NOTIFIER®

Fire Alarm Control Panel
NFS-3030
Installation Manual

Fire Alarm System Limitations

While a fire alarm system may lower insurance rates, it is not a substitute for fire insurance!

An automatic fire alarm system—typically made up of smoke detectors, heat detectors, manual pull stations, audible warning devices, and a fire alarm control panel with remote notification capability—can provide early warning of a developing fire. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire.

The Manufacturer recommends that smoke and/or heat detectors be located throughout a protected premise following the recommendations of the current edition of the National Fire Protection Association Standard 72 (NFPA 72), manufacturer's recommendations, State and local codes, and the recommendations contained in the Guide for Proper Use of System Smoke Detectors, which is made available at no charge to all installing dealers. A study by the Federal Emergency Management Agency (an agency of the United States government) indicated that smoke detectors may not go off in as many as 35% of all fires. While fire alarm systems are designed to provide early warning against fire, they do not guarantee warning or protection against fire. A fire alarm system may not provide timely or adequate warning, or simply may not function, for a variety of reasons:

Smoke detectors may not sense fire where smoke cannot reach the detectors such as in chimneys, in or behind walls, on roofs, or on the other side of closed doors. Smoke detectors also may not sense a fire on another level or floor of a building. A second-floor detector, for example, may not sense a first-floor or basement fire.

Particles of combustion or "smoke" from a developing fire may not reach the sensing chambers of smoke detectors because:

- Barriers such as closed or partially closed doors, walls, or chimneys may inhibit particle or smoke flow.
- Smoke particles may become "cold," stratify, and not reach the ceiling or upper walls where detectors are located.
- Smoke particles may be blown away from detectors by air outlets.
- Smoke particles may be drawn into air returns before reaching the detector.

The amount of "smoke" present may be insufficient to alarm smoke detectors. Smoke detectors are designed to alarm at various levels of smoke density. If such density levels are not created by a developing fire at the location of detectors, the detectors will not go into alarm.

Smoke detectors, even when working properly, have sensing limitations. Detectors that have photoelectronic sensing chambers tend to detect smoldering fires better than flaming fires, which have little visible smoke. Detectors that have ionizing-type sensing chambers tend to detect fast-flaming fires better than smoldering fires. Because fires develop in different ways and are often unpredictable in their growth, neither type of detector is necessarily best and a given type of detector may not provide adequate warning of a fire.

Smoke detectors cannot be expected to provide adequate warning of fires caused by arson, children playing with matches (especially in bedrooms), smoking in bed, and violent explosions (caused by escaping gas, improper storage of flammable materials, etc.).

Heat detectors do not sense particles of combustion and alarm only when heat on their sensors increases at a predetermined rate or reaches a predetermined level. Rate-of-rise heat detectors may be subject to reduced sensitivity over time. For this reason, the rate-of-rise feature of each detector should be tested at least once per year by a qualified fire protection specialist. Heat detectors are designed to protect property, not life.

IMPORTANT! Smoke detectors must be installed in the same room as the control panel and in rooms used by the system for the connection of alarm transmission wiring, communications, signaling, and/or power. If detectors are not so located, a developing fire may damage the alarm system, crippling its ability to report a fire.

Audible warning devices such as bells may not alert people if these devices are located on the other side of closed or partly open doors or are located on another floor of a building. Any warning device may fail to alert people with a disability or those who have recently consumed drugs, alcohol or medication. Please note that:

- Strobes can, under certain circumstances, cause seizures in people with conditions such as epilepsy.
- Studies have shown that certain people, even when they hear a fire alarm signal, do not respond or comprehend the meaning of the signal. It is the property owner's responsibility to conduct fire drills and other training exercise to make people aware of fire alarm signals and instruct them on the proper reaction to alarm signals.
- In rare instances, the sounding of a warning device can cause temporary or permanent hearing loss.

A fire alarm system will not operate without any electrical power. If AC power fails, the system will operate from standby batteries only for a specified time and only if the batteries have been properly maintained and replaced regularly.

Equipment used in the system may not be technically compatible with the control panel. It is essential to use only equipment listed for service with your control panel.

Telephone lines needed to transmit alarm signals from a premise to a central monitoring station may be out of service or temporarily disabled. For added protection against telephone line failure, backup radio transmission systems are recommended.

The most common cause of fire alarm malfunction is inadequate maintenance. To keep the entire fire alarm system in excellent working order, ongoing maintenance is required per the manufacturer's recommendations, and UL and NFPA standards. At a minimum, the requirements of NFPA 72 shall be followed. Environments with large amounts of dust, dirt or high air velocity require more frequent maintenance. A maintenance agreement should be arranged through the local manufacturer's representative. Maintenance should be scheduled monthly or as required by National and/or local fire codes and should be performed by authorized professional fire alarm installers only. Adequate written records of all inspections should be kept.

Precau-L-1-2005.fm

Installation Precautions

Adherence to the following will aid in problem-free installation with long-term reliability:

WARNING - Several different sources of power can be connected to the fire alarm control panel. Disconnect all sources of power before servicing. The control unit and associated equipment may be damaged by removing and/or inserting cards, modules, or interconnecting cables while the unit is energized. Do not attempt to install, service, or operate this unit until this manual is read and understood.

CAUTION - 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. Reacceptance 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.

This system meets NFPA requirements for operation at 0°C to 49°C (32°F to 120°F) and at a relative humidity (non condensing) of 85% at 30°C (86°F) per NFPA, and 93% ± 2% at 32°C ± 2°C (89.6°F ± 1.1°F) per ULC. However, the useful life of the system's standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and all peripherals be installed in an environment with a nominal room temperature of 15-27° C/60-80° F.

Verify that wire sizes are adequate for all initiating and indicating device loops. Most devices cannot tolerate more than a 10% I.R. drop from the specified device voltage.

Like all solid state electronic devices, this system may operate erratically or can be damaged when subjected to lightning-induced transients. Although no system is completely immune from lightning transients and interferences, proper grounding will reduce susceptibility. Overhead or outside aerial wiring is not recommended, due to an increased susceptibility to nearby lightning strikes. Consult with the Technical Services Department if any problems are anticipated or encountered.

Disconnect AC power and batteries prior to removing or inserting circuit boards. Failure to do so can damage circuits.

Remove all electronic assemblies prior to any drilling, filing, reaming, or punching of the enclosure. When possible, make all cable entries from the sides or rear. Before making modifications, verify that they will not interfere with battery, transformer, and printed circuit board location.

Do not tighten screw terminals more than 9 in-lbs. Over-tightening may damage threads, resulting in reduced terminal contact pressure and difficulty with screw terminal removal.

Though designed to last many years, system components can fail at any time. This system contains static-sensitive components. Always ground yourself with a proper wrist strap before handling any circuits so that static charges are removed from the body. Use static-suppressive packaging to protect electronic assemblies removed from the unit.

Follow the instructions in the installation, operating, and programming manuals. These instructions must be followed to avoid damage to the control panel and associated equipment. FACP operation and reliability depend upon proper installation by authorized personnel.

Precau-L-1-2005.fm

FCC Warning

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for class A computing device pursuant to Subpart B of Part 15 of FCC Rules, which is designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user will be required to correct the interference at his own expense.

Canadian Requirements

This digital apparatus does not exceed the Class A limits for radiation noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la classe A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

Documentation Feedback

Your feedback helps us keep our documentation up-to-date and accurate. If you have any comments or suggestions about our online Help or printed manuals, you can email us.

Please include the following information:

- Product name and version number (if applicable)
- Printed manual or online Help
- Topic Title (for online Help)
- Page number (for printed manual)
- Brief description of content you think should be improved or corrected
- Your suggestion for how to correct/improve documentation

Send email messages to:

TechPubs_FireGroup@fla-whq.com

Please note this email address is for documentation feedback only. If you have any technical issues, please contact Technical Services.

Table of Contents

Section 1: About This Manual

1.1 Standards and Other Documents

■ **This Fire Alarm Control Panel complies with the following NFPA standards:**

NFPA 12A Halon 1301 Extinguishing Systems
NFPA 13 Sprinkler Systems
NFPA 15 Water Spray Systems
NFPA 16 Foam/Water Deluge and Foam/Water Spray Systems
NFPA 17 Dry Chemical Extinguishing Systems
NFPA 17A Wet Chemical Extinguishing Systems
NFPA 72-1999 Central Station Fire Alarm Systems (Automatic, Manual and Waterflow) Protected
    Premises Unit (requires Notifier UDACT).
NFPA 72-1999 Local (Automatic, Manual, Waterflow and Sprinkler Supervisory) Fire Alarm
    Systems.
NFPA 72-1999 Auxiliary (Automatic, Manual and Waterflow) Fire Alarm Systems
    (requires TM-4).
NFPA 72-1999 Remote Station (Automatic, Manual and Waterflow) Fire Alarm Systems
NFPA 72-1999 Proprietary (Automatic, Manual and Waterflow) Fire Alarm Systems (Protected
    Premises Unit).
NFPA 2001 Clean Agent Fire Extinguishing Systems

■ **The installer should be familiar with the following documents and standards:**

NFPA 72-1999 Initiating Devices for Fire Alarm Systems
NFPA 72-1999 Inspection, Testing and Maintenance for Fire Alarm Systems
NFPA 72-1999 Notification Appliances for Fire Alarm Systems
Underwriters Laboratories (UL)
UL 38 Manually Actuated Signaling Boxes
UL 217 Smoke Detectors, Single and Multiple Station
UL 228 Door Closers - Holders for Fire Protective Signaling Systems
UL 268 Smoke Detectors for Fire Protective Signaling Systems
UL 268A Smoke Detectors for Duct Applications
UL 346 Waterflow Indicators for Fire Protective Signaling Systems
UL 464 Audible Signaling Appliances
UL 521 Heat Detectors for Fire Protective Signaling Systems
UL 864 Standard for Control Units for Fire Protective Signaling Systems
UL 1481 Power Supplies for Fire Protective Signaling Systems
UL 1971 Visual Signaling Appliances
UL 1076 Proprietary Burglar Alarm Systems
Underwriters Laboratories of Canada (ULC)
ULC-S527-99 Standard for Control Units for Fire Alarm Systems
ULC S524 Standard for the Installation of Fire Alarm Systems
Other
EIA-485 and EIA-232 Serial Interface Standards
NEC Article 300 Wiring Methods
NEC Article 760 Fire Protective Signaling Systems
Applicable Local and State Building Codes
Requirements of the Local Authority Having Jurisdiction
Canadian Electrical Code, Part 1

1.2 Supplemental Documentation

The table below provides a list of documents referenced in this manual, as well as documents for selected other compatible devices. The document series chart (DOC-NOT) provides the current document revision. A copy of this document is included in every shipment.

Compatible Conventional Devices (Non-addressable)	Document Number
Device Compatibility Document	15378
Fire Alarm Control Panel (FACP) and Main Power Supply Installation	**Document Number**
NFS-3030 FACP Installation, Operations, and Programming Manuals	51330, 51345, 51344
AMPS-24/E Addressable Power Supply Manual	51907
Voice Alarm System Manual	51252
SLC Wiring Manual	51253
Note: For individual SLC Devices, refer to the *SLC Wiring Manual*	
Off-line Programming Utility	**Document Number**
VeriFire™ Tools CD help file	VERIFIRE-TCD
Cabinets & Chassis	**Document Number**
CAB-3/CAB-4 Series Cabinet Installation Document	15330
Battery/Peripherals Enclosure Installation Document	50295
Power Supplies, Auxiliary Power Supplies & Battery Chargers	**Document Number**
ACPS-2406 Installation Manual	51304
APS-6R Instruction Manual	50702
CHG-120 Battery Charger Manual	50641
FCPS-24 Field Charger/Power Supply Manual	50059
Networking	**Document Number**
Noti•Fire•Net Manual, Network Version 4.0 & Higher	51584
NCM-W/F Installation Document	51533
NCS Network Control Station, Network Version 4.0 & Higher Manual	51658
System Components	**Document Number**
Annunciator Control System Manual	15842
Annunciator Fixed Module Manual	15048
ACM-8R Annunciator Control Module Manual	15342
LCD-80 Manual	15037
LCD-80TM Manual	51082
LCD-160 Manual	51850
LDM Series Lamp Driver Annunciator Manual	15885
NCA Network Control Annunciator Manual	51482
SCS Smoke Control Manual (Smoke and HVAC Control Station) Manual	15712
DPI-232 Manual	51499
TM-4 Installation Document (Reverse Polarity Transmitter)	51490
UDACT Manual (Universal Digital Alarm Communicator/Transmitter)	50050
ACT-2 Installation Document	51118
VEC 25/50 Manual	50686
RM-1 Series Remote Microphone Installation Document	51138
RA400Z Remote LED Annunciator Document	I56-508
RFX Wireless Interface Manual	51012

Table 1.1 Related Documentation (1 of 2)

UZC-256 Universal Zone Coder Manual	15216
UZC-256 Programming Manual	15976
XP Transponder Manual	15888
XP10-M Ten Input Monitor Module Installation Document	I56-1803
XP5 Series Manual	50786
XP6-C Supervised Control Module Installation Document	I56-1805
XP6-MA Six Zone Interface Module Installation Document	I56-1806
XP6-R Six Relay Control Module Installation Document	I56-1804
XPIQ Audio Transponder Manual	51013

Table 1.1 Related Documentation (2 of 2)

NOTE: Where used in this manual, the term CPU refers to the main circuit board for the fire alarm control panel's central processing unit (see Section 2.2 "System Components" for a more detailed list of part numbers.)

1.3 Cautions and Warnings

This manual contains cautions and warnings to alert the reader as follows:

CAUTION: Summary in bold
Information about procedures that could cause programming errors, runtime errors, or equipment damage.

WARNING: Summary in bold
Indicates information about procedures that could cause irreversible damage to the control panel, irreversible loss of programming data or personal injury.

Notes

Section 2: System Overview

2.1 System Description

2.1.1 Standard Features

- Connections to easily mount from one to ten Signaling Line Circuit (SLC) loops
- Network operation
- Uses Notifier's VIEW® early warning fire detection and the FlashScan® or CLIP families of detectors and modules
- Alarm, Trouble, Supervisory and Security relays
- Support for 32 annunciator addresses with either 64 or 96 points each (depending on the capability of the annunciator)
- Supports Style 4, Style 6, Style 7 SLC loops
- Logic Equations
- Multi-line display
- Ability to activate local sounder or relay bases in alarm or pre-alarm
- Alarm verification pre-alarm indication (NYC)
- Supervisory duct detectors
- Supports AWACS algorithms
- EIA-485 connections for wiring ACS annunciators (including LDM custom graphic annunciators), TM-4 transmitter

- EIA-232 connection for printer
- Autoprogram feature for faster programming of new devices
- Easy connection to VeriFire Tools programming utility
- The basic system power supply is addressable, charges sealed lead-acid batteries ranging in capacity from 25 to 200 amp hours, and provides 4.5 amps of power for use by the CPU.
- Easy connection to auxiliary power supplies and battery chargers for custom design of very large systems.
- Diagnostic LEDs and switches
- Ground fault detection
- Supports up to 12 panel circuit modules, including input module IZM-8RK
- Support for Remote Text Display (LCD-160)
- Support for Display and Control Center (DCC) functionality

2.1.2 Options

Refer to Section 2.2 "System Components" for descriptions of the various optional modules.

- Rubberized keypad with a standard "QWERTY" keyboard layout, a 640-character LCD display, indicator LEDs, and switches.
- Separately ordered Loop Control Modules and Loop Expander Modules provide up to ten SLC loops.
- Optional equipment includes: ACS devices, UDACT Universal Digital Alarm Communicator/Transmitter, ACM-8R remote relay module to provide additional relay points, audio and voice components, and panel circuit modules.

2.1.3 System Limitations

System expansion must take into consideration the following:

1. The physical limitations of the cabinet configuration.
2. The electrical limitations of the system power supply.
3. The capacity of the secondary power source (standby batteries).

2.2 System Components

Central Processing Unit (CPU) The central processing unit for the NFS-3030 system can be ordered with a keypad/display (P/N CPU-3030D) or without a keypad/display (P/N CPU-3030ND). CPU-3030D serves as "primary display" version for ULC applications. CPU-3030ND is intended for use in network applications; LEDs and momentary switches on the printed circuit board mimic those on the keypad to enable operation and trouble-shooting at the panel when it is used without a local primary display.

Power supply The main power supply is AMPS-24/AMPS-24E, which provides +24 VDC power and a battery charger for a basic system. Auxiliary power supplies and/or battery chargers are available to customize large systems.

Enclosures Four cabinet sizes are available; doors and backboxes are ordered separately. "A" size backboxes hold one row of modules, "B" size backboxes hold two rows, "C" size backboxes hold three rows, and "D" size backboxes hold four rows. See Section 2.4 "System Cabinets" for basic description. A variety of dress panels, trim rings, and blank modules are available to accompany specific combinations of system equipment; contact Notifier for a complete parts list.

SLC Loops: LCM-320, LEM-320 To provide one SLC loop, connect one LCM-320 to the panel. Connect an LEM-320 to the LCM-320 to provide a second loop. Up to five pairs of modules can be installed on the panel to provide a maximum of ten SLC loops.

Network connection Connect an NCM-W or NCM-F to provide a connection to Noti•Fire•Net (network version 5.0 or higher).

Annunciators The NFS-3030 supports ACM-24AT/ACM-48A (and their expanders) with either 64 or 96 points at an address, as well as ACM-16AT/ACM-32A/LDM-32 (and their expanders) with 64 points at an address and Notifier's other ACS devices. (See Section 2.5 "Compatible Equipment" if looking for specific ACS devices.)

Panel Circuit Modules These include both output modules (ICM-4RK/ICE-4, CRM-4RK/CRE-4, ARM-4, VCM-4RK/VCE-4, DCM-4RK/VCE-4) and input modules (IZM-8RK/IZE-A). For installation information about VCM-4RK and DCM-4RK, see the *Voice Alarm System Manual.*

2.3 Product Diagram

The control panel electronics are contained on one printed circuit board (PCB) that holds the central processing unit (CPU). The CPU can be purchased with or without keypad and display; (see Section 2.2 "System Components" for P/N details). Connections are identical on both versions. The following figure illustrates the location of the various connections, switches, jumpers and LEDs on the circuit board. See Section 3 "Installation" for more details.

Note: Relay circuits are power-limited only if connected to a power-limited signal source. Relays are rated for 2A@30Vdc resistive.

TB1 Security Relay
TB2 Supervisory Relay
TB3 Trouble Relay
TB4 Alarm Relay

TB7 ACS (power-limited, supervised)
TB9 RDP devices such as LCD-160
TB9 TOUT+/- : Future Use
TB5, left side. Printer (isolated)
TB5, CTS/CRX Keltron printer supervision (TB5, CTS & REF No connection)

J1 Network/Service Connection (NUP) Cable P/N 75556

J7 SLC Loops (Connect to first LCM-320) Cable P/N 75565

SW1 Security
SW2 Supervisory

J6 Security switch connection
J5 Trouble bus connection

J2 LCD connection
J4 backlight connection

SW3 Acknowledge
SW4 Signal Silence
SW5 System Reset
SW6 Lamp Test

Service-level switches for local operation without keypad/display

Status Indicator LEDs (See Figure 2.3)

Lithium battery for backup of on-board memory (See Section 3.5.1 "Memory-Backup Battery".)

