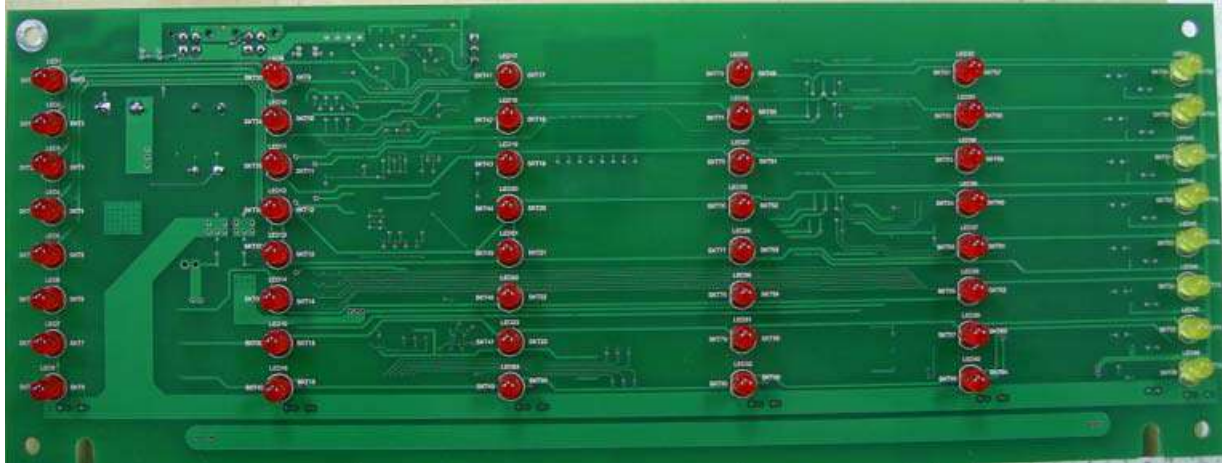
Figure 2-7. 48-LED Module (front view)

Figure 2-8 outlines what the different LEDs, jumpers and switches represent.

COMMS AND 24V
(DAISY CHAINED)

COMM LOSS FEATURE JUMPER:
1-2 = NORMAL (NOT ACTIVE)
2-3 = ACTIVE: LED1 DISPLAYS COMM LOSS

COMM LOSS LED

LED41	LED33	LED25	LED17	LED9	LED1
LED42	LED34	LED26	LED18	LED10	LED2
LED43	LED35	LED27	LED19	LED11	LED3
LED44	LED36	LED28	LED20	LED12	LED4
LED45	LED37	LED29	LED21	LED13	LED5
LED46	LED38	LED30	LED22	LED14	LED6
LED47	LED39	LED31	LED23	LED15	LED7
LED48	LED40	LED32	LED24	LED16	LED8

P1
1
2
3

ADDRESS SW1
LSB   MSB

Comm Loss
LED49

Bar Code label

DEFAULT ARRANGEMENT:
LEDs 1-40: RED
LEDs 41-48: YELLOW
OTHER COLORS ORDERED SEPARATELY

SWITCH ON = SELECTED
ADDRESS 1 = SWITCH 8 OFF, OTHERS ON
ADDRESS 2 = SWITCH 7 OFF, OTHERS ON
ADDRESS 3 = SWITCHES 7&8 OFF, OTHERS ON
SWITCH 1: ON = 9600 BAUD; OFF = OFF LINE

Figure 2-8. 48-LED Module LEDs, jumpers and switches (rear view)

48-LED Module, *continued*

48-LED Module specifications

Table 2-17. 48-LED Module current specifications

Standby current	Current
LED controller circuit	20 mA
Add to above for each additional LED that is on	1.89 mA
Total current for fully loaded 48-LED Module	111 mA
Maximum alarm current	**Current**
LED controller circuit	20 mA
Add to above for each additional LED that is on	2.39 mA
Total current for fully loaded 48-LED Module	135 mA

System power

Main system power

The 4010ES FACP is powered primarily by the MSS. The MSS draws power from the main power line, via an AC block, a transformer and a rectifier (Figure 2-5). In the case of main power failure, backup power is provided by backup batteries.

Backup batteries

A pair of 12V sealed lead acid batteries are used as a backup power source in the event of AC failure. The backup batteries are ordered and shipped separately from the 4010ES system. They are installed at the bottom of the 4010ES back box.

Batteries larger than 33 Ah for a one-bay 4010ES and 50 Ah for a two-bay 4010ES can be used. However, they must be accepted and installed per UL and local authority requirements using 4100-5128 Battery Distribution Terminal Block. The connection from the battery box to the 4010ES panel must be within 20 feet and in conduit.

For 50 Ah external batteries with a one-bay box, use box 2081-9282 Remote Battery Cabinet (Red). For 110 Ah external batteries with a one or two-bay box, use box 2081-9280 Remote Battery Cabinet (Red).

Chapter 3

Panel configurations

Introduction   The 4010ES comes in either in a one-bay or a two-bay configuration. Each of these can be ordered in a variety of base systems to satisfy various market needs.

In this chapter   This chapter covers the following topics:

Topic	Page
One-bay 4010ES Panels	3-2
Two-bay 4010ES Panels	3-6

One-bay 4010ES Panels

Overview   The basic components are shipped pre-assembled inside the 4010ES panel. The optional components need to be ordered and installed separately.

The one-bay 4010ES panel comes in three configurations. Table 4-1 of Chapter 4, "Orderable Panels and Devices," lists the basic components that are shipped with each of the three configurations.

Note: The dead front on a one-bay 4010ES panel is different for 48-LED Module configurations, as seen in Figure 3-1. See Figure 3-2 for detailed diagrams of one-bay 4010ES panels.

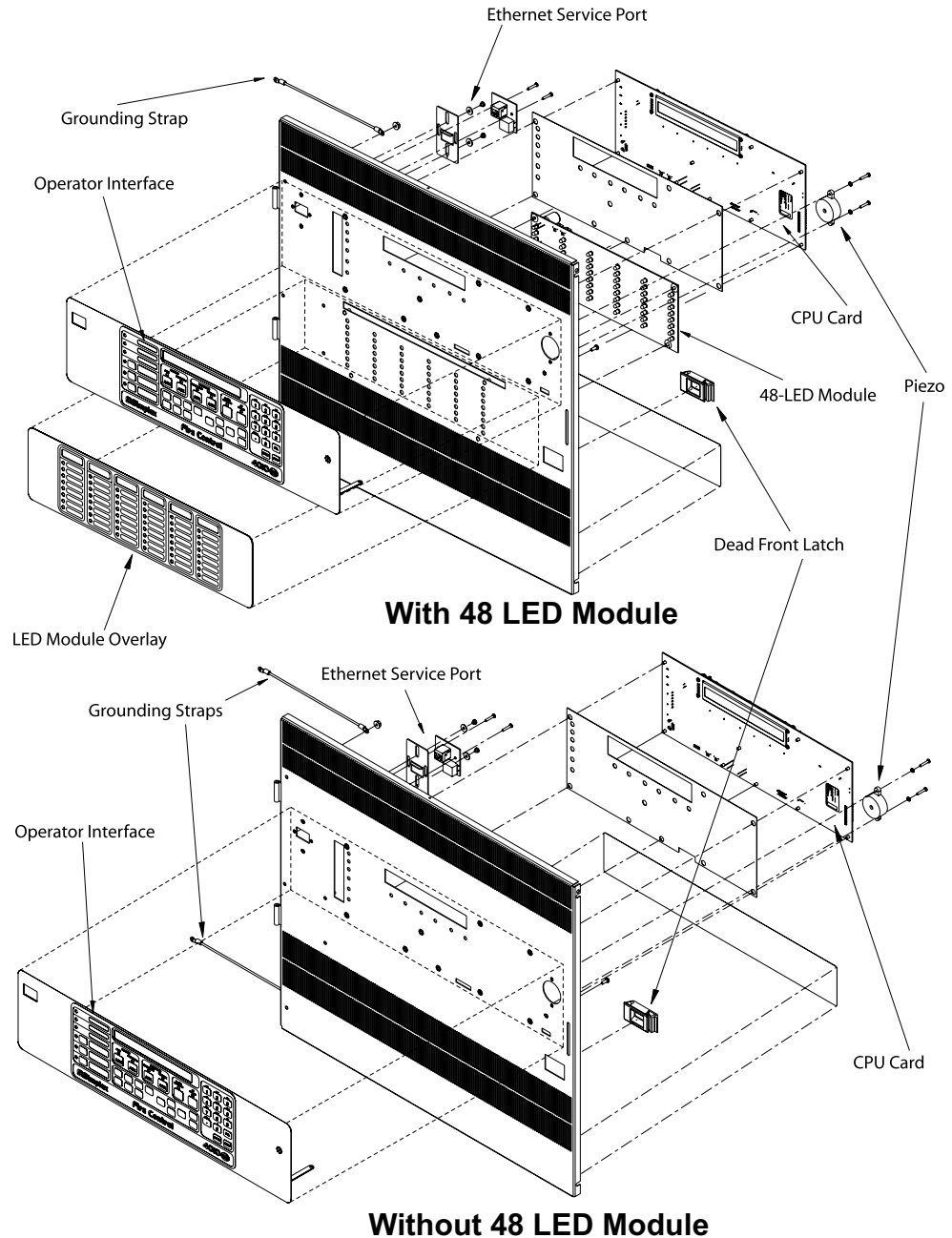
With 48 LED Module

Without 48 LED Module

Figure 3-1. One-bay dead front with and without 48-LED Module

Overview
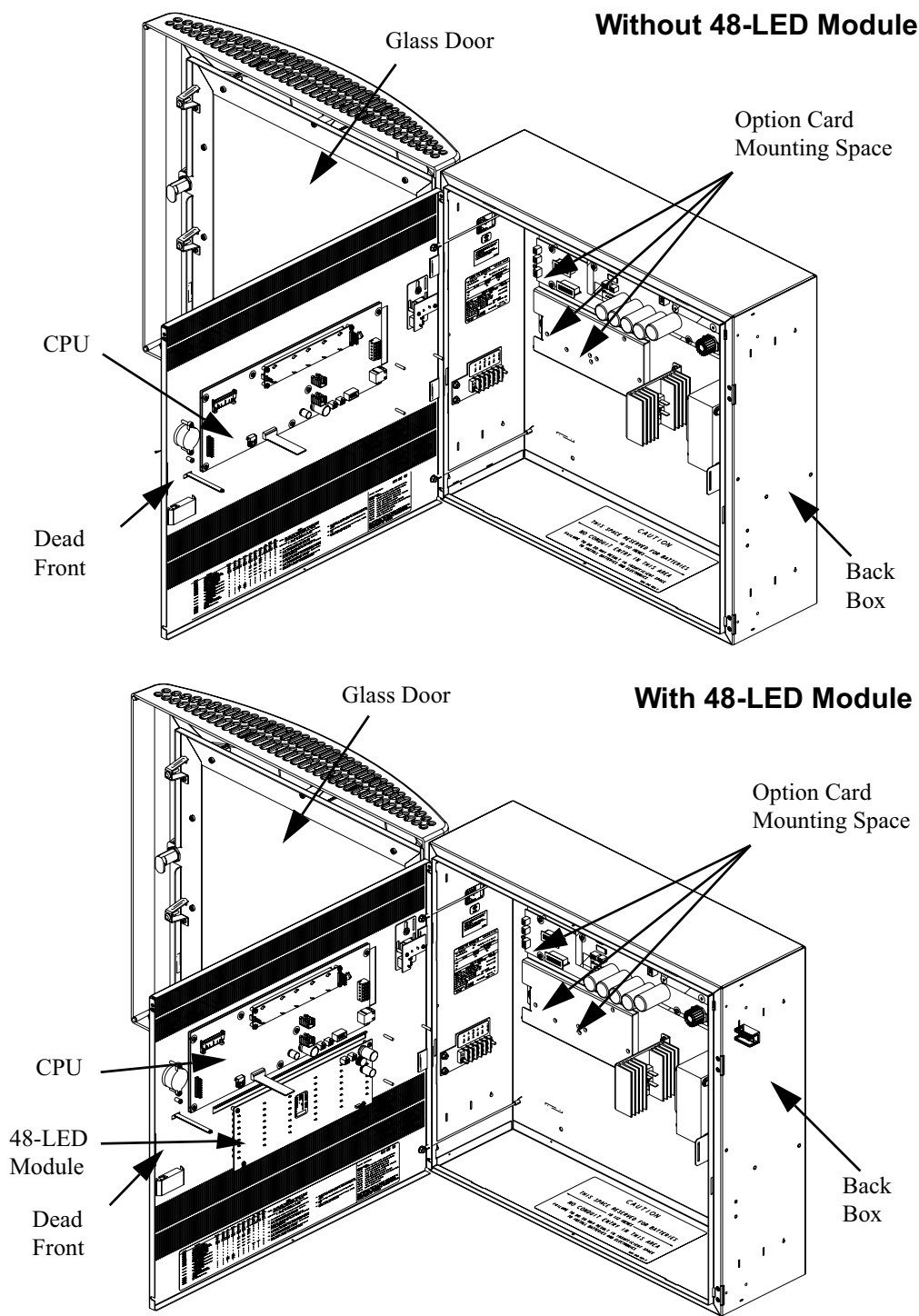
Figure 3-2. One-Bay 4010ES Panel

Optional modules   In addition to the basic modules, optional modules can be installed inside the one-bay 4010ES panels. The types of modules available depend on the panel configuration as well as the accessibility and availability of the power distribution interface (PDI) blocks.

> **Note:** Out of four PDI blocks in the top bay PDI card, three are available since the MSS card utilizes one (Figure 2-5).

Table 3-1 lists the optional modules that can be installed inside the different configurations of the 4010ES panels. Refer to the user manual associated with each card for specifications and installation instructions. The list of these manuals is available in Table 4-3 in Chapter 4, "Orderable Panels and Devices."

Table 3-1. Optional modules

Optional modules	Description	Blocks
4010-9818	Network Media Card Wired (Mounts on 4010-9902 and 4010-9922)	none
4010-9819	Network Media Card Fiber Optic (Mounts on 4010-9902 and 4010-9922)	none
4010-9901	VESDA Interface Card	1
4010-9902 and 4010-9922	4120 Network Interface Card	2
4010-9903 and 4010-9924 (Note 2)	4120 Network Interface w/ Modem physical Bridge Style 4	2
4010-9904 and 4010-9925 (Note 2)	4120 Network Interface w/ Modem physical Bridge Style 7	2
4010-9905 and 4010-9926 (Note 2)	4120 Network Interface TCP/IP physical Bridge Style 4	3
4010-9906 and 4010-9927 (Note 2)	4120 Network Interface TCP/IP physical Bridge Style 7	3
4010-9908	4-Point Flat AUX Relay (2 A)	1
4010-9909	City Connect Card with Disconnect Switches (MSS mounted)	none
4010-9910	City Connect Card without Disconnect Switches (MSS mounted)	none
4010-9911	Alarm Relay Card (MSS mounted)	none
4010-9912	SDACT Card (Mounts in top bay Block D only)	1
4010-9913	SafeLinc Internet Interface (FPII) Card	2
4010-9914	Building Network Interface Card (BNIC)	2
4010-9916	25 VDC Voltage Regulator Card	1
4010-9917	MX Digital Loop Card (international models only)	2
4010-9918	Dual RS232 Card	1
4010-9919	TrueInsight Remote Service Gateway (Perle) (mounts on dead front)	none
4010-9920	8 Zone Initiating Device Circuit, Class B	2
4010-9921	8 Zone Initiating Device Circuit, Class A	2
4010-9929	IDNet 2+2 Card	1

> **Note: 1.** Consult your local sales office to determine which modules are available in your area.
>
> **2.** Physical bridge cards must also be installed with a network interface card. Therefore, the 4010ES one-bay systems do not have enough option card space left to install a physical bridge after a NIC is added.

One-bay 4010ES Panels, *continued*

Back box mechanical specifications

Back boxes ship with the panel and can only be ordered separately as a service part. Table 3-2 lists the specifications for the one-bay back boxes.

Table 3-2. Back box specifications

PID number	Height	Width	Depth	Depth with door
699-467 (Platinum)	22 in. (559 mm)	24 in. (610 mm)	6-29/32 in. (175 mm)	11-11/16 in. (297 mm)
699-466 (Red)				

Two-bay 4010ES Panels

Overview   A two-bay system is used when more option card space is required than is given in a one-bay system, or when InfoAlarm is the primary display. Refer to Figure 2-4 for an illustration of the InfoAlarm interface.

The basic components of the two-bay panels are the same as for the one-bay panels and are pre-installed in the top bay. The expansion bay contains another PDI card with eight available blocks. Those can be used to connect optional modules to the 4010ES panels. The Expansion Bay PDI card comes pre-installed inside the two-bay panel.

See Figures 3-3 through 3-5 for two-bay 4010ES diagrams.
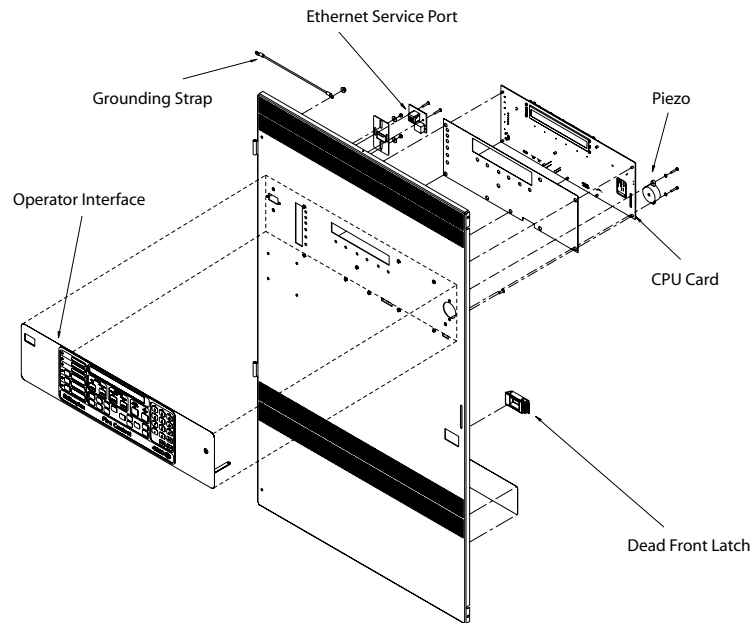
Standard User Interface
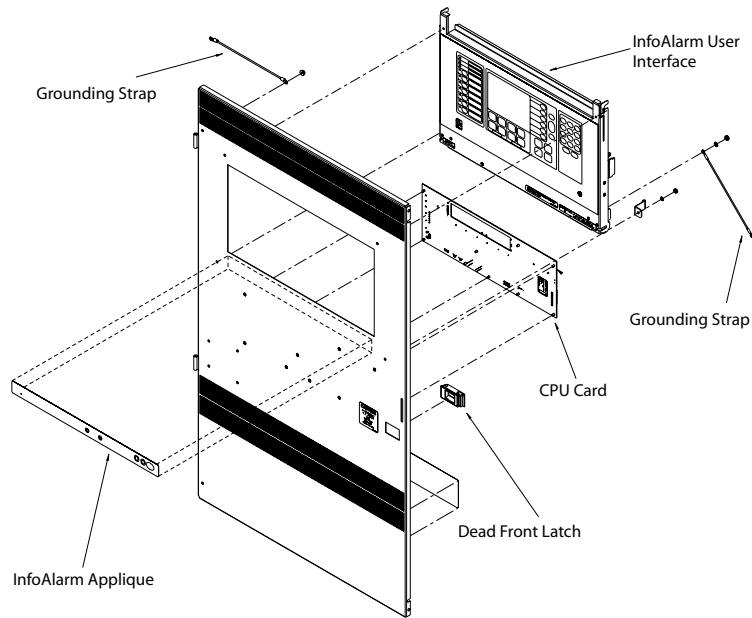
InfoAlarm User Interface

Figure 3-3. Two-bay, standard and InfoAlarm dead fronts

Overview

Glass Door

Back Box

Top Bay

CPU

Dead Front

Expansion PDI

MSS
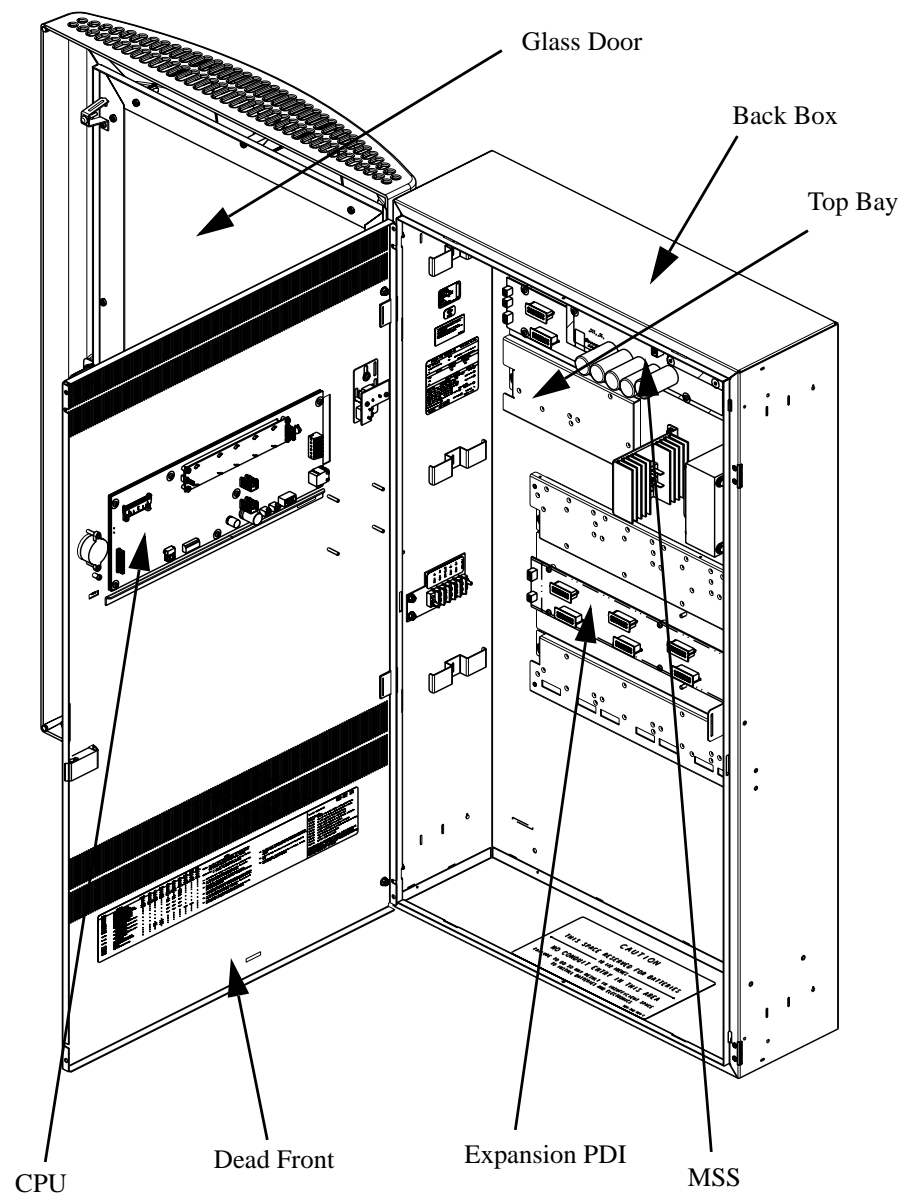
Figure 3-4. Two-bay 4010ES Panel with standard user interface

Two-bay 4010ES Panels, *continued*

Overview
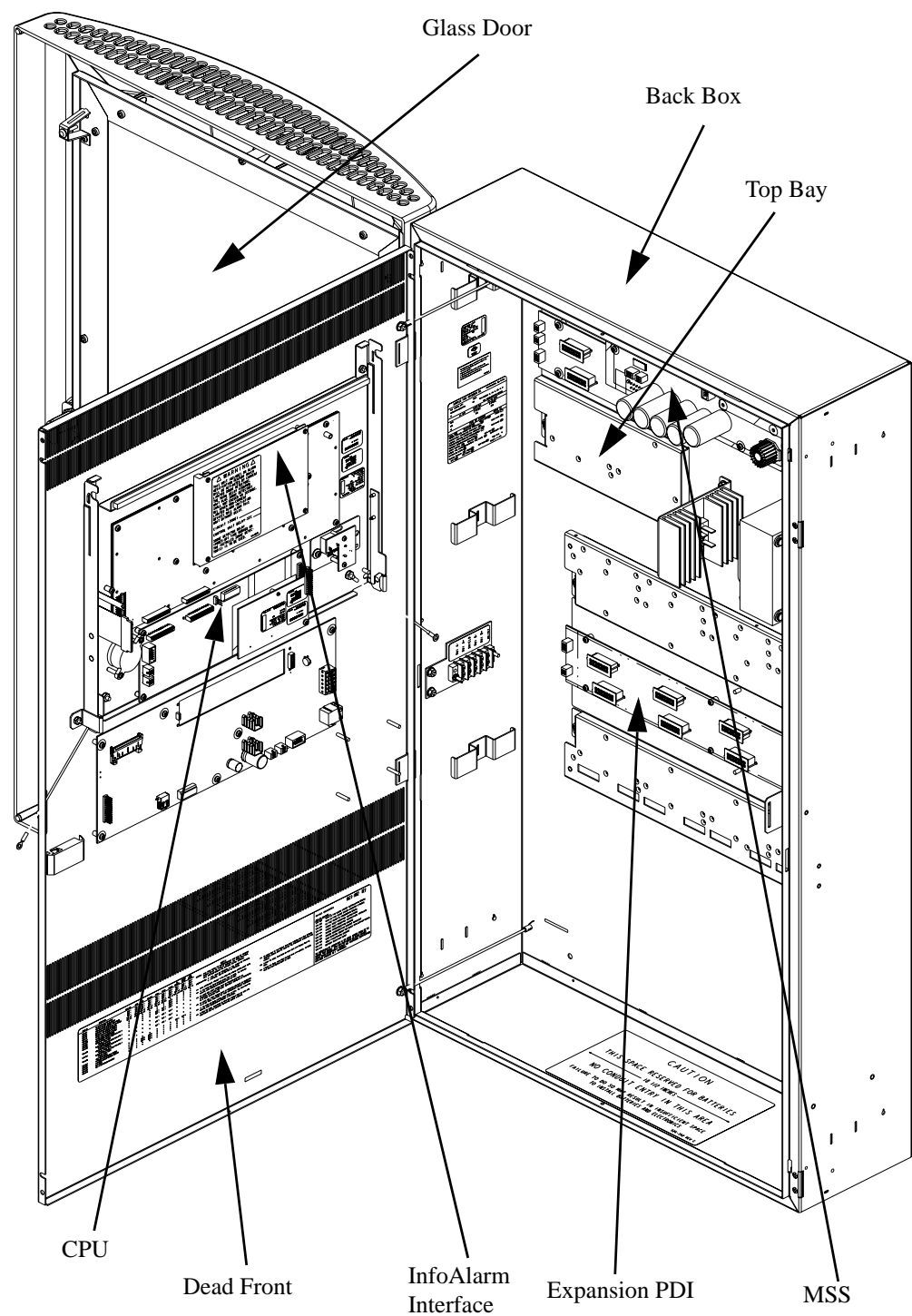
Figure 3-5. Two-bay 4010ES Panel with InfoAlarm interface

Two-bay 4010ES Panels, *continued*

Optional modules   The same optional modules can be used with the two-bay panels as with the one-bay panels. For a complete list of optional components, see Chapter 4, "Orderable Panels and Devices."