TB6 Accessory Power (See Section 3.15 "Connecting Power Sources and Outputs")

J9 Keypad connection

J13 Power connections (non-power-limited) (See Section 3.15 "Connecting Power Sources and Outputs")

J10, **J11**, **J12** Panel circuit module connections (power-limited, supervised) Cable 71088 (See Figure 3.9)

Note: Dotted line indicates location of optional keypad & LCD display

Figure 2.1 CPU Connections

The keyboard/display assembly is shown in Figure 2.2. As shown in Figure 2.3, LEDs on the keyboard/display are repeated on the printed circuit board. This enables operation and trouble-shooting when the panel is used without the display assembly.
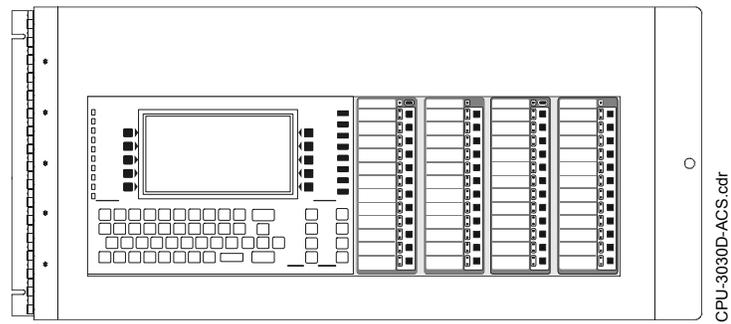

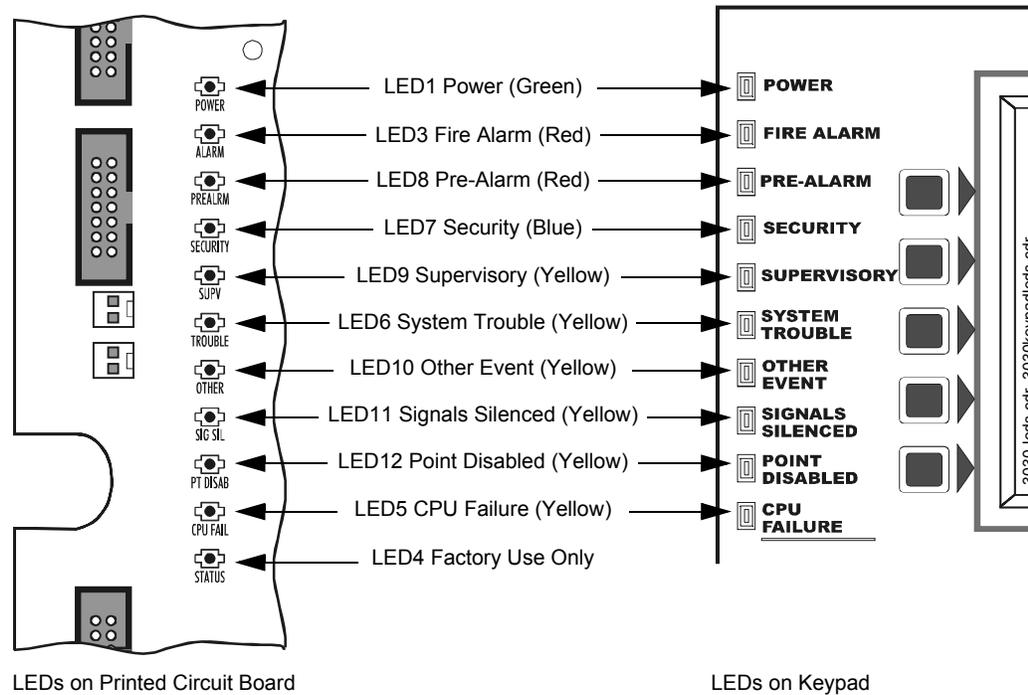**Figure 2.2 CPU-3030D (Shown with Two Annunciators)**

LEDs on Printed Circuit Board   LEDs on Keypad

Figure 2.3 Status Indicator LEDs

2.3.1 Main Power Supply

The AMPS-24/E addressable main power supply provides a total of 4.5 A to the CPU. During normal operation it recharges batteries ranging in capacity from 25 to 200 amp-hours. Refer to the *AMPS-24/E Manual* for details.

Refer to Appendix A, "Electrical Specifications" to determine whether your system requires an auxiliary power supply.

2.4 System Cabinets

The CPU and modules are installed in a CAB-4 series backbox. There are four different sizes available, holding from one to four rows of equipment plus batteries (up to two 25AH batteries). Backboxes are ordered separately from doors. The doors can be mounted on the left or the right side of the cabinet; reversible hinges are provided so that this choice can be made in the field. Doors open a full 180 degrees and have locks. Mounting methods include surface-mounting or semi-flush mounting on a wall between 16 inch (406.4 mm) on-center studs. A trim ring option is available for semi-flush mounting.

External measurements for each cabinet size are provided below. Refer to *CAB-3/CAB-4 Series Cabinet Installation Document* (shipped with your cabinet) for specific mounting drawings and dimensions.

A-size backbox (one row)	24.125 in (612.78 mm) wide 20.125 in (511.18 mm) tall 5.218 in (132.54 mm) deep **Optional trim ring TR-A4**
B-size backbox (two rows)	24.125 in (612.78 mm) wide 28.625 in (727.08 mm) tall 5.218 in (132.54 mm) deep **Optional trim ring TR-B4**
C-size backbox (three rows)	24.125 in (612.78 mm) wide 37.250 in (946.15 mm) tall 5.218 in (132.54 mm) deep **Optional trim ring TR-C4**
D-size backbox (four rows)	24.125 in (612.78 mm) wide 45.875 in (1165.23 mm) tall 5.218 in (132.54 mm) deep **Optional trim ring TR-D4**

The CPU and adjacent first-row modules mount in chassis CHS-M3. Additional rows of modules mount in the cabinet using CHS-4N (shipped in kit CHS-4MB), CHS-4L, or other chassis compatible with CAB-4 series enclosures.

Some additional components available in the CAB-4 series include:

DP-DISP An Inner Dress Panel for covering the backbox area surrounding various modules.

BMP-1 Blank Module Plate for covering an unused module position. Provides another location for mounting option boards such as TM-4 or NCM-W.

MP-1B Blank panel for covering panel circuit modules in second, third, or fourth rows of backbox.

BP-4 Battery dress panel.

DP-1B High-profile battery cover

ADP-4B Annunciator dress panel

2.5 Compatible Equipment

Compatible Notifier and System Sensor equipment that connects directly to the CPU is listed below. These are the most common devices at time of publishing; the most complete list of compatible intelligent SLC loop devices is provided in the *SLC Wiring Manual*; for conventional non-addressable equipment see the Device Compatibility Document. These devices are UL and ULC listed unless marked otherwise (in parentheses next to the product). Other control panels and their equipment can also be connected in a network, via Noti•Fire•Net version 5.0; refer to the *Noti•Fire•Net Version 4.0 & Higher Installation Manual* for details. Some products are documented in a separate manual; see Section 1.2 "Supplemental Documentation".

Notifier Compatible Equipment

AA-30 30-Watt Audio Amplifier
AA-100 100-Watt Audio Amplifier
AA-120 120-Watt Audio Amplifier
ACM-16AT Annunciator Control Module
ACM-24AT Annunciator Control Module
ACM-32A Annunciator Control Module
ACM-48A Annunciator Control Module
ACM-8R Annunciator Control Module
ACPS-2406 Auxiliary Charger/Power Supply
ACT-1 Audio Coupling Transformer
ACT-2 Audio Coupling Transformer
AEM-16AT Annunciator Expander Module
AEM-24AT Annunciator Expander Module
AEM-32A Annunciator Expander Module
AEM-48A Annunciator Expander Module
AFM-16A Annunciator Fixed Module
AFM-16AT Annunciator Fixed Module
AFM-32A Annunciator Fixed Module
AKS-1B Annunciator Key Switch
APJ-1B Annunciator Phone Jack
AMG-1 Audio Message Generator
AMG-E Audio Message Generator Expander
AMPS-24/E Addressable Main Power Supply
APS-6R Auxiliary Power Supply
ARM-4 Auxiliary Relay Module
BGX-101L Addressable Manual Pull Station
BX-501 Intelligent Detectors/Sensors Base
B501 Intelligent Base
B501BH Sounder Base
B710LP Intelligent Detector Base
B224RB Low-profile Relay Base
B224BI Isolator Base for Low-profile Detectors
CHG-120 Battery Charger
CMX-1 Addressable Control Module
CMX-2 Addressable Control Module
CPX-551 Intelligent Ionization Smoke Detector
CPX-751 Intelligent Ionization Smoke Detector (CLIP mode)
CRE-4 Control Relay Expander
CRM-4RK Control Relay Module
DCM-4RK Dual Channel Module
DPI-232 Direct Panel Interface
FCM-1 NAC Module
FCPS-24 Field Charger Power Supply
FDX-551 Intelligent Thermal Sensor
FDX-551R Intelligent Thermal Rate-of-Rise Sensor
FFT-7 Fire Fighters Telephone
FFT-7S Fire Fighters Telephone
FHS Fireman's Handset
FTM-1 Telephone Module
FMM-1 Monitor Module
FMM-101 Mini Monitor Module
FSB-200S Single-ended beam smoke detector with sensitivity testing
FSB-200 Single-ended beam smoke detector.
FSD-751P/RP/PL Duct Detectors
FSI-751 Ion Detector

FSI-851 Ion Detector
Acclimate Plus™ FAPT-751 Combination Photoelectric/Heat Detector
FAPT-851 (Acclimate Plus™) Combination photo/heat Detector
FSM-101 Pull Station Monitor Module
FPJ-1 Fireman's Phone Jack
FRM-1 Relay Module
FDM-1 Dual Monitor Module
FSL-751 FlashScan VIEW® Laser Detector
FSH-751 HARSH™ Photo Detector
FSP-751 Photo Detector
FSP-851 Photo Detector, listed for use in ducts
FSP-751T Photo/Thermal Detector
FSP-851T Photo/heat Detector, listed for use in ducts.
FST-751 Thermal Detector
FST-751R Thermal Rate-of-rise Detector
FST-851 Thermal Detector
FST-851R Thermal Rate-of-rise Detector
FST-851H High-temperature thermal Detector
FZM-1 Zone Module
HPX-751 HARSH™ Hostile Environment Smoke Detector
ICE-4 Indicating Control Expander
ICM-4RK Indicating Control Module
IPX-751 Advanced Multi-Sensor Intelligent Detector
ISO-X Loop Fault Isolator Module
IZE-A Initiating Zone Expander
IZM-8RK Initiating Zone Module
LCD-80 Liquid Crystal Display Module (ACS mode)
LCD-160 Liquid Crystal Display
LCM-320 Loop Control Module
LDM-32 Lamp Driver Module
LDM-E32 Lamp Driver Module
LDM-R32 Lamp Driver Module
LEM-320 Loop Expander Module
LPX-751 VIEW® Low Profile Laser Detector
MMX-1 Addressable Monitor Module
MMX-2 Addressable Monitor Module
MMX-101 Addressable Mini Monitor Module
NBG-12LX Series Addressable Manual Pull Station
NCA Network Communications Annunciator
NCM-F Network Control Module (Fiber)
NCM-W Network Control Module (Wire)
NCS Network Control Station
N-ELR Assortment ELR Pack with Mounting Plate
VS4095 Keltron Printer (Dress plate P-40) *(Not ULC-listed)*
PRN Series 80-Column Printers (PRN-4, PRN-5, PRN-6)
R-120 120 Ohm End-of-Line Resistor
R-2.2K 2.2K End-of-Line Resistor
R-27K 27K End-of-Line Resistor
R-470 470 End-of-Line Resistor
R-47K 47K End-of-Line Resistor
RA400 Remote Annunciator
RA400Z Remote Annunciator with diode

RFX Wireless Transmitter (version 2.0 and higher) *(Not ULC-listed)*: SDRF-751 Wireless Photo/Thermal Smoke Detector; 5817CB Wireless Monitor Module
RKS-S Remote Security Keyswitch *(Not ULC-listed)*
RPJ-1 Remote Phone Jack
RPT-485F EIA-485 Repeater (Fiber)
RPT-485W EIA-485 Repeater (Wire)
RPT-485WF EIA-485 Repeater (Wire/Fiber)
RM-1 Remote Microphone
RM-1SA Remote Microphone
SCS-8, SCE-8 Smoke Control System
SDX-551 Intelligent Photoelectric Detector
SDX-551TH Intelligent Photoelectric and Thermal Detector
SDX-751 Intelligent Photoelectric Detector
STS-1 Security Tamper Switch *(Not ULC-listed)*
TM-4 Transmitter Module
UDACT Universal Digital Alarm Communicator Transmitter
UZC-256 Universal Zone Coder

VCE-4 Voice Control Expander
VCM-4RK Voice Control Module
VeriFire™ Tools Upload/Download Software
XP5-C Transponder Control Module
XP5-M Transponder Monitor Module
XPC-8 Transponder Control Module
XPIQ Quad Intelligent Audio Transponder
XPM-8 Transponder Monitor Module
XPM-8L Transponder Monitor Module
XPP-1 Transponder Processor
XPR-8 Transponder Relay Module
XP6-C Supervised Control Module
XP6-R Six Relay Control Module
XP10-M Ten Input Monitor Module
XP6-MA Six Zone Interface Module

System Sensor Compatible Equipment
A2143-00 End of Line Resistor Assembly

Notes

Section 3: Installation

3.1 Preparing for Installation

Choose a location for the fire alarm system that is clean, dry, and vibration-free with moderate temperature. The area should be readily accessible with sufficient room to easily install and maintain it. There should be sufficient space for cabinet door(s) to open completely.

Carefully unpack the system and inspect for shipping damage. Count the number of conductors needed for all devices and find the appropriate knockouts. (Refer to Section 3.16 "UL Power-limited Wiring Requirements" for selection guidelines.)

Before installing the fire alarm system, read the following:

- Review the installation precautions at the front of this manual.
- Installers should be familiar with the standards and codes specified in Section 1.1 "Standards and Other Documents".
- All wiring must comply with the National and Local codes for fire alarm systems.
- Do not draw wiring into the bottom 9 inches (22.86 cm) of the cabinet except when using a separate battery cabinet; this space is for internal battery installation.
- Review installation instructions in Section 3.2 "Installation Checklist".

⚡ **WARNING: Risk of irreparable equipment damage**
Make sure to install system components in the sequence listed below. Failure to do so can damage the control panel and other system components.

⚡ **WARNING: Risk of irreparable equipment damage**
Wear a static discharge strap on wrist to prevent equipment damage.

3.2 Installation Checklist

The checklist that follows contains references to information included in other manuals; see Section 1.2 "Supplemental Documentation" for document part numbers.

	Task	Refer to:
1.	Mount the cabinet backbox to the wall.	Section 3.3 "Mounting a Cabinet"
2.	Attach CPU to chassis	Section 3.5 "Attaching the CPU & Chassis"
3.	Attach panel circuit modules and option boards (e.g. SLC loop modules, network control modules, and other devices of the same size) to chassis.	• Section 3.6 "Attaching Option Boards" • Section 3.7 "Attaching Panel Circuit Modules" • Section 3.14 "Connecting Specific Option Boards" • Installation document for the specific device
4.	Attach chassis to backbox as appropriate for system design	Section 3.4 "Laying Out Equipment in Cabinet and Chassis"
5.	Wire Notification Appliance Circuits, Initiating Device Circuits, and Relays	• Section 3.8 "Initiating Device Circuits with IZM-8RK/IZE-A" • Section 3.9 "NACs with ICM-4RK/ICE-4" • Section 3.10 "Form-C Relays on the CPU" • Section 3.11 "Form-C Relays with CRM-4RK/CRE-4" • Section 3.12 "Form-C Relays with Auxiliary Relay Module (ARM-4)"
6.	Attach & wire other system components	
	☐ Annunciators and other ACS devices	*ACS Manual, LCD-80 Manual*, etc.
	☐ Remote Data Port devices	LCD-160 Manual

Table 3.1 Installation Checklist (1 of 2)

	Task	Refer to:
	☐ Printer or other output device(s)	Section 3.18 "Installing Printers"
	☐ Network devices	*Noti•Fire•Net Version 4.0 & Higher Manual,* and/or Installation document for specific device(s)
7.	Wire the Signaling Line Circuits.	Section 3.19 "Wiring a Signaling Line Circuit (SLC)" and the *SLC Wiring Manual*
8.	Calculate the proper battery rating.	Main Power Supply Manual
9.	Install main power supply & batteries in separate enclosure. Run cable to main & optional power supplies, DC power outputs, relays, etc.	Section 3.15 "Connecting Power Sources and Outputs" Section 3.16 "UL Power-limited Wiring Requirements"
	⚠ **WARNING:** Do not activate power at this time. Do NOT connect batteries.	
	☐ Main power supply.	Main Power Supply Manual *BB-100/200 Cabinet Installation Instructions*
	☐ Auxiliary power supply and/or external battery charger	Auxiliary power supply manuals and/or battery charger manuals Note: If using multiple power supplies with one set of batteries, refer to main power supply manual for connection requirements.
10.	Check that all mounting holes are secured to insure a proper Earth Ground connection.	
11.	Connect wire shielding to Earth Ground.	
12.	Remove insulator from lithium battery on CPU	Section 3.5.1 "Memory-Backup Battery"
13.	Apply AC power to the control panel by placing the external circuit breaker to the ON position. **Do NOT connect batteries until AC power is checked (see next step).**	
14.	Check AC power.	Section 3.15.3 "Checking AC Power"
15.	Connect the batteries using interconnect cable as described in power supply manual.	
16.	Install the dress panels, doors and covers.	CAB-3/CAB-4 Series Cabinet Installation Document
17.	Program the control panel.	Programming Manual.
18.	Field test the system.	Section 5 "Testing the System"

Table 3.1 Installation Checklist (2 of 2)

3.3 Mounting a Cabinet

This section provides instructions for mounting the CAB-4 Series backbox to a wall. Follow these guidelines when mounting the backbox:

- Locate the backbox so that the top edge is 66 inches (1.6764 m) above the surface of the finished floor.

- Allow sufficient clearance around cabinet for door to swing freely. (See Section 2.4 "System Cabinets".)

- Use the four holes in the back surface of the backbox to provide secure mounting (See Figure 3.1).

- Mount the backbox on a surface that is in a clean, dry, vibration-free area.

⚠ **CAUTION:**
Unless you are familiar with the placement of components within this backbox, only use the knockout locations provided for conduit entry.

Follow the instructions below.

1. Mark and pre-drill holes for the top two keyhole mounting bolts.

2. Select and punch open the appropriate knock-outs. (For selection guidelines, see Section 3.16 "UL Power-limited Wiring Requirements".)

3. Using the keyholes, mount the backbox over the two screws.

4. Mark the location for the two lower holes, remove the backbox and drill the mounting holes.

5. Mount the backbox over the top two screws, then install the remaining fasteners. Tighten all fasteners securely.

6. Feed wires through appropriate knockouts.

7. Install CPU and other components according to this section, before installing hinges and door (see *CAB-3/CAB-4 Series Cabinet Installation Document)*.
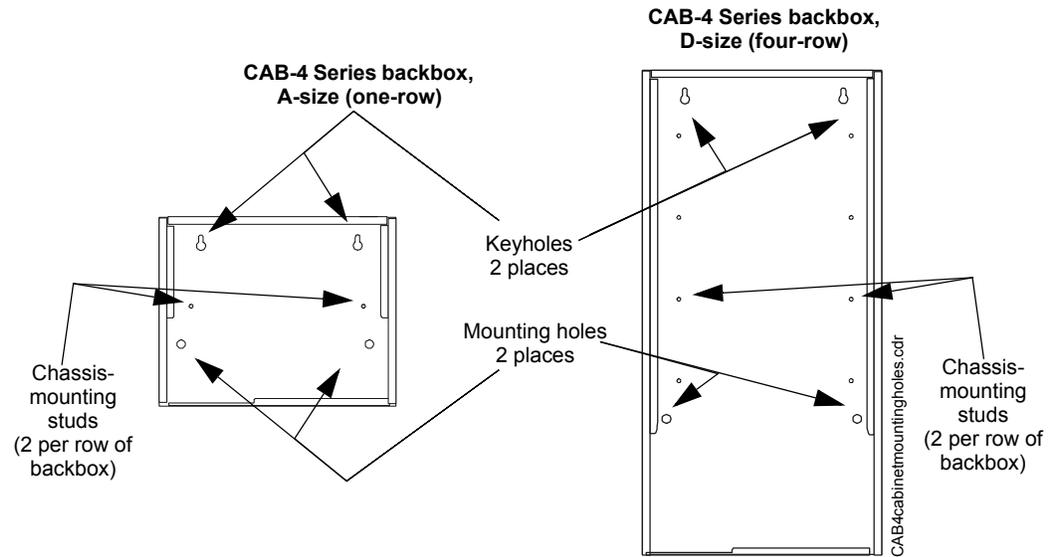
Figure 3.1 Backbox-Mounting Holes and Chassis-Mounting Studs

3.4 Laying Out Equipment in Cabinet and Chassis

The NFS-3030 allows for flexible system design. Follow these guidelines when deciding where to locate equipment in the backbox. There are four basic positions available on a chassis; the number of layers that can be mounted in each position depends on the chassis model and the module size.