Back box mechanical specifications

Table 3-3 lists the specifications for the two-bay back boxes.

Table 3-3. Back box specifications

PID number	Height	Width	Depth	Depth with door
699-465 (Platinum)	40.0 in. (1016 mm)	24 in. (610 mm)	6-29/32 in. (175 mm)	11-11/16 in. (297 mm)
699-464 (Red)				

Chapter 4

Orderable panels and devices

Introduction

The following chapter lists the 4010ES panels and optional modules that can be ordered. It also lists the installation manuals that are associated with each optional device.

In this chapter

This chapter covers the following topics:

Topic	Page
Panels	4-2
Optional modules	4-3

Panels

One-bay 4010ES Panels

Table 4-1. One-bay 4010ES systems

Panel PIDs	Panel color	Panel language and AC voltage	Panel components				
4010-9401	Red	English 120V	CPU with a 2 x 40 display and a piezo	Standard operator interface	MSS with an IDNet channel	Three free option blocks	---
4010-9402	Platinum	English 120V					---
4010-9501	Red	English 220V-240V					---
4010-9502	Platinum	English 220V-240V					---
4010-9403	Red	English 120V					48-LED Module (door-mounted)
4010-9404	Platinum	English 120V					48-LED Module (door-mounted)
4010-9405	Red	French 120V					48-LED Module (door-mounted)
4010-9406	Platinum	French 120V					48-LED Module (door-mounted)
4010-9503	Red	English 220V-240V			MSS (No IDNet)	One free option block	One MX Loop Option Card pre-installed (4010-9917)
4010-9504	Platinum	English 220V-240V			MSS (No IDNet)	One free option block	One MX Loop Option Card pre-installed (4010-9917)

Two-bay 4010ES Panels

Table 4-2. Two-bay 4010ES systems

Panel PIDs	Panel color	Panel language and AC voltage	Panel components				
4010-9421	Red	English 120V	CPU with a 2 x 40 display and a piezo	Standard operator interface	MSS with an IDNet channel	10 free option card blocks	One IDNet 2+2 Card pre-installed (4010-9929)
4010-9422	Platinum	English 120V					One IDNet 2+2 Card pre-installed (4010-9929)
4010-9521	Red	English 220V-240V					One IDNet 2+2 Card pre-installed (4010-9929)
4010-9522	Platinum	English 220V-240V					One IDNet 2+2 Card pre-installed (4010-9929)
4010-9425	Red	English 120V	CPU	InfoAlarm interface (display and piezo)			One IDNet 2+2 Card pre-installed (4010-9929)
4010-9426	Platinum	English 120V					One IDNet 2+2 Card pre-installed (4010-9929)
4010-9525	Red	English 220V-240V				11 free option card blocks	--
4010-9526	Platinum	English 220V-240V				11 free option card blocks	--
4010-9523	Red	English 220V-240V	CPU with a 2 x 40 display and a piezo	Standard operator interface	MSS (No IDNet)	7 free option card blocks	Two MX Loop Option Cards pre-installed (4010-9917)
4010-9524	Platinum	English 220V-240V				7 free option card blocks	Two MX Loop Option Cards pre-installed (4010-9917)
4010-9527	Red	English 220V-240V	CPU	InfoAlarm interface (display and piezo)		9 free option card blocks	One MX Loop Option Card pre-installed (4010-9917)
4010-9528	Platinum	English 220V-240V				9 free option card blocks	One MX Loop Option Card pre-installed (4010-9917)
4010-9529	Red	English 220V-240V				7 free option card blocks	Two MX Loop Option Cards pre-installed (4010-9917)
4010-9530	Platinum	English 220V-240V				7 free option card blocks	Two MX Loop Option Cards pre-installed (4010-9917)
4010-9423	Red	English 120V	CPU with a 2 x 40 display and a piezo	Standard operator interface	MSS with an IDNet channel	10 free option card blocks	One IDNet 2+2 Card pre-installed (4010-9929)
4010-9428	Platinum	English 120V					One IDNet 2+2 Card pre-installed (4010-9929)
4010-9430	Platinum	French 120V					48 LED Module (door mounted)

Optional modules

Local optional modules

Table 4-3. Local optional modules installation instructions

PID	Description	Installation instructions
4010-9818	Wired Network Media Card	579-956
4010-9819	Fiber Optic Network Media Card	579-956
4010-9901	4010ES/4100/4120-Series VESDA Card	579-963
4010-9902 and 4010-9922	Network Interface Card	579-956 574-041
4010-9903 and 4010-9924	Style 4 Network Modular Physical Bridge	579-818 579-184 574-041
4010-9904 and 4010-9925	Style 7 Network Modular Physical Bridge	579-818 579-184 574-041
4010-9905 and 4010-9926	Style 4 Network TCP/IP Physical Bridge	579-818 579-184 574-041
4010-9906 and 4010-9927	Style 7 Network TCP/IP Physical Bridge	579-818 579-184 574-041
4010-9908	4-Point Flat AUX Relay Card	579-220
4010-9909	City Connect Module with Disconnect Switches (MSS mounted)	579-955
4010-9910	City Connect Module without Disconnect Switches (MSS mounted)	579-955
4010-9911	Alarm Relay Module (MSS mounted)	579-955
4010-9912	SDACT	579-954
4010-9913	SafeLinc Internet Interface (FPII)	579-349
4010-9914	Building Network Interface Card (BNIC)	579-949
4010-9916	25 VDC Voltage Regulator Module (international only)	579-812
4010-9917	MX Digital Loop (international only)	579-833
4010-9918	Dual RS232 Module	574-910
4010-9919	TrueInsight Remote Service Gateway	579-953
4010-9920	8 Zone Initiating Device Circuit, Class B	579-205
4010-9921	8 Zone Initiating Device Circuit, Class A	579-991
4010-9929	IDNet 2+2 Module	579-1170

Optional modules, *continued*

Remote devices

Table 4-4. Remote power and notification devices installation instructions

PID	Description	Installation instructions
4010-9818	Wired Network Media Card	579-956
4010-9819	Fiber Optic Network Media Card	579-956
4009-9401	4009T TrueAlert Controller	574-762
4081-9306	4100U External Battery Charger 120V (with cabinet, holds 11 Ah batteries)	579-268
4009-9201	4009A 120V	574-181
4009-9202CA	4009A 120V ULC-listed model	574-181
4009-9301	4009A 240V	574-181
4009 Remote TrueAlert Power Supply (TPS)		
4009-9813	Transponder Interface Card (TIC)	579-875
4100-5120	120 V Domestic TPS	579-875
4100-5121	120 V Canadian TPS	579-875
4100-5122	220-240 V International TPS	579-875

Table 4-5. Remote display and annunciation devices installation instructions

PID	Description	Installation instructions
4100-9401	Remote InfoAlarm - Red	579-687
4100-9402	Remote InfoAlarm - Beige	579-687
4100-9421	Remote InfoAlarm (French) - Red	579-687
4100-9422	4100-9422 Remote InfoAlarm (French) - Beige	579-687
4100-9441	Remote InfoAlarm (international) - Red	579-687
4100-9442	Remote InfoAlarm (international) - Beige	579-687
4100-7401	24-Point I/O Graphic Module (requires mounting cabinet)	574-348
4606-9102	4010ES RUI LCD Annunciator	579-977

Optional modules, *continued*

Adjunct features

Table 4-6. Adjunct features

PID	Description	Installation instructions
4081-9308	4100U External Battery Charger 220/230/240 V (with cabinet. Holds 110 Ah batteries)	579-268
4190-9021	Red Fiber Modem Expansion Cabinet with Left Port Modem – Single Mode	579-831
4190-9022	Beige Fiber Modem Exp Cabinet with Left Port Modem - Single Mode	579-831
4190-9023	Right Port Modem for Exp Cabinet – Single Mode	579-831
4190-9024	Red Fiber Modem Exp Cabinet with Left Port Modem – Multimode	579-831
4190-9025	Beige Fiber Modem Exp Cabinet with Left Port Modem - Multimode	579-831
4190-9026	Right Port Modem for Expansion Cabinet – Single Mode	579-831

End user programming tools

Table 4-7. End user programming tools

PID	Description
4100-0292	Custom Label Editing (USB Dongle)
4100-0295	Port Vectoring Setup and Control (USB Dongle)
4100-0296	User Group/Passcode Editing (USB Dongle)
4100-0298	Walktest Configuration Setup and Control (USB Dongle)
4100-8802	Programming Unit Software

LED kits for the 48-LED Module

Table 4-8. LED kits for the 48-LED Module

PID	Description
4100-9843	8 Yellow LEDs
4100-9844	8 Green LEDs
4100-9845	8 Red LEDs
4100-9855	8 Blue LEDs

Chapter 5

Installing 4010ES systems

Introduction

This chapter describes how to mount the 4010ES back boxes to a wall, and install basic system components into the boxes.

Before beginning the installation, review this chapter to get a sense of the types of bays and modules that make up the FACP.

IMPORTANT: Verify ES Panel Programmer, Executive, and Slave Software compatibility when installing or replacing system components. Refer to the technical support website for up-to-date compatibility information.

In this chapter

This chapter covers the following topics:

Mounting the panel

Installing the back box

Store the system electronics containers in a safe, clean, and dry location until the back box installation is completed and you are ready to install additional modules. Make certain that you have the necessary hardware before you begin the installation procedure.

Install the back box as shown in Figure 5-1. Use the holes in the back box to secure it to the wall.

Note:
- Conductor entrance and routing restrictions apply to power-limited systems only.

- While the pre-installed system components may be left in the backbox during installation, due to the danger of metal fragments falling into electronics, it is recommended to remove the dead front and any bay pans in the system.

- For surface or flush mounting to a wooden wall structure, the back box must be attached with four 3/8-inch-diameter x 1-½-inch-long (9.5 mm x 38 mm) fasteners and four 3/8-inch-diameter (9.5 mm) washers.

- For surface mounting, secure the box to the wall using the tear-drop mounting holes on the back surface. For flush and semi-flush mounting, secure the box to the wall studs using the indicated areas (dents in the metal) on the sides of the box. Note that the front surface of the back box must protrude at least three inches from the wall surface for semi-flush installations.

- Power-limited systems have entrance and routing restrictions for field wiring. See section "General Field Wiring Guidelines" on page 5-5 for more details.
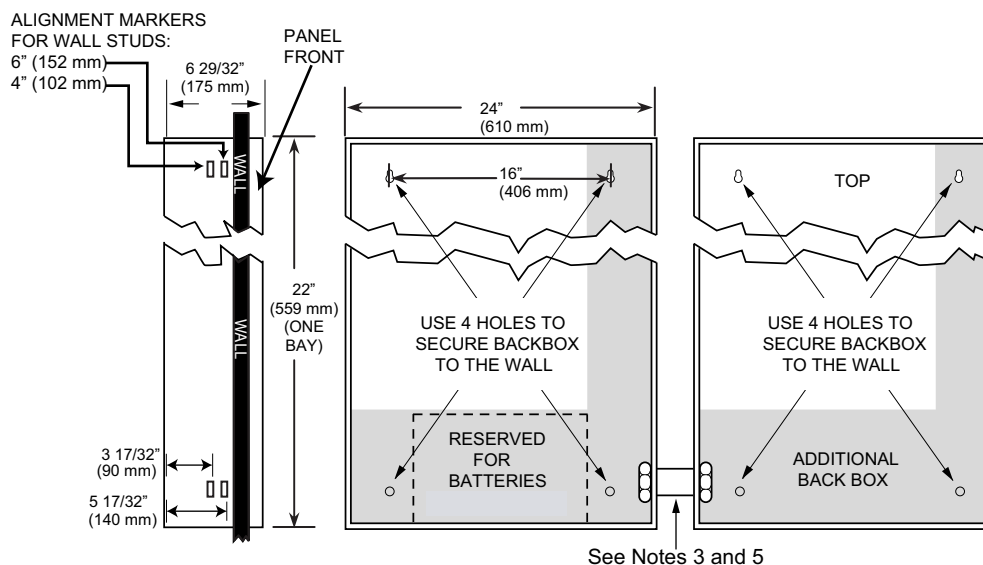
Figure 5-1. Back box installation

Notes:
1. Dimensions shown are typical for all surface and semi-flush installations.

2. Use suitable punch when conduit is required. Knockouts are not provided. Locate and create on-site as required during installation.

3. A minimum clearance of 5 inches (127 mm) from the hinge side is required to provide a maximum door opening of 90 degrees.

4. Do not install any power-limited wiring in the shaded area of the back box as shown in Figure 5-1. This area is reserved for non power-limited devices and circuits. for example, AC power, batteries, and city circuits. The non power-limited area is determined by the internal barriers, but is always below and to the right of these barriers.

5. Minimum distance between boxes is 3 1/4 inches (83 mm). Maximum distance between boxes is 10 inches (254 mm).

Mounting the panel, *continued*

Attaching the dead front

To attach the 4010ES panel dead fronts containing the operator interface and the 48-LED Module (where applicable), perform the following steps:

1. Align the dead front hinges with the hinge pins on the back box, and slide the door down onto the hinge pins.
2. Attach the two grounding straps to the back box with the # 6 hex flange nuts. See Figure 5-3. The grounding straps should already be attached to the dead front.

One-Bay   Two-Bay

Figure 5-2. 4010ES dead fronts

Top   Bottom

Figure 5-3. Dead front grounding straps

Mounting the panel, *continued*

Attaching doors

To attach the glass doors (Figure 5-4) to the cabinet, follow the steps below:

1. Align the door hinges with the hinge pins on the back box, and slide the door down onto the hinge pins.
2. Attach the two grounding straps to the back box with the # 6 hex flange nuts. The grounding straps should already be attached to the door.
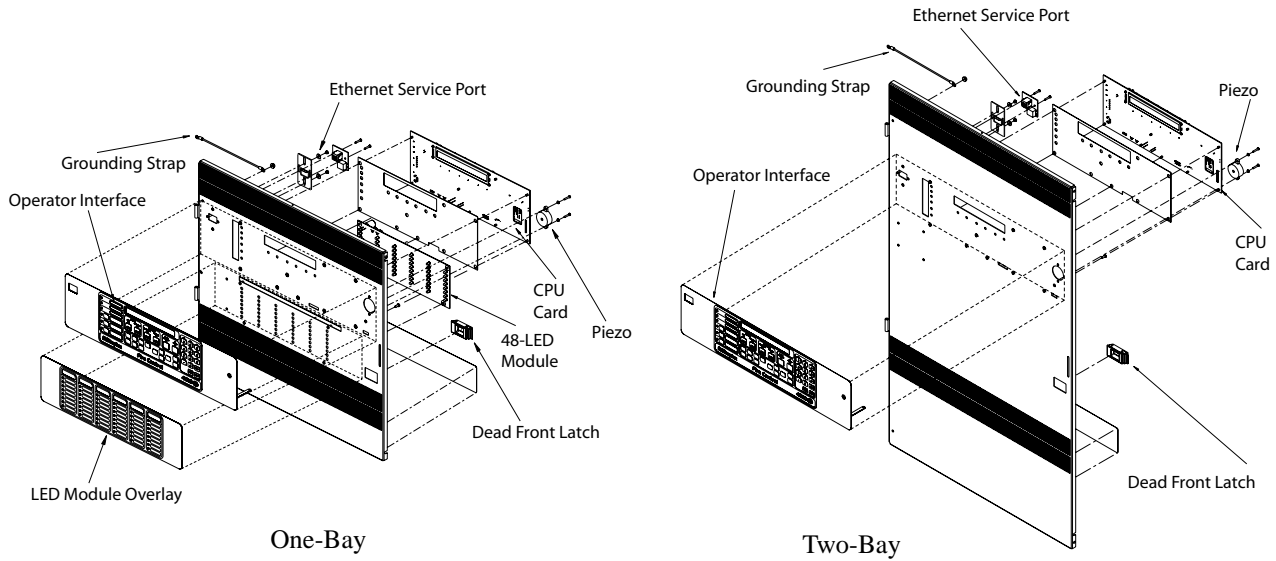
Note: The hinge pins for the glass door are located higher and further to the side than the dead front hinge pins.
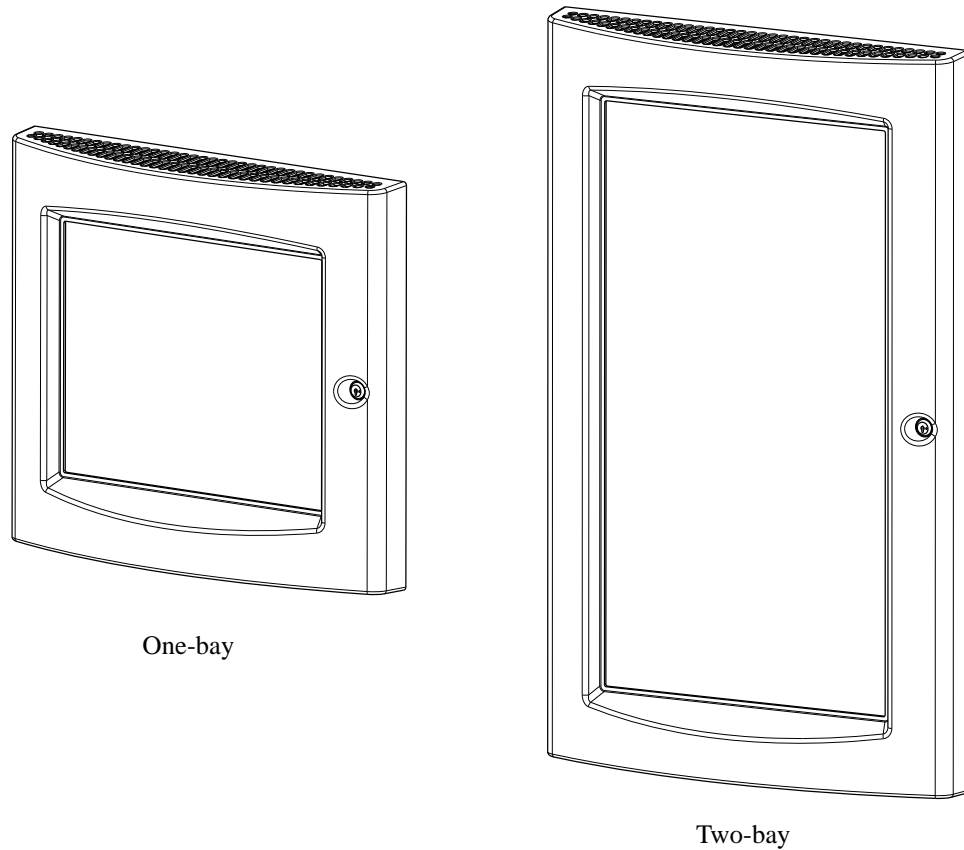
One-bay

Two-bay

Figure 5-4. One-bay and Two-bay glass doors

General field wiring guidelines

Power-limited guidelines

For wiring guidelines, see the applicable installation documentation or contact your authorized Simplex Product supplier. Make sure these guidelines are accounted for before wiring for power-limited systems:

- Non-power limited field wiring (AC power, batteries, city connection) must be installed and routed in the shaded areas shown in Figure 5-5.
- Power-limited field wiring must be installed and routed in the non-shaded areas shown in Figure 5-5, with the exception of city wiring.
- Excess slack should be kept to a minimum inside the back box enclosure. The wiring should be neatly dressed and bundled together using wire ties.
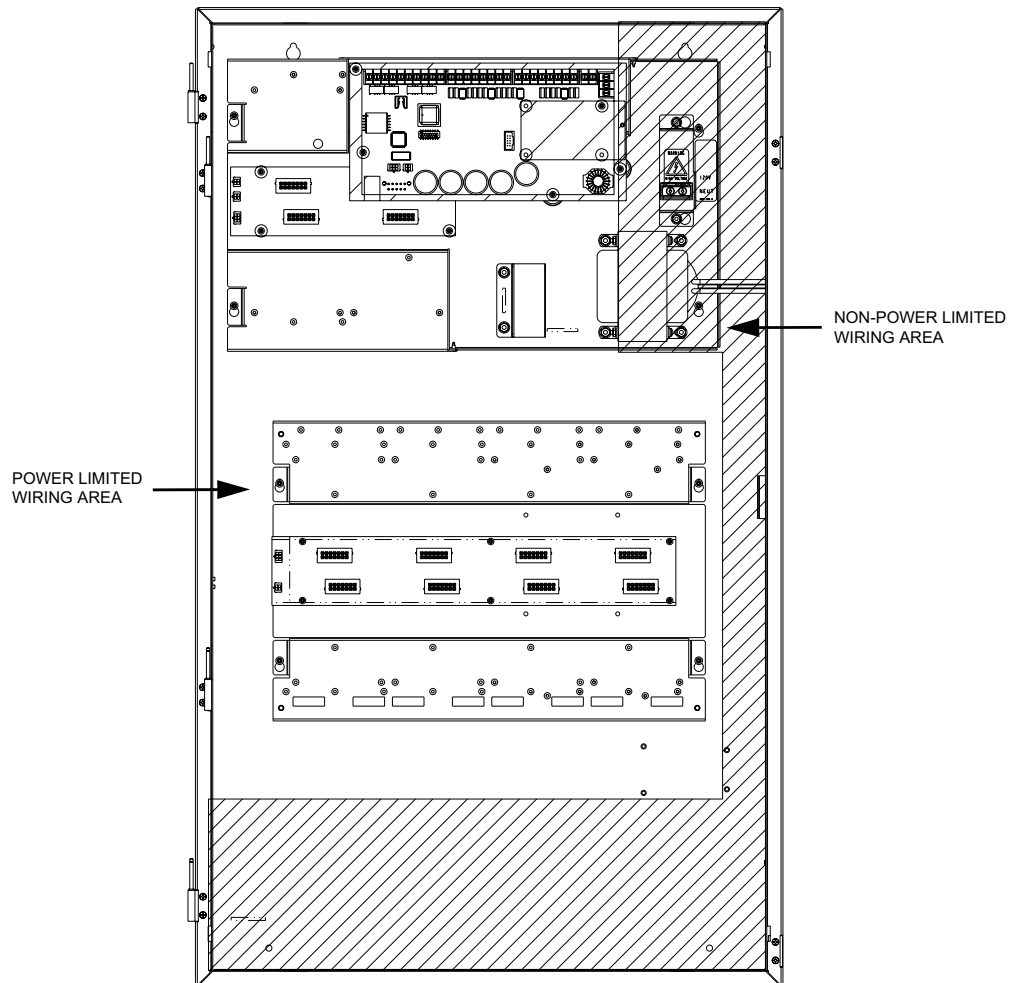
Figure 5-5. Field wiring guidelines

- Tie the wiring located between bays to the internal wiring troughs, if applicable.
- When powering remote units or switching power through relay contacts, power for these circuits must be provided by a power-limited power supply listed for fire-protective signaling use. An EOL relay must be used to supervise the auxiliary power circuit.
- Auxiliary power only: Supervision must be provided if the auxiliary power circuit is to be wired as a power-limited circuit. In order to connect a circuit using power-limited wiring, the devices being powered must all be addressable, or a UL listed EOL relay must be used to supervise the circuit. Refer to Figure 5-6 for wiring directions for the EOL relay.

General field wiring guidelines, *continued*

**Power-limited
guidelines**

Note: The 2098-9739 Relay is
used as an example.
Other UL Listed 24VDC
EOL relays can be used,
depending on the
application.