The CPU mounts in chassis CHS-M3 in the top row of the cabinet. The CPU and its optional display occupy the left half of the chassis (positions 1 and 2, see Figure 3.2). If NCA is used, it may be door-mounted in front of a displayless CPU (see the NCA manual for details & restrictions).
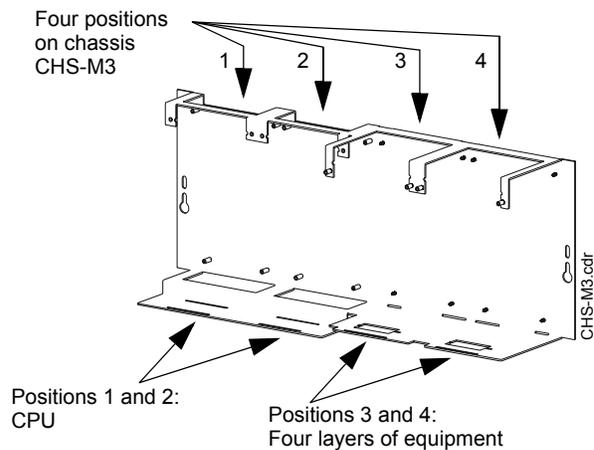
Figure 3.2 Chassis CHS-M3

Positions 3 and 4 of CHS-M3 can hold up to four layers of equipment including annunciators, panel circuit modules, and option boards. See Figure 3.3 for possible configurations of these four layers.

The BMP-1 Blank Module Plate covers unused positions and also provides a location to door-mount some option boards (see *BMP-1 Product Installation Drawing* for details).

Layers 1&2&3 mounted to PEM studs on chassis

Layers 1&2&3 mounted to PEM studs on chassis

Layers 1&2 mounted to PEM studs on chassis

Layers 1&2 mounted to PEM studs on chassis

CHS-M3-options.cdr

Layer 4 mounted to PEM studs and tab-slot

Layer 4 door-mounted*

Layer 4 mounted to PEM studs and tab-slot; Layer 3 suspended from Layer 4

Layer 4 mounted to PEM studs and tab-slot; Layer 3 suspended from Layer 4
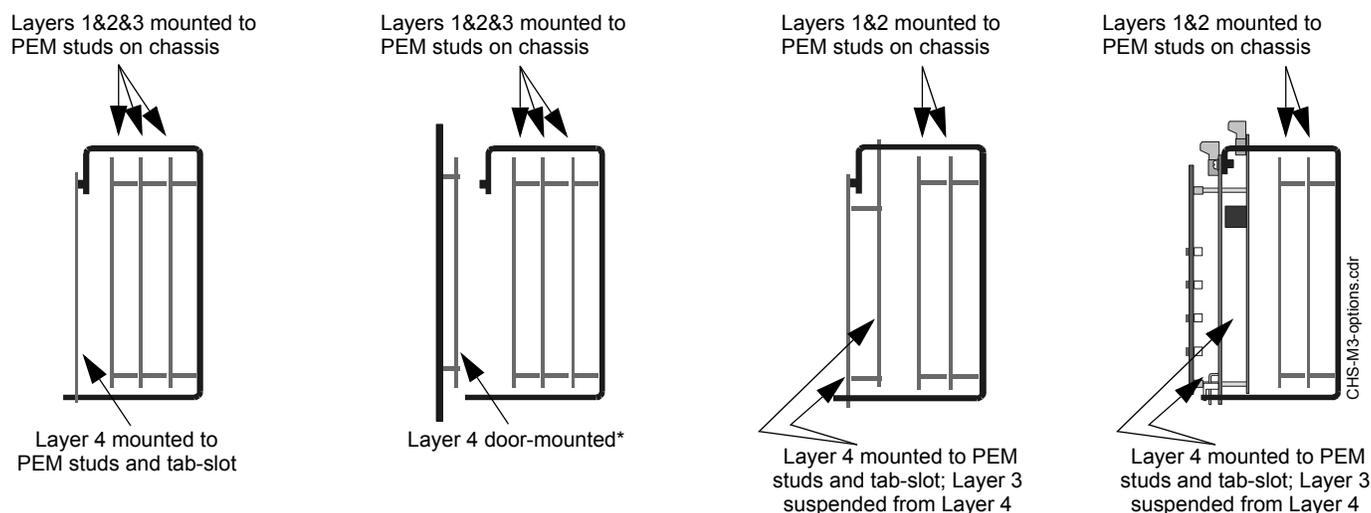
*Note: If CHS-4N is used, door-mounting is only for use with ACM-24AT and ACM-48A series annunciators.

Figure 3.3 Configuring Equipment in Chassis (Side View): Positions 3 and 4 of CHS-M3, All 4 Positions of CHS-4N

Second, third, and fourth rows of equipment use any chassis compatible with CAB-4 series backboxes, such as CHS-4N (shipped as part of CHS-4MB) or CHS-4L. Refer to the *CAB-3/CAB-4 Series Cabinet Installation Document* for a complete list. Some equipment (such as the NCA and annunciators) can be door-mounted; refer to your equipment's documentation for instructions.

Panel circuit modules include ICM-4RK, CRM-4RK, IZM-8RK, VCM-4RK, DCM-4RK and their expanders. See Section 3.7 "Attaching Panel Circuit Modules"; for VCM-4RK and DCM-4RK, also see the *Voice Alarm System Manual*. Option boards include LCM-320, LEM-320, NCM-W/F, TM-4, and DPI-232; see Section 3.6 "Attaching Option Boards". The documentation shipped with your equipment may also contain device-specific instructions.

NOTE: It is recommended that system design take into consideration the UL requirements for minimum separation of power-limited and non-power-limited wiring; for example, having all non-power-limited circuits grouped in one area of the cabinet (see Section 3.16 "UL Power-limited Wiring Requirements" and your power supply manual).

3.5 Attaching the CPU & Chassis

Mount CPU into positions 1 and 2 of CHS-M3 as follows; equipment may be mounted to the chassis before or after the chassis is mounted in the backbox. Some equipment may be door-mounted directly in front of the CPU; see Section 3.4 "Laying Out Equipment in Cabinet and Chassis" and the manual shipped with the other device.

1. Attach four stand-offs to chassis as shown in Figure 3.4.
    CPU-3030D (with keypad/display) requires the longer stand-offs: 1.5 inch (38.1 mm);
    CPU-3030ND (without keypad/display) requires the shorter stand-offs: 0.25 inch (6.35 mm)

2. Slide circuit-board tabs into slots on chassis as shown in Figure 3.4.

3. Place the board over the stand-offs so that mounting holes line up with those on the chassis. Secure all stand-offs with screws provided.
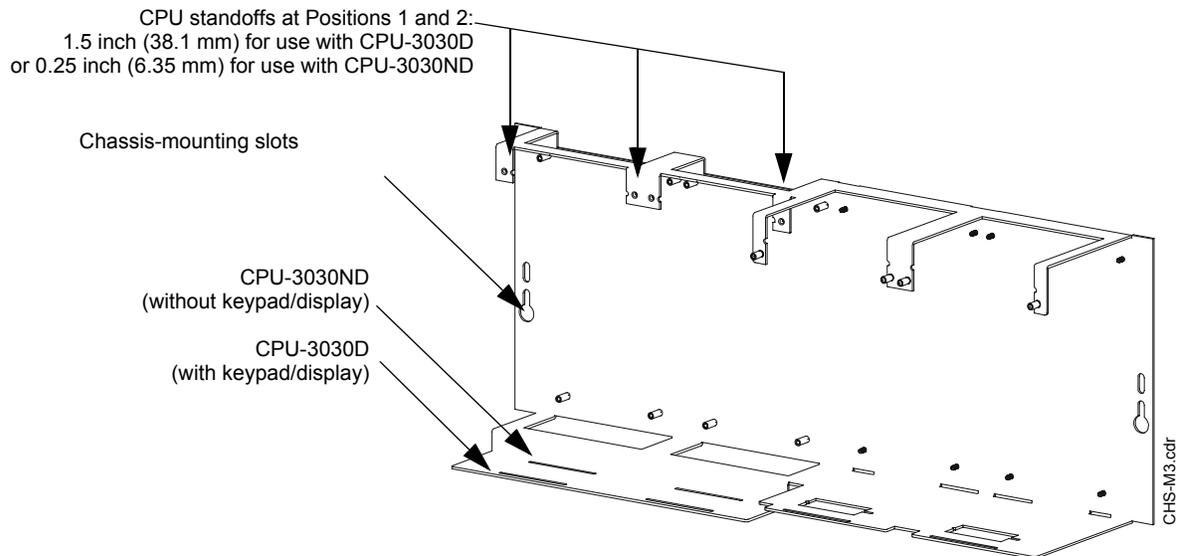
CPU standoffs at Positions 1 and 2:
1.5 inch (38.1 mm) for use with CPU-3030D
or 0.25 inch (6.35 mm) for use with CPU-3030ND

Chassis-mounting slots

CPU-3030ND
(without keypad/display)

CPU-3030D
(with keypad/display)

CHS-M3.cdr

Figure 3.4 Standoffs on Chassis CHS-M3

> ⚠ **CAUTION:**
> It is critical that all mounting holes of the NFS-3030 are secured with a screw or stand-off to insure
> continuity of Earth Ground.

Note for CPU-3030D. Due to the difficulty of reaching under the keypad, it may be convenient to remove the insulator from the lithium memory-backup battery at this time. See Section 3.5.1 "Memory-Backup Battery".

Mounting Chassis in Backbox

Align chassis-mounting slots with chassis-mounting studs (see Figure 3.1 and Figure 3.4 for locations). Secure with nut & lock-washer provided with chassis.

3.5.1 Memory-Backup Battery

The lithium battery on the CPU provides backup of the CPU's on-board memory during power loss. The CPU ships with an insulator to prevent the battery from discharging. To preserve the battery, the insulating tube should be left in place as long as possible before applying AC power.

If the insulator is *not* removed before applying AC power, the control panel will show a trouble situation.

BT1

3030-lithium.cdr

Lift clip gently while
removing battery

Dotted line indicates
location of insulator

This battery's shelf-life should exceed 10 years, but if for some reason it fails, the control panel will show a trouble when powered up. To replace the lithium battery:

1. Make a full backup of all system settings to prevent loss of all programming data.

2. Disconnect all power sources.

3. *CPU-3030D only*: Disconnect wiring and remove CPU-3030D from backbox (3 screws at top, lift board tabs out of slot) and remove keypad (4 screws on back, LCD display stays attached).
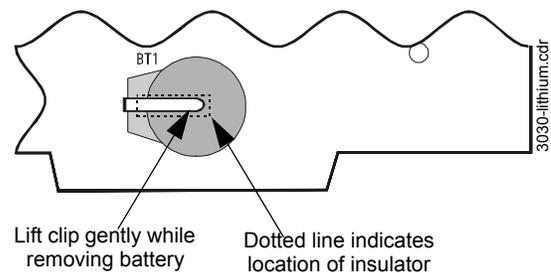
4. Remove battery from under clip (use fingers, because screwdriver could damage components) and insert new battery.

⚠ **CAUTION:**
The battery used in this device may present a risk of fire or chemical burn if mistreated.
Do not recharge, disassemble, heat above 212°F (100°C), or incinerate. Replace battery with Notifier P/N LITHBATT-3V only. Use of another battery may present a risk of fire or explosion.

5. *CPU-3030D only*: Replace keyboard, reinstall CPU-3030D into chassis, and reconnect wiring.
6. Follow system power-up procedures.
7. Dispose of used battery promptly. Keep away from children. Do not disassemble and do not dispose of in fire.

3.6 Attaching Option Boards

If installing option boards into a CAB-4 Series backbox, mount & connect those boards at this time. This section contains general instructions for mounting an option board; see the documentation that shipped with your board for any product-specific instructions.

As described in Section 3.4 "Laying Out Equipment in Cabinet and Chassis", up to eight option boards can be mounted in CHS-M3 to the right of the CPU; additional modules can be mounted in other chassis.
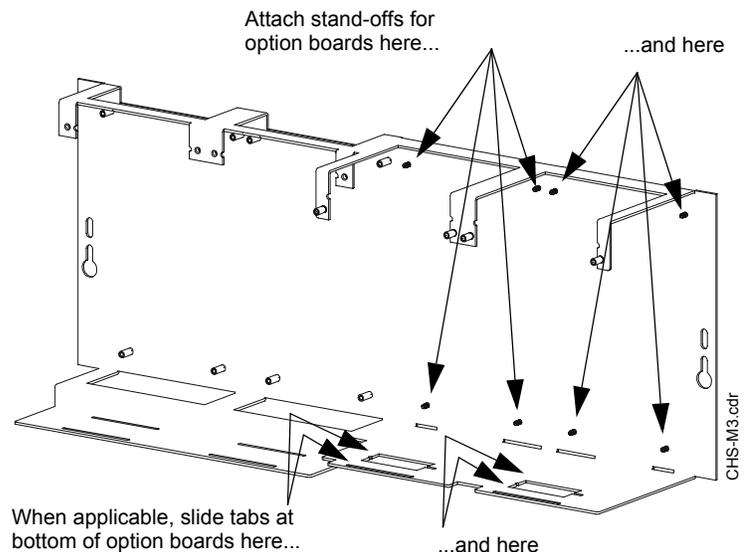
Figure 3.5 Mounting Option Boards in CHS-M3

There are no slots in the first (back) two layers, but option boards with tabs (such as NCM-W) will still fit in those positions.

📄 **NOTE:** Mounting two pairs of LCM-320 and LEM-320 modules in one chassis possition may cause intermittent electrical interference. If this occurs, move one pair to a separate chassis position.

Mounting procedures

1. Install four 1 inch (25.4 mm) stand-offs onto the chassis as shown in Figure 3.5.
2. Place the first option board over the stand-offs so that holes line up.
3. If no more option boards will be mounted in that position, securely fasten all stand-offs with screws (provided with module). If mounting a second or third option board, attach another layer of stand-offs and repeat steps 2-3. **Note:** Set the switches on an option board before mounting another layer in front of it.
4. If mounting a pair of SLC loop modules, refer to Section 3.14.2 "Loop Control Module, Loop Expander Module" and to Section 3.7.3 "Installing a Multi-layer Module into the Chassis".

5. For the top (fourth) layer of option boards, slide the tab at the bottom of the board into the slots on the chassis, and lay the board back onto the top of the chassis so that the studs line up with mounting holes on the option board. Securely fasten all stand-offs with screws provided with module.

6. If mounting the option board behind a blank module plate in a dress plate or annunciator backbox, see the *BMP-1 Product Installation Drawing* for details. This dress plate is suitable for option boards, which do not need to be visible or accessible when the door is closed.
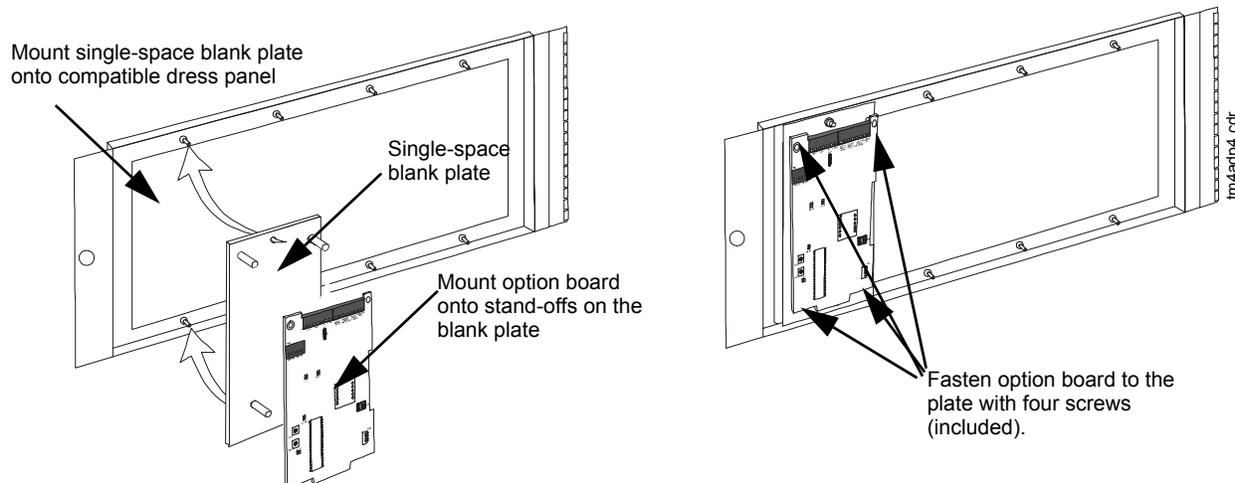
Note: Mounting instructions for option boards are the same in various dress panels.

Figure 3.6 Mounting Single-space Blank Plate with Option Board

7. If mounting a pair of loop control/expander modules, see Section 3.14.2 "Loop Control Module, Loop Expander Module".

3.7 Attaching Panel Circuit Modules

3.7.1 Overview

If installing panel circuit modules into a CAB-4 Series backbox, mount and connect those boards at this time. This section contains general instructions for mounting a panel circuit module; see the sections about individual panel circuit modules for module-specific instructions. For voice alarm/evacuation applications (VCM-4RK and DCM-4RK), see the *Voice Alarm System Manual*.

*   Mount an optional expander board to the module.
*   Install the panel module onto a chassis.
*   Connect ribbon cables from CPU.
*   Connect ICM-4RK and ICE-4 modules to the power supply.
*   Connect NACs, IDCs, and relays; write any non-power-limited relay connections on door label.
*   Field wire the module.
*   After powering up the system, program the panel.
*   Type your point-programming information onto the slide-in labels provided with your panel circuit module or create custom labels with LabelEase (available from Notifier); insert these labels into the slots at the top of the module.

3.7.2 Mount Expander Boards

Expander Board Modules need to be mounted onto their respective modules (e.g. ICE-4 onto ICM-4RK, or CRE-4 onto CRM-4RK) before being installed onto a chassis. To mount an expander module:

1. Remove one module support screw and set it aside for later use.

2. Replace the module support screw with one module stand-off (supplied with expander).

3. Repeat Steps 1 and 2 for the three remaining module support screws. Remove only one at a time so the panel circuit module does not come apart.

4. Insert pins on the front of the expander board into connector on the back of the module. Make sure the pins are in line; then, press the two units together until they snap into place.

5. Install the four module support screws (removed earlier) through the back of the expander board and into the stand-offs. Tighten securely.

Figure 3.7 illustrates the steps.
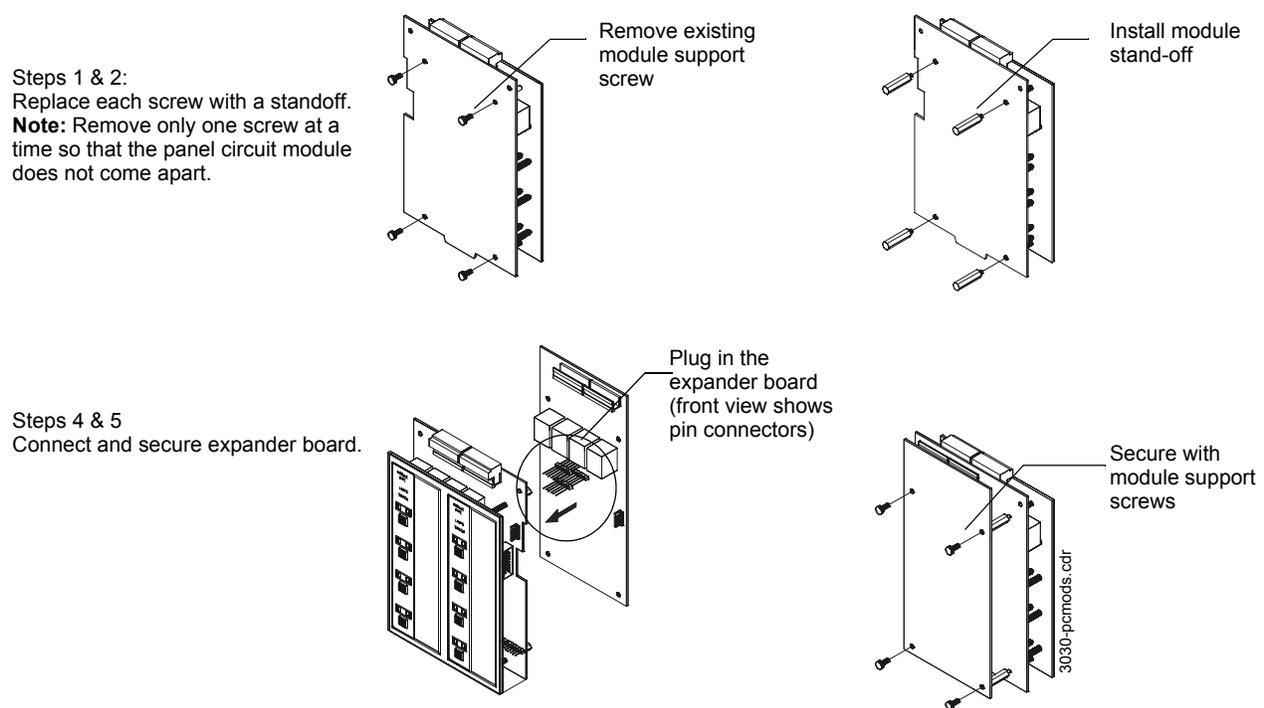
Figure 3.7 Expander Module Installation

3.7.3 Installing a Multi-layer Module into the Chassis

Follow the instructions illustrated in Figure 3.8 to install a panel circuit module or a pair of loop control/expander modules into into CHS-4N or CHS-M3.

NOTE: Loop control/expander modules can also mount in CHS-4; see Figure 3.21.

1. Angle the module into the chassis so that the upper end of the rear board (or boards) fits into the top slot.

2. Bring the module back down so that the lower board edges slip into the bottom slots.

3. Secure the module to the chassis with the two module screws. Tighten securely.

4. Connect the ribbon cable to the module.
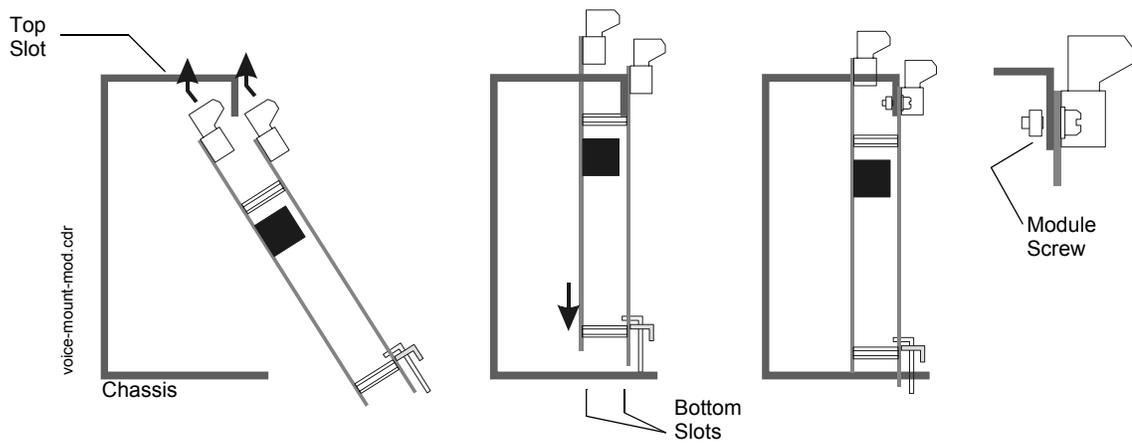
Figure 3.8 Inserting a Two-Layer Module into CHS-4N or CHS-M3 Chassis

📑 **NOTE:**   Depending on system components, clearance may be tight. Do not force modules! Move the assembly around gently until you find the angle where components and mounting studs pass each other without scraping together.

3.7.4 Connecting Expander Row Ribbon Cables

Expander Row Ribbon Cables connect panel circuit modules such as Indicating Circuit Modules (ICM-4RK) or Control Relay Modules (CRM-4RK) to the CPU.

Figure 3.9 provides a typical wiring setup connecting the control panel to three rows of panel circuit modules each below the CPU in a CAB-4 Series backbox.
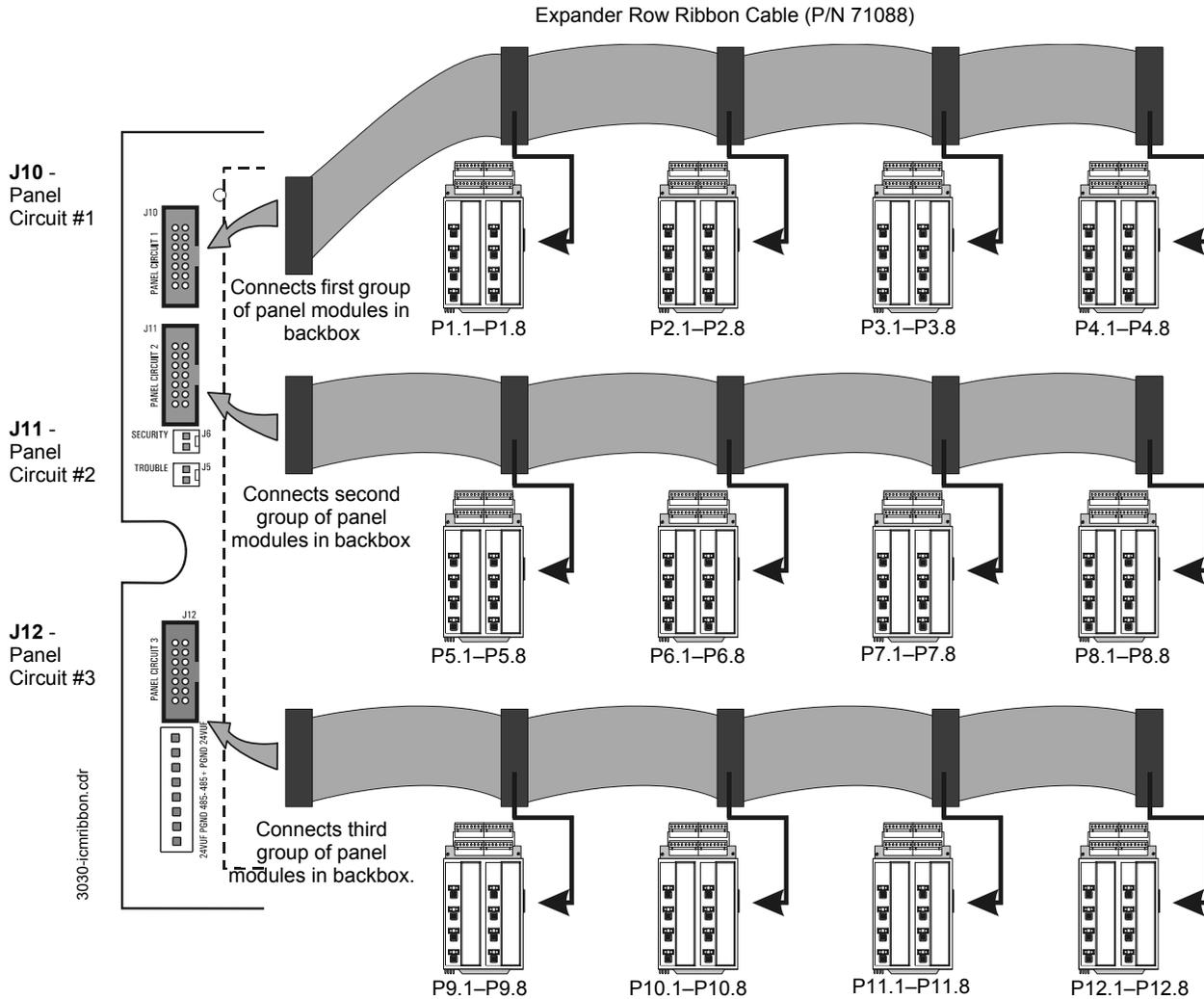
Figure 3.9 Expander Row Ribbon Cable Setup

3.8 Initiating Device Circuits with IZM-8RK/IZE-A

3.8.1 Style B Field Wiring (Up to 8 Style B IDCs)

Typical NFPA Style B Initiating Device Circuit
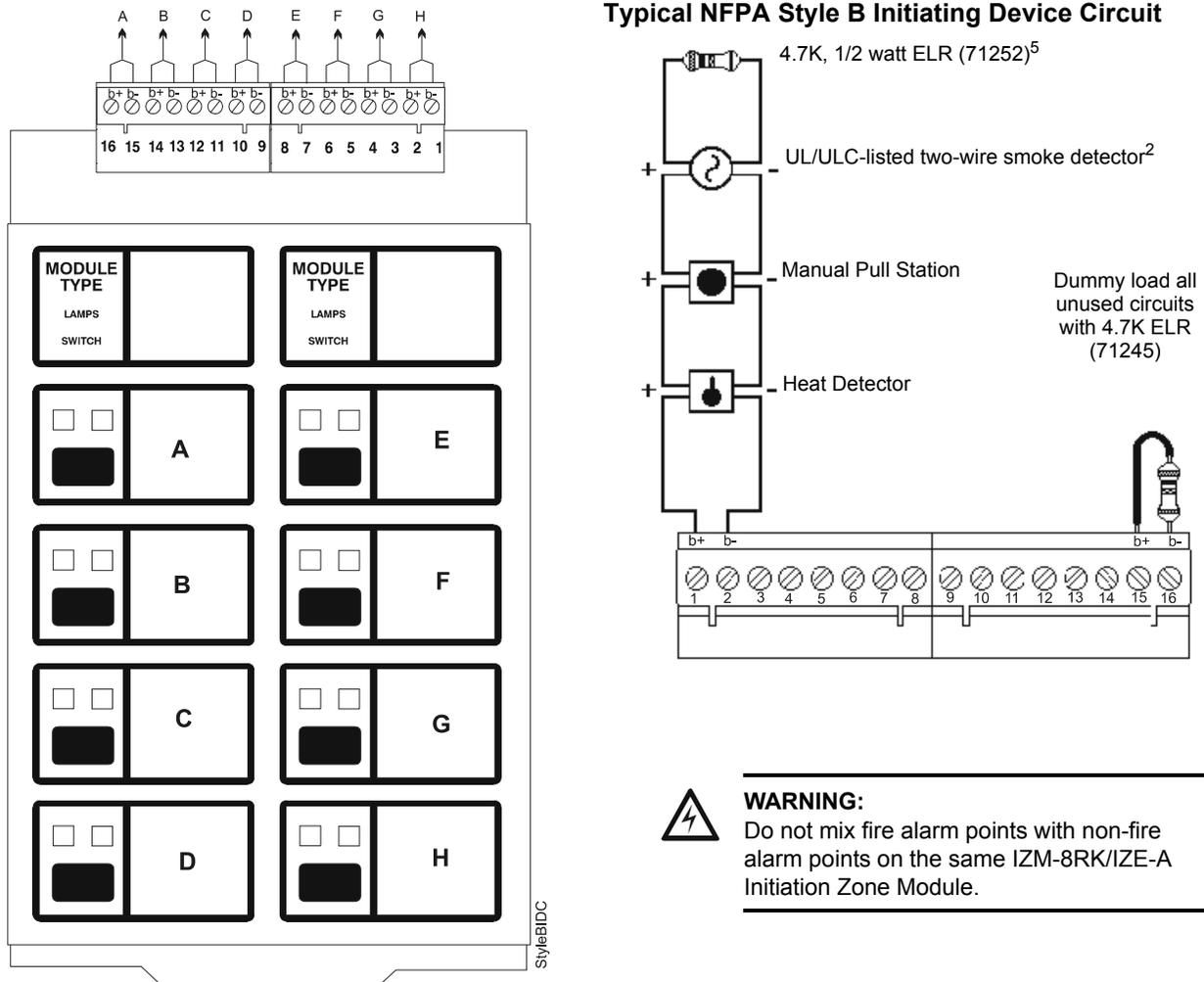
Figure 3.10   NFPA Style B Field Wiring of the IZM-8RK Initiating Zone Module

1. Initiating Device Circuits are supervised, power-limited and may be connected to limited-energy cable. Initiating devices include non-coded manual pull station, heat detectors, photo and ion detectors, waterflow alarm and waterflow supervisory devices. Connect waterflow alarm devices to a dedicated circuit, programmed for waterflow option. Connect N.O. waterflow supervisory devices to a dedicated zone programmed for supervisory operation. The terminal blocks will accept 12AWG to 22AWG wire. Initiating circuit current will ensure alarming of one two-wire detector only.

2. Use only the compatible, UL/ULC-listed two-wire smoke detectors that are listed in the Device Compatibility Document.

3. For connection of 4-wire smoke detectors and initiating devices requiring separate 24 VDC power, refer to your power supply manual and to the wiring diagrams shipped with your devices.

4. Wire initiating devices according to the manufacturer's instructions packaged with each device.

5. For Canada, model N-ELR End-of-Line Resistor Assembly required.

6. Maximum line resistance due to wiring is 100 ohms.

3.8.2 Style D Field Wiring
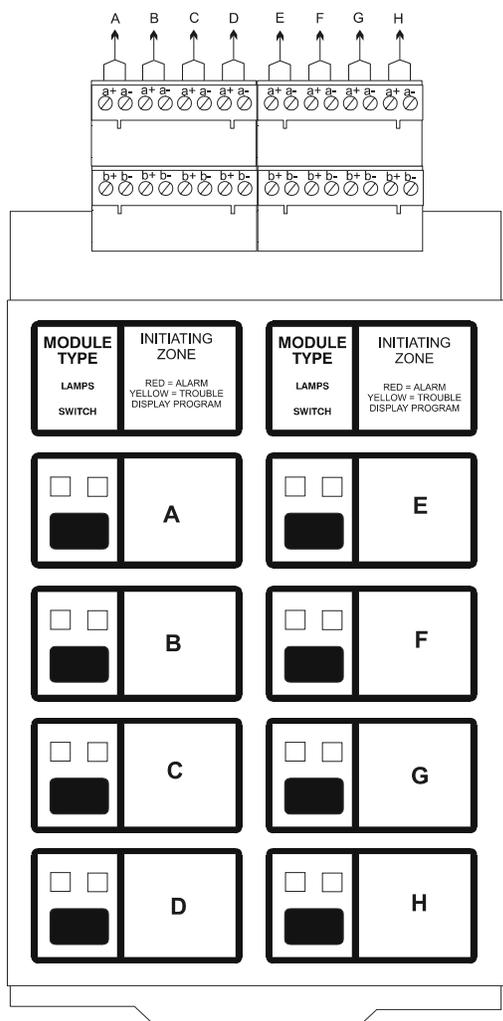
Typical NFPA Style D Initiating Device Circuit

UL/ULC-listed two-wire smoke detector. [2]

Manual Pull Station

Heat Detector

Jumper all unused circuits as shown
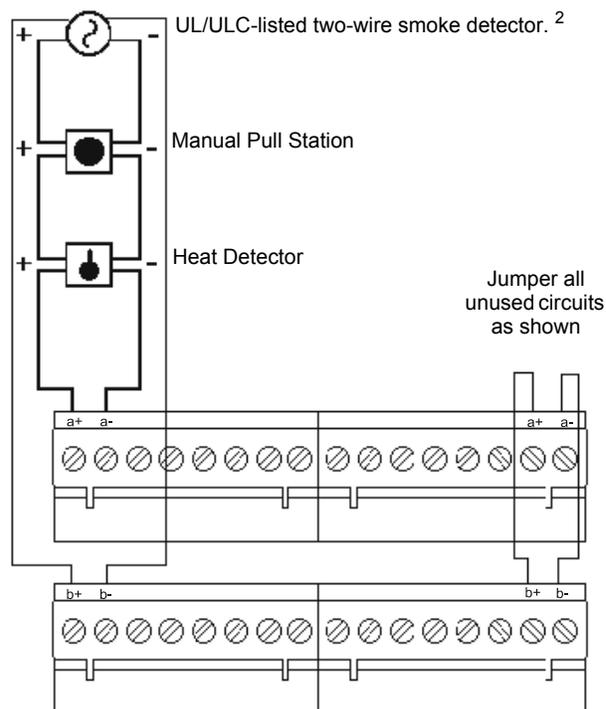
WARNING:
Do not mix fire alarm points with non-fire alarm points on the same IZM-8RK/IZE-A Initiation Zone Module.

Figure 3.11 Style D Field Wiring of IZM-8RK Initiating Zone Module with IZE-A Expander

1. Initiating Device Circuits are supervised, power-limited and may be connected to limited-energy cable. Initiating devices include non-coded manual pull station, heat detectors, photo and ion detectors, waterflow alarm and waterflow supervisory devices. Connect waterflow alarm devices to a dedicated circuit, programmed for waterflow option. Connect N.O. waterflow supervisory devices to a dedicated zone programmed for supervisory operation. The terminal blocks will accept 12AWG to 22AWG wire. Initiating circuit current will ensure alarming of one two-wire detector only.

2. Use only the compatible, UL/ULC-listed two-wire smoke detectors that are listed in the Device Compatibility Document.

3. For connection of 4-wire smoke detectors and initiating devices requiring separate 24 VDC power, refer to your power supply manual and to the wiring diagrams shipped with your devices.