TO AUX POWER

RED   BLACK

2098-9739
END OF
LINE RELAY

YELLOW

IDC

LAST IDC
DEVICE

RESISTOR
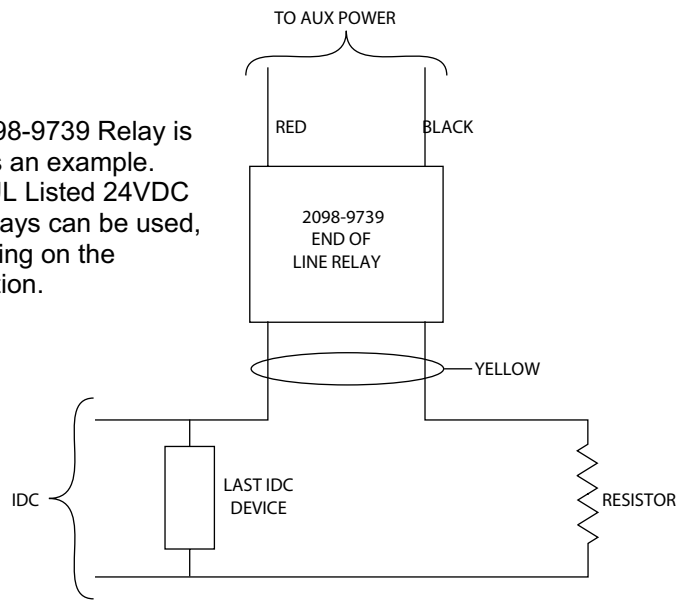
Figure 5-6. The EOL relay

Connecting 4010ES basic components

Connecting the CPU and the operator interface

Note: All the basic components come pre-installed with the system. The connections are shown for reference purposes.

To connect the CPU and the operator interface, follow the steps below:

1. Place the white spacer on the dead front.

2. Attach the CPU card and the piezo to the dead front, using metal screws provided.

3. Attach the **Keypad Membrane** cable of the operator interface to port **P8** on the CPU card (Figure 5-7). To do so:

   a. Slide down the keypad connector shroud on the CPU card.

   b. Insert the **Keypad Membrane** cable into the connector. Do not twist the flat cable.

   c. Slide the shroud back up into the connector while holding the flat cable in place.

4. Attach the Ethernet connection board using the 734-232 RJ45 cable.

5. Attach the perle box using the 734-229 cable.

6. Connect port **P9** or **P10** of the CPU card to the **dead front connection** (**P1**) port on the top-bay power distribution interface (PDI) card (Figure 5-7 and Figure 5-8). Use the 734-008 4-pin connector harness provided.
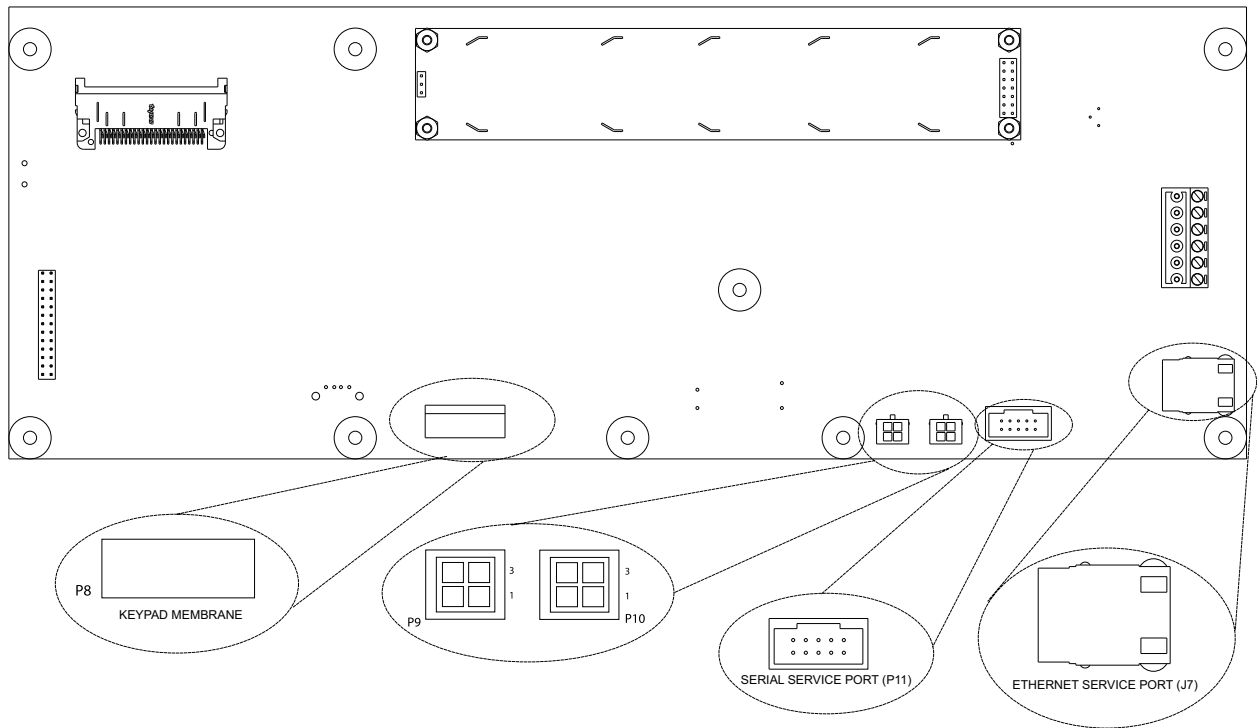
Figure 5-7. CPU card rear view

Continued on next page

Connecting 4010ES basic components, *continued*

**Connecting the
CPU and the
operator interface**

Dead Front Connection (P1)

Pin1 - COMMS+
Pin2 - COMMS-
Pin3 - Card Power+
Pin4 - Card Power-

P1

Top Bay
PDI

MSS

Rectifier

Transformer

Back Box

AC Terminal
Block
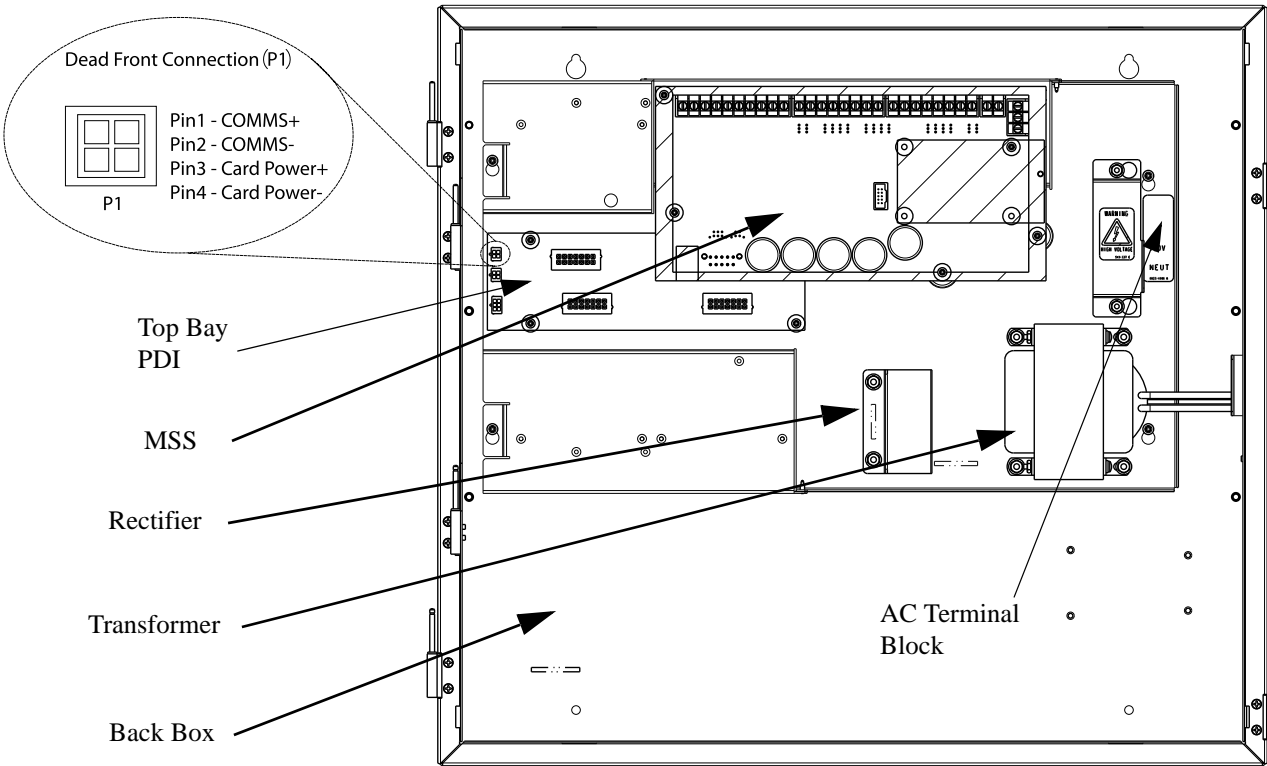
Figure 5-8. Top bay

Connecting 4010ES basic components, *continued*

Connecting the MSS

Follow the steps below:

1. Connect the MSS to the **MSS (Block C)** connector on the Top Bay PDI.
2. Attach the MSS to the back box using metal screws and standoffs.
3. Connect the rectifier to the **Bridge HARN1** connectors on the MSS (Figure 5-9). The red wire connects to the tab labeled "+" on the bridge. The black wire connects to the tab labeled "-" on the rectifier. See Figure 5-8 for the location of the rectifier.
4. Connect the backup batteries to the **Battery** connectors on the MSS. The red wire connects to the tab labeled "RED" on the MSS, the black wire connects to the "BLK" tab. The backup batteries must be wired in series such that you have 24 V. Use the white wire provided to bridge the batteries together. The batteries can be placed on the bottom of the 4010ES back box.

Notes: 1. A fused harness is required to connect the backup batteries. That harness is shipped with the panel. The mating spade lug on the battery should be 0.250 inch x 0.032 inches. If another size is needed, you will need to replace the battery terminal connectors on the supplied battery harness.

    2. One-bay system back boxes support up to 33 Ah batteries. Two-bay system back boxes support up to 50 Ah batteries. If 50 Ah batteries are used, you must also order the 4100-0650 Battery Shelf.

    3. To minimize the power losses due to wiring from the battery box to the 4010ES, use at least a 12 AWG wire and keep the battery box at the minimum distance possible from the 4010ES.
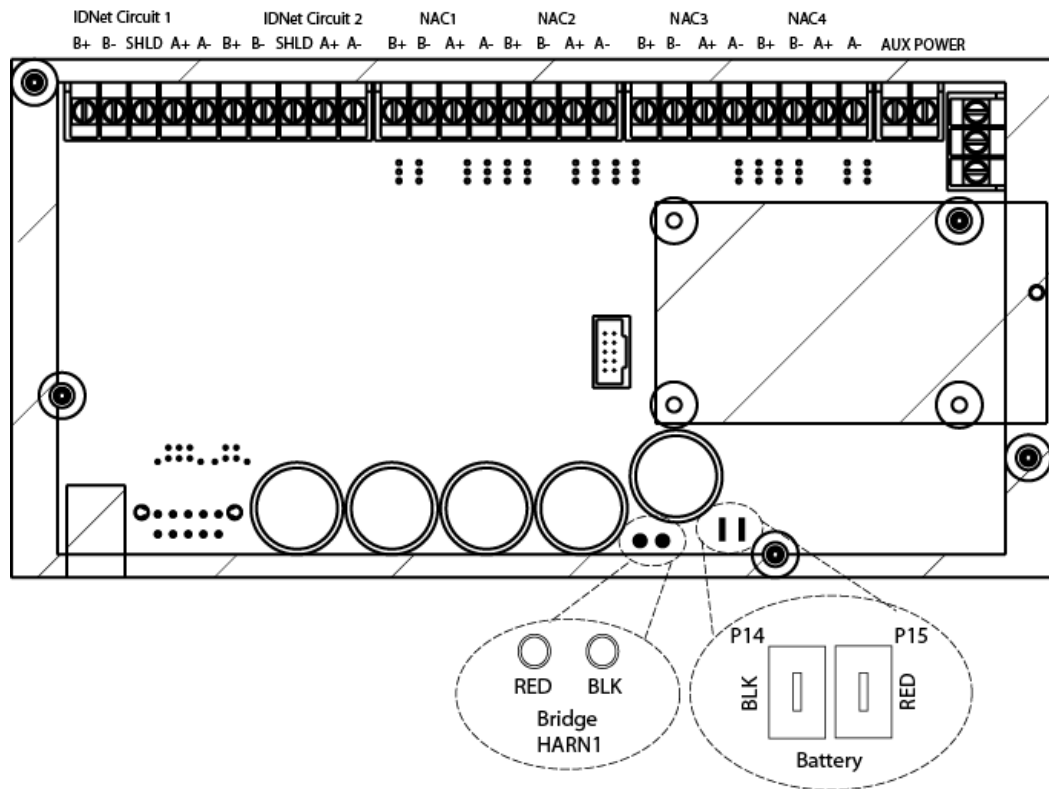
Figure 5-9. MSS Bridge HARN1 connector

Connecting 4010ES basic components, *continued*

Connecting the 48-LED Module

Connect port **P1** or **P2** of the 48-LED Module card to either port **P9** or **P10** of the CPU card (Figure 5-10). Use the 734-181 4-pin connector harness provided.
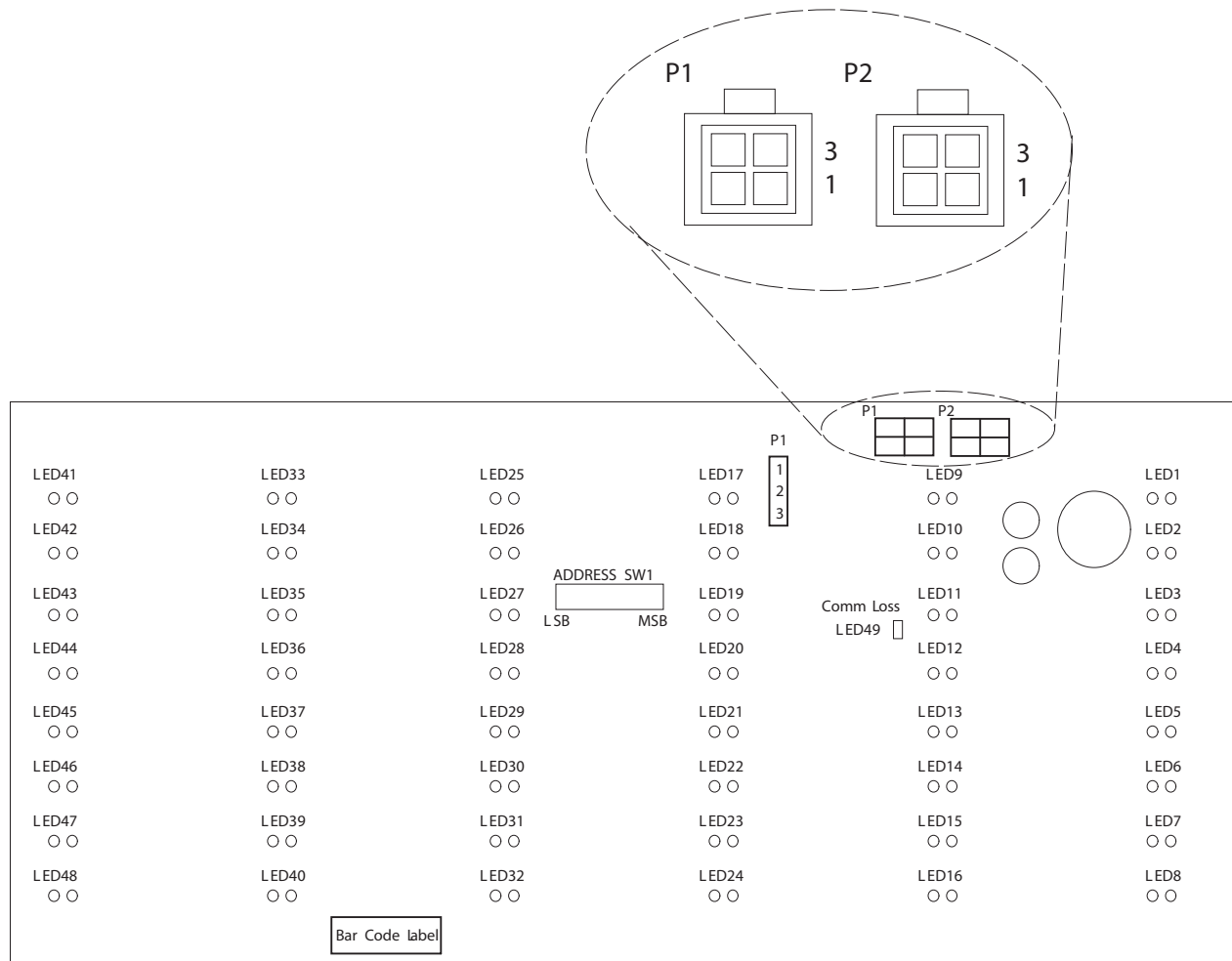
Figure 5-10. 48-LED Module rear view

<u>**Swapping LEDs**</u>

To swap any of the 48 LEDs on the 48-LED Module, follow the steps below:

1. Turn off AC power at the breaker, then remove the battery + connection at the panel.

2. Remove the 48-LED module from the dead front by following the steps below:

    1. Disconnect any cables in **P1** or **P2** of the module
    2. Remove the four screws holding the card to the dead front.
    3. Remove the card from the dead front.

3. Pull out any necessary LEDs from the module.

4. Insert new LEDs in the vacated slots. For correct polarity, the flat line of the LED outline on the card must line up with the flat side on the LED.

5. Re-attach the 48-LED module back on its spot on the dead front.

6. Re-attach the batteries and re-apply AC power to the 4010ES panel.

RUI wiring

Overview
The CPU card's RUI channel supports the following devices:

- 4009T
- 4009 TPS
- 4602 Series RCU/SCU
- 4606-9102 Remote LCD Annunciator
- 4100-7400 Series Graphic Annunciators
- 4100-9400 Series Remote InfoAlarm Command Center

Wire from the CPU card's RUI interface to the RUI terminal block (Figure 5-11). From there, wire to each RUI device. The wiring may be Class A or Class B:

Class A wiring allows devices to communicate with the FACP even in the event of a single open circuit somewhere in the loop. Class A wiring requires that two wires are routed from the CPU card to each device, and then back again to the CPU card.

Class B wiring allows "T" tapping, and therefore requires less wiring distance per installation than Class A.
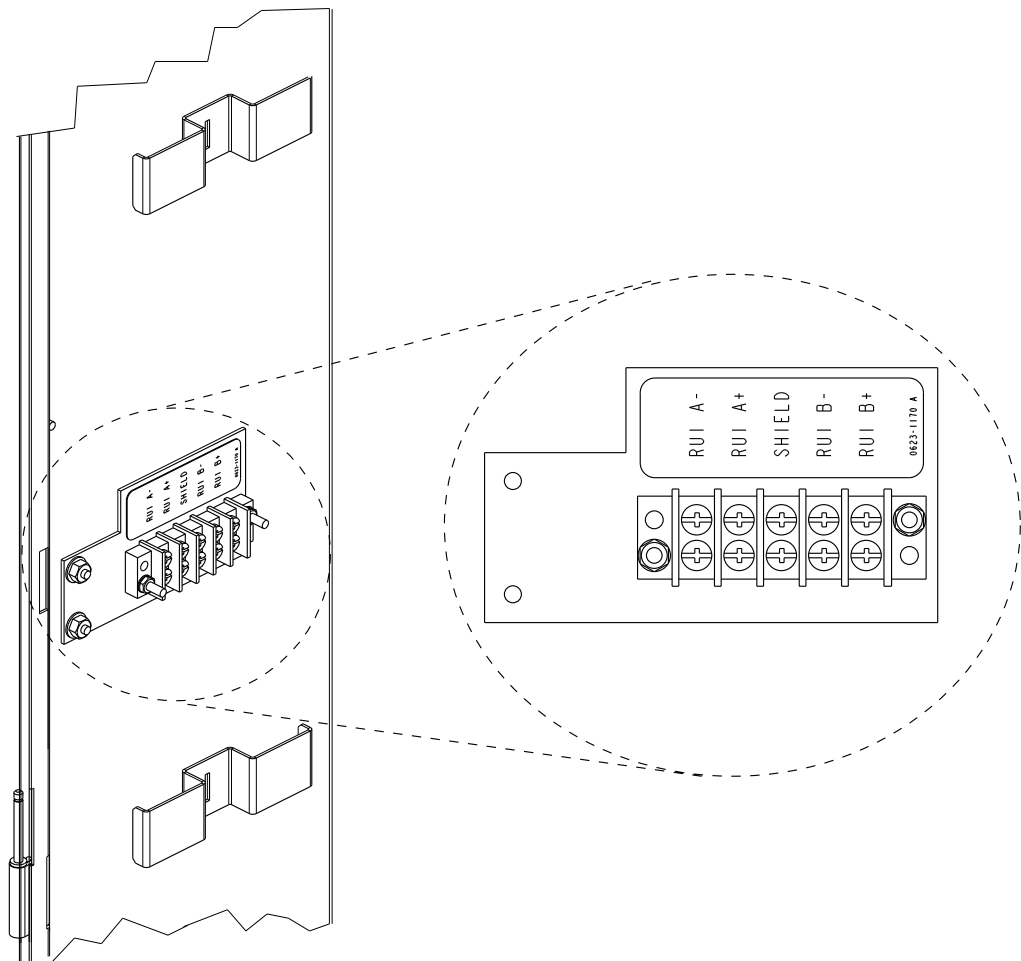
Figure 5-11. Location of the RUI terminal block

RUI wiring, *continued*

Overview   Figure 5-12 depicts Class A and Class B wiring.
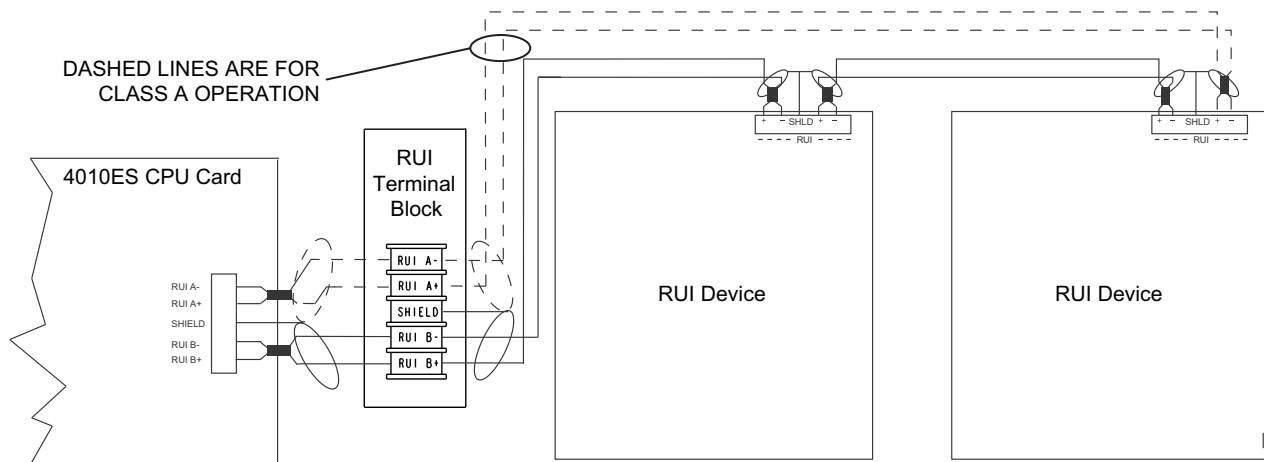
Notes:

1. Wire size must be between 18 AWG (0.8231 mm^2) and 12 AWG (3.309 mm^2).
2. Maximum wiring distance: 2,500 feet (762 m) to device from CPU card.
3. Maximum "T" tapping length: 10,000 feet (3,048 m).
4. Maintain correct polarity on terminal connections. Do not loop wires under terminals.
5. If Class A is not used, leave loop back wires from A+ to B+ and A- to B- on RUI terminal blocks.
6. Shield wire is not required. Twisted wire is recommended for improved noise immunity

Figure 5-12. RUI wiring to the host panel

For more detailed field wiring information on each device, refer to its specific installation instructions manual. See Chapter 4, "Orderable panels and devices," for a list of instruction manuals.

Installing the optional modules

Overview

This page contains the general placement guidelines for the optional modules that can be used with the 4010ES panels. If this information conflicts with the installation instructions for the optional modules, the installation instructions take precedence. Refer to Table 4-3 in Chapter 4, "Orderable panels and devices," for a list of these installation instructions.

In addition to basic system components, the 4010ES panel has space on the PDI to accommodate the following option card configurations:

1. One Two-Block 4 inch x 10 inch option card (such as a NIC or a SafeLINC card) and one 4 inch x 5 inch option card.
or
2. Three 4 inch x 5inch single-block option cards.

If the system is a two-bay system, an eight-block PDI card in the second bay allows for additional mounting space beyond the three blocks in the top bay.

Note: Some systems come with option cards pre-installed. In these cases, the number of available option card blocks is reduced. See the PID list table in Chapter 4 for details.

Installing one-block and two-block cards

The PDI cards are mounted to the back of each bay and carry power and data across all bays.