4. Wire initiating devices according to the manufacturer's instructions packaged with each device.

5. Maximum line resistance due to wiring is 100 ohms.

3.9 NACs with ICM-4RK/ICE-4
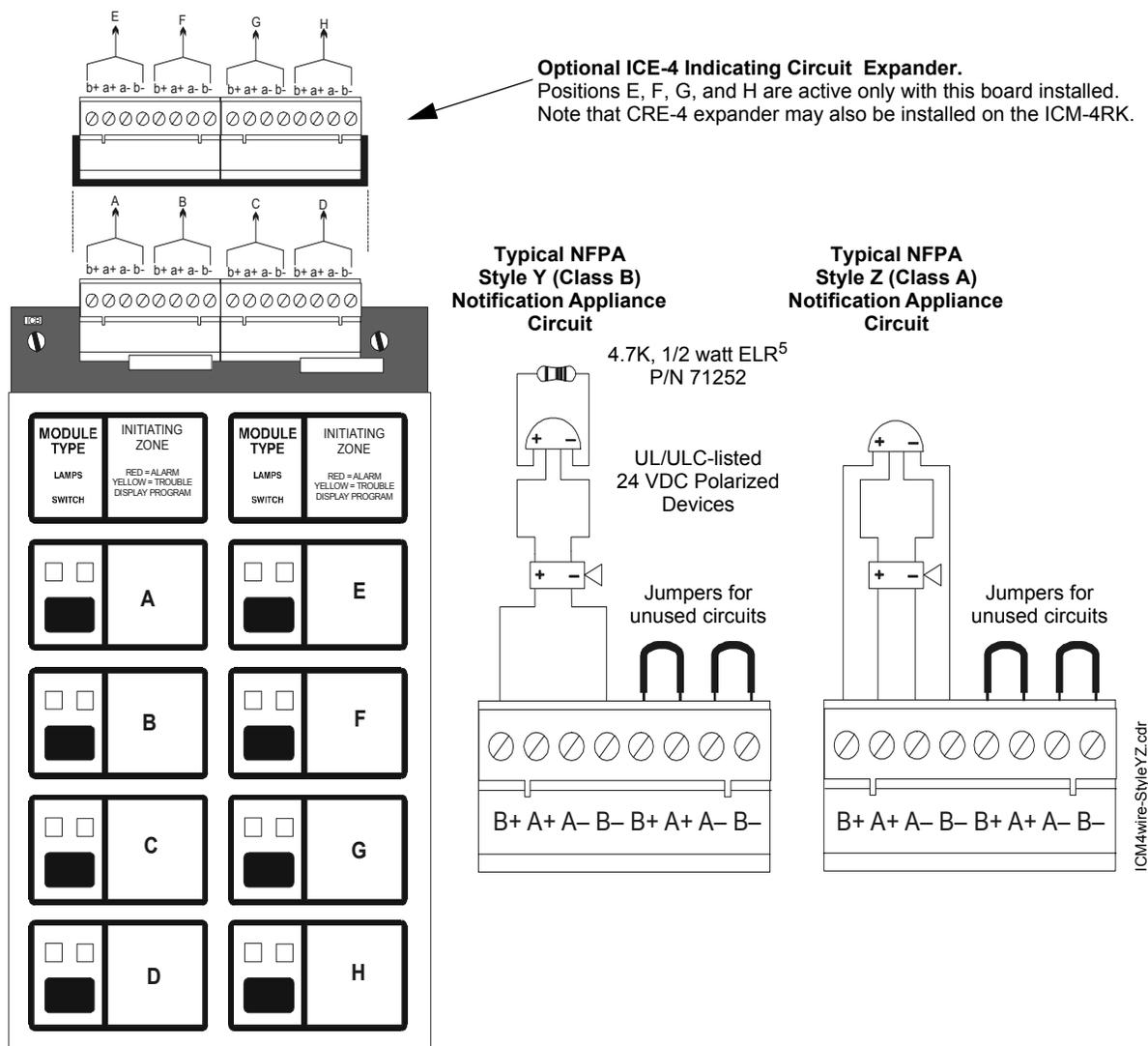
Figure 3.12 Field-Wiring an ICM-4RK/ICE-4: NFPA Style Y, Z

1. Notification circuits are supervised, power limited and may be connected to energy-limited cable.

2. Use only the compatible, UL-listed Notification Appliances listed in Device Compatibility Document.

3. Wire Notification Appliances according to the manufacturer's instructions packaged with each device.

4. Maximum current per circuit is 3.0 A. Maximum current per module depends on the type of power supply (standard or auxiliary).

5. Canadian installations require model N-ELR End-of-Line Resistor Assembly (Style Y only).

6. Size the NAC wiring so the voltage drop does not exceed the minimum rated voltage of the notification appliance used as the last device on the circuit.

7. For zone coded applications, see the *UZC-256 Universal Zone Coder* manual.

8. For power wiring see Figure 3.14.

9. The ICM-4RK is California Code programmable (microprocessor P/N 34077 Rev. B or higher). To program for California Code, cut diode D35 as shown in Figure 3.13.
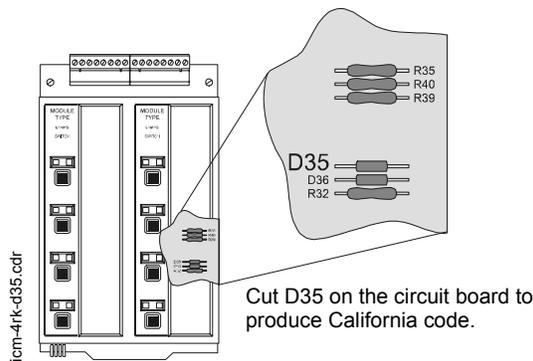
Figure 3.13 Location of D35 on ICM-4RK Circuit Board

3.9.1 Power Supply Connections

Figure 3.14 illustrates typical connections from the main power supply. Figure 3.15 shows location of those connections on the bottom of the ICM-4RK and the ICE-4 modules.
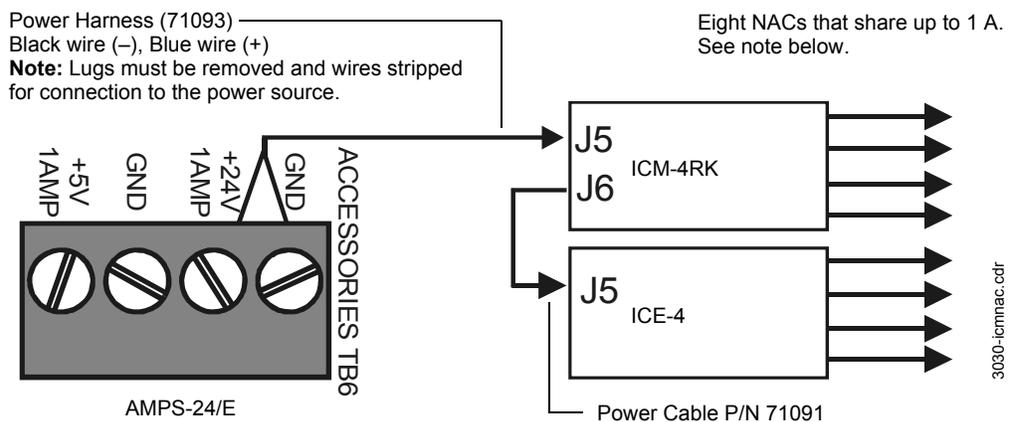
Figure 3.14 ICM-4RK/ICE-4 Main Power Supply Connection

> **NOTE:**   For limitations on the total current available for any group of Notification Appliance Circuits (NACs), see Section 3.13 "Notification Appliance Circuit Current Limitations" on page 36, as well as the manual for your system's power supply.

> **NOTE:**   ICM-4RK could be connected to a compatible UL/ULC-listed +24V auxiliary power supply instead (such as APS-6R). Refer to the manual for your auxiliary power supply for equivalent connections. If an auxiliary power supply is used, maximum current per circuit is 3 Amps, total output limited to the maximum rating of the supply.

> **WARNING:**
> Auxiliary power supply connections to ICM-4RK/ICE-4 <u>must</u> come from a power supply whose battery terminals are tied back to those on the main power supply. Failure to do so will cause panel circuit trouble at the control panel and possible equipment damage.
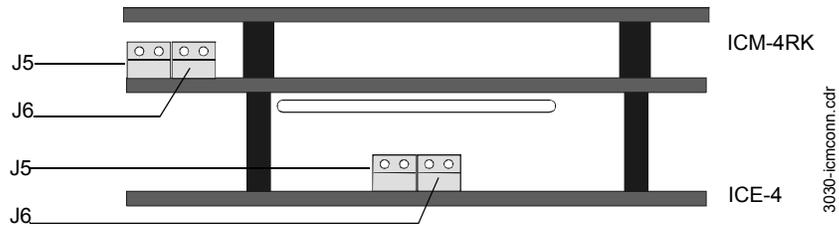
Figure 3.15 ICM-4RK/ICE-4 Connectors

3.10 Form-C Relays on the CPU

The panel provides a set of Form-C relays. These are rated for 2 A at 30 VDC (resistive):

*   Alarm - TB4
*   Trouble - TB3
*   Supervisory - TB2
*   Security - TB1

The Supervisory and Security contacts can also be configured as Alarm contacts by setting switches SW1 and SW2 away from the factory default positions shown in Figure 3.16.
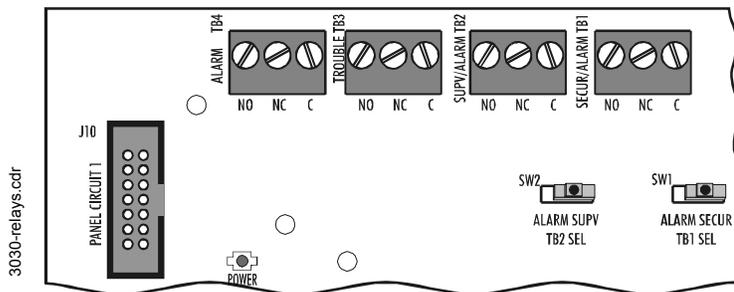
Figure 3.16 Form-C Relay Connections

3.11 Form-C Relays with CRM-4RK/CRE-4
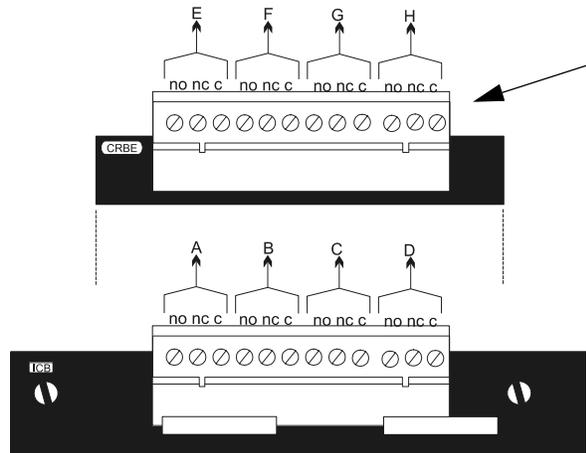
* Optional CRE-4 Control Relay Expander. Positions E, F, G and H are active only with this board installed.

1. These Form-C gold-plated, silver alloy relay contacts are for medium duty switching or Pilot Duty.

2. UL contact ratings are 5 amps @ 125 volts AC (resistive) or 30 volts DC (resistive) and 2 amps @ 125 volts AC (inductive).

3. Activation of a CRM-4 or CRE-4 relay occurs automatically when an alarm is detected on a selected (programmed) Initiating Device Circuit.

Note: Refer to the Power-limited label located on the FACP door. Make a notation on the label for each circuit being employed as a Nonpower-limited circuit. (Refer to the example on the label).

Typical Form-C Control Relay in Normal Position
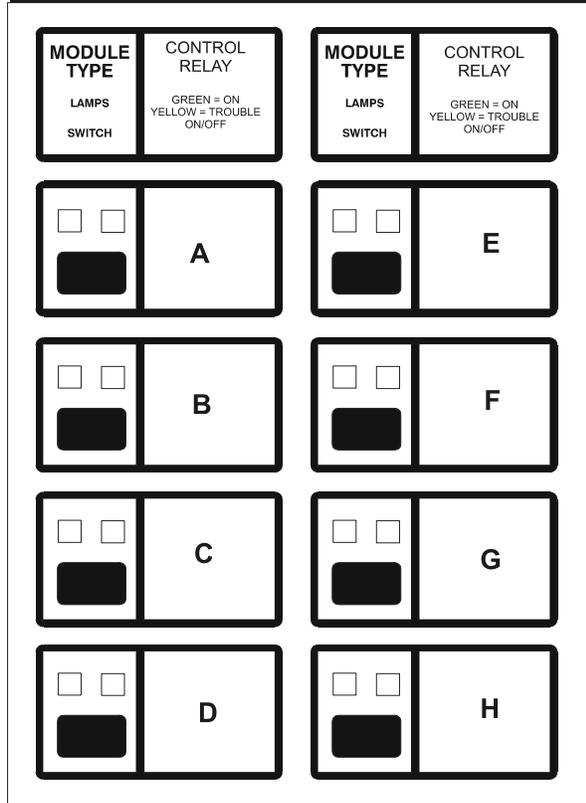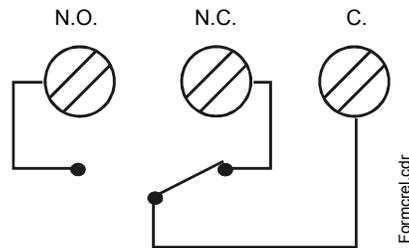
Nonpower-limited and power-limited wiring must have a minimum distance of 0.25" wire to wire and must enter and exit from different knockouts. If this module is used to drive nonpower-limited and power-limited circuits, please follow the instructions:

1. Skip a set of dry contacts to maintain the 0.25" required space between power-limited and nonpower-limited circuits. The wiring of this module must follow UL Power-limited Wiring Requirements (see Section 3.16 "UL Power-limited Wiring Requirements").

OR

2. If this module is needed to drive power-limited and nonpower-limited relays that are next to each other, refer to the figure to the left showing a typical connection.

Note: For limitations on the total current available for any group of Notification Appliance Circuits (NACs), see Section 3.13 "Notification Appliance Circuit Current Limitations" on page 36, as well as the manual for your system's power supply.
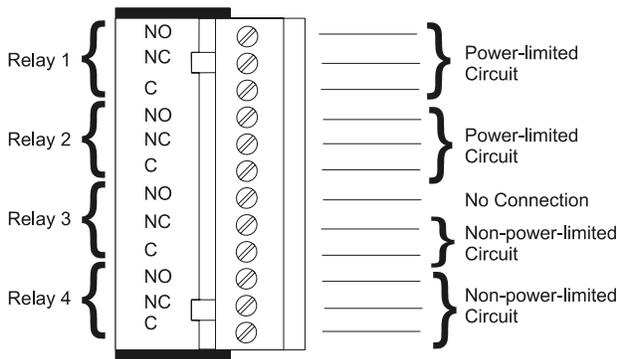
Figure 3.17 Field-Wiring a CRM-4RK or CRE-4 Module

3.12 Form-C Relays with Auxiliary Relay Module (ARM-4)

3.12.1 Overview

If a CRM-4RK/CRE-4 is to be incorporated into the control panel and an ARM-4 is being driven by it, the ARM-4 should be installed at the same time. Keep the following in mind:

- Each ARM-4 must be supported by one CRM-4RK or one CRE-4.
- If using ARM-4's for both modules, mount two ARM-4's in separate positions.
- If mounted in FACP enclosure keep all non-power limited wiring separate from power limited wiring.

For ease of installation, service, and wiring mount the ARM-4 module in a position on the chassis that will not have any other module or expander board in front of it. However, you can install the ARM-4 directly behind the CRM-4RK or CRE-4.

ARM-4 mounts in the second, third or fourth row in a CAB-4 series backbox. Locate the ARM-4 against the back of a chassis CHS-4 or CHS-4L; it must be immediately next to, above, or below the CRM-4RK/CRE-4 due to cable length.

3.12.2 Installation

To install the Auxiliary Relay Module in the chassis:

1. Select a mounting position for the module on the chassis.
2. Install two (2) mounting stand-offs onto the studs of the chassis, at the selected location, as shown in Figure 3.17. Tighten securely.
3. Install three (3) support stand-offs, with screws, onto the PC board in the locations shown in Figure 3.17 or in the two right-hand positions on the first row. Tighten securely.
4. Position module over the stand-offs on the chassis; fasten the module to the chassis with the two (2) retaining screws. Tighten securely.
5. Connect one end of the Cable (P/N 71092) to plug P1 on the ARM-4.
   Note: The other end of the cable is connected to jumper JP5 on the CRM-4RK or CRE-4.
6. Connect all available external wiring at this time. Refer to Section 3.12.3 "Field Wiring an Auxiliary Relay Module".
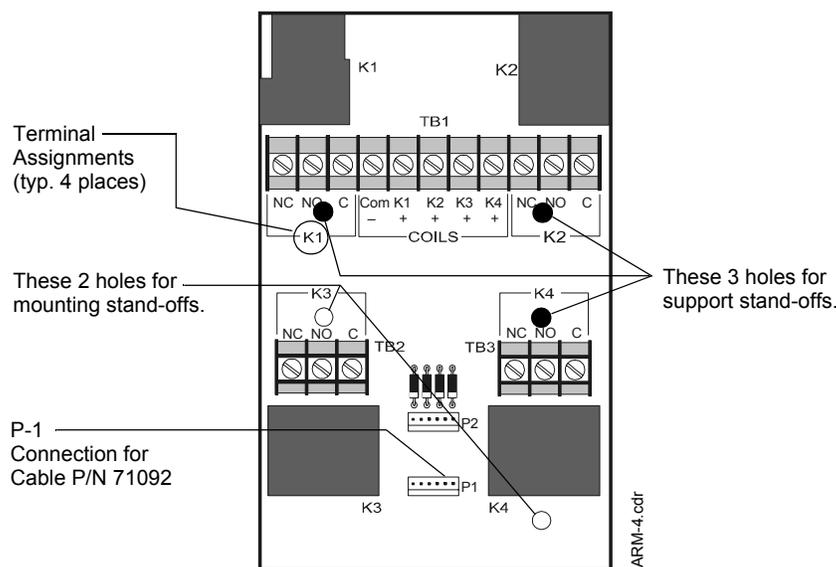

Figure 3.17 ARM-4 Stand-off & Terminal Locations

3.12.3 Field Wiring an Auxiliary Relay Module

The figure above shows terminal assignments for ARM-4 module control relays K1-K4, which control non-power-limited circuits. Power-limited and non-power-limited circuit wiring must remain separated by at least 0.25 inch (6.35 mm) within the cabinet and exit the cabinet though different knockouts, conduits, or both. Refer to Section 3.16 "UL Power-limited Wiring Requirements".

The table contains contact ratings for relays K1-K4 on the ARM-4 module:

Resistive Load	Contacts	
	Normally Open (N.O.)	Normally Closed (N.C.)
125 VAC	20 A	10 A
30 VDC	20 A	10 A

Table 3.2 Contact Ratings for K1-K4 on the ARM-4 Module

3.13 Notification Appliance Circuit Current Limitations

The total current available from any group of Indication Appliance Circuits cannot exceed 3.0 amps; this is limited to 1.0 amps if AMPS-24 is the only power source.   Figure 3.18 illustrates some of the typical power supply/ Notification Appliance Circuit configurations.
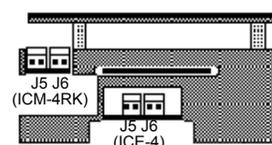
Bottom wire of the
ICM-4RK/ICE-4
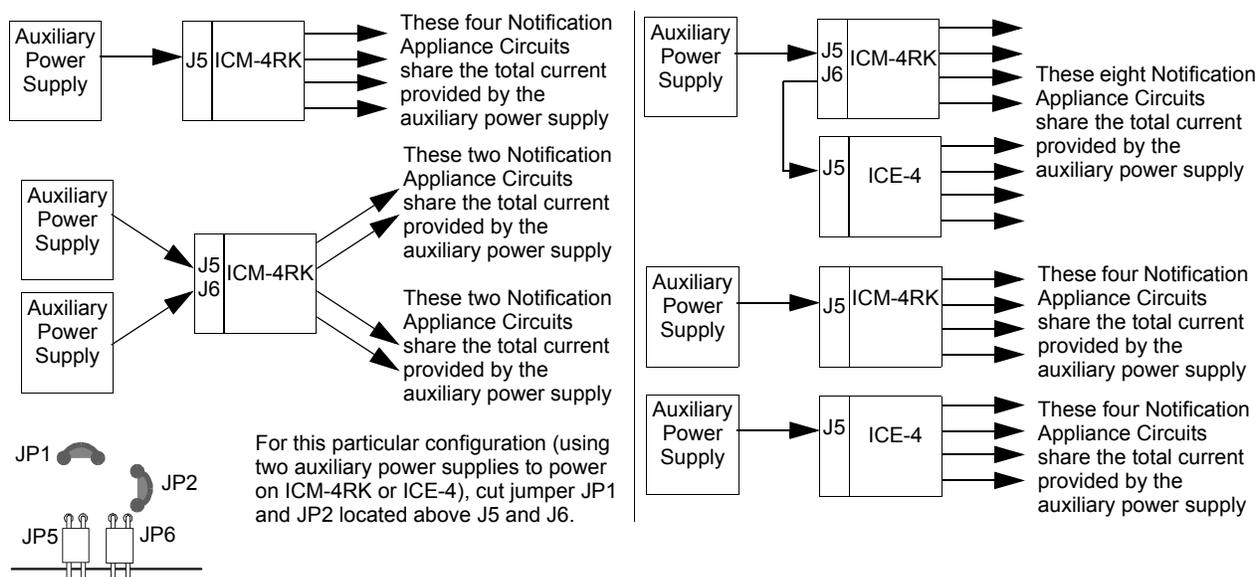
Figure 3.18 Typical Supply/Notification Circuit Configurations

NOTE: The term "total" in these figures assumes that no Notification Appliance power is drawn for any other purpose.

3.14 Connecting Specific Option Boards

3.14.1 Network Control Module

If networking two or more control panels (including NCAs), each one requires a Network Control Module; a wire version and a fiber version are available. The NCM-W/F can be installed in any panel circuit module position (see Section 3.7 "Attaching Panel Circuit Modules"); the default position is immediately to the right of the main circuit board.