Use the following instructions and Figure 5-13 to mount cards into a 4010ES panel bay

1. Screw standoffs and washers to the appropriate holes in the back of the cabinet. These holes must line up with the screw holes in the card.
2. Plug the card into the appropriate blind mating connector. Seat the card firmly onto the PDI when installing to ensure complete insertion of the power connector into the PDI.
3. Secure the card to the standoffs with screws and washers.
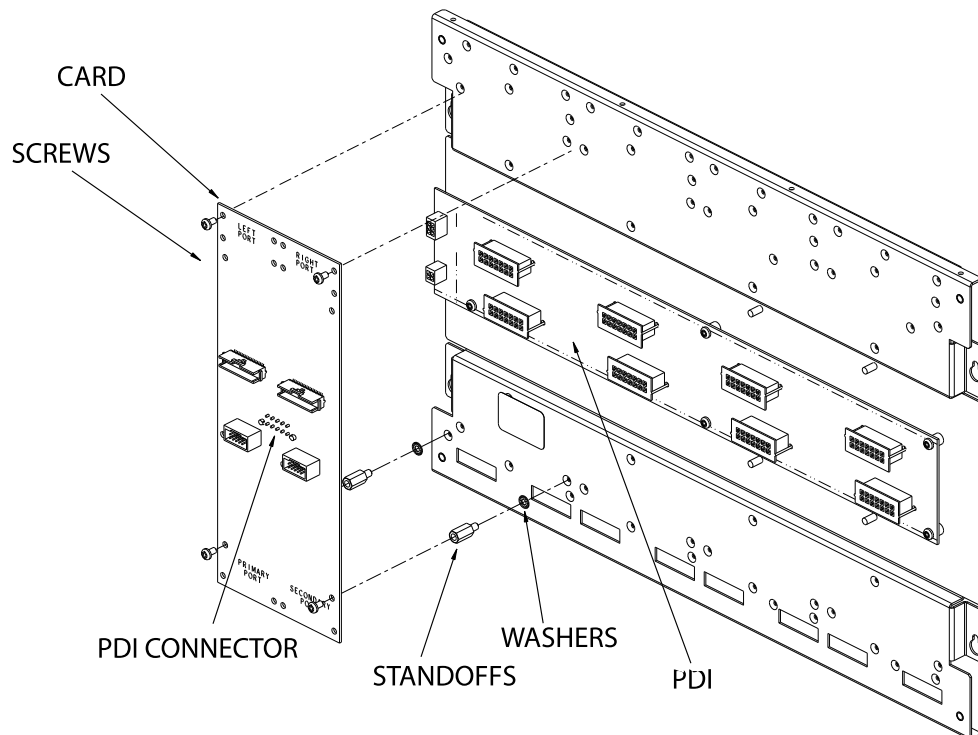
Figure 5-13. Card connection to a PDI

Address configuration DIP switch

Overview   Addressable cards include a bank of eight DIP switches. From left to right (Figure 5-14) these switches are designated as SWx-1 through SWx-8. The function of these switches is as follows:

- SWx-1. This switch sets the baud rate for the internal 4010ES communications line running between the card and the CPU. Set this switch to ON.
- SWx-2 through SWx-8. These switches set the card's address within the 4010ES FACP. Refer to Table 5-1 for a complete list of the switch settings for all of the possible card addresses.

Note: You must set these switches to the value assigned to the card by the ES Panel Programmer.

4100 Comm. Baud Rate.
Switch (SWx-1)
Must Be Set to ON

DIP Switches SWx-2 through SWx-8 set the Card Address. Figure shows an Address of 3.

ON

OFF

1 2 3 4 5 6 7 8

Figure 5-14. DIP switch SWx

Continued on next page

Overview

Table 5-1. Card addresses

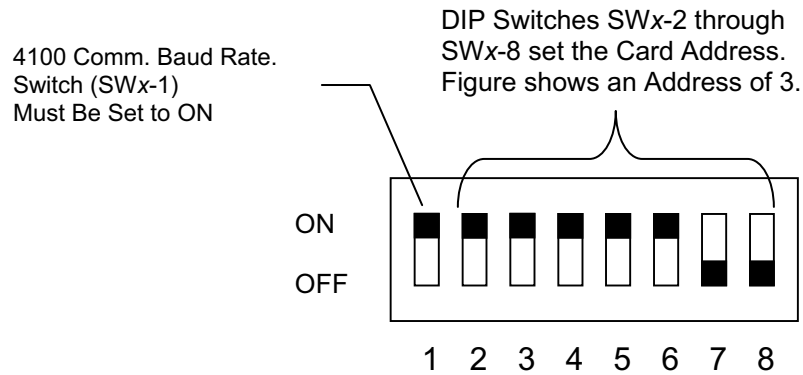| Address	SW 1-2	SW 1-3	SW 1-4	SW 1-5	SW 1-6	SW 1-7	SW 1-8	Address	SW 1-2	SW 1-3	SW 1-4	SW 1-5	SW 1-6	SW 1-7	SW 1-8
1	ON	ON	ON	ON	ON	ON	OFF	61	ON	OFF	OFF	OFF	OFF	ON	OFF
2	ON	ON	ON	ON	ON	OFF	ON	62	ON	OFF	OFF	OFF	OFF	OFF	ON
3	ON	ON	ON	ON	ON	OFF	OFF	63	ON	OFF	OFF	OFF	OFF	OFF	OFF
4	ON	ON	ON	ON	OFF	ON	ON	64	OFF	ON	ON	ON	ON	ON	ON
5	ON	ON	ON	ON	OFF	ON	OFF	65	OFF	ON	ON	ON	ON	ON	OFF
6	ON	ON	ON	ON	OFF	OFF	ON	66	OFF	ON	ON	ON	ON	OFF	ON
7	ON	ON	ON	ON	OFF	OFF	OFF	67	OFF	ON	ON	ON	ON	OFF	OFF
8	ON	ON	ON	OFF	ON	ON	ON	68	OFF	ON	ON	ON	OFF	ON	ON
9	ON	ON	ON	OFF	ON	ON	OFF	69	OFF	ON	ON	ON	OFF	ON	OFF
10	ON	ON	ON	OFF	ON	OFF	ON	70	OFF	ON	ON	ON	OFF	OFF	ON
11	ON	ON	ON	OFF	ON	OFF	OFF	71	OFF	ON	ON	ON	OFF	OFF	OFF
12	ON	ON	ON	OFF	OFF	ON	ON	72	OFF	ON	ON	OFF	ON	ON	ON
13	ON	ON	ON	OFF	OFF	ON	OFF	73	OFF	ON	ON	OFF	ON	ON	OFF
14	ON	ON	ON	OFF	OFF	OFF	ON	74	OFF	ON	ON	OFF	ON	OFF	ON
15	ON	ON	ON	OFF	OFF	OFF	OFF	75	OFF	ON	ON	OFF	ON	OFF	OFF
16	ON	ON	OFF	ON	ON	ON	ON	76	OFF	ON	ON	OFF	OFF	ON	ON
17	ON	ON	OFF	ON	ON	ON	OFF	77	OFF	ON	ON	OFF	OFF	ON	OFF
18	ON	ON	OFF	ON	ON	OFF	ON	78	OFF	ON	ON	OFF	OFF	OFF	ON
19	ON	ON	OFF	ON	ON	OFF	OFF	79	OFF	ON	ON	OFF	OFF	OFF	OFF
20	ON	ON	OFF	ON	OFF	ON	ON	80	OFF	ON	OFF	ON	ON	ON	ON
21	ON	ON	OFF	ON	OFF	ON	OFF	81	OFF	ON	OFF	ON	ON	ON	OFF
22	ON	ON	OFF	ON	OFF	OFF	ON	82	OFF	ON	OFF	ON	ON	OFF	ON
23	ON	ON	OFF	ON	OFF	OFF	OFF	83	OFF	ON	OFF	ON	ON	OFF	OFF
24	ON	ON	OFF	OFF	ON	ON	ON	84	OFF	ON	OFF	ON	OFF	ON	ON
25	ON	ON	OFF	OFF	ON	ON	OFF	85	OFF	ON	OFF	ON	OFF	ON	OFF
26	ON	ON	OFF	OFF	ON	OFF	ON	86	OFF	ON	OFF	ON	OFF	OFF	ON
27	ON	ON	OFF	OFF	ON	OFF	OFF	87	OFF	ON	OFF	ON	OFF	OFF	OFF
28	ON	ON	OFF	OFF	OFF	ON	ON	88	OFF	ON	OFF	OFF	ON	ON	ON
29	ON	ON	OFF	OFF	OFF	ON	OFF	89	OFF	ON	OFF	OFF	ON	ON	OFF
30	ON	ON	OFF	OFF	OFF	OFF	ON	90	OFF	ON	OFF	OFF	ON	OFF	ON
31	ON	ON	OFF	OFF	OFF	OFF	OFF	91	OFF	ON	OFF	OFF	ON	OFF	OFF
32	ON	OFF	ON	ON	ON	ON	ON	92	OFF	ON	OFF	OFF	OFF	ON	ON
33	ON	OFF	ON	ON	ON	ON	OFF	93	OFF	ON	OFF	OFF	OFF	ON	OFF
34	ON	OFF	ON	ON	ON	OFF	ON	94	OFF	ON	OFF	OFF	OFF	OFF	ON
35	ON	OFF	ON	ON	ON	OFF	OFF	95	OFF	ON	OFF	OFF	OFF	OFF	OFF
36	ON	OFF	ON	ON	OFF	ON	ON	96	OFF	OFF	ON	ON	ON	ON	ON
37	ON	OFF	ON	ON	OFF	ON	OFF	97	OFF	OFF	ON	ON	ON	ON	OFF
38	ON	OFF	ON	ON	OFF	OFF	ON	98	OFF	OFF	ON	ON	ON	OFF	ON
39	ON	OFF	ON	ON	OFF	OFF	OFF	99	OFF	OFF	ON	ON	ON	OFF	OFF
40	ON	OFF	ON	OFF	ON	ON	ON	100	OFF	OFF	ON	ON	OFF	ON	ON
41	ON	OFF	ON	OFF	ON	ON	OFF	101	OFF	OFF	ON	ON	OFF	ON	OFF
42	ON	OFF	ON	OFF	ON	OFF	ON	102	OFF	OFF	ON	ON	OFF	OFF	ON
43	ON	OFF	ON	OFF	ON	OFF	OFF	103	OFF	OFF	ON	ON	OFF	OFF	OFF
44	ON	OFF	ON	OFF	OFF	ON	ON	104	OFF	OFF	ON	OFF	ON	ON	ON
45	ON	OFF	ON	OFF	OFF	ON	OFF	105	OFF	OFF	ON	OFF	ON	ON	OFF
46	ON	OFF	ON	OFF	OFF	OFF	ON	106	OFF	OFF	ON	OFF	ON	OFF	ON
47	ON	OFF	ON	OFF	OFF	OFF	OFF	107	OFF	OFF	ON	OFF	ON	OFF	OFF
48	ON	OFF	OFF	ON	ON	ON	ON	108	OFF	OFF	ON	OFF	OFF	ON	ON
49	ON	OFF	OFF	ON	ON	ON	OFF	109	OFF	OFF	ON	OFF	OFF	ON	OFF
50	ON	OFF	OFF	ON	ON	OFF	ON	110	OFF	OFF	ON	OFF	OFF	OFF	ON
51	ON	OFF	OFF	ON	ON	OFF	OFF	111	OFF	OFF	ON	OFF	OFF	OFF	OFF
52	ON	OFF	OFF	ON	OFF	ON	ON	112	OFF	OFF	OFF	ON	ON	ON	ON
53	ON	OFF	OFF	ON	OFF	ON	OFF	113	OFF	OFF	OFF	ON	ON	ON	OFF
54	ON	OFF	OFF	ON	OFF	OFF	ON	114	OFF	OFF	OFF	ON	ON	OFF	ON
55	ON	OFF	OFF	ON	OFF	OFF	OFF	115	OFF	OFF	OFF	ON	ON	OFF	OFF
56	ON	OFF	OFF	OFF	ON	ON	ON	116	OFF	OFF	OFF	ON	OFF	ON	ON
57	ON	OFF	OFF	OFF	ON	ON	OFF	117	OFF	OFF	OFF	ON	OFF	ON	OFF
58	ON	OFF	OFF	OFF	ON	OFF	ON	118	OFF	OFF	OFF	ON	OFF	OFF	ON
59	ON	OFF	OFF	OFF	ON	OFF	OFF	119	OFF	OFF	OFF	ON	OFF	OFF	OFF
60	ON	OFF	OFF	OFF	OFF	ON	ON								

Connecting main system power

Overview
The 4010ES panel is shipped with the AC block, the transformer, and the rectifier already interconnected. You only need to wire the AC block to the main power line. The ground wire on the power line connects to a screw, located on the top right back box (Figure 5-15). The other wires connect to the AC terminal block, as indicated by the labels (Figure 5-16).
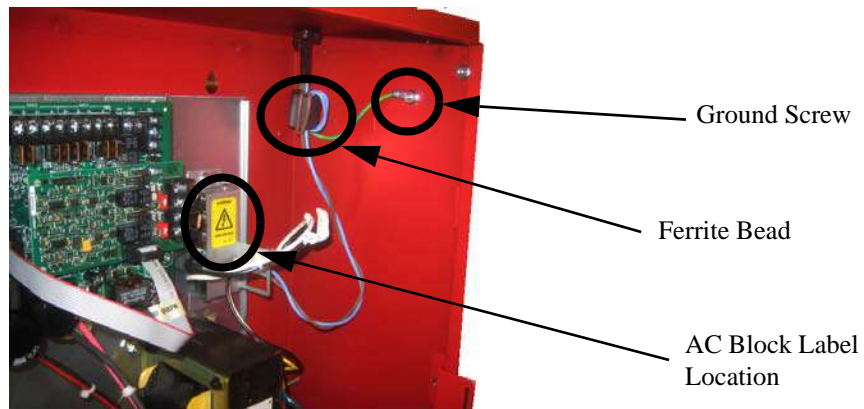

Figure 5-15. Grounding wire

Connect the "hot" wire to the appropriate voltage, depending on your installation.

The neutral wire always connects to the lowest terminal.
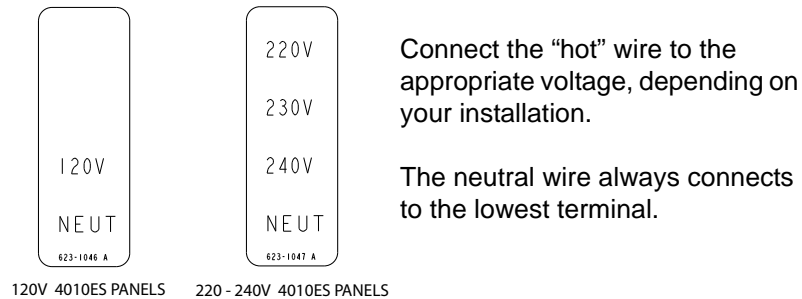
Figure 5-16. AC Block labels for AC power connections

Note: In 220-240 V panels, the 4010ES requires a true transformer output of 220-240 V. Do not connect two out of phase "hot" wires to create the desired voltage.

When connecting the AC power wire to the AC block, it needs to pass through a ferrite bead to reduce radiated emissions. Route the black and white AC power wires to the supplied ferrite bead. Loop the wires twice through the bead and secure with two cable ties as shown in Figure 5-17. The cable ties are supplied in the ship group that comes with the panel.
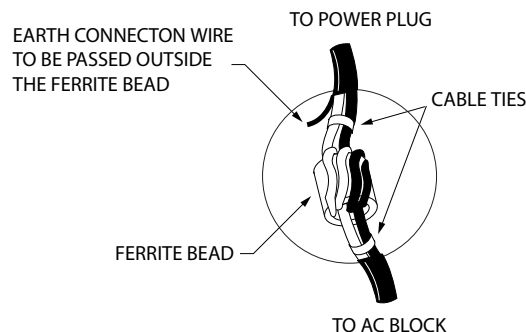
Figure 5-17. AC power line ferrite bead

Panel power-up sequence
Follow the steps below to power-up the 4010ES panel:

1. Connect the negative (-) connector on the battery.
2. Connect the positive (+) connector on the battery.
3. Apply AC power.

Chapter 6

MSS field wiring

Introduction   This chapter shows how 4010ES devices are wired to notification appliances. Most of the connections shown here are reverse-polarity NACs, IDNet circuits, and power circuits.

In this chapter   This chapter covers the following topics:

Power supply wiring distances

Overview   Before wiring from any type of power supply to notification appliances, check Tables 6-1 and 6-2 for wiring distances.

Class A NAC wiring table   Table 6-1 lists the maximum distances from the NAC terminal block to the last appliance in a Class A configuration, depending on wire gauge and current. Use Table 6-1 to calculate wire distances for your application if you are using Class A wiring.

Table 6-1. Class A wiring distances

Alarm current @ 24 VDC	Max distance w/ 18 AWG (0.8231 mm^2)	Max distance w/ 16 AWG (1.309 mm^2)	Max distance w/ 14 AWG (2.081 mm^2)	Max distance w/ 12 AWG (3.309 mm^2)	DC resistance
0.25 A	420 ft (128 m)	667 ft (203 m)	1,063 ft (324 m)	1,691 ft (515 m)	6 Ohms
0.50 A	210 ft (64 m)	334 ft (102 m)	532 ft (162 m)	845 ft (258 m)	3 Ohms
0.75 A	140 ft (43 m)	222 ft (68 m)	354 ft (108 m)	564 ft (172 m)	2 Ohms
1.00 A	105 ft (32m)	167 ft (51 m)	266 ft (81 m)	423 ft (129 m)	1.5 Ohms
1.25 A	84 ft (26 m)	133 ft (41 m)	213 ft (65 m)	338 ft (103 m)	1.2 Ohms
1.50 A	70 ft (21 m)	111 ft (34 m)	177 ft (54 m)	282 ft (86 m)	1 Ohm
1.75 A	60 ft (18 m)	95 ft (29 m)	152 ft (46 m)	242 ft (74 m)	0.86 Ohm
2.00 A	53 ft (16 m)	83 ft (25 m)	133 ft (41 m)	211 ft (64 m)	0.75 Ohm
2.25 A	47 ft (14 m)	74 ft (23 m)	118 ft (36 m)	188 ft (57 m)	0.67 Ohm
2.50 A	42 ft (13 m)	67 ft (20 m)	106 ft (32 m)	169 ft (51 m)	0.60 Ohm
2.75 A	38 ft (12 m)	61 ft (19 m)	97 ft (30 m)	154 ft (47 m)	0.55 Ohm
3.00 A	35 ft (11 m)	56 ft (17 m)	89 ft (27 m)	141 ft (43 m)	0.50 Ohm

Note:

- Max distance = distance from MSS to last appliance.
- This table is calculated at 49 $^\circ$C (120 $^\circ$F). If you are installing in locations that could be exposed to higher temperatures, refer to NEC Table 8.
- Distances are based on a 3V drop, and take into account the worst-case panel output voltage.
- If circuit integrity wire is used instead of housing cable in a fire-rated enclosure, reduce wiring distances by 38 ft (12 m) for every 10 ft (3 m) of potential exposure.

Power supply wiring distances, *continued*

**Class B NAC
wiring table**

Table 6-2 lists the maximum distances from the NAC terminal block to the last appliance in a Class B configuration, depending on wire gauge and current. Use Table 6-2 to calculate wire distances for your application if you are using Class B wiring.

Table 6-2. Class B wiring distances

Alarm current @ 24 VDC	Max distance w/ 18 AWG (0.8231 mm^2)	Max distance w/ 16 AWG (1.309 mm^2)	Max distance w/ 14 AWG (2.081 mm^2)	Max distance w/ 12 AWG (3.309 mm^2)	DC resistance
0.25 A	840 ft (256 m)	1,335 ft (407 m)	2,126 ft (648 m)	3,382 ft (1,031 m)	12 Ohms
0.50 A	420 ft (128 m)	667 ft (203 m)	1,063 ft (324 m)	1,691 ft (515 m)	6 Ohms
0.75 A	280 ft (85 m)	445 ft (136 m)	709 ft (216 m)	1,127 ft (344 m)	4 Ohms
1.00 A	210 ft (64 m)	334 ft (102 m)	532 ft (162 m)	845 ft (258 m)	3 Ohms
1.25 A	168 ft (51 m)	267 ft (81 m)	425 ft (130 m)	676 ft (206 m)	2.4 Ohms
1.50 A	140 ft (43 m)	222 ft (68 m)	354 ft (108 m)	564 ft (172 m)	2 Ohms
1.75 A	120 ft (37 m)	191 ft (58 m)	304 ft (93 m)	483 ft (147 m)	1.71 Ohms
2.00 A	105 ft (32 m)	167 ft (51 m)	266 ft (81 m)	423 ft (129 m)	1.5 Ohms
2.25 A	93 ft (28 m)	148 ft (45 m)	236 ft (72 m)	376 ft (115 m)	1.33 Ohms
2.50 A	84 ft (26 m)	133 ft (41 m)	213 ft (65 m)	338 ft (103 m)	1.2 Ohms
2.75 A	76 ft (23 m)	121 ft (37 m)	193 ft (59 m)	307 ft (94 m)	1.09 Ohms
3.00 A	70 ft (21 m)	111 ft (34 m)	177 ft (54 m)	282 ft (86 m)	1 Ohm

Note:

- Max distance = distance from MSS to last appliance.
- This table is calculated at 49 ^{o}C (120 ^{o}F). If you are installing in locations that could be exposed to higher temperatures, refer to NEC Table 8.
- Distances are based on a 3V drop, and take into account the worst-case panel output voltage.
- If circuit integrity wire is used instead of housing cable in a fire rated enclosure, reduce wiring distances by 38 ft (12 m) for every 10 ft (3 m) of potential exposure.

MSS NAC field wiring guidelines

Guidelines   Review the following guidelines for NACs before you begin NAC field wiring.

- All wiring is 18 AWG (0.8231 mm^2) minimum to 12 AWG (3.309 mm^2) maximum.
- All wiring is supervised and power-limited.
- The maximum alarm current is 3 A per circuit. The supervisory current is 2.03 mA at 24 VDC.
- When NACs are used for **regulated** notification appliances, maximum current per NAC is reduced to 2 A.
- The nominal voltage rating is 24 VDC, 2 Vp-p ripple maximum.
- The total available current from the MSS is 8 A, unless it is used for **regulated**.
- 24 VDC notification appliances, where the MSS is rated for 4 A notification. Any current used for card power by modules plugged into the PDI, as well as any auxiliary 24 VDC current, must be deducted from the total available current.
- Terminal designations "+" and "-" are for the alarm state.
- Compatible TrueAlert non-addressable appliances for NACs are:
    - 4901-series Horn[1]
    - 4903-series A/V[1]
    - 4903-series S/V [1]
    - 4904-series V/O [1]
    - 4906-Multi-Candela series A/V, V/O, S/V, and others.[1]
    - 49CMT-series, Multi-Tone[2]
    - 49CMTV-series, Multi-Tone/Multi-Candela[2]

        Note 1. A maximum of 70 appliances can be supported per circuit.

        Note 2. Each 49CMT and 49CMTV series appliance counts as 5 regular appliances, therefore no more than thirteen 49CMT or 49CMTV series appliances may be placed on one circuit.
- Notification appliances are rated per individual nameplate label.
- Maintain correct polarity on terminal connections. Do not loop wires under terminals.

MSS NAC wiring

Class A NAC Wiring

To connect the MSS to reverse-polarity, non-addressable notification appliances using Class A wiring, read the instructions below and refer to Figure 6-2.

1. When connecting the NAC wires to the terminal block, they need to pass through a ferrite bead to reduce radiated emissions. Route the wires to the supplied ferrite bead. Loop the wires twice through the bead and secure with two cable ties as shown in Figure 6-1. The cable ties are supplied in the panel's ship group.
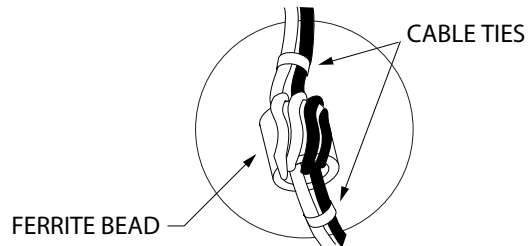

Figure 6-1. NAC ferrite bead wiring

2. Route wire (between 12 AWG [3.309 mm^2] and 18 AWG [0.8231 mm^2]) from the "B+", "B-", and SHIELD (if used) outputs on TB2 of the MSS to the appropriate inputs on a peripheral notification appliance. Use NAC1, NAC2, NAC3 or NAC4.
3. Route wire from the first appliance to the next one. Repeat for each appliance.
4. Route wire from the last appliance to the A+ and A- inputs on the same NAC circuit of TB1 of the MSS.
5. Repeat steps 1 through 4 for each NAC output you want to use.
6. Leave the 10 KOhms, ½ W, brown/black/orange resistor (378-030) on each unused circuit. The circuit must connect "B+" to "B-" terminals. No external end-of-line resistor is needed for circuits in use.

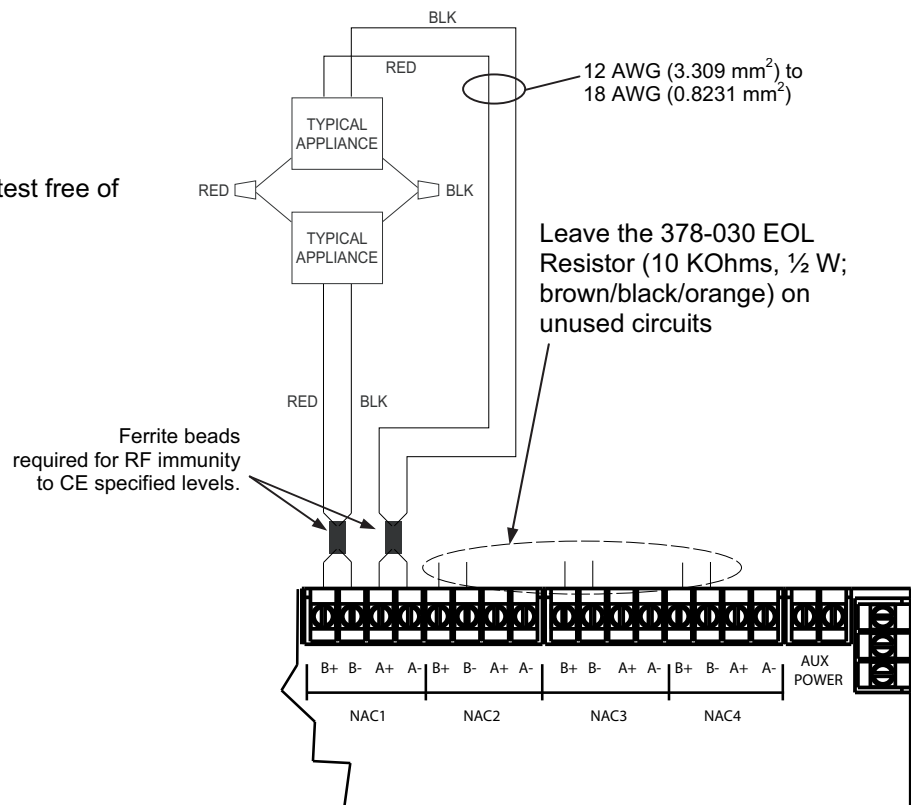**Important:** Conductors must test free of all grounds.