1. Mount the NCM in the selected position. If another board is going to be mounted in the slot immediately in front of it, use stand-offs to secure it in place. Otherwise use the screws provided.

2. Connect J1 on the CPU to J3 on the NCM using the network cable provided (P/N 75556). Do not connect two NCMs via NUP ports (aka NUP to NUP).

3. Connect Channel A and/or Channel B as described in the *NCM Installation Document*.

📄 **NOTE:**   See the *Noti•Fire•Net Version 4.0 & Higher Manual* and *NCM Installation Document* for system configuration information. See the *BMP-1 Product Installation Drawing* if considering mounting the module (wire version) behind blank module plate in a dress plate or annunciator backbox.

3.14.2 Loop Control Module, Loop Expander Module

Mounting Instructions

Mount loop control and expander modules within the cabinet with the CPU. Standard mounting positions are adjacent to the panel or in the row immediately below it. Follow the basic chassis-mounting instructions given for option boards; LEM-320 modules are mounted first; LCM-320 modules are mounted on top of those. Alternately, LCM-320 and LEM-320 modules can be attached to each other and mounted as a pair to the chassis. See Figure 3.20 for connector locations and stand-off lengths. To suspend a pair of modules in the third and fourth layer of CHS-M3, follow the instructions given in Section 3.7.3 "Installing a Multi-layer Module into the Chassis". If using LCM-320/LEM-320 in CHS-4L see Figure 3.21.

📄 **NOTE:**   Mounting two pairs of LCM-320 and LEM-320 modules in one chassis position may cause intermittent electrical interference. If this occurs, move one pair to a separate chassis position.

After all loop control and expander modules are mounted in the cabinet, connect the SLC loops to TB1 on each loop control and expander module as shown in Figure 3.22. Daisy-chain the loop control modules as shown in Figure 3.23. The ribbon-cable connection runs from header J7 on the CPU to header J1 ("Data in") on the first loop control module, from J3 ("Data out") on that unit to J1 on the next unit in the chain, and likewise for up to five loop control modules. Each module should be assigned a unique SLC loop number (see below); loop number does not need to match the module's locaiton in this daisy-chain.
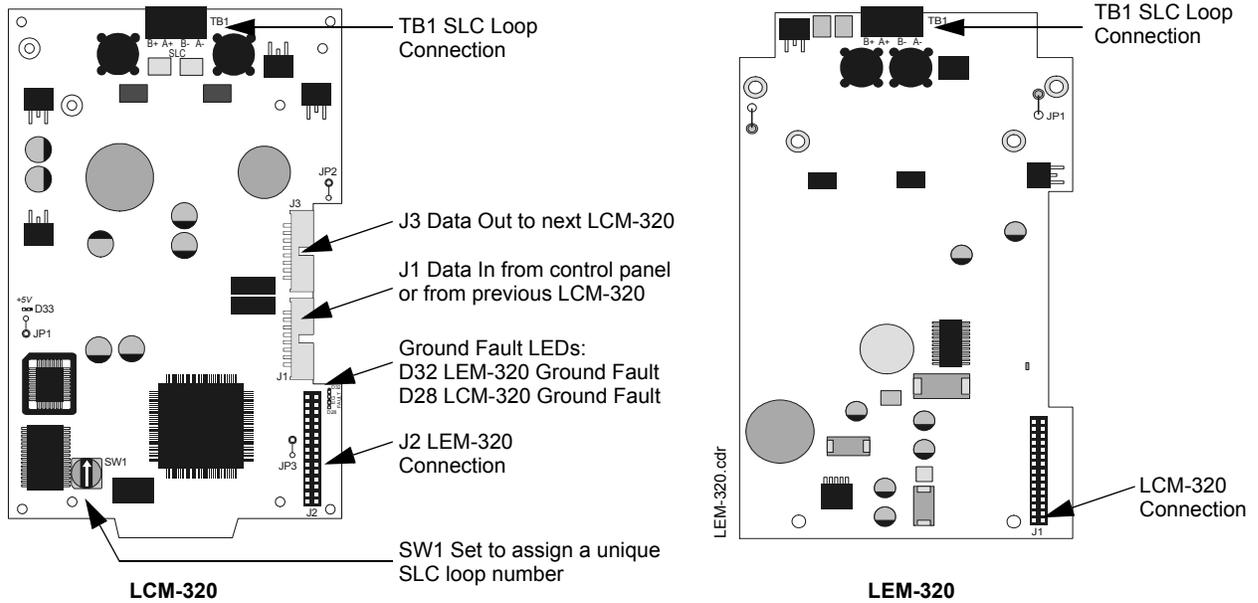
FlashScan devices can operate in either FlashScan or, for retrofit applications, CLIP mode. Each LCM-320 or LEM-320 running a FlashScan SLC can support up to 159 detectors and 159 modules. CLIP loops are limited to 99 detectors and 99 modules. Older models of CLIP devices only support addresses up to address 99. These and other capacity restrictions for CLIP mode loops are discussed in Section 3.19 "Wiring a Signaling Line Circuit (SLC)". Refer to the *SLC Wiring Manual* for wiring requirements and specific details.

Setting SLC Loop Number

Assign a unique SLC loop number to an LCM-320 by setting SW1 on the module to 1, 3, 5, 7, or 9. The LEM-320 which is mounted behind this LCM-320 will be assigned the next-higher even number. For example, if the LCM-320 is set to loop number 5, the LEM-320 mounted to it will be set to loop number 6.

Enabling External Power Supervision

With LCM-320 revision 2.0 and higher, some type codes have external power supervision built into the software; see Section 4.2 "Devices Requiring External Power Supervision" for details.

Note: Do not cut any jumpers on LCM-320 or LEM-320

Figure 3.19 LCM-320 & LEM-320 Diagram

The short-pin end plugs directly into the top of the LEM plug.

The long-pin end plugs directly into the back of the LCM board.

Stand-off locations

LEM-LCM.cdr

J2 on LCM-320 "LEM-320 Data"

LEM mounted behind LCM

⚠ **CAUTION:**
If the stacker-connector is installed incorrectly, the short-pin end of the plug can fail to make a secure connection when plugged through the LCM.
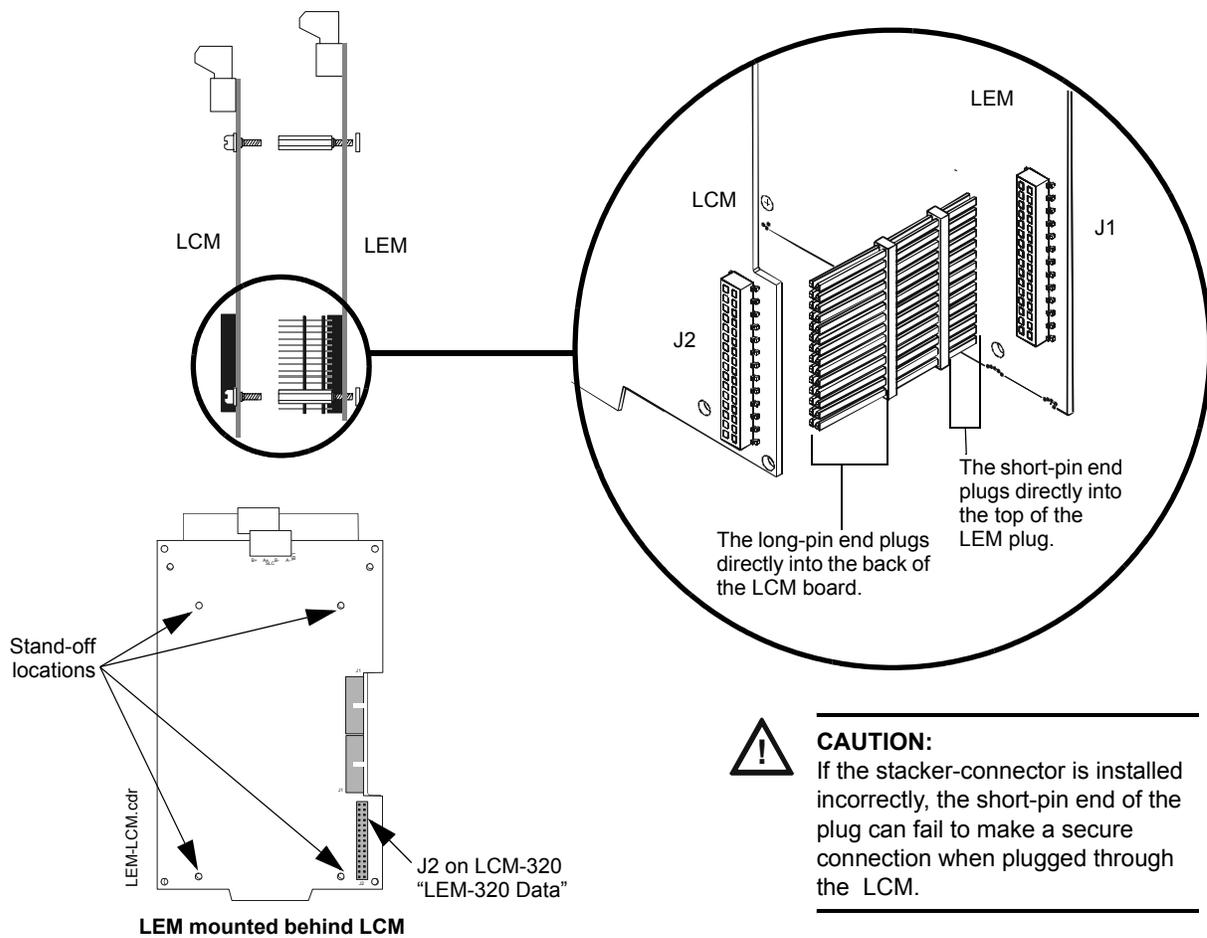
Figure 3.20 Connecting LCM-320 with LEM-320

Angle tab on LCM-320 into slot on CHS-4L

Use a slimline screwdriver (3/32") to fasten down LEM-320 through the hole in the LCM-320 board.

CHS-4L–LEM–LCM.cdr
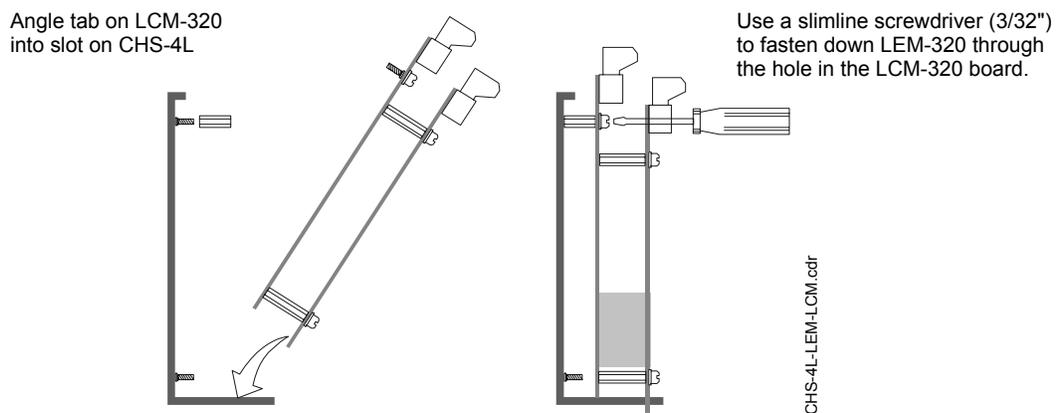
Figure 3.21 Inserting LCM-320/LEM-320 into CHS-4L
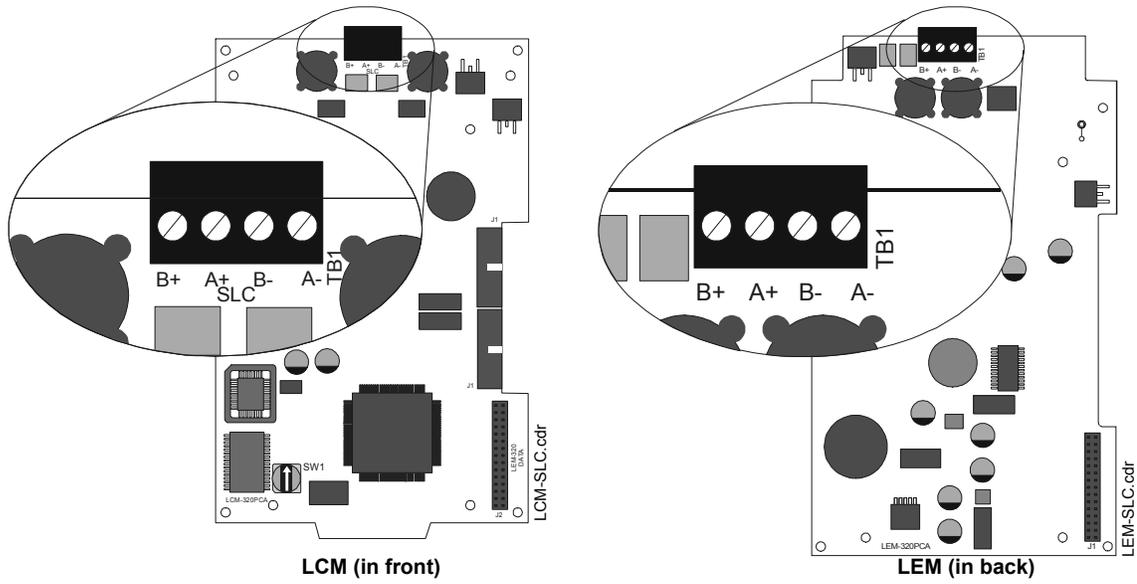
Figure 3.22 SLC Loop Connections on LCM-320 and LEM-320
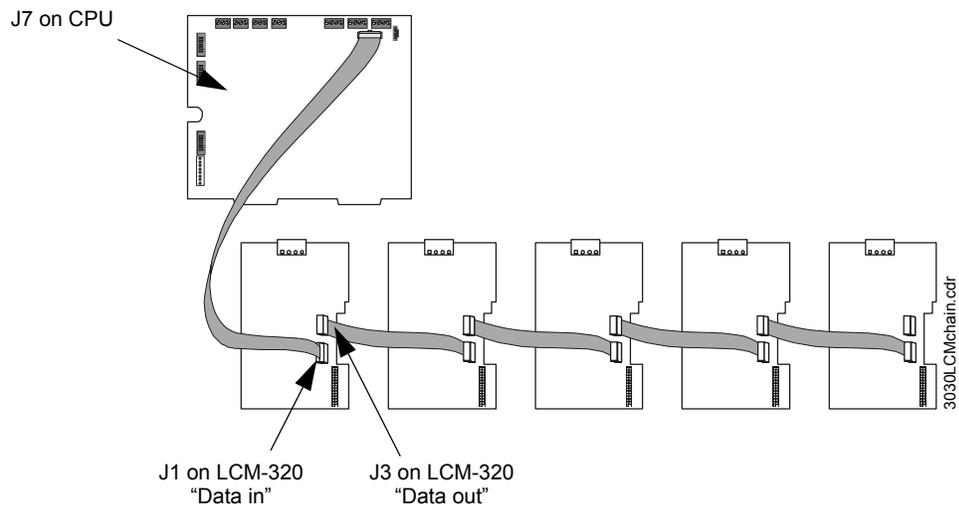
Figure 3.23   Connecting Multiple LCM-320/LEM-320 Pairs

3.15 Connecting Power Sources and Outputs

WARNING:
Remove all power sources to equipment while connecting electrical components. Leave the external, main power breaker OFF until installation of the entire system is complete.

WARNING:
Several sources of power can be connected to the control panel. Before servicing the control panel, disconnect all sources of input power *including the battery*. While energized, the control panel and associated equipment can be damaged by removing and/or inserting cards, modules, or interconnecting cables.

3.15.1 Overview

Complete all mounting procedures and check all wiring before applying power. Electrical connections include the following:

- **Primary power source.** +24VDC, delivered through AMPS-24/AMPS-24E main power supply. If AMPS-24/E is mounted in a separate cabinet, power-supply wiring must be in conduit (for cabinet placement information see Section 3.4 "Laying Out Equipment in Cabinet and Chassis" and the AMPS-24/E manual.

- **Secondary power source.** +24 VDC from batteries, installed in the control panel (or in an optional battery cabinet). Secondary (battery) power is required to support the system during loss of primary power.

- **External power sources.** +24VDC auxiliary power supplies that are UL/ULC-listed for fire protective service.

- **Accessory power for peripheral devices.** TB6 on the CPU draws power from primary, secondary and external sources to supply a maximum of 1.0 amp of +24 VDC power to devices within the same enclosure as the CPU. If those devices have outputs, the outputs must be power-limited.

NOTE: The CPU ships with an insulator to prevents its lithium battery from discharging. To preserve the battery, this insulator should be left in place as long as possible before applying AC power. Some installers may find it convenient to remove the insulator before mounting all equipment.

NOTE: If using multiple power supplies with one set of batteries, refer to main power supply manual for connection requirements.

WARNING:
Auxiliary power supply connections to ICM-4RK/ICE-4 <u>must</u> come from a power supply whose battery terminals are tied back to those on the main power supply. Failure to do so will cause panel circuit trouble at the control panel and possible equipment damage.

3.15.2 Connecting the Power Supply

Connect J13 Power on the CPU to TB2 on AMPS-24/E with Cable 75591 (see Figure 3.24). This cable is 20 feet long, and must run in conduit between the backbox containing the fire alarm control panel and the backbox containing the AMPS-24/E. See AMPS-24/E manual for full details and installation precautions.

In order to conserve batteries, connect AC power and check it before connecting batteries. Follow the procedures specified in the power supply manual.
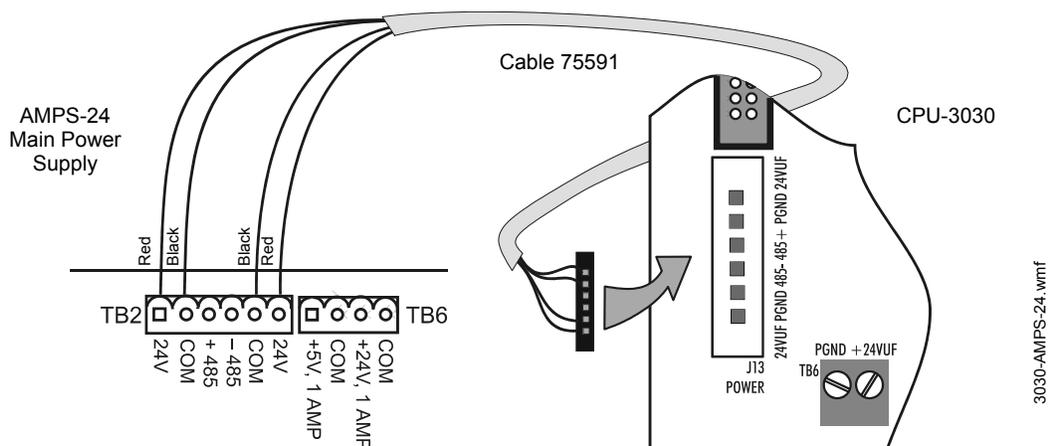

Figure 3.24   DC Power Connections: Main Power Supply

3.15.3 Checking AC Power

Table 3.3 contains a checklist for checking the system with AC power applied to the main power supply:

⚠ **CAUTION:**
While checking AC power, make sure batteries are not connected.

Component	Status
CPU	The green Power indicator will come on when power is coming from the main power supply. The yellow Trouble indicator will come on until batteries are connected.
Main power supply	The green AC indicator will come on when AC is supplied. The yellow Trouble indicator will come on until batteries are connected.
Each auxiliary power supply	The yellow Trouble indicator comes on because batteries are not connected.

Table 3.3 AC Power Checklist

3.15.4 Auxiliary Power Supply Connections

If an optional auxiliary power supply is installed in the cabinet, connect it at this time. Follow the connection procedures specified in your auxiliary power supply manual.

3.16 UL Power-limited Wiring Requirements

Power-limited and non-power-limited circuit wiring must remain separated in the cabinet. All power-limited circuit wiring must remain at least 0.25 inches (6.35 mm) from any non-power-limited circuit wiring. All power-limited and non-power-limited circuit wiring must enter and exit the cabinet through different knockout and or conduits. To maintain separations easily, it is recommended that non-power-limited modules are grouped together. For example, use a separate row or designated side of the enclosure so that power-limited and non-power-limited wiring do not cross. Install tie wraps and adhesive squares to secure the wiring.

For a quick reference to control panel circuits, refer to Figure 2.1 at the start of this manual. The power-limiting label inside your cabinet door identifies which compatible modules have power-limited or non-power-limited wiring.
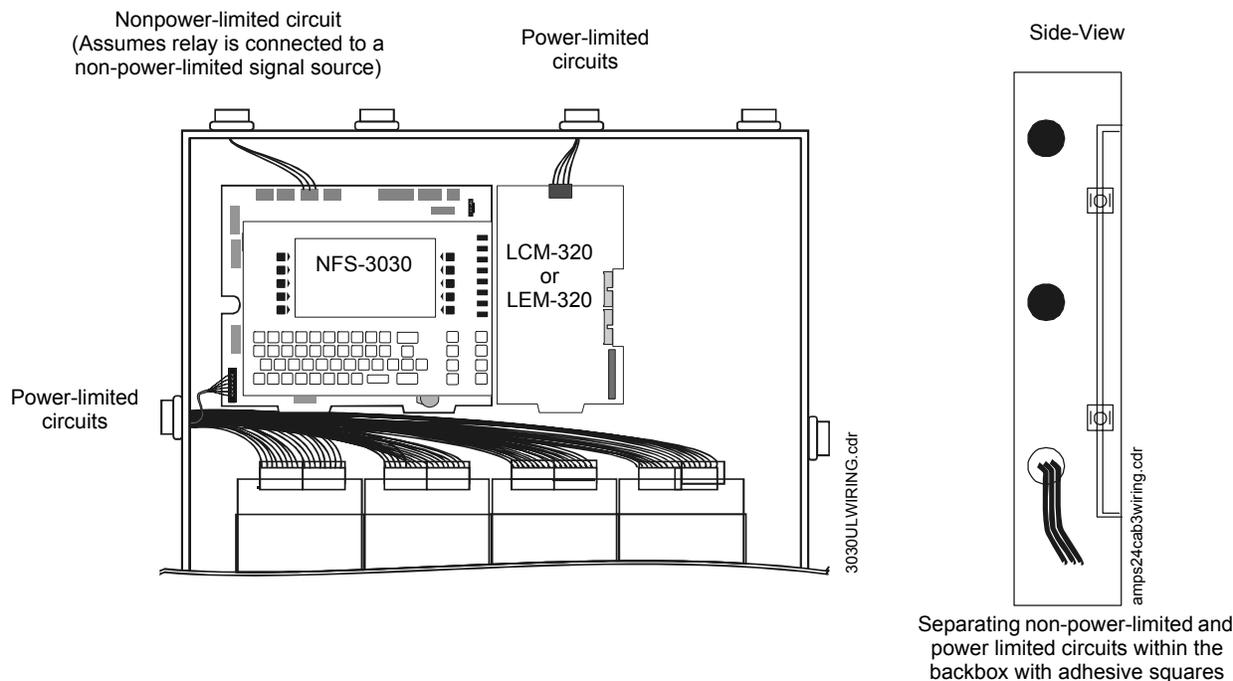
Figure 3.25 Typical Wiring in a Four-Row Backbox

Some devices (such as ACM-8R, ARM-4, CRM-4RK, CRE-4, and LDM-R32) are power-limited only when connected to power-limited sources. When one of these devices is connected to a non-power-limited source, the power-limited marking must be removed, and at the time of installation, each non-power-limited circuit connected to these modules must be identified in the space provided on the cabinet door label.

NOTE: Relays are power-limited only when connected to power-limited sources for the relay outputs.

3.17 ULC Remote Connection Feature

ULC requires that devices such as TM-4 and UDACT be disconnected during annual testing to prevent transmission of false alarms.

Disconnecting TM-4 for Annual Testing Follow standard installation procedures as described in the TM-4 installation documentation. To disable reporting, slide SW4 Disable All Output switch from "Enable" to "Disable." Refer to TM-4 documentation for product drawing.

Disconnecting UDACT for Annual Testing Install UDACT as the last device on the EIA-485 line, with a listed key switch such as AKS-1B installed on the EIA-485 line. In this case only, install the ELR between the EIA-485 wires just in advance of the key switch (see Figure 3.26). The key switch should installed so that key-removed is the closed position; it should be located inside the same backbox as the UDACT, as close to the UDACT as possible.

NOTE: During testing when the key switch is turned, the panel will report a communication failure for the UDACT's address.
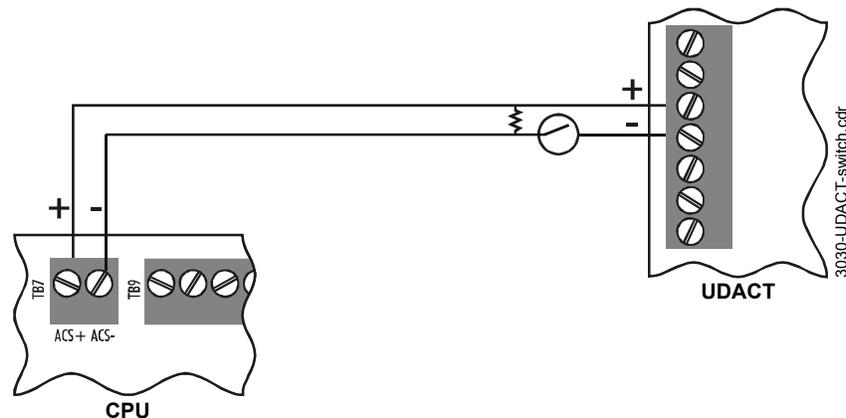
Figure 3.26 Wiring a Key Switch to Disconnect UDACT During Annual Testing

3.18 Installing Printers

This section contains information on connecting a printer to the CPU and for setting the printer options. The basic steps are as follows:

1.   Make custom cable & connect it from printer to EIA-232 terminal on the CPU.

2.   Connect printer's power supply.

3.   Configure printer settings as described in printer documentation.

■ Overview: PRN Printer

The PRN provides a printed record (80 columns on standard 9" x 11" tractor-feed paper) of all system events (alarm, trouble) and status changes within the system. The control panel can be configured to time-stamp the printout with the current time-of-day and date for each event. The printer can be located up to 50 feet (15.25 m) from the control panel. Installation and configuration instructions follow.

■ Overview: Keltron Remote Printer (Model VS4095)

The VS4095 is a two-color (red and black), 40-column, 24 VDC printer that can print up to 50 messages in 90 seconds. This printer connects to the EIA-232 TB5 on the CPU and to the +24V screw on TB6 of AMPS-24/E, and mounts in a separate cabinet next to the control panel. The VS4095 meets UL fire and security requirements for an ancillary device; it is not ULC-listed. For more information on the Keltron printer, contact the manufacturer (Keltron Corp., Waltham, MA). Installation and configuration instructions follow.
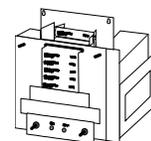
3.18.1 Printer Installation Sequence

1. Fabricate a custom cable to connect a printer to the system. Length of the cable will vary with each installation, but should not exceed a maximum length of 50 feet (15.24 meters). Printer must be installed in the same room as panel. Using overall foil/braided-shield twisted-pair cable, properly connect one end to the DB-25 Connector (provided) using the wiring specifications shown in Figure 3.27.

2. Tighten clamp on connector to secure cable. Connect the four open leads of the custom cable to the TB5 terminal block on the CPU as shown in Figure 3.27.
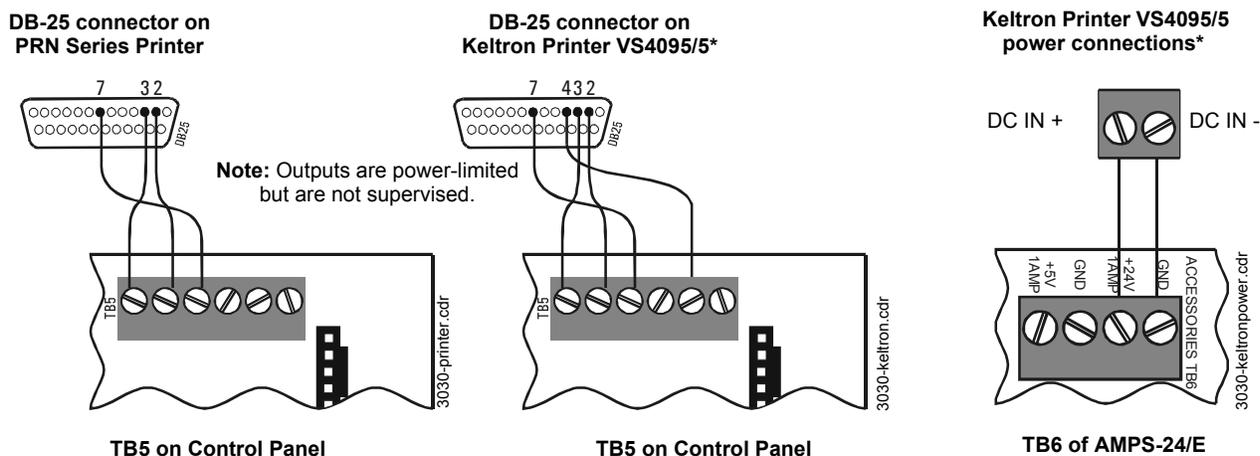
*Note: VS4095/5 is not ULC-listed.

Figure 3.27 Printer Connections

3. If installing a Keltron Printer VS4095/5, connect 24 VDC non-resettable power from a UL-listed power supply to the Keltron printer as shown in Figure 3.27 (14 AWG).

4. If installing a PRN series printer, plug it into your AC power source. **Note:** PRN printers require a 120 VAC, 50/60 Hz primary power source. If required for the fire alarm system configuration (for example, a Proprietary Fire Alarm System), a remote printer requires a secondary power source (battery backup). Because a secondary power source is not provided, use a separate Uninterruptable Power Supply (UPS) that is UL-listed for Fire Protective Signaling.

5. Plug the DB-25 connector end of the custom cable into the EIA-232 port of your printer. Tighten securely.

6. Configure the printer as described in Section 3.18.2 "Configuring the Printer".

3.18.2 Configuring the Printer

Refer to the documentation supplied with your printer for instructions on configuring your printer.

PRN Printer Settings

Set the printer options (under the menu area) according to the settings listed in Table 3.4.

Option	Setting		Option	Setting
L/R Adjust	0		Menu Lock	ON
Font	HS Draft		Language	English
CPI	10 CPI		Paper	
LPI	6 LPI		Single	
Skip	0.0		Form Adjust	12/72
ESC Character	ESC		Trac 1	
Emulate	FX-850		Form Adjust	12/72
Bidirectional Copy	ON		Trac 2	
I/O			Form Adjust	12/72
Interface	Serial		Auto Sheet Feeder	
Buffer	40K		Form Adjust	12/72
Serial			Auto Tear	OFF
Baud	9600		F-Eject	OFF
Format	8 Bit, None, 1 Stop		Form Length	
Protocol *	ENQ/STX		Trac 1	
CG-TAB	Graphic		Lines	66
Character Set	Standard		Standard	10.5"
Country	E-USA ASCII		Trac 2	
Select Zero	ON		Lines	66
Auto-CR	OFF		Standard	10.5"
Auto-LF	OFF		Barcode	Off
			Barmode	Unsecured

*Protocol: When printing in graphics mode, set I/O Serial Protocol to "Robust XON/OFF".

Table 3.4 PRN Setup Options

Keltron Printer VS4095/5 Settings

The printer communicates using the following protocol:

- Baud Rate
  - Supervised mode: 2400
  - Unsupervised mode: 300
  (Supervision is a programmed setting; refer to the Panel Programming section of the Programming Manual for instructions.)
- Data bits: 8
- Parity: None
- Stop bits: 1

Set the printer DIP switches SP1 and SP2 according to settings in Table 3.5.

Supervised			Unsupervised			Supervised and Unsupervised		
SP1	**On**	**Off**	**SP1**	**On**	**Off**	**SP2**	**On**	**Off**
1		X	1	X		1		X
2	X		2		X	2		X
3		X	3	X		3		X
4		X	4		X	4		X
5	X		5	X		5	X	
6		X	6		X	6		X
7	X		7	X		7	X	
8	X		8	X		8	X	

Table 3.5 Keltron DIP Switch Settings

3.19 Wiring a Signaling Line Circuit (SLC)

3.19.1 Overview

Communication between the CPU and intelligent and addressable initiating, monitor, and control devices takes place through a Signaling Line Circuit (SLC). You can wire an SLC to meet the requirements of NFPA Style 4, Style 6, or Style 7 circuits. This manual provides requirements and performance details specific to this control panel; for installation information and general information, refer to the *SLC Wiring Manual.*

For electrical specifications, see Appendix A.2 "SLC Loops". For additional notes on SLC resistance values, see Section 5.3 "Operational Checks".

3.19.2 Capacity

The NFS-3030 supports up to five pairs of loop control and expander modules, providing from one to ten SLC loops. Each loop has a total capacity of 318 intelligent/addressable devices:

- 01-159 intelligent detectors
- 01-159 monitor and control modules

FlashScan devices can operate in either FlashScan or, for retrofit applications, in CLIP mode. Older models of CLIP devices only support addresses up to address 99. CLIP loops are limited to 99 detectors and 99 modules.

NOTE: Response times for CLIP loops may vary. CLIP loops must be tested to assure that actuation of notification appliances occurs within 10 seconds after activation of an initiating device. Systems with response time that exceed 10 seconds must be approved by the AHJ.

The following configuration guidelines may be used to reduce the response times of CLIP loops:

1. All manual pull stations must be assigned addresses from 1-20.
2. Loops must be programmed for Rapid Poll (refer to the programming manual for specific instructions).
3. Modules on a fully loaded loop must adhere to a ratio of two monitor modules to one control module.

3.19.3 Installation

Install loop control and expander modules as described in Section 3.14.2 "Loop Control Module, Loop Expander Module". Note that the unique SLC loop number assigned to a module does not need to match the module's location in the cabinet. For details on designing, installing and configuring SLC loops, see the *SLC Wiring Manual*.
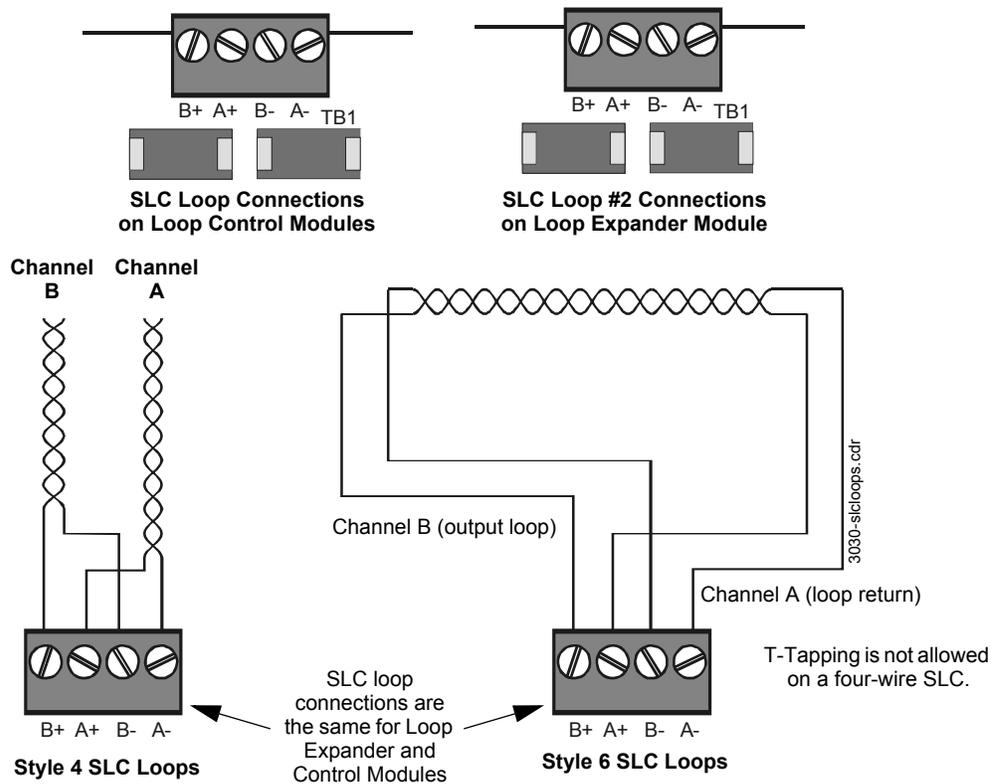
Figure 3.28 SLC Loop Connections and Wiring

3.20 Connecting a PC for Programming

A PC running the VeriFire™ Tools programming utility can upload and download the operating program of the control panel when attached to J1 Network/Service Connection (NUP) or to the second Network/Service connection on an attached NCM-W/F. Refer to the VeriFire™ Tools CD for instructions.

📄 **NOTE:** Download operations that change the basic program of the control panel must be performed by responsible service personnel in attendance at the control panel. After downloading a program, test the control panel in accordance with NFPA 72-1999.

Section 4: Applications

4.1 Overview

A listing of chapters and topics covered in this section:

Chapter	Covers the following topics
Section 4.3 "NFPA 72 Central or Remote Station Fire Alarm System (Protected Premises Unit)"	How to install a UDACT with the CPU for use as a NFPA Central or Remote Station Fire Alarm System (Protected Premises Unit)
Section 4.4 "NFPA 72 Proprietary Fire Alarm Systems"	How to set up a Protected Premises Unit to communicate with a listed compatible Protected Premises Receiving Unit.
Section 4.5 "Fire/Security Applications"	How to use the CPU as a combination Fire/Security system, including the following: • Installing a Security Tamper Switch into the cabinet • Circuit Wiring

NOTE: *NFS-3030* is not listed for Canadian security application.

■ Municipal Box (Auxiliary)

Municipal Box applications require a TM-4 Transmitter module. Refer to the *Transmitter Module TM-4* installation document for installation details.

4.2 Devices Requiring External Power Supervision

With LCM-320 revision 2.0 and higher, certain type codes have external power supervision (FlashScan only) built into the software. An external power-supervision relay is required (see Figure 4.1) unless one of the following typecodes is selected for the device:

- Control
- Relay
- Strobe
- Horn
- (Blank)
- Release Ckt
- Rel Ckt Ulc
- Rel Form C
- Nonreset Ctl
- Alarms Pend
- Gen Alarm
- Gen Super
- Gen Trouble
- Gen Pend
- Trouble Pend
- Form C Reset
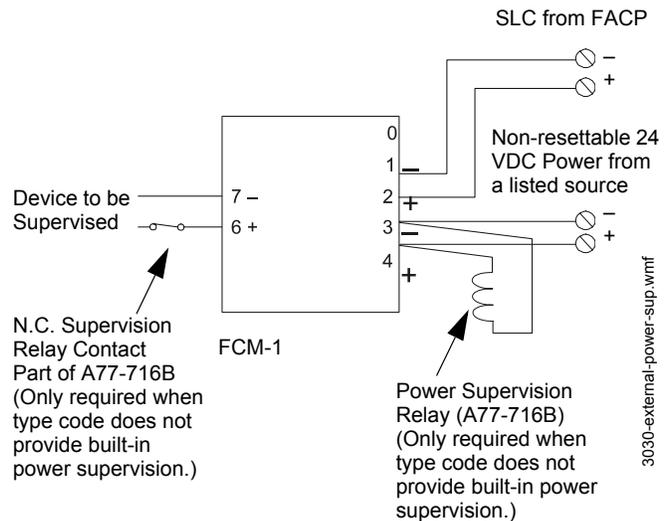
Figure 4.1 Enabling External Power Supervision Using Relays

4.3 NFPA 72 Central or Remote Station Fire Alarm System (Protected Premises Unit)

The figure below shows typical wiring diagram for a NFPA 72-1999 Central Station Fire Alarm System (Protected Premises Unit) or a Remote Station Fire Alarm System (Protected Premises Unit) using the Universal Digital Alarm Communicator/Transmitter (UDACT) and *NFS-3030*. Connect and program the UDACT according to the directions given in *The UDACT Instruction Manual*.