Figure 6-2. Class A NAC wiring

6-5

Class B NAC wiring

To connect the MSS to appliances using Class B wiring, read the following instructions and refer to Figure 6-3.

1. When connecting the NAC wires to the terminal block, they need to pass through a ferrite bead to reduce radiated emissions. Route the wires to the supplied ferrite bead. Loop the wires twice through the bead and secure with two cable ties as shown in Figure 6-1. The cable ties are supplied in the panel's ship group.

2. Route wire (between 12 AWG [3.309 mm^2] and 18 AWG [0.8231 mm^2]) from the B+, B-, and SHIELD outputs on TB2 of the MSS to the appropriate inputs on a peripheral notification appliance. Use NAC1, NAC2, NAC3 or NAC4.

3. Route wire from the first appliance to the next one. "T" tapping is not allowed. Repeat for each appliance.

4. Route wire from the last appliance to the EOLR harness (10KOhms, 1/2 W: P/N 733-894, PID# 4081-9008).

5. Repeat steps 1 through 4 for each NAC output you want to use.

6. Leave the factory installed EOL Resistor (10K Ohms, ½ W; brown/black/orange) on each unused circuit. The circuit must connect "B+" to "B-" terminals.
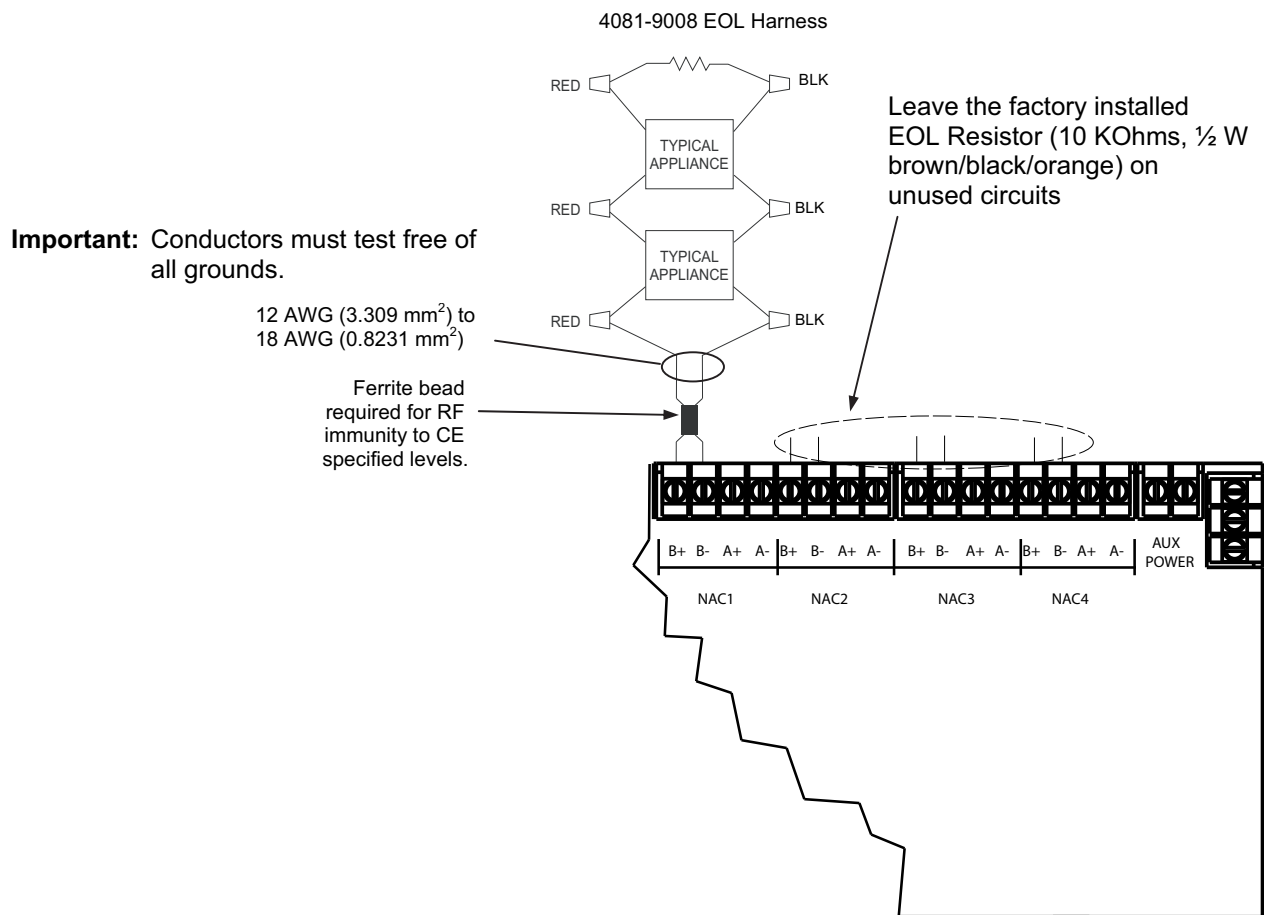

Figure 6-3. Class B wiring

MSS IDNet wiring

Overview   A single IDNet+ channel is provided that can connect up to 248 IDNet devices. The IDNet+ channel has 2 isolated circuits that support either Class A or Class B wiring. Typical devices include smoke and heat sensors, QuickConnect sensors and a variety of addressable input and/ or output modules. Refer to datasheet S4090-0011 for a list of compatible IDNet devices.

Class A wiring provides an alternate communication path that provides communications to all devices when a single open circuit fault occurs. Class A wiring requires two wires to be routed from the IDNet+ Primary Terminals (B+, B-) to each IDNet device, and then back to the IDNet+ Secondary Terminals (A+, A-).

Note: Wiring is in/out. "T" tapping is not allowed.

Class B wiring allows "T" tapping, and typically results in less wiring used per installation compared to Class A. IDNet wiring is inherently supervised due to individual device level communications, and end-of-line resistors are not required.

Wiring parameters   Table 6-3 identifies the MSS with IDNet wiring parameters that must be considered when applying this module. For additional wiring information, see the applicable installation documentation or contact your authorized Simplex Product supplier.

Table 6-3. MSS IDNet wiring parameters

IDNet wiring capacitance parameters			
Parameter		**Value**	
Maximum supported channel capacitance; **Total of both isolated outputs**		The sum of line-to-line capacitance, plus the capacitance of either line-to-shield (if shield is present) = 0.6 µF (600 nF)	
Capacitance between IDNet+ SLCs wiring (between wires of the same polarity; plus to plus, minus to minus)		1 µF maximum (this is for multiple IDNet+ channels)	
IDNet+ wiring distance limits (see notes below)			
Channel loading	**Class B wiring, total channel wiring parameters, including T-Taps**		**Class A wiring, total channel wiring parameters**
	Up to 125 devices	**126 to 248 devices**	**Up to 125 devices**	**126 to 248 devices**
Total loop resistance	**50 Ω maximum**	**35 Ω maximum**	**50 Ω maximum**	**35 Ω maximum**
18 AWG (0.82 mm^2)	12,500 ft (3.8 km)		4000 ft (1219 m)	2500 ft (76 2m)
16 AWG (1.31 mm^2)	12,500 ft (3.8 km)		5000 ft (1524 m)	2500 ft (762 m)
14 AWG (2.08 mm^2)	12,500 ft (3.8 km)		5000 ft (1524 m)	2500 ft (762 m)
12 AWG (3.31 mm^2)	12,500 ft (3.8k m)		5000 ft (1524 m)	2500 ft (762 m)

Notes: Maximum wiring distance is determined by either reaching the maximum resistance, the maximum capacitance, or the stated maximum distance, whichever occurs first. Class A maximum distances are to the farthest device on the loop from either "B" or "A" terminals. For Class B wiring, the maximum distance to the farthest device is limited to the stated Class A wiring distances.

|	
IDNet+ wiring considerations using 2081-9044 Overvoltage Protectors (2081-9044 is UL listed to Standard 60950-1, *Standard for Safety of Information Technology Equipment*)	**Note:** External wiring must be shielded for lightning suppression, and 2081-9044 Overvoltage Protectors must be installed at building exit and entrance locations.
	Capacitance; each protector adds 0.006µF across the connected line.
	Resistance; each protector adds 3 Ω per line of series resistance; both IDNet lines are protected; 6 Ω per protector will be added to total loop resistance.
	Maximum distance of a single protected wiring run is 3270 ft (1 km).
	Refer to document number 574-832, 2081-9044 *Overvoltage Protector Installation Instructions*, for additional information.

Class A wiring   To connect the MSS with an IDNet+ channel to devices using Class A wiring, read the following instructions and refer to Figure 6-4:

1. Route wiring from the IDNet Circuit Primary Terminals (B+, B-), and SHIELD terminals on TB1 of the IDNet+ module to the appropriate inputs on the first IDNet device.

Note: Shielded wiring is optional. SHIELD terminations are connected to earth.

2. Route wiring from the first IDNet device to the next as in/out as shown in Figure 6-4. Repeat for each device.
3. Route wiring from the last IDNet device to the IDNet Circuit Secondary Terminals (A+, A) and SHIELD Terminals (if used) on TB1 of the IDNet+ module.
4. Ensure that circuit jumpers are configured for Class A operation.
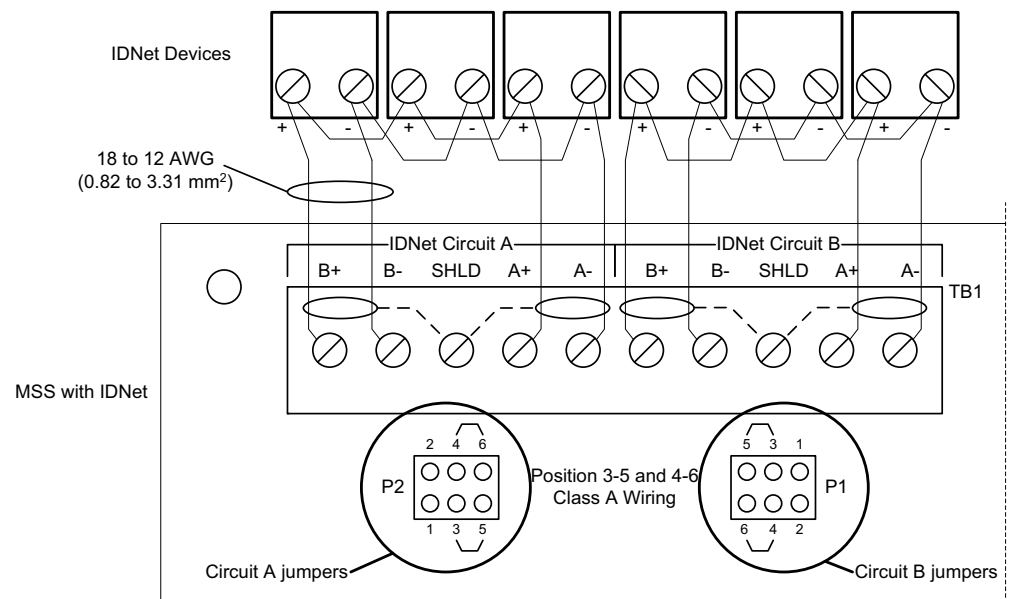
Figure 6-4. Class A wiring

Note: There are two considerations for addressing Class A wired IDNet devices connected to the IDNet+ module:

1. If no remote isolators or isolator bases are on the loops, device addressing can be assigned without concern for sequence.

2. **If remote isolators or isolator bases are on the loops**, the required addressing approach is to start from the "B" side of the A loop output and assign each successive isolator a higher address than the isolator it proceeds. Follow this sequencing through to the "B" side of the B loop.

Class B wiring   Class B wiring requires the configuration jumpers to be set to positions 1-3 and 2-4. Two jumpers must be set for each circuit, refer to Figure 6-5 for locations. Each of the four IDNet outputs provides short circuit isolation between itself and the others. A short on one output is isolated from the others.

For Class B wiring only, both the B+, B- and A+, A- terminals are available for parallel connections. A+ is connected to B+, and A- is connected to B- as shown in Figure 6-5. Additionally, two wires can be connected to each screw terminal. The result is that for Class B wiring only, four parallel output branch circuits can be connected at the IDNet+ module terminals.
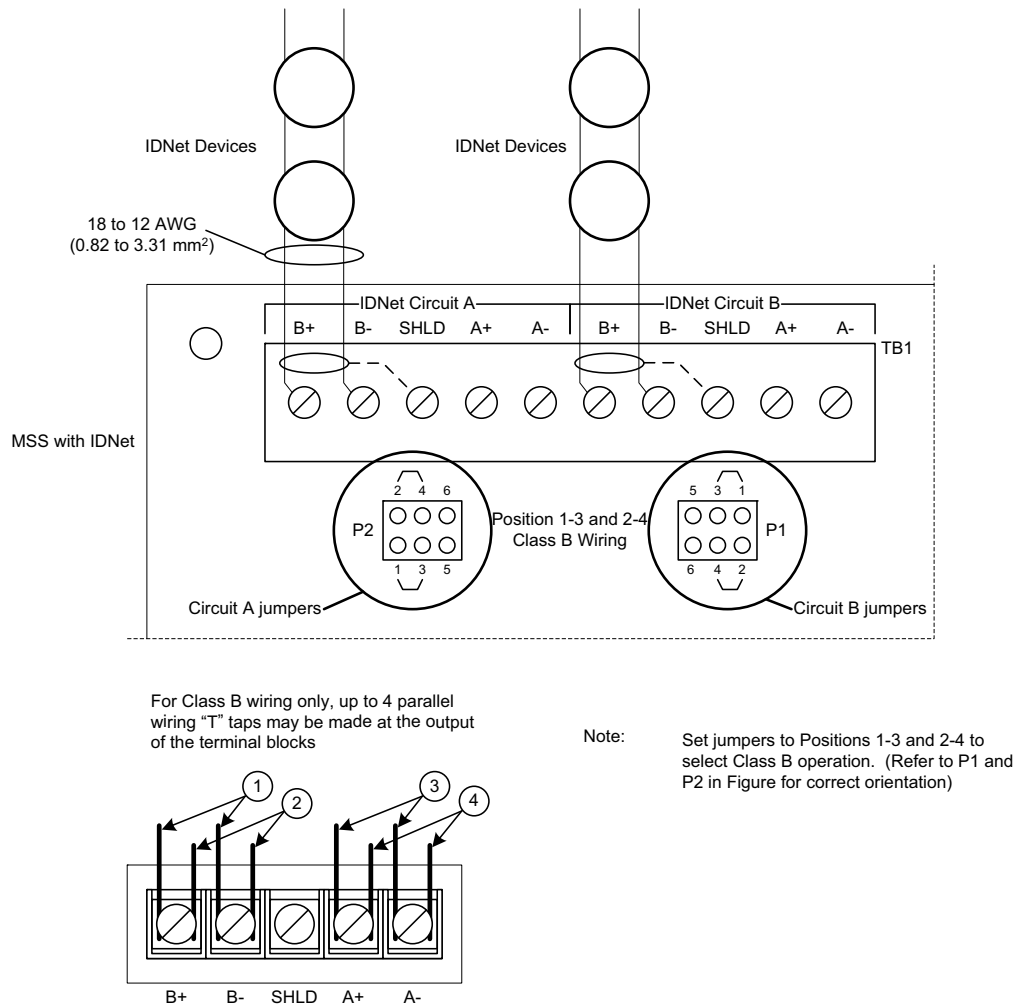
Figure 6-5. Class B wiring

Note: There are two considerations for addressing Class B wired IDNet devices connected to the IDNet+ module.

   1. If no remote isolators or isolator bases are on the loops, device addressing can be assigned without concern for sequence.

   2. If remote isolators or isolator bases are on the loops, the required addressing approach is to start at the A loop output and assign each successive isolator a higher address than the previous one. Follow this sequencing through to the B loop, then to the C loop, and then to the D loop.

   3. For Class B wiring only, the "A" output and "B" output per loop are connected together in parallel for wiring convenience.

MSS auxiliary power wiring

Guidelines

- All wiring is 18 AWG (0.8231 mm^2) and 12 AWG (3.309 mm^2).
- All wiring is power-limited.
- When a NAC is configured as an auxiliary power circuit, no end-of-line resistor is used.
- Auxiliary power may be taken from the dedicated auxiliary power tap or from an unused NAC. The Aux power circuit can be used to power four-wire detectors. It can also control unit accessories and other supplemental devices.
- If auxiliary power is taken from NAC terminals, the NAC must be configured as an auxiliary power point type in the ES Panel Programmer.
- Remove end-of-line resistors from NACs when used for auxiliary power.
- External wiring from the dedicated auxiliary power tap is not supervised unless an end-of-line relay is wired to auxiliary power, and normally open contacts are monitored by a system power point. Relay current must be considered as part of the load. When NACs are used as AUX power taps, they are supervised for overcurrent or short-circuit faults. When only addressable devices are connected to the auxiliary power tap, an end-of-line relay is not required. This is because the power for the addressable devices is supervised due to the device being addressable.
- All wiring that leaves the building requires overvoltage protection. Install module 2081-9044 wherever wire enters or exits the building.
- Voltage rating: 24 VDC (nominal), 2 Vp-p ripple (maximum).
- The following devices are compatible with 24VDC aux. power:
    - 2088-series relays and door holders
    - 2098-series four-wire smoke detectors
    - 4090-series IDNet ZAMs
    - 4098-series four-wire smoke detectors and duct detectors
    - 4190-9050/9051 4-20 mA ZAMs
    - 4606-9102 LCD Annunciator
    - 4100-94XX InfoAlarm Remote Annunciators
    - 4100-7401, -7402 Graphic Annunciator Modules
- The total auxiliary current available is 4 A. The total current available for the entire MSS is 8 A (special application) or 4 A regulated 24 VDC, including NAC, auxiliary, and card power.

MSS auxiliary power wiring, *continued*

Wiring   The MSS can connect to auxiliary power appliances via the dedicated auxiliary power tap. If more power is needed, any of the three NAC outputs can be used for auxiliary power.

- Maximum allowed NAC current consumption (aux power plus NACs): 8 A (Special Application) or 4 A regulated 24 VDC.
  Maximum per NAC: 3 A

- Maximum allowed auxiliary power current consumption: 4 A (total supply).
  Maximum per auxiliary output: 2 A

- Class A wiring is possible only if a 4090-9117 Power Isolator is used.

- International systems require ferrite beads. Use kit 4100-5129.

Figure 6-6. Auxiliary power wiring

MSS auxiliary relay wiring

Guidelines   The MSS includes one on-board, programmable relay.

- All wiring must be between 18 AWG (0.8231 mm^2) and 12 AWG (3.309 mm^2).
- When power through auxiliary contacts is provided by the MSS, wiring is power-limited.
- When power through auxiliary contacts is not provided by the MSS, use in-line fuse holder 208-165 with 208-183, 1A fuse with attached cap (supplied separately). If the power source is not power-limited to the requirements of UL864, wiring is to be segregated to the non-power-limited spaces of the cabinet.
- The relay circuit is not supervised.
- The relay circuit is rated to switch 2 A at 30 VAC or 30 VDC, resistive load.
- Relay contacts are Form C dry contacts. Suppression is provided to earth. Do not switch voltages greater than rating, or damage may result.

Wiring   Figure 6-7 shows MSS auxiliary relay wiring.

Figure 6-7. Auxiliary relay wiring
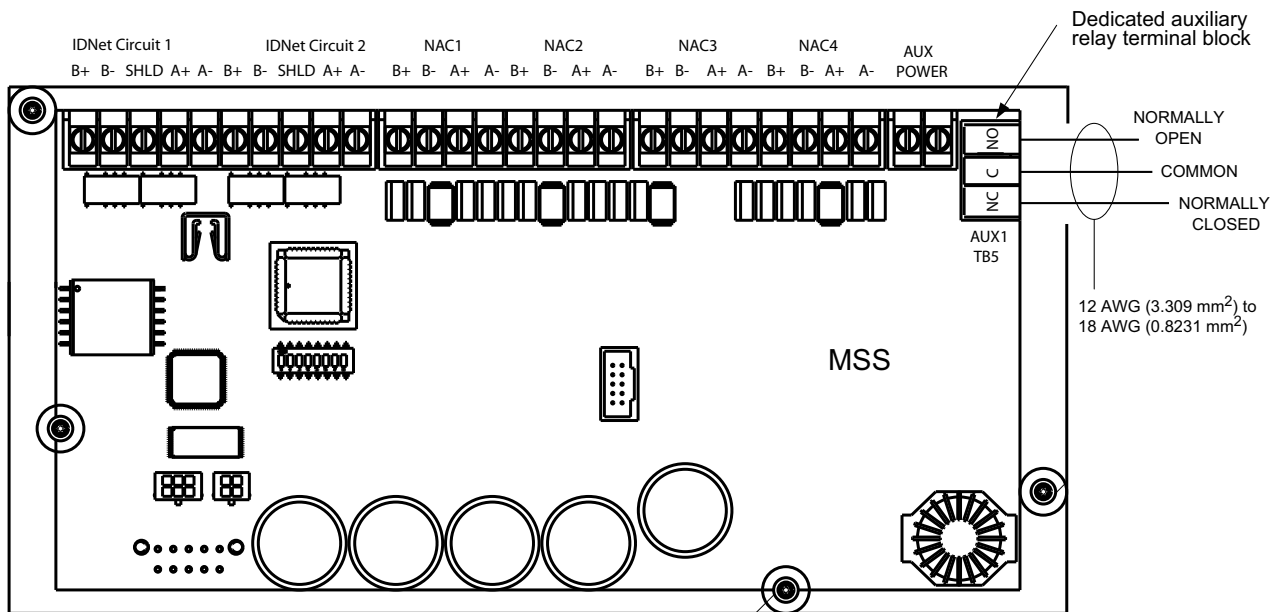
Chapter 7

PC software connections

Introduction   The service port on the CPU allows the 4010ES panel to connect to a PC running utilities, such as diagnostics, programming, CPU firmware downloading, and channel monitoring.

In this chapter   This chapter covers the following topics:

Topic	Page
Software modes	7-2
Ethernet service port	7-4

Software modes

Software modes　　There are three basic software modes that the service port can be used to connect to:

- Service and Diagnostics Mode
- Data Transfer Interface Mode
- Master Bootloader Interface Mode

Each mode is described below.

Service and Diagnostics Mode:

This is the default functionality when a PC is connected to the FACP. On a PC, this mode provides application startup messages, an ASCII interface to a UI command set for diagnostics, and event reporting. A pre-configured terminal emulator is part of the 4010ES software and can be launched from the programmer. The connection to a PC is made through the Ethernet port. If it is not available, the serial port can be used instead.

Note: Ethernet connection is the preferred connection for service.

serial download or
standard Ethernet cable

Laptop/PC running
terminal emulation software

4010ES Panel
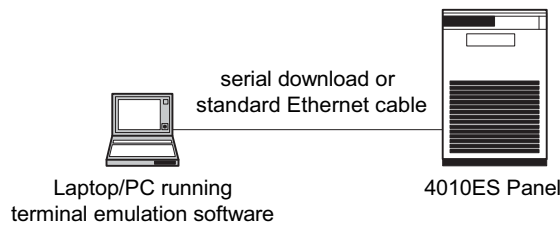
Figure 7-1. Service and Diagnostic interface

Data Transfer Interface Mode:

In this mode, the ES Panel Programmer is used. This allows for slave downloading and uploading a configuration or history log from the FACP. Connection to a PC is made through the Ethernet port. If it is not available, the serial port can be used instead.

serial download or
standard Ethernet cable

Laptop/PC running
Programmer software

4010ES Panel
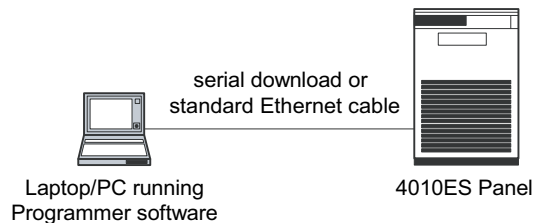
Figure 7-2. Data Transfer interface

Software modes

Master Bootloader Interface Mode:
This interface should be used when the Master executable is not functioning. It downloads the CPU Exec firmware and the CFG.TXT file to the CPU via the serial or the Ethernet port.

serial download or
standard Ethernet cable

Laptop/PC running
programming file transfer

4010ES Panel
running Bootloader

Figure 7-3. Bootloader interface

Ethernet service port

Ethernet service port overview

The Ethernet service port **J7** on the CPU card is used to connect the panel to a local PC. See Figure 7-4 for the port location.

Ethernet SERVICE PORT (J7)
RJ45 TYPE
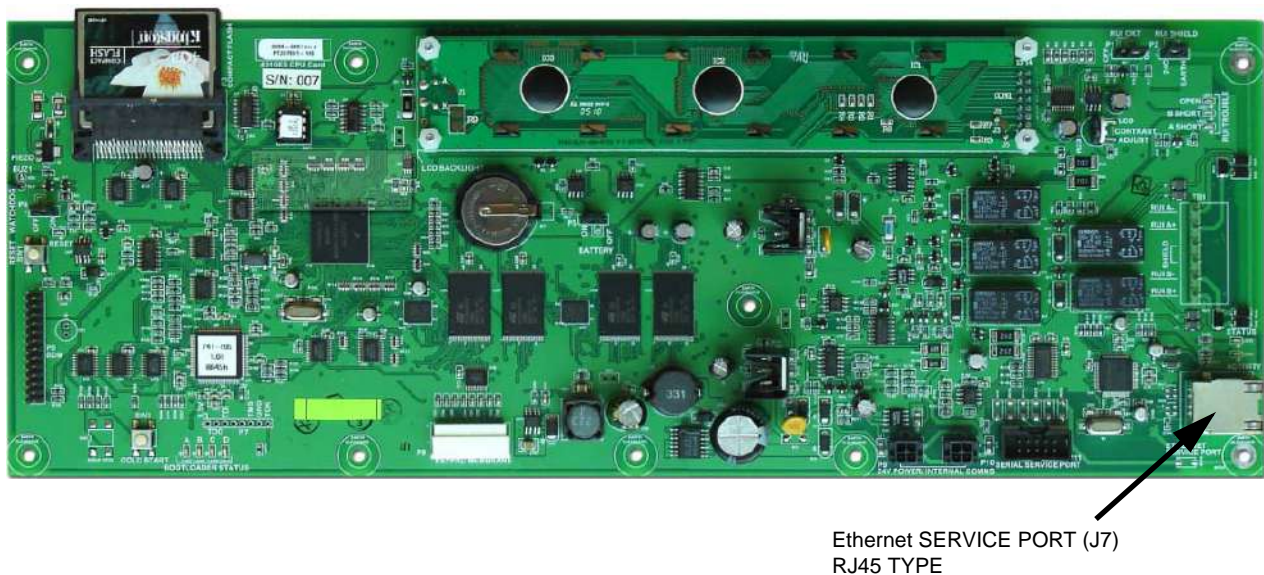
Figure 7-4. Ethernet service port

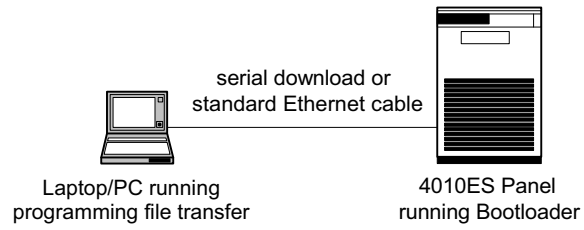The Ethernet service port connects to the front panel Ethernet connection through a standard straight (non-crossover) Ethernet patch cable. The front panel Ethernet connection is located on the top left of the 4010ES front panel. The service technician should connect his PC to the CPU card through this front panel connection with a standard straight Ethernet cable. If this connection is not available, you may plug the CPU Card connector **J7** directly to the PC with a standard straight Ethernet cable.

Note: If a BNIC card is used with the system, the CPU card Ethernet connection connects to it. The BNIC card then connects to the Front Panel Ethernet Connection board

.

Front Panel
Ethernet Service Port
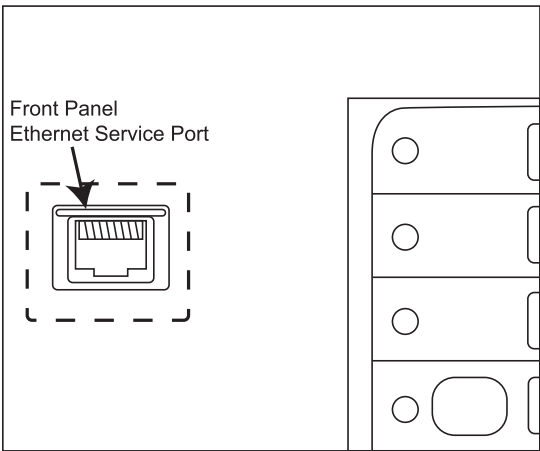
Figure 7-5. Front Panel Ethernet Service Port

Chapter 8

System wiring checkout and earth fault diagnostics

Introduction   This chapter describes how to check system wiring and run the earth fault diagnostics in the panel.

In this chapter   This chapter covers the following topics:

Topic	Page
Checking system wiring	8-2
Earth fault diagnostics	8-4
Earth fault searching from the front panel	8-6
Earth fault search results	8-9

Checking system wiring

Overview

This section contains instructions on how to use a multimeter to check system wiring

Using the multimeter

When using the multimeter to check each circuit, make sure to adhere to the notes and instructions below.

Note:
- Ensure that no power is applied to the 4010ES fire alarm panel and that all wiring is properly connected (terminal blocks, LED/switch module ribbon cables, etc.)
- Use the grounding lug with the earth ground symbol inside the control panel for all measurements to ground.
- Each circuit must test free of all grounds and extraneous (stray) voltages.
- If there are problems removing all power from the fire alarm system, there is an alternate method of testing for stray voltage. The wires may be lifted from the panel and terminated with appropriate resistors. Use 3.3K ohms across conductor pairs and 50K ohms connected from any conductor under test to ground. All conductors must read less than 1.0V AC or DC.

Use a multimeter as described in the steps below to check each circuit type.

1. At the control panel, locate wires from each initiating device or indicating appliance circuit.
2. Check each circuit for extraneous voltage by setting the volt/ohm meter to AC. Place the meter probes so that the black probe is on the "-" wire and the red probe is on the "+" wire. Meter readings must show less than 1.0 VAC.
3. Set the multimeter to DC and repeat step 2. The meter must read less than 1.0 VDC.
4. Check all conductors for extraneous voltage to ground. The meter must read less than 1.0V AC and DC.
5. Set the multimeter to OHMS and place the meter probes as described in step 2. Check the circuits using the resistance measurements in Table 8-1. Locate and correct any abnormal conditions at this time.

Note: If the reading indicates an open circuit in an initiating circuit, make sure the smoke detector heads are properly mounted and seated. The circuit may be open if smoke detector power is not present, and if separately powered 4-wire devices are used.

6. Check all other system wiring to verify that each circuit is free of grounds and extraneous voltages.

Checking system wiring, *continued*

Meter readings   Table 8-1 lists the correct meter readings for indicating appliances and initiating devices.

Table 8-1. Acceptable zone and signal circuit meter readings

Circuit type	Meter reading
Class B/Style B Initiating Device (Zone) Circuit	
From zone + to zone – (each zone)	3.3 KOhms
From zone + to ground	Infinity
From zone - to ground	Infinity
Class A/Style D Initiating Device (Zone) Circuit	
From zone + to zone – (each zone)	Infinity
From zone + to ground	Infinity
From zone - to ground	Infinity
From zone + OUT to + IN	Less than 25 Ohms
From zone - OUT to - IN	Less than 25 Ohms
Class B/Style Y Notification Appliance Circuit (each signal circuit)	
From + to ground	Infinity
From - to ground	Infinity
Resistance across circuit	10 KOhms
Class A/Style Z Notification Appliance Circuit (each signal circuit)	
From + to ground	Infinity
From - to ground	Infinity
From B+ to A+	Less than 50 Ohms
From B- to A-	Less than 50 Ohms
Resistance across circuit	10 KOhms
IDNET+ Loops (ZAMs and IAMs)	
From IDNET+ "+" to ground	Infinity
From IDNET+ "-" to ground	Infinity

Note: Ground refers to earth ground.

Earth fault diagnostics

Overview

This section contains instructions on how to use the Earth Fault Search feature of the 4010ES diagnostics menus. The minimum earth fault detection level for the 4010ES is 10 KOhms for all circuits.

Earth Fault Search is a diagnostic search of external field wiring that assists in locating circuits with earth faults. An earth fault occurs when an electrical circuit is shorted to ground. Although most circuits operate with a single earth fault, multiple earth faults can disable communications. Because of this, earth faults must be located and repaired.

Earth Fault Search is conducted by the FACP. The diagnostic may be activated using either the front panel interface or the computer port protocol (CPP), via a service port.

The 4010ES supports two types of Earth Fault Searches:

- **Location Search.** Searches all circuits at a location, such as a transponder or the main panel. For the purposes of earth fault searching,

    - A location is composed of a group of slaves connected to each other via 4010ES comm (local RUI).

    - The main panel is defined as all slaves local to the Master CPU.

    - A transponder denotes all slaves associated with a single Transponder Interface Card (Remote InfoAlarm or 4009 TPS).

- **IDNet Channel Search.** Selectively enables channel isolators and repeaters to detect which segment of the channel wiring has a fault. Earth faults are detected by one of the following:

    - A single designated power supply at a location. The power supply that detects the fault is designated via a jumper setting on the power supply slave. For any given location, only one power supply should detect earth faults.

    - Each 4009 IDNet NAC Extender on an IDNet channel.

General guidelines

Review the guidelines below before initiating an Earth Fault Search.

- The Detect Earth Fault jumper (**P3**) must be installed at the MSS for earth fault detection to occur. See Table 2-12 in Chapter 2 for details on that jumper.
- Only one power supply per location is configured to detect earth faults.
- For more reliable earth fault searching:
    - Use IDNet channel isolators to isolate channel faults to a specific segment of channel wiring.
    - Set IDNet channel isolator addresses to the lowest IDNet device addresses, increasing with communication distance from the IDNet card.
- If an earth fault is suspected on the IDNet channel with multiple isolators, start an IDNet Channel Search before doing a Location Search. If the Location Search is done first, it may not yield the correct location (this is a by-product of the extended amount of time required for the IDNet channel to initialize during a Location Search).

Note: The 4009 IDNet NAC Extender has a common ground fault trouble that reports to the panel without running the Earth Fault Search.

- Earth Fault Search detects only one fault at a time. Multiple faults require fixing the first fault and then repeating the search.
- The FACP suspends normal operation for the duration of the Earth Fault Search.

Earth fault diagnostics, *continued*

General guidelines

- Location Earth Fault Searches optionally allow exclusion of auxiliary power circuits from the search, so that modules connected to the 24V auxiliary outputs can remain in operation during the search.
- The option to exclude auxiliary power circuits does not apply to IDNet devices, because the entire IDNet communication channel is isolated during each search.
- During the search, all related troubles are suppressed and a single trouble pseudo-point is activated (P438).
- At the completion of the search, all slaves are restarted and normal panel operation resumes.

IMPORTANT: The fire panel cannot provide fire protection during an Earth Fault Search.

Earth fault searching from the front panel

Overview

This section describes how to conduct an Earth Fault Search, from selecting the appropriate access code to correcting the fault.

Access level selection

The panel must be at the appropriate access level (1, 2, 3, or 4) in order to run diagnostics. To get to the correct access level:

1. Press the **Menu** button. The following message comes up (press the **Next** or **Previous** buttons, if necessary, to display it):

> Press <NEXT> or <PREVIOUS> to scroll
> Change Access Level?

2. Press the **Enter** button. Now you are prompted to log in or log out.

> 1=Login   2=Logout
> CURRENT ACCESS LEVEL = x

3. Press the "**1**" key on the numeric keypad to log in, so that the passcode prompt comes up.

> Enter a Passcode followed by <ENTER>

4. Enter the passcode and press the **Enter** button. **ACCESS GRANTED** displays briefly on the LCD, and then the display goes back to:

> 1=Login   2=Logout
> CURRENT ACCESS LEVEL = y

You can now open the diagnostic menu as described in the next topic.

Starting the Earth Fault Search

To start an Earth Fault Search:

1. If necessary, press the **Menu** button to access the menus.

2. Press the **Previous** or **Next** buttons until the diagnostic functions option appears:

> Press <NEXT> or <PREVIOUS> to scroll
> Diagnostic Functions?

3. Press the **Enter** button. Then press **Next** or **Previous** buttons until the Earth Fault Search option appears:

> Press <NEXT> or <PREVIOUS> to scroll
> Earth Fault Search?

4. Press the **Enter** button. The following options become available when you press the **Next** and **Previous** buttons:

> Press <NEXT> or <PREVIOUS> to scroll
> Location Search

> Press <NEXT> or <PREVIOUS> to scroll
> IDNet Channel Search

> Press <NEXT> or <PREVIOUS> to scroll
> Last Search Result

The search types are described below. When you have determined what kind of search to initiate, display its option (one of the three shown above) and press the **Enter** button. Each option is described below.

Earth fault searching from the front panel, *continued*

Search Option A:
Select Location

- If you select the **Location Search** menu item, a list of cards to search becomes available. Use the **Next** and **Previous** buttons to scroll through the list.

- If you find a card that you suspect is connected to a circuit with an earth ground, press the **Enter** button when that circuit is shown.

- Before you can start the search, the Aux Power Select option comes up.

> 1=Exclude   2=Include
> Exclude AUXPWR circuits from search?

- The number you select, 1 or 2, determines whether the auxiliary power circuit on the selected board is searched for earth grounds. If you exclude the auxiliary power circuit from the search, the circuit will continue to operate normally.

- Press **1** (or just press the **Enter** button) to exclude the card's auxiliary power circuits from the search, or press **2** to remove auxiliary power circuits from normal operation and search them for earth grounds.

- Now you are prompted to start the search. When the location you want to search is shown and "Press <ENTER> to start search" displays, the search is ready to start. A sample is shown below.

> CARD 1, SYSTEM POWER SUPPLY
> Press <ENTER> to start search

Note: The FACP suspends normal operation for the duration of the search.

- Press the **Enter** button to start the search.

- As the search progresses, watch the display for an indication of how much of the search has been completed. The search can be aborted at any time if you press the **Clear** button.

> Earth Search In-Progress, Please Wait...

> Earth Search In-Progress, Please Wait...
> 40%

Skip ahead to "Completing the Search".

Search Option B:
Select Location

- If you select the IDNet Channel Search menu item, a list of IDNet channels to search becomes available. Use the **Next** and **Previous** buttons to scroll through the list. When the IDNet channel you want to search is shown and "Press <ENTER> to start search" displays, the search is ready to start. A sample screen is shown below.

> IDNET CHANNEL M12
> Press <ENTER> to select for search

Note: The FACP suspends normal operation for the duration of the search.

- Press the **Enter** button to start the search.

- As the search progresses, watch the display for an indication of how much of the search has been completed. The search can be aborted at any time if you press the **Clear** button.

> Earth Search In-Progress, Please Wait...

> Earth Search In-Progress, Please Wait...
> 40%

Skip ahead to "Completing the Search".

**Search Option C:
Last Search
Result**

This option simply displays the last Earth Fault Search result. If there has been no search since the last system startup, or if the last search was aborted, the panel displays "RESULT NOT AVAILABLE."

**Completing the
search**

When a Location or IDNet Channel Search completes, all of the following occur:

• All slaves automatically reset.

• The FACP turns off the Earth Fault Search trouble pseudo-point.

• The panel displays the specific fault information.

The panel can only return one Earth Fault Search result at a time. If another fault exists, it can only be found via diagnostics after the first fault is cleared. Faults will continue to appear, one by one, until each one has been found and corrected.

IMPORTANT: Once you have been directed to an earth ground fault and corrected it, it is recommended that you restart the system (warm- or cold-start).

Continue to the next topic for a list of search results and their required actions.

Earth fault search results

Overview

There are several types of results that can display at the end of an Earth Fault Search. This section covers all types of results.

IMPORTANT: Once you have been directed to an earth ground fault and corrected it, it is recommended that you restart the system (warm- or cold-start).

Non-point faults

A non-point fault indicates a ground that cannot be traced to an addressable point (for example, a shield).

Point Faults

A point fault indicates a ground at a specific addressable point. Point faults can be found at any point in the system that connects to field wiring.

Some IDNet channel point fault examples are illustrated below.

Fault not cleared. The message below shows that an IDNet channel that has been isolated for fault detection still has the earth fault:

> CARD 2, IDNET CARD (250 POINTS)
> M1, EARTH FAULT SEARCH FAULT CLEAR FAIL

Fault between channel output and first isolator. The message below shows a fault between the IDNet channel output and the first isolator on the line:

> CARD 2, IDNET CARD (250 POINTS)
> M1, CHANNEL OUTPUT   EARTH FAULT

4009 IDNet NAC Extender/TrueAlert Addressable Controller faults. The message below shows a fault detected on the 4009 IDNet NAC Extender before the repeater connected to that circuit is turned on:

> CARD 2, IDNET CARD (250 POINTS)
> M1-18, 4009A NAC   EARTH FAULT

Conversely, the following example shows a fault detected after the repeater connected to that circuit is turned on:

> CARD 2, IDNET CARD (250 POINTS)
> M1-18, 4009A REPEATER   EARTH FAULT

IDNet isolator fault. The message below shows a fault detected after the IDNet isolator was turned on:

> CARD 2, IDNET CARD (250 POINTS)
> M1-3, IDNET ISOLATOR   EARTH FAULT

Fault Not Found

If the message in the lower right corner of the LCD reads FAULT NOT FOUND (for a Location Earth Fault Search) or FAULT CLEAR FAIL (for an IDNet Channel Earth Fault Search), it means the search could not locate the fault, but it acknowledges that a fault exists.

There are five possible causes for this message:

- There are one or more internal wiring earth(s) in the system.
- There are system defects (hardware or software, such as a failed isolation circuit).
- An intermittent earth exists in the system (it occurs inconsistently and is therefore difficult to track via diagnostics).
- The cable to the service port may be grounded due to the remote PC's 3-prong plug. Use a non-grounded plug adapter to the remote PC to get rid of the earth ground.
- The fault is on an auxiliary output that was excluded from the search.

The problem may have to be found manually and then corrected in some of the above scenarios.

No Fault

If the message in the lower right corner of the LCD reads NO FAULT, it means the IDNet channel search could not locate any earth faults on that channel.

Result Not Available

If the message in the lower right corner of the LCD reads RESULT NOT AVAILABLE, it means there is no result to view. This message comes up only when you have selected "Last Search Result" on the menu.

Appendix A

ULC programming requirements

Introduction   This appendix discusses the programming operations that must be met to comply with Canadian Underwriter's Laboratory (ULC) standards.

In this chapter   This chapter covers the following topics:

Common earth fault ground indicator

Overview

This application monitors a system pseudo (A112) that counts the number of ground faults that occur on the system. Each time this counter increments (i.e., a ground fault occurs), a yellow LED on the operator interface panel illuminates.

Step 1. Open CPU card properties dialog

1. Click on the **Hardware** tab and expand the Unit 0, Box 1, Bay 1 icons to display the CPU Card. (Click on the + signs to the left of the Unit 0, Box 1, and Bay 1 icons to expand them.)
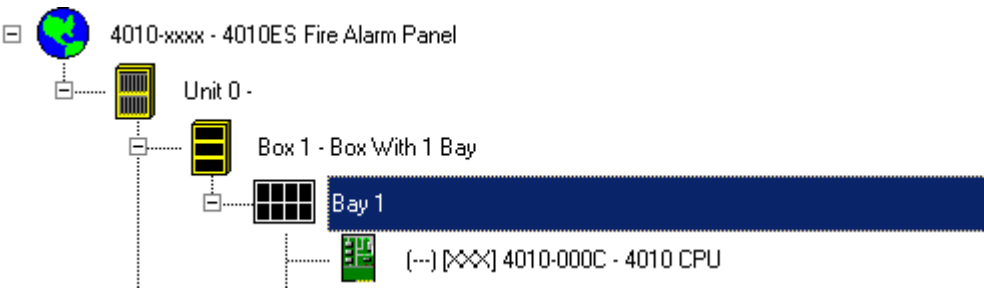
Figure A-1. Selecting the CPU card

2. Right click on the CPU card icon (it is highlighted in the example above) and select **Properties**. When the CPU card properties dialog appears, click on the **Display** tab as shown in the example below.
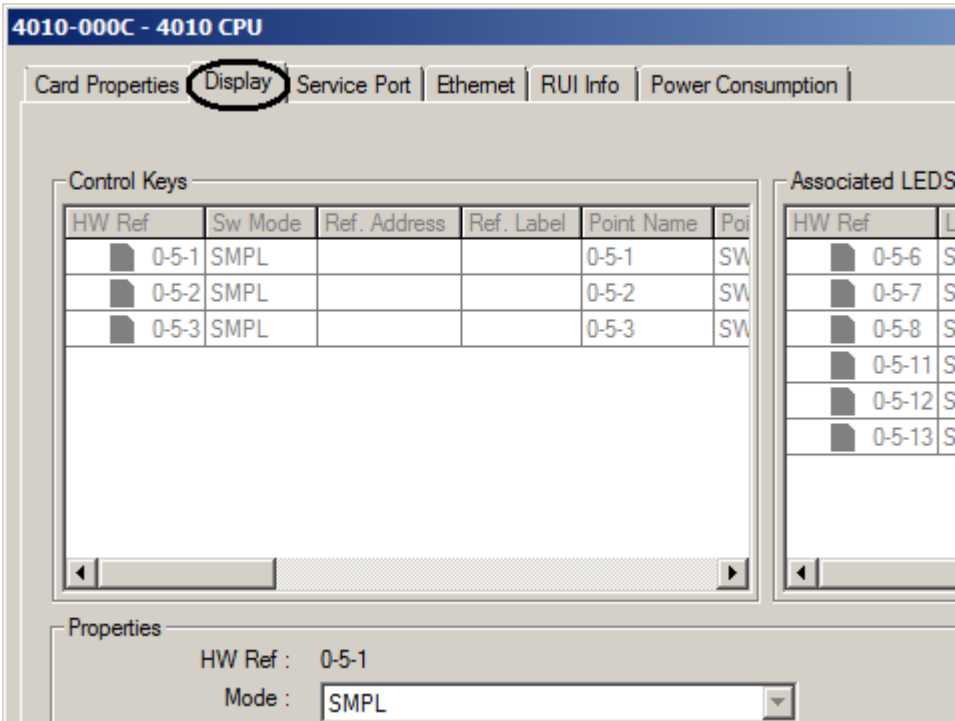
Figure A-2. The Display tab: Display checkbox

Common earth fault ground indicator, *continued*

Step 2. Program the LED

1. Select one of the multicolor LEDs (0-5-11, 0-5-12, or 0-5-13) to program (Figure A-3).

2. Click on the **Point Type** list box and select **LEDYELLOW**.

3. Click on the Mode drop down list box and select **ON**.

4. Enter A112 (no spaces) in the **Reference Address** field.

Figure A-3. The Display tab: LEDs

Simultaneous alarm display

Overview ULC requires that every fire panel be capable of indicating the presence of up to eight simultaneous alarms. The 48-LED Module supplied with some configurations of the 4010ES panels is used for that purpose. Implementing this on the 4010ES is a two-step process, as follows:
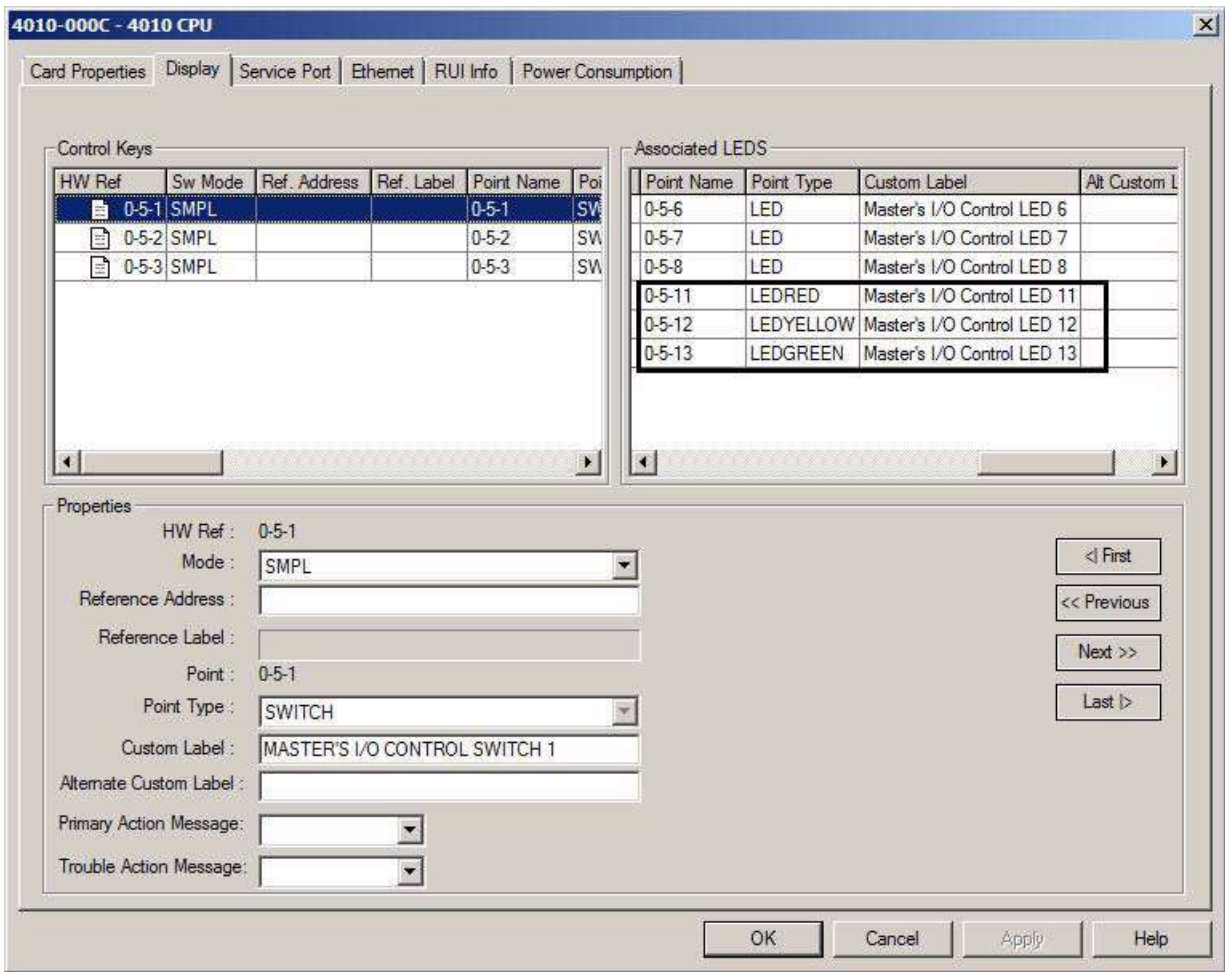
1. Create Annunciation Zone Lists. Divide the panel's initiating devices into physical areas (by floor, by department, etc.) Create a user-defined list for each zone and include all of the initiating devices for the zone in the list. See "Creating Annunciation Zone Lists" below for information on doing this.

Note: Annunciation Zone Lists are only necessary if you are using addressable devices. If you are using hardwired monitor zones, it is not necessary to create a list.

2. Program LED modes and reference addresses. This step associates the address of the zone list with the LED and its mode.

Creating annunciation zone lists To create the annunciation zone lists – which are the lists containing the initiating devices for each zone – follow these steps.

1. Click on the **List** tab in the main ES Panel Programmer window.

2. Right click anywhere in the **TagList** dialog. A menu appears, containing a range of options. Select **Add List**. A tag list, similar to the following, appears.

HW Ref	Point Name	Device Type	Point Type	Custom Label
0-5-1	0-5-1	PBSWITCH	SWITCH	Master's I/O Control Switch 1
0-5-2	0-5-2	PBSWITCH	SWITCH	Master's I/O Control Switch 2
0-5-3	0-5-3	PBSWITCH	SWITCH	Master's I/O Control Switch 3
0-5-4	0-5-4	PBSWITCH	SWITCH	Master's I/O Control Switch 4
0-5-5	0-5-5	PBSWITCH	SWITCH	Master's I/O Control Switch 5
0-5-6	0-5-6	MKYLED5	LED	Master's I/O Control LED 6
0-5-7	0-5-7	MKYLED5	LED	Master's I/O Control LED 7
0-5-8	0-5-8	MKYLED5	LED	Master's I/O Control LED 8
0-5-9	0-5-9	MKYLED5	LED	Master's I/O Control LED 9
0-5-10	0-5-10	MKYLED5	LED	Master's I/O Control LED 10
0-5-11	0-5-11	MKYLED5CRY	LEDRED	Master's I/O Control LED 11
0-5-12	0-5-12	MKYLED5CRY	LEDYELLOW	Master's I/O Control LED 12
0-5-13	0-5-13	MKYLED5CGY	LEDGREEN	Master's I/O Control LED 13

Figure A-4. The TagList dialog

Creating annunciation zone lists

3. Select points for the list as follows.

- Non-Adjacent Points. If the points required for the zone are not adjacent to one another, select the points by holding down the shift key and then click the mouse cursor on each point. When all of the non-adjacent points are selected, press the space key to select the points and add them to the zone's list. A >> symbol appears to the left of each point to indicate that it is selected.

- Range of Adjacent Points. If the points required for the zone are adjacent to one another in the tag list, highlight the first point then hold down the shift key and use the Up or Down arrow key to highlight the points above or below the first point. When the full range of points is highlighted, press the space key to select the points and add them to the zone's list. A >> symbol appears to the left of each point to indicate that it is selected.

4. Click the **OK** button in the **TagList** dialog. A labeling dialog appears, allowing you to specify the name for the list.
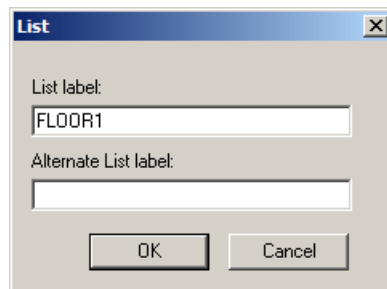

Figure A-5. The List dialog

5. Enter a text name that uniquely identifies the zone (i.e., Floor1, Zone1, etc.).   Click **OK**. The list is added to the List window. Repeat steps 1 through 5 for each annunciation zone list.

Programming the address and mode for each LED

This section describes associating each pair of LEDs with the correct mode and reference address.

1. Click on the **Hardware** tab. Locate the icon for the 48 PLuggable LED Module (door mount). Right-click the mouse and select **Properties**. When the properties dialog for the card appears, click on the **Point Editing** tab. A window similar to the following appears.
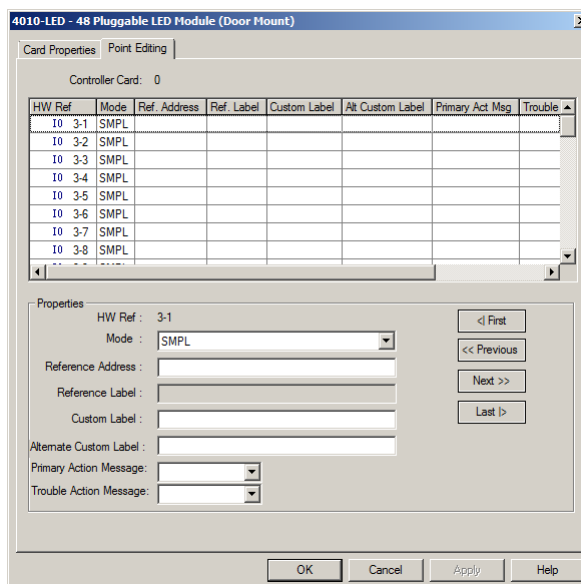

Figure A-6. The Point Editing tab

Simultaneous alarm display, *continued*

Programming the address and mode for each LED

2. Do the following for each zone:

   a. Click on the line for a red LED.

   b. Click on the **Mode** list box and select the **FIRE** mode.

   c. Click on the **Reference Address** field and enter the identifier for one of the zone's list

   d. Click on the line for the yellow LED that is paired with the red LED you selected in Step 2a.

   e. Click on the **Mode** list box and select the **TROUBLE** mode.

   f. Click on the **Reference Address** field and enter the identifier for the same list specified in Step 2c.

The effect of this programming is that if any of the points within the zone's list enters an alarm state, the red LED illuminates. Likewise, if any of the points within the zone's list enters a trouble state, the yellow LED illuminates.

Setting alarm verification timer to Canadian operation

Introduction

When you select Canadian operation for the alarm verification feature, the system operates as follows:

- If a point specified within one of the alarm verification lists enters an alarm state, the system delays the annunciation of the alarm for 15 seconds.
- When the 15-second timer expires, the system attempts to reset the initiating device for five seconds.
- After the five-second timer expires, the system evaluates the state of the initiating device for 10 additional seconds. After 10 seconds, if the device is still in alarm, the system immediately annunciates the alarm.

Procedure

1. Click on the **List** tab to display the List window.
2. At the bottom of the List window, select the **Alarm Verification** tab.
3. Right-click on one of the lists and select **Properties**. The Alarm Verification Properties dialog shown below appears.
4. Click on the **Alarm Verification** tab.
5. Click on the drop down list box and select Canadian (ULC).

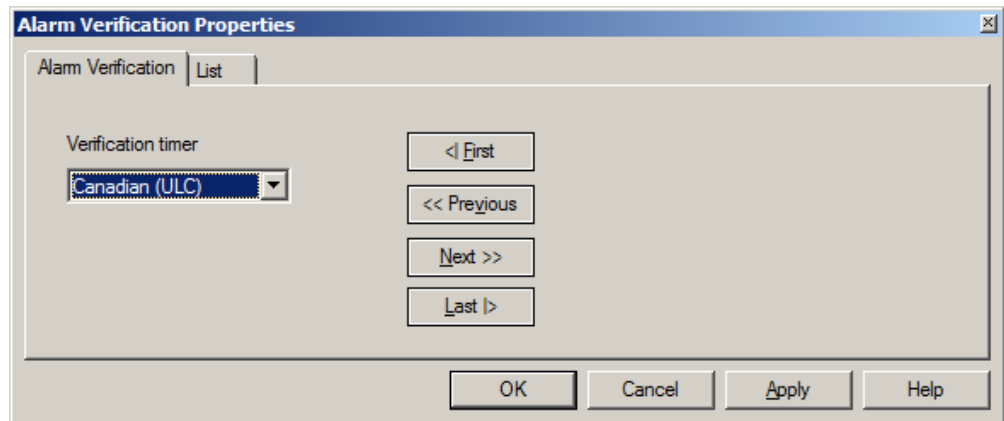Setting this property for one alarm verification list sets it for all lists.

Figure A-7. Alarm verification properties: Alarm Verification tab

Setting Alarm Reset/Inhibit Timer

Overview

The Alarm Reset/Inhibit Timer system option disables the Alarm Silence and System Reset keys for a user-definable duration that ranges from 1 to 60 minutes. The timer is activated only by the first alarm (i.e., subsequent alarms do not reset the timer).

Note: The default setting is not enabled. This option must be enabled for Canadian jobs

Enabling Alarm Reset/Inhibit Timer

To enable the Alarm Reset/Inhibit Timer, do the following:

1. Click on the **Panel** tab at the top of the programmer.
2. Click on the **System Options** tab at the bottom of the programmer. A screen similar to the one shown below appears.
3. Click on the checkbox to the right of Alarm Silence/Reset Inhibit. Specify the timer value in the **Seconds** box to the right of the checkbox.

Figure A-8. The Panel: System Options tab

Alarm Cutout Timer

Overview

The **Alarm Cutout Timer** allows you to set a duration (up to 10 minutes) that specifies how long signals sound following an alarm. For example, with this option set at two minutes, building signals sound for two minutes and then automatically stop. After the signals stop, the alarm condition remains active at the panel.

Note: The default setting is not enabled. This option must be enabled for Canadian jobs

Enabling Alarm Cutout Timer

To enable the **Alarm Cutout Timer**, do the following:

1. Click on the **Panel** tab at the top of the programmer.
2. Click on the **System Options** tab at the bottom of the programmer. A screen similar to the one shown below appears.
3. Click on the checkbox to the right of **Alarm Cutout Timer**. Specify the timer value in the **Seconds** box to the right of the checkbox.
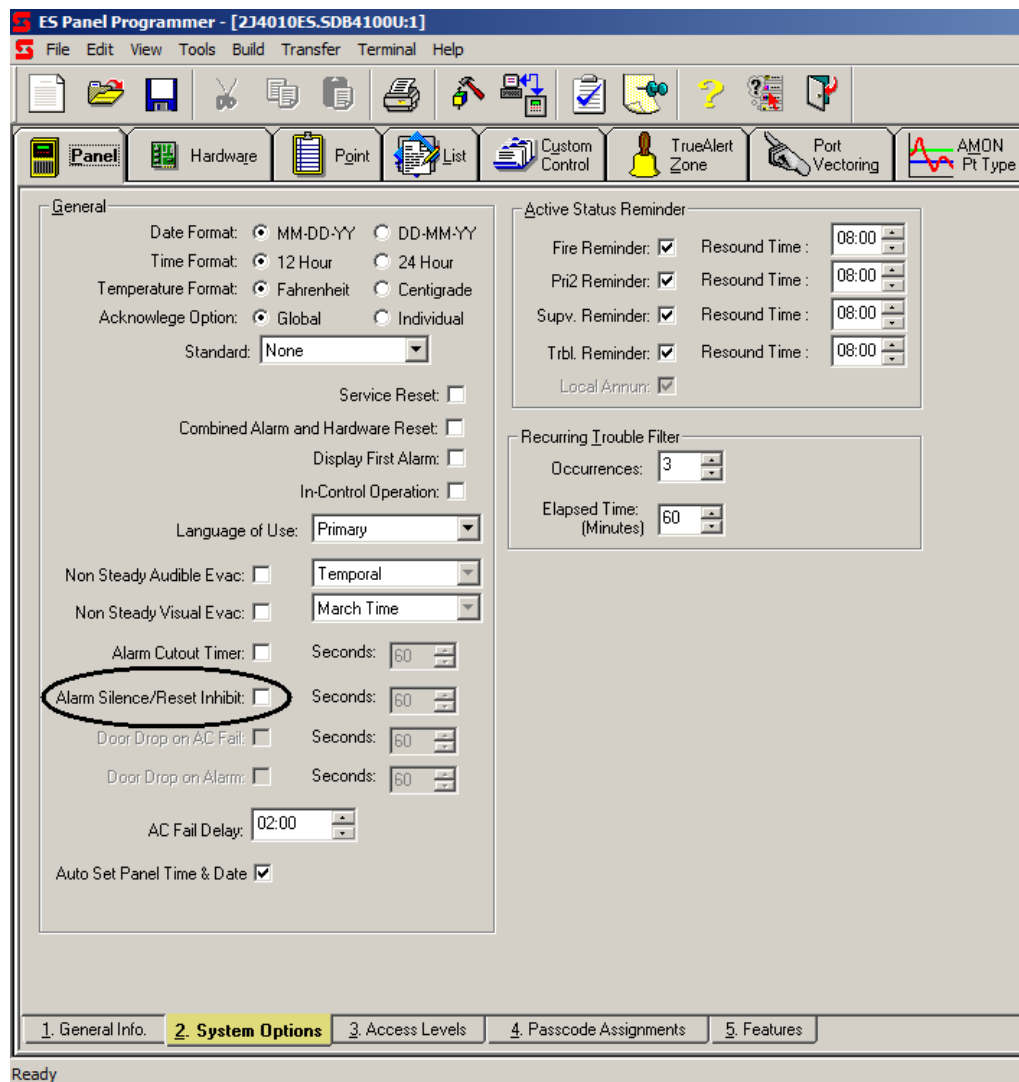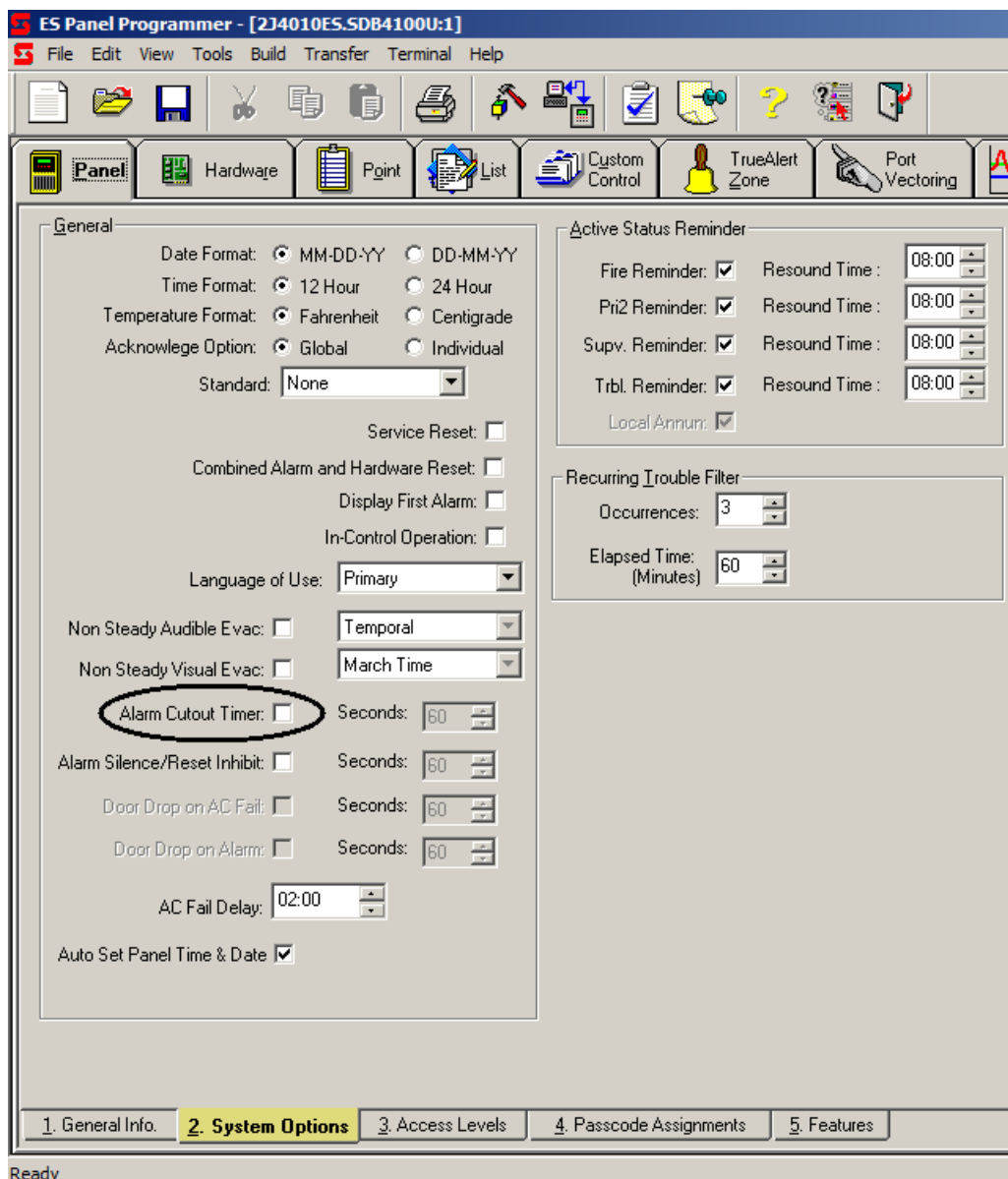

Figure A-9. System Options: Setting the Alarm Cutout Timer

Appendix B

UL programming requirements

Introduction   This appendix identifies key UL programming requirements for the 4010ES FACP.

In this chapter   This chapter covers the following topics:

Setting Alarm Verification to US operation

Overview   When you select United States operation for the alarm verification feature, the system operates as follows:

- If a point specified within one of the alarm verification lists enters an alarm state, the system delays the annunciation of the alarm for 30 seconds.
- When the 15 second timer expires, the system attempts to reset the initiating device for five seconds.
- After the five second timer expires, the system evaluates the state of the initiating device for up to 120 additional seconds. If the device re-alarms during this time, the system immediately annunciates the alarm.

Procedure   1. Click on the **List** tab to display the List window.

2. At the bottom of the List window, select the **Alarm Verification** tab.
3. Right-click on one of the lists and select **Properties**. The **Alarm Verification Properties** dialog shown below appears.
4. Click on the **Alarm Verification** tab.
5. Click on the drop down list box and select **United States**.

Setting this property for one alarm verification list sets it for all lists.
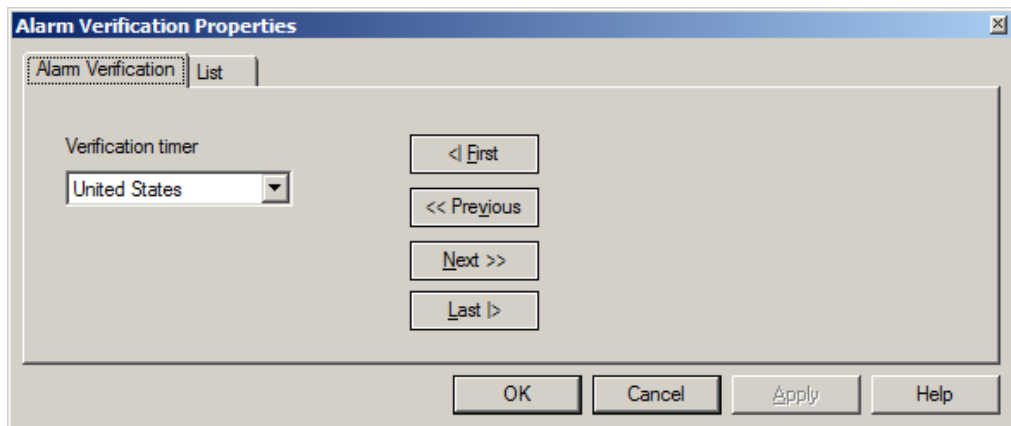
Figure B-1. Alarm Verification Properties: Alarm Verification tab

Alarm Cutout Timer

Overview   The **Alarm Cutout Timer** allows you to set a duration (up to 10 minutes) that specifies how long signals sound following an alarm. For example, with this option set at two minutes, building signals sound for two minutes and then automatically stop. After the signals stop, the alarm condition remains active at the panel.

Note: The default setting is not enabled.

Enabling Alarm Cutout Timer   To enable the **Alarm Cutout Timer**, do the following:

1. Click on the **Panel** tab at the top of the programmer.
2. Click on the **System Options** tab at the bottom of the programmer. A screen similar to the one shown below appears.
3. Click on the checkbox to the right of **Alarm Cutout Timer**. Specify the timer value in the **Seconds** box to the right of the checkbox.
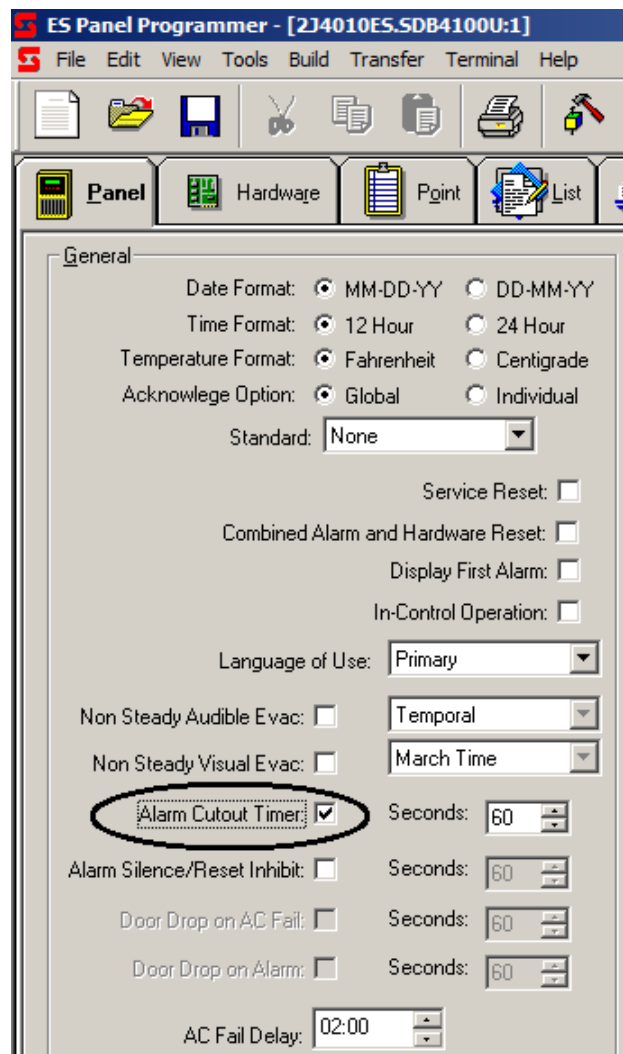
Figure B-2. System Options: Setting the Alarm Cutout Timer

Non Steady Visual Evacuation system option

Overview

When enabled, this option allows you to select the flash pattern output by non-steady visual signals. The term non-steady visual signal refers to any visual notification appliance capable of emitting a pattern of flashes, such as incandescent visuals.

The default setting for this option is not enabled.

When you enable this option, use the drop down list box to the right of the option to set the flash pattern as follows:

- **March Time**. A coded signal that uses 120 beats per minute. Each beat consists of 1/4 second pulse on, 1/4 second off.
- **Slow March Time**. A coded signal that uses 60 beats per minute. Each beat consists of 1/2 second pulse on, 1/2 second off.
- **Temporal**. A five-pulse coding pattern consisting of five 1/2 second pulses, each separated by a 1/2 second silence. Each three pulse group is separated by 1 ½ seconds of silence.

Note: This option cannot be used for public mode signaling as defined in Section 4-4 of NFPA 72-99.

Figure B-3. System Options: Setting Non Steady Visual Evacuation

Appendix C
Simplex special application NAC-compatible notification appliances and accessories

Table C-1. Multi-Candela SmartSync (New Installations)

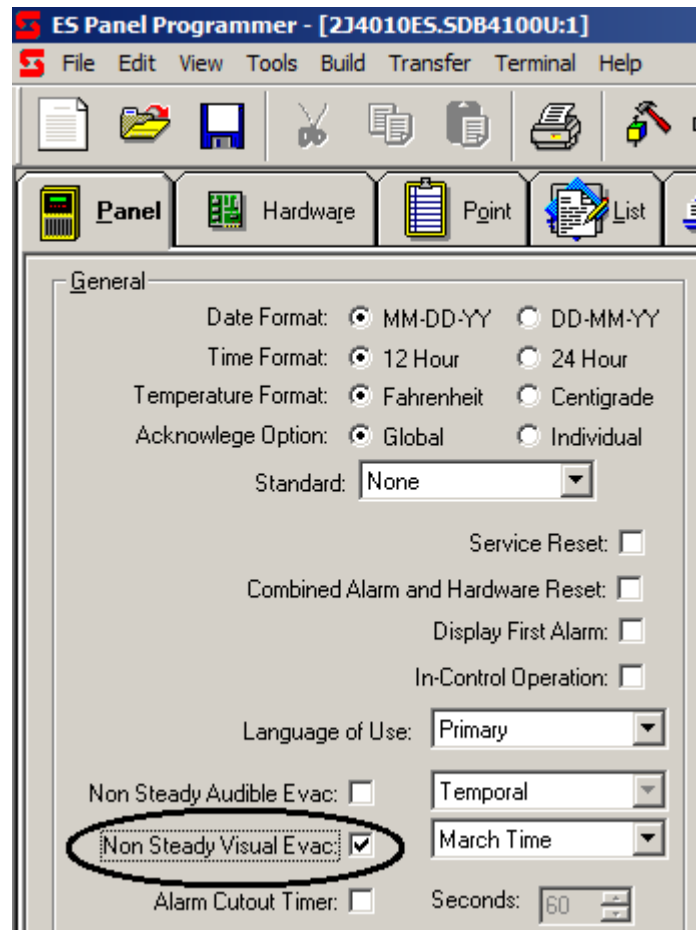| P/N	Description	Device type
49CMTV-Series	49CMTV-APPLW/ 49CMTV-WRF/ 49CMTV-WRF-BA/ 49CMTV-WWF/ 49CMTV-WWF-BA **Note**: Maximum thirteen 49CMTV appliances per NAC.	Multi-Tone and Multi-Candela
4906-9101	Visible Only 15/30/75/110cd Wall Mount Red	Visible only Wall mount
4906-9103	Visible Only 15/30/75/110cd Wall Mount White	
4906-9102	Visible Only 15/30/75/110cd Ceiling Mount Red	Visible only Ceiling mount
4906-9104	Visible Only 15/30/75/110cd Ceiling Mount White	
4906-9127	Audible Visible 15/30/75/110cd Wall Mount Red	Audible visible Wall mount
4906-9129	Audible Visible 15/30/75/110cd Wall Mount White	
4906-9128	Audible Visible 15/30/75/110cd Ceiling Mount Red	Audible visible Ceiling mount
4906-9130	Audible Visible 15/30/75/110cd Ceiling Mount White	
4906-9137	Audible Visible Multi-Tone Wall Mount Red	Multitone audible visible Wall mount
4906-9138	Audible Visible Multi-Tone Wall Mount White	
4906-9133	Chime Visible Wall Mount Red	Chime visible Wall mount
4906-9134	Chime Visible Wall Mount White	
4906-9135	Chime Visible Ceiling Mount Red	Chime visible Ceiling mount
4906-9136	Chime Visible Ceiling Mount White	
4906-9151	Speaker Visible 15/30/75/110cd Wall Mount Red	Speaker visible Wall mount
4906-9153	Speaker Visible 15/30/75/110cd Wall Mount White	
4906-9154	Speaker Visible 15/30/75/110cd Ceiling Mount White	Speaker visible Ceiling Mount
4906-9109	Visible Only High Candela Wall Mount Red	High candela visible only Wall mount
4906-9111	Visible Only High Candela Wall Mount White	
4906-9110	Visible Only High Candela Ceiling Mount Red	High candela visible only Ceiling mount
4906-9112	Visible Only High Candela Ceiling Mount White	
4906-9139	Audible Visible High Candela Wall Mount Red	High candela audible visible Wall mount
4906-9141	Audible Visible High Candela Wall Mount White	
4906-9140	Audible Visible High Candela Ceiling Mount Red	High candela audible visible Ceiling mount
4906-9142	Audible Visible High Candela Ceiling Mount White	
4906-9105	Visible Only Weatherproof Wall Mount Red	Weatherproof visible only Wall mount
4906-9106	Visible Only Weatherproof Wall Mount White	
4906-9113	Visible Only Weatherproof Wall Mount (CAN) Red	
4906-9131	Audible Visible Weatherproof Wall Mount Red	Weatherproof audible visible Wall mount
4906-9132	Audible Visible Weatherproof Wall Mount White	
4906-9143	Audible Visible Weatherproof Wall Mount (CAN) Red	
4906-9107	Visible Only Non-Fire Emergency Alert Wall Mount White	Non-emergency visible only Wall mount
4906-9108	Visible Only Non-Fire Emergency Alert Wall Mount Red	

Table C-2. Audible only appliances

P/N	Description	Device type
49CMT-Series	49CMT-APPLW / 49CMT-WRF/ 49CMT-WRF-BA/ 49CMT-WWF/ 49CMT-WWF-BA **Note**: Maximum thirteen 49CMT appliances per NAC.	Multi-tone
4901-9820	HORN 24VDC Red TrueAlert Non-Addressable (new installations)	Audible only
4901-9822	HORN 24VDC Red	Audible only legacy mount

Table C-3. Audible visible and speaker visible appliances

P/N	Description	Device type
4903-9425	Audible Visible 15CD Red STD TrueAlert Non-Addressable	Free-run or sync Audible visible
4903-9426	Audible Visible 75CD Red STD TrueAlert Non-Addressable	
4903-9427	Audible Visible 110CD Red STD TrueAlert Non-Addressable	
4903-9431	Audible Visible 15CD White STD TrueAlert Non-Addressable	
4903-9432	Audible Visible 75CD White STD TrueAlert Non-Addressable	
4903-9433	Audible Visible 110CD White STD TrueAlert Non-Addressable	
4903-9356	Speaker Visible 15CD Red 25/70V TrueAlert Non-Addressable	Free-run or sync Speaker visible
4903-9357	Speaker Visible 75CD Red 25/70V TrueAlert Non-Addressable	
4903-9358	Speaker Visible 110CD Red 25/70V TrueAlert Non-Addressable	
4903-9359	Speaker Visible 15CD White 25/70V TrueAlert Non-Addressable	
4903-9360	Speaker Visible 75CD White 25/70V TrueAlert Non-Addressable	
4903-9361	Speaker Visible 110CD White 25/70V TrueAlert Non-Addressable	
4903-9196	Speaker Visible 15CD RND TrueALert Non-Addressable	Free-run or sync Speaker visible Ceiling mount
4903-9197	Speaker Visible 30CD RND TrueAlert Non-Addressable	
4903-9198	Speaker Visible 110CD RND TrueAlert Non-Addressable	
4903-9148	Speaker Visible 24VDC 30CD Red HORIZ Free Run or Sync	Free-run or sync Speaker visible Legacy housing
4903-9150	Speaker Visible 24VDC 15CD Red HORIZ Free Run or Sync	
4903-9153	Speaker Visible 24VDC 15CD Red VER Free Run or Sync	
4903-9193	Speaker Visible 24VDC 15CD White HORIZ Free Run or Sync	
4903-9194	Speaker Visible 24VDC 30CD White HORIZ Free Run or Sync	
4903-9252	Audible Visible 24VDC 15CD Red HOR Free Run or Sync	Free-run or sync Audible visible Legacy housing
4903-9253	Audible Visible 24VDC 30CD Red HOR Free Run or Sync	
4903-9254	Audible Visible 24VDC 110CD Red HOR Free Run or Sync	
4903-9255	Audible Visible 24VDC 15CD Red VER Free Run or Sync	
4903-9256	Audible Visible 24VDC 110CD Red VER Free Run or Sync	
4903-9257	Audible Visible 24VDC 15CD White HOR Free Run or Sync	
4903-9258	Audible Visible 24VDC 30CD White HOR Free Run or Sync	
4903-9417	Audible Visible 15CD Red SYNC TrueAlert Non-Addressable	Discontinued
4903-9418	Audible Visible 75CD Red SYNC TrueAlert Non-Addressable	
4903-9419	Audible Visible 110CD Red SYNC TrueAlert Non-Addressable	
4903-9428	Audible Visible 15CD White SYNC TrueAlert Non-Addressable	
4903-9429	Audible Visible 75CD White SYNC TrueAlert Non-Addressable	
4903-9430	Audible Visible 110CD White SYNC TrueAlert Non-Addressable	

Table C-4. Visible only appliances (retrofit)

P/N	Description	Device type
4904-9174	Visible Only 24VDC 30CD Red VER Free Run or Sync	SmartSync visible only Legacy housing
4904-9175	Visible Only 24VDC 110CD Red VER Free Run or Sync	
4904-9176	Visible Only 24VDC 15CD Red VER Free Run or Sync	
4904-9177	Visible Only 24VDC 15CD White VER Free Run or Sync	
4904-9178	Visible Only 24VDC 15CD Red HORIZ Free Run or Sync	
4904-9180	Visible Only 24VDC 30CD Red HORIZ Free Run or Sync	
4904-9181	Visible Only 24VDC 110CD White VER Free Run or Sync	
4904-9182	Visible Only 24VDC 110CD Red HOR Free Run or Sync	Discontinued
4904-9183	Visible Only 24VDC 15CD Red CEIL Free Run or Sync	SmartSync visible only Ceiling mount
4904-9184	Visible Only 24VDC 30CD Red CEIL Free Run or Sync	
4904-9185	Visible Only 24VDC 110CD Red CEIL Free Run or Sync	
4904-9345	Visible Only 24VDC 15CD White PLAIN Free Run or Sync	
4904-9346	Visible Only 24VDC 30CD White PLAIN Free Run or Sync	
4904-9168	Visible Only 15CD Red FREE-RUN TrueAlert Non-Addressable	Free-run visible only
4904-9169	Visible Only 75CD Red FREE-RUN TrueAlert Non-Addressable	
4904-9170	Visible Only 110CD Red FREE-RUN TrueAlert Non-Addressable	
4904-9171	Visible Only 15CD White FREE-RUN TrueAlert Non-Addressable	
4904-9172	Visible Only 75CD White FREE-RUN TrueAlert Non-Addressable	
4904-9173	Visible Only 110CD White FREE-RUN TrueAlert Non-Addressable	
4904-9331	Visible Only 15CD Red SYNC TrueAlert Non-Addressable	Discontinued
4904-9332	Visible Only 75CD Red SYNC TrueAlert Non-Addressable	
4904-9333	Visible Only 110CD Red SYNC TrueAlert Non-Addressable	
4904-9342	Visible Only 15CD White SYNC TrueAlert Non-Addressable	
4904-9343	Visible Only 75CD White SYNC TrueAlert Non-Addressable	
4904-9344	Visible Only 110CD White SYNC TrueAlert Non-Addressable	
4098-9772	Sensor Base with 520 Hz Sounder	Free-run audible only
4098-9773	Co Sensor Base with 520 Hz Sounder	

Table C-5. Miscellaneous

P/N	Description
4090-9005	Suppression Release Peripheral (SRP)
4090-9006	Suppression Release Peripheral (SRP) w/ENCLOSURE
4905-9815	SMARTSYNC ADAPTER, TrueAlert Non-Addressable
4905-9938	SMARTSYNC CTL MODULE

Appendix D
Cooper Wheelock appliances compatible with 4010ES Wheelock protocol for special applications

Overview

The tables in this appendix list Cooper Wheelock appliances compatible with 4010ES Wheelock protocol for special applications.

Synchronizing horn strobes

Table D-1. Synchronizing horn strobes

Appliance	Description
AS-241575W	AS Series Horn Strobe. 24VDC, 15/75Cd, Wall Mount
AS-24MCW	AS Series Horn Strobe. 24VDC, Multi-Cd, Wall Mount
AS-24MCC	AS Series Horn Strobe. 24VDC, Multi-Cd, Ceiling Mount
AS-24MCWH	AS Series Horn Strobe. 24VDC, Multi-High-Cd, Wall Mount
AS-24MCCH	AS Series Horn Strobe. 24VDC, Multi-High-Cd, Ceiling Mount
ASWP-2475W, ASWP-2475C	AS Series WP Horn Strobe. 24VDC, 30Cd, Wall or Ceiling Mount
ASWP-24MCWH	AS Series WP Horn Strobe. 24VDC, Multi-High-Cd, Wall Mount
ASWP-24MCCH	AS Series WP Horn Strobe. 24VDC, Multi-High-Cd, Ceiling Mount
ASA-24MCW, ASB-24MCW	AS Series Horn Strobe. 24VDC, Multi-Cd, Wall Mount. Amber/Blue
ASA-24MCC, ASB-24MCC	AS Series Horn Strobe. 24VDC, Multi-Cd, Ceiling Mount. Amber/Blue
HSR	HN STR, Red, 2-Wire, Wall, 12/24VDC, 3dB, 8CD, 5 Mount
HSRC	HN STR, Red, 2-wire, Ceiling Mount, 12/24VDC, 3dB, 8 Cd, 5 Mount
HSRCS	HN STR, Silver red, 2-wire, Ceiling Mount, 12/24VDC, 3dB, 8 Cd, 5 Mount
HSRS	HN STR, Silver Red, 2-Wire, Wall, 12/24VDC, 3dB, 8CD, 5 Mount
HSW	HN STR, White, 2-Wire, Wall, 12/24VDC, 3dB, 8CD, 5 Mount
HSWC	HN STR, White, 2-wire, Ceiling Mount, 12/24VDC, 3dB, 8 Cd, 5 Mount
HSWCS	HN STR, Silver white, 2-wire, Ceiling Mount, 12/24VDC, 3dB, 8 Cd, 5 Mount
HSWS	HN STR, Silver White, 2-Wire, Wall, 12/24VDC, 3dB, 8CD, 5 Mount
HS4-241575W	HS4 Series Horn Strobe. 24VDC, 15/75Cd, Wall Mount
HS4-24MCW	HS4 Series Horn Strobe. 24VDC, Multi-Cd, Wall Mount
HS4-24MCWH	HS4 Series Horn Strobe. 24VDC, Multi-High-Cd, Wall Mount
HS4-24MCC	HS4 Series Horn Strobe. 24VDC, Multi-Cd, Ceiling Mount
NS-241575W	NS Series Horn Strobe. 24VDC, 15/75Cd, Wall Mount
NS-24MCW	NS Series Horn Strobe. 24VDC, Multi-Cd, Wall Mount
NS-24MCC	NS Series Horn Strobe. 24VDC, Multi-Cd, Ceiling Mount
NS-24MCCH	NS Series Horn Strobe. 24VDC, Multi-High-Cd, Ceiling Mount
ZNS-MCW	ZNS Series Horn Strobe. 24VDC, Multi-Cd, Wall Mount
ZNS-MCWH	ZNS Series Horn Strobe. 24VDC, Multi-High-Cd, Wall Mount
ZNS-24MCC	ZNS Series Horn Strobe. 24VDC, Multi-Cd, Ceiling Mount
ZNS-24MCCH	ZNS Series Horn Strobe. 24VDC, Multi-High-Cd, Ceiling Mount

Compatible appliances, *continued*

Synchronizing strobes

Table D-2. Synchronizing strobes

Appliance	Description
RSS-241575W	RSS Series Strobe. 24VDC, 15/75Cd, Wall Mount
RSSP-241575W	RSSP Series Strobe. 12VDC or 24VDC, 15/75Cd, Wall Mount
RSS-24MCW, RSSP-24MCW	RSS/RSSP Series Strobe. 24VDC, Multi-Cd, Wall Mount
RSS-24MCWH, RSSP-24MCWH	RSS/RSSP Series Strobe. 24VDC, Multi-High-Cd, Wall Mount
RSS-24MCC, RSS-24MCCR	RSS Series Strobe. 24VDC, Multi-Cd, Ceiling Mount (R=Round)
RSS-24MCCH, RSS-24MCCHR	RSS Series Strobe. 24VDC, Multi-High-Cd, Ceiling Mount (R=Round)
RSSR-2415W, RSSR-2415C	RSS Series Strobe. 24VDC, 15Cd, Red, Wall or Ceiling Mount
RSSR-2475W, RSSR-2475C	RSS Series Strobe. 24VDC, 75Cd, Red, Wall or Ceiling Mount
RSSR-24110C	RSS Series Strobe. 24VDC, 110Cd, Red, Ceiling Mount
RSSA-24110W, RSSB-24110W, RSSG-24110W, RSSR-24110W	RSS Series Strobe. 24VDC, 110Cd, Wall Mount. Amber/Blue/Green/Red.
RSSA-24MCC, RSSB-24MCC, RSSG-24MCC, RSSR-24MCC	RSS Series Strobe. 24VDC, Multi-Cd, Ceiling Mount. Amber/Blue/Green/Red.
RSSA-24MCCH, RSSB-24MCCH, RSSG-24MCCH, RSSR-24MCCH	RSS Series Strobe. 24VDC, Multi-High-Cd, Ceiling Mount. Amber/Blue/Green/Red.
RSSPA-24MCC	RSSP Series Strobe. 24VDC, Multi-Cd, Ceiling Mount. Amber
RSSWPA-2475W	RSS Series WP Strobe. 24VDC, Wall Mount. Amber
RSSWPA-24MCCH, RSSWPB-24MCCH, RSSWPG-24MCCH, RSSWPR-24MCCH	RSS Series WP Strobe. 24VDC, Multi-High-Cd, Ceiling Mount. Amber/Blue/Green/Red.
RSSWP-2475W, RSSWP-2475C	RSS Series WP Strobe. 24VDC, 30Cd, Wall or Ceiling Mount
RSSWP-24MCWH	RSS Series WP Strobe. 24VDC, Multi-High-Cd, Wall Mount
RSSWP-24MCCH	RSS Series WP Strobe. 24VDC, Multi-High-Cd, Ceiling Mount
STR	STR, Red, 2-Wire, Wall, 12/24VDC, 12/24VDC, 8CD, 5 Mount
STRC	STR, Red, 2-wire, Ceiling Mount, 12/24VDC, 8 Cd, 5 Mount
STRCS	STR, Silver red, 2-wire, Ceiling Mount, 12/24VDC, 8 Cd, 5 Mount
STRS	STR, Silver Red, 2-Wire, Wall, 12/24VDC, 12/24VDC, 8CD, 5 Mount
STW	STR, White, 2-Wire, Wall, 12/24VDC, 12/24VDC, 8CD, 5 Mount
STWC	STR, White, 2-wire, Ceiling Mount, 12/24VDC, 8 Cd, 5 Mount
STWCS	STR, Silver white, 2-wire, Ceiling Mount, 12/24VDC, 8 Cd, 5 Mount
STWS	STR, Silver White, 2-Wire, Wall, 12/24VDC, 12/24VDC, 8CD, 5 Mount
ZRS-MCW	ZRS Series Strobe. 24VDC, Multi-Cd, Wall Mount
ZRS-MCWH	ZRS Series Strobe. 24VDC, Multi-High-Cd, Wall Mount
ZRS-24MCC	ZRS Series Strobe. 24VDC, Multi-Cd, Ceiling Mount
ZRS-24MCCH	ZRS Series Strobe. 24VDC, Multi-High-Cd, Ceiling Mount

Compatible appliances, *continued*

Appliances with synchronizing strobes

<div align="center">

Table D-3. Appliances with synchronizing strobes

</div>

Appliance	Description
(Only strobe portion compatible with the 4008 Wheelock protocol for special applications)	
AMT-241575W, AMT-241575W-NYC	AMT Series Multi-Tone Horn Strobe. 24VDC, 15/75Cd, Wall Mount
AMT-24MCW	AMT Series Multi-Tone Horn Strobe. 24VDC, Multi-Cd, Wall Mount
MT-241575W	MT Series MT Horn Strobe. 24VDC, 15/75Cd, Wall Mount.
MT-24MCW	MT Series Multi-Tone Horn Strobe. 24VDC, Multi-Cd, Wall Mount
MTWP-2475W, MTWP-2475C	MTWP Series MT Horn Strobe. 24VDC, 30Cd, Wall or Ceiling Mount
MTWP-24MCWH	MTWP Series MT Horn Strobe. 24VDC, Multi-High-Cd, Wall Mount
MTWP-24MCCH	MTWP Series MT Horn Strobe. 24VDC, Multi-High-Cd, Ceiling Mount
MTWPA-2475W, MTWPB-2475W MTWPG-2475W, MTWPR-2475W	MTWP Series Multi-Tone Horn Strobe. 24VDC, Wall Mount. Amber/Blue/Green/Red
MTA-24MCCH, MTB-24MCCH, MTG-24MCCH, MTR-24MCCH	MT Series Multi-Tone Horn Strobe. 24VDC, Multi-High-Cd, Wall Mount. Amber/Blue/Green/Red
MTWPA-24MCCH, MTWPB-24MCCH, MTWPG-24MCCH,MTWPR-24MCCH	MTWP Series Multi-Tone Horn Strobe. 24VDC, Multi-High-Cd, Wall Mount. Amber/Blue/Green/Red
ET70WP-2475W, ET70WP-2475C	ET70WP Series Speaker Strobe. 24VDC, 30Cd, Wall or Ceiling Mount
ET70WP-24185W	ET70WP Series Speaker Strobe. 24VDC, 185Cd, Wall Mount
ET70WP-24177C	ET70WP Series Speaker Strobe. 24VDC, 177Cd, Ceiling Mount
ET70WPA-2475	ET70WP Series Speaker Strobe. 24VDC, Wall or Ceiling Mt. Amber
CH70-241575W	CH70 Series Chime Strobe. 24VDC, 15/75Cd, Wall Mount
CH70-24MCW	CH70 Series Chime Strobe. 24VDC, Multi-Cd, Wall Mount
CH90-24MCC	CH90 Series Chime Strobe. 24VDC, Multi-Cd, Ceiling Mount
CH70-24MCWH	CH70 Series Chime Strobe. 24VDC, Multi-High-Cd, Wall Mount
CH90-24MCCH	CH90 Series Chime Strobe. 24VDC, Multi-High-Cd, Ceiling Mount
E50-241575W	E50 Series Speaker Strobe. 24VDC, 15/75Cd, Wall Mount
E50-24MCW	E50 Series Speaker Strobe. 24VDC, Multi-Cd, Wall Mount
E50-24MCWH	E50 Series Speaker Strobe. 24VDC, Multi-High-Cd, Wall Mount
E50A-24MCC, E50B-24MCC	E50 Series Speaker Strobe. 24VDC, Multi-Cd, Ceiling Mt. Amber/Blue
E60-24MCW	E60 Series Speaker Strobe. 24VDC, Multi-Cd, Wall Mount
E60-24MCWH	E60 Series Speaker Strobe. 24VDC, Multi-High-Cd, Wall Mount
E60-24MCC	E60 Series Speaker Strobe. 24VDC, Multi-Cd, Ceiling Mount
E60-24MCCH	E60 Series Speaker Strobe. 24VDC, Multi-High-Cd, Ceiling Mount
E70-241575W	E70 Series Speaker Strobe. 24VDC, 15/75Cd, Wall Mount
E70-24MCW	E70 Series Speaker Strobe. 24VDC, Multi-Cd, Wall Mount
E70-24MCWH	E70 Series Speaker Strobe. 24VDC, Multi-High-Cd, Wall Mount
E70-24MCC, E90-24MCC	E70/E90 Series Speaker Strobe. 24VDC, Multi-Cd, Ceiling Mount

Compatible appliances, *continued*

Appliances with synchronizing strobes

Table D-3. Appliances with synchronizing strobes, *continued*

Appliance	Description
(Only Strobe portion compatible with the 4008 Wheelock Protocol for Special Applications)	
E90-24MCCH	E90 Series Speaker Strobe. 24VDC, Multi-High-Cd, Ceiling Mount
E60A-24MCC, E70A-24MCC, E70B-24MCC, E90A-24MCC, E90B-24MCC	E60/E70/E90 Series Speaker Strobe. 24VDC, Multi-Cd, Ceiling Mount. Amber/Blue
ET70-241575W, ET90-241575W	ET70/ET90 Series Speaker Strobe. 24VDC, 15/75Cd, Wall Mount
ET70-24MCW	ET70 Series Speaker Strobe. 24VDC, Multi-Cd, Wall Mount
ET70-24MCWH	ET70 Series Speaker Strobe. 24VDC, Multi-High-Cd, Wall Mount
ET70-24MCC, ET90-24MCC	ET70/ET90 Series Speaker Strobe. 24VDC, Multi-Cd, Ceiling Mount
ET70WPG-2475, ET70WPB-2475W ET70WPG-2475W, ET70WPR-2475W	ET70WP Series Speaker Strobe. 24VDC, Wall or Ceiling Mt. Green, Blue, Red
ET90-24MCCH	ET90 Series Speaker Strobe. 24VDC, Multi-High-Cd, Ceiling Mount
ET80-241575W	ET80 Series Speaker Strobe. 24VDC, 15/75Cd, Wall Mount
ET80-24MCW	ET80 Series Speaker Strobe. 24VDC, Multi-Cd, Wall Mount
ET80-24MCWH	ET80 Series Speaker Strobe. 24VDC, Multi-High-Cd, Wall Mount
S8-24MCC	S8 Series Speaker Strobe. 24VDC, Multi-Cd, Ceiling Mount
S8-24MCCH	S8 Series Speaker Strobe. 24VDC, Multi-High-Cd, Ceiling Mount
SA-S70-24MCW	SA-S70 Series Amp-Speaker Strobe. 24VDC, Multi-Cd, Wall Mount
SA-S90-24MCC	SA-S90 Series Amp-Speaker Strobe. 24VDC, Multi-Cd, Ceiling Mount

Synchronizing horns

Table D-4. Synchronizing horns

Appliance	Description
AH-24	AH Series Horn. 24VDC
AH-24WP	AH Series Weatherproof Horn. 12VDC or 24VDC
HS-24	HS Series Horn. 24VDC
HNR	Horn, Red, 2-Wire, Wall, 12/24VDC, 3dB, 5 Mount
HNRC	Horn, Red, 2-wire, Ceiling Mount, 12/24V, 3dB, 5 Mount
HNRCS	Horn, Silver red, 2-wire, Ceiling Mount, 12/24V, 3dB, 5 Mount
HNRS	Horn, Silver Red, 2-Wire, Wall, 12/24VDC, 3dB, 5 Mount
HNW	Horn, White, 2-Wire, Wall, 12/24VDC, 3dB, 5 Mount
HNWC	Horn, White, 2-wire, Ceiling Mount, 12/24VDC, 3dB, 5 Mount
HNWCS	Horn, Silver white, 2-wire, Ceiling Mount, 12/24VDC, 3dB, 5 Mount
HNWS	Horn, Silver White, 2-Wire, Wall, 12/24VDC, 3dB, 5 Mount
MIZ-24S	MIZ Series Horn. 24VDC
NH-12/24, NH-12/24R	NH Series Horn. 12/24VDC (R=Round)
ZNH	ZNH Series Horn. 12/24VDC

Compatible appliances, *continued*

Coded audible appliances

Table D-5. Coded audible appliances

Appliance	Description
AMT-12/24, AMT-12/24-NYC	AMT Series Multi-Tone Horn. 12/24VDC, Wall or Ceiling Mount
CH70, CH90	CH70/CH90 Series Chime. 24VDC, Wall or Ceiling Mount
CSX10-24-DC, CSXG10-24-DC	CSX Series Bell. 24VDC, Wall Mount
MT-12/24, MT4-12/24	MT Series Multi-Tone Horn. 12/24VDC, Wall or Ceiling Mount

Non-synchronizing appliances

Table D-6. Non-synchronizing appliances

Appliance	Description
MB-G6-24, MB-G10-24	MB Series Bell. 24V, Wall Mount

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