NOTE: An NFPA 72-1999 Central Station requires 24 hours of standby power; an NFPA 72-1999 Remote Station requires 60 hours of standby power.

Typical wiring of a UDACT with NFS-3030:
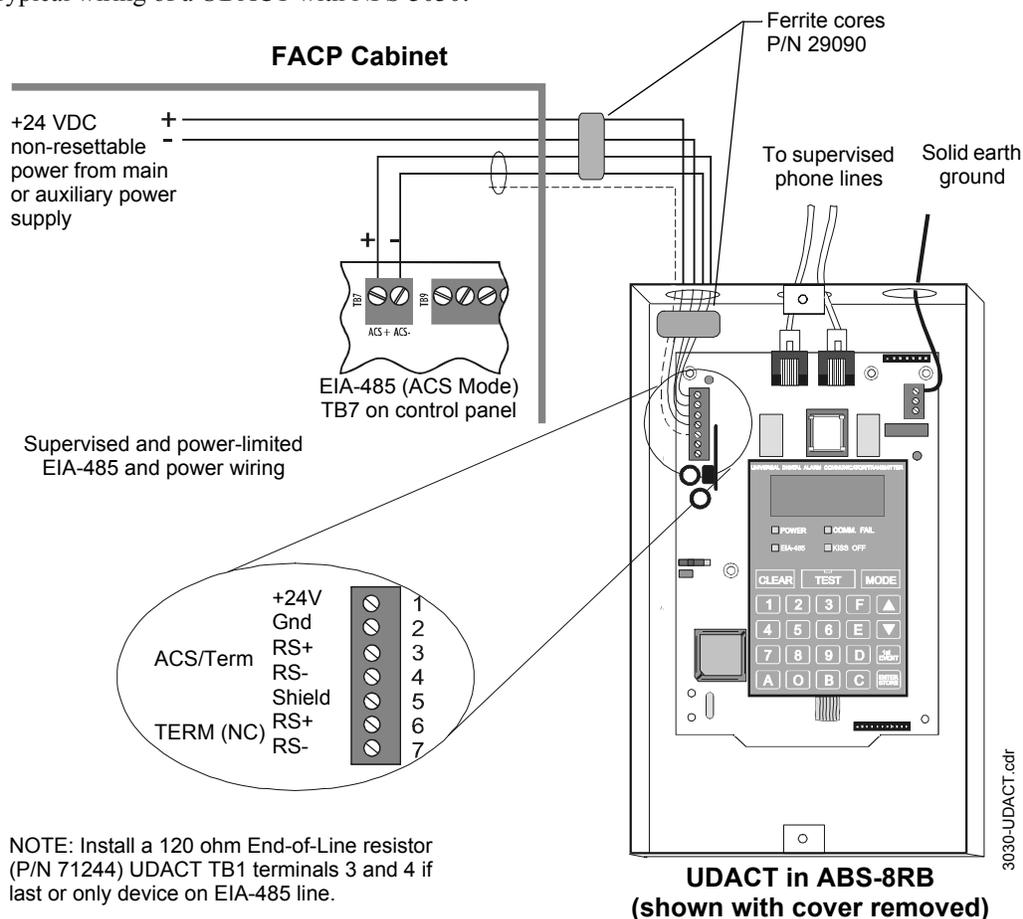
Figure 4.2 Typical Wiring Diagram for a Central Station Fire Alarm System

NOTE: This application can also be done with the TM-4 Transmitter; refer to the TM-4 Transmitter Module manual for more details.

NOTE: The following models do not comply with requirements for AC loss delay reporting and must be used with Central Station Protected Premises systems: AA-30, AA-120, AA-100, APS-6R, CHG-120.

4.4 NFPA 72 Proprietary Fire Alarm Systems

When connected and configured as a protected premises unit with monitor and relay modules, the NFS-3030 will automatically transmit General Alarm, General Trouble, General Supervisory, and Security signals to a listed compatible Protected Premises Receiving Unit. A simplified drawing of connections between the receiving unit and the NFS-3030 protected premises unit is shown in Figure 4.3.

Connect the receiving unit to the protected premises unit as shown in Section 4.3 "NFPA 72 Central or Remote Station Fire Alarm System (Protected Premises Unit)".

Install and program the Receiving unit with type codes and zone mappings shown in Figure 4.3; see the programming manual for procedures.

Block View
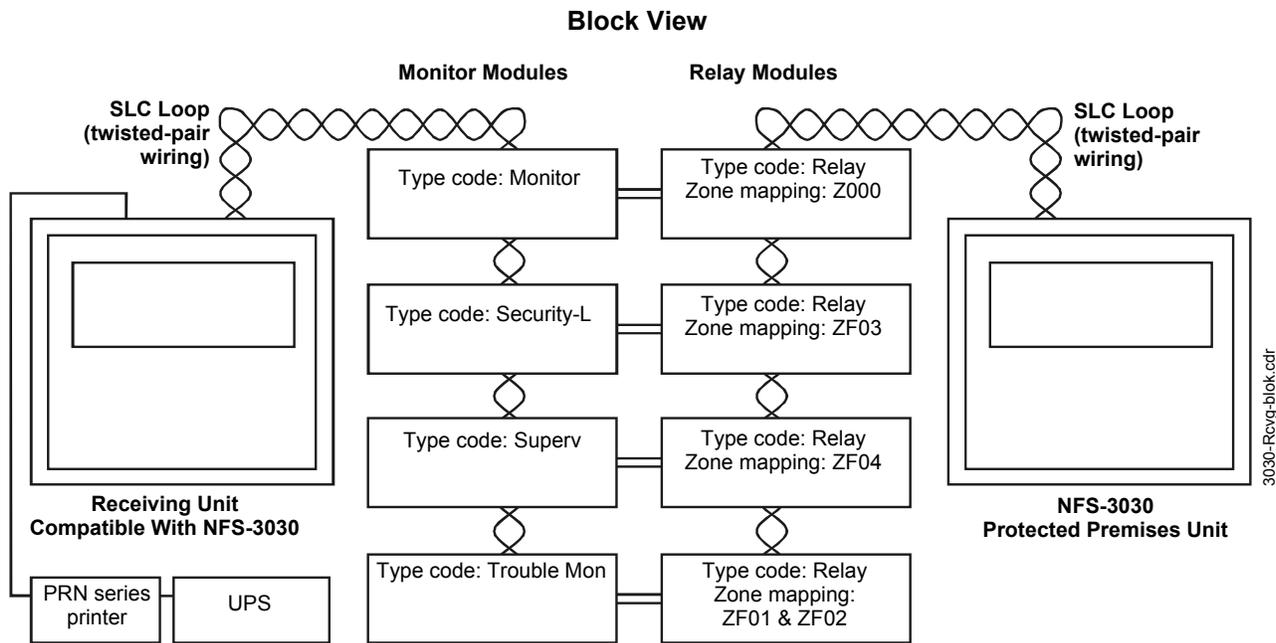
Note: Remote printers require 120 VAC, 50/60Hz primary power. A secondary power source (battery backup) is not provided; the use of a separate Uninterruptable Power Supply (UPS) 50 watt minimum, UL-listed for Fire Protective Signaling is recommended. A UPS is required for NFPA 72-1999 Proprietary Protected Premises Receiving Unit Applications.

Detail View
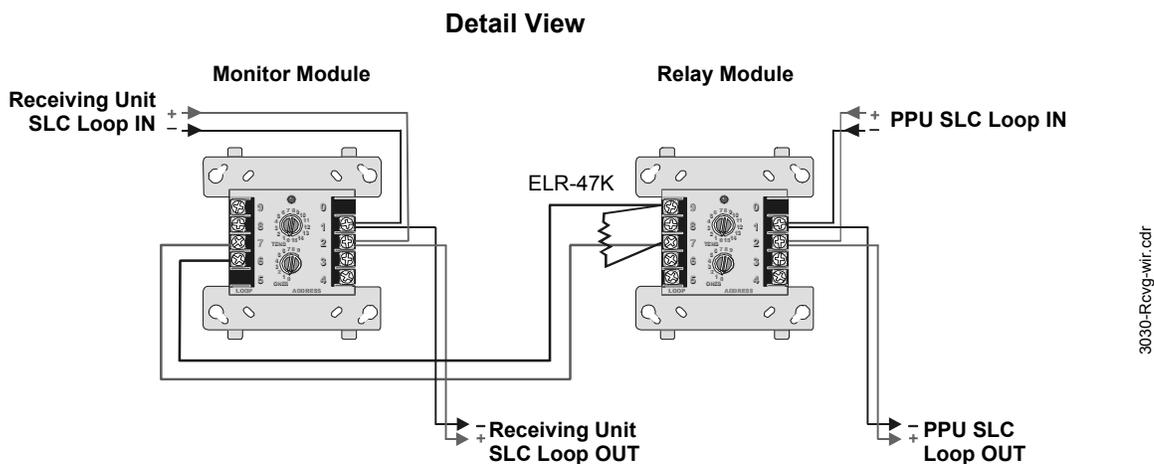
Figure 4.3 Typical Proprietary Fire Alarm Systems Wiring Connections

4.5 Fire/Security Applications

📄 **NOTE:** The NFS-3030 is not approved for use in security applications in Canada.

4.5.1 General Operation

The NFS-3030 can be used as a combination Fire/Security system when installed and operated according to the instructions in this section.

For security applications, program one or more monitor module (listed for security applications) with the SECURITY-L, SYSTEM MONITOR, or AREA MONITOR Type Codes, and wire as shown in Figure 4.5. Activating these types of modules lights the SECURITY LED, and displays a security alarm condition on the primary display. The panel sounder will sound until you acknowledge the Security alarm. You can also program additional sounders or output devices to activate with the security alarm initiating device. These type codes are designed to indicate an alarm in one or more of the following situations:

(a) on an open or short circuit
(b) on a ±50% change in resistance value from the End-of-Line resistor value
(c) on loss of communication with the device.

A tamper switch installed in the cabinet door will indicate a door tamper condition whenever the door is open. If the control panel indicates a Security alarm, you can perform acknowledge, signal silence, and system reset from the control panel.

Damage can result from incorrect wiring connections.

4.5.2 General Security Requirements

The following security requirements must be met:

*   Use AMPS-24/E power supply.
*   Shielded cable must be used on all input/output wiring associated with security functions.
*   SLC Loop Shielding (refer to the *SLC Wiring Manual*).
*   Security Module I/O Circuit Shielding — terminate the shield at earth ground at the junction box containing the module.
*   When employed as a Protected Premises Unit, the NFS-3030 cabinet door must be wired with an STS-1 Tamper Switch that is monitored by the control panel
*   If the system has arming and disarming capability, a ringback signal from the Central Station to the arming location is required for Grade A operation. The ringback signal informs the Protected Premises Control Panel that the signal to arm/disarm has been received by the Central Station.
*   A single SLC loop may be used for both Fire and Security Device Connections.

There are five software type IDs associated with security operation: ACCESS MONITOR alarm, AREA MONITOR, EQUIP MONITOR, SECURITY-L, and SYS MONITOR. There is also one software function, Security Delay (SDEL). These software elements are essential to all aspects of security operation, including Control-By-Event (CBE) programming. Devices with the type IDs ACCESS MONITOR and EQUIP MONITOR do not automatically display at the LCD or require state change acknowledgment. State changes in devices with these software types may be output at a printer. Refer to this panel's Programming manual for more information about the characteristics of software type IDs.

⚠ **WARNING:**
XP Transponder circuits (XPP-1, XPM-8, XPC-8, XPR-8, XPM-8L) are not suitable for security applications.

4.5.3 Installing a Security Tamper Switch

Follow the instructions below to wire the cabinet with a Security Tamper Switch kit model STS-1.

1. Install the STS-1 Tamper Switch onto the side of the backbox opposite the door hinge, pushing the switch through the opening until it snaps into place.

2. Install the magnet on the same side of the cabinet door as the lock. Push the magnet through the opening in the door until it snaps into place.

3. Connect the STS-1 connector to J6 Security on the CPU.

4. Program panel supervision for Tamper Input "Yes".

Connect to
J6 Security

STS-1
mounting
location
(side opposite
of door hinges)

3030-sts1.cdr
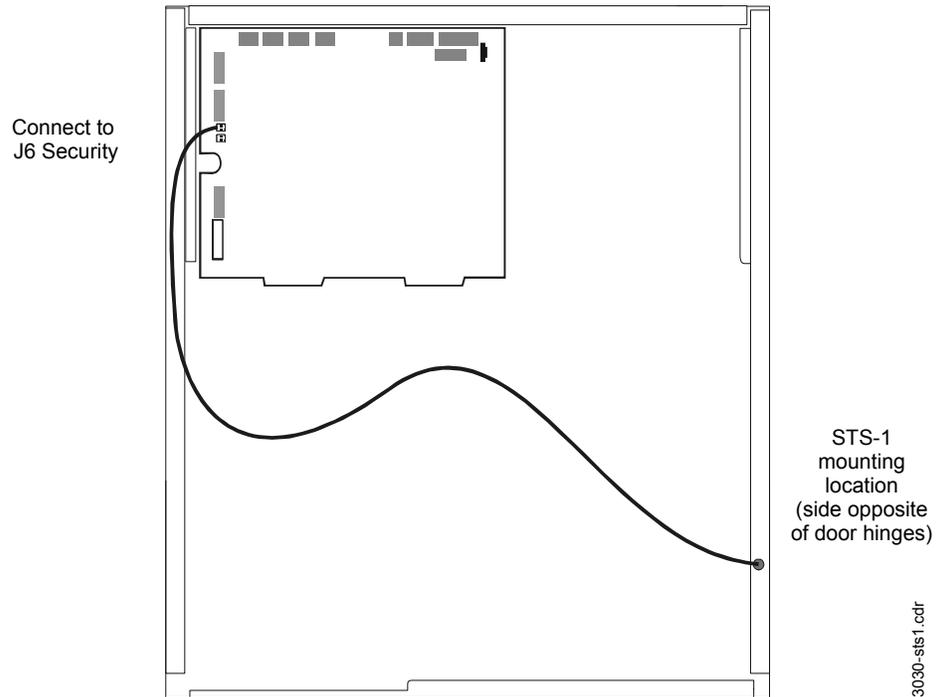
Figure 4.4 Installing the STS-1 Security Tamper Switch

4.5.4 Receiving Unit

For applications requiring transmission of security alarm information to a central receiving unit, the CPU may be connected to a compatible receiving unit. For information on configuring the Receiving unit for Combination Fire/Security applications, refer to the documentation for that control panel.

4.5.5 Programming

The control panel can communicate with any number of security devices. To do so, program the points as follows:

1. Select the address of the module(s) to be used for security.
2. Select one of the type codes described in Section 4.5.2 "General Security Requirements".

For detailed instruction on programming Type Codes, refer to the *Programming Manual*.

4.5.6 Wiring for Proprietary Security Alarm Applications

Typical wiring for proprietary security alarm applications with the FMM-1 module.

Note the following:

- The module is programmed with one of five type codes (see Section 4.5.2 "General Security Requirements").

- Supplementary use only applies to UL-listed systems.

- NAC devices used for security cannot be shared with fire NAC devices.

- Refer to the *Device Compatibility Document* for compatible NAC devices.

- All monitor modules used for security application must be installed in the control panel cabinet with STS-1 Security Tamper Switch.
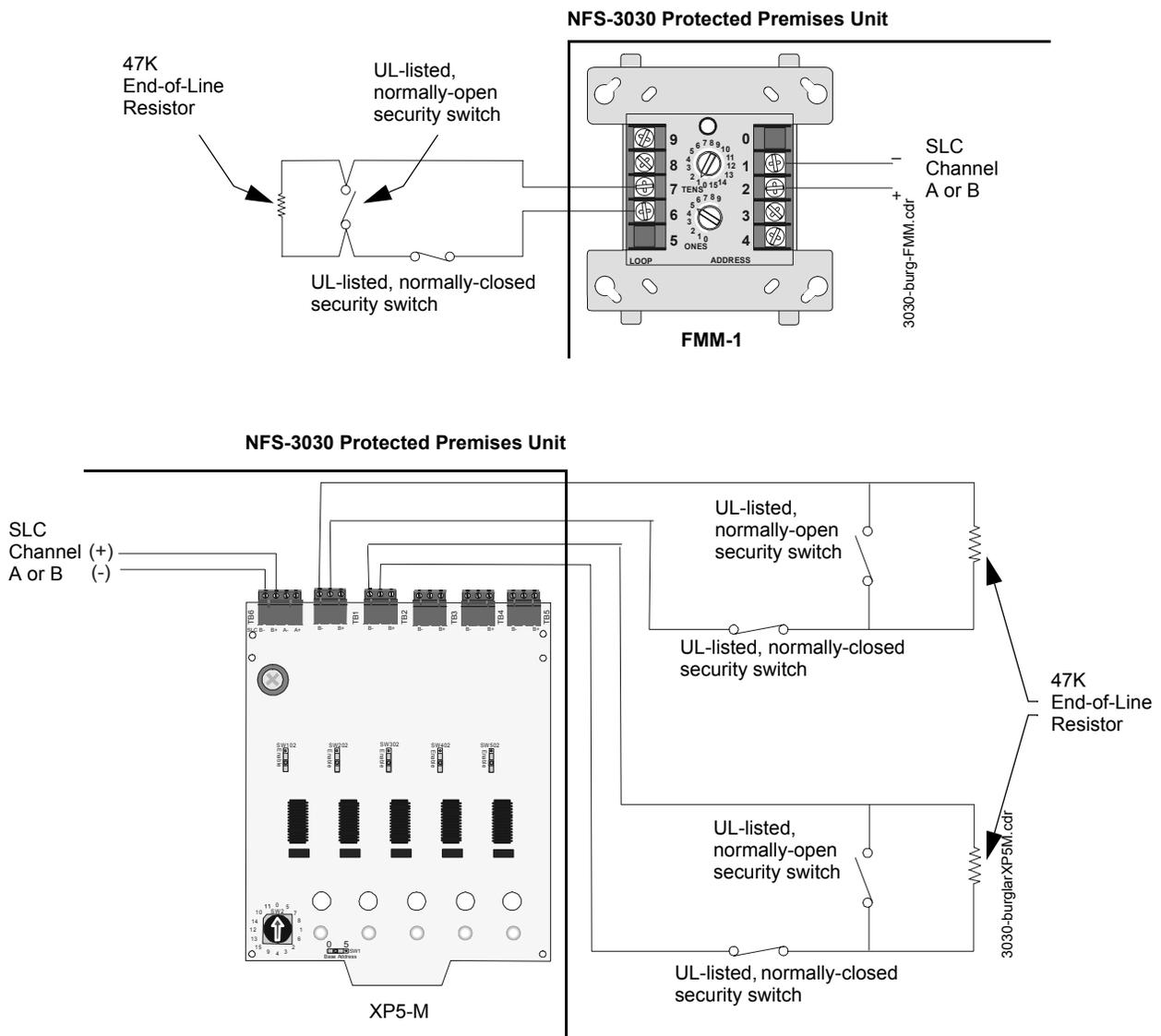
Figure 4.5 Wiring Diagram for Proprietary Security Alarm Applications

4.5.7 Connecting an RKS-S Remote Key Switch

The RKS-S Remote Key Switch arms and disarms the system. It can be mounted in a UL listed single-gang electrical box. Both the monitor module and RKS-S must be mounted within the protected area. Figure 4.6 and Figure 4.7, respectively, depict the connection of the FMM-101 or FMM-1 module to the RKS-S.

WARNING:
XP Transponder circuits (XPP-1, XPM-8, XPC-8, XPR-8, XPM-8L) are not suitable for security applications.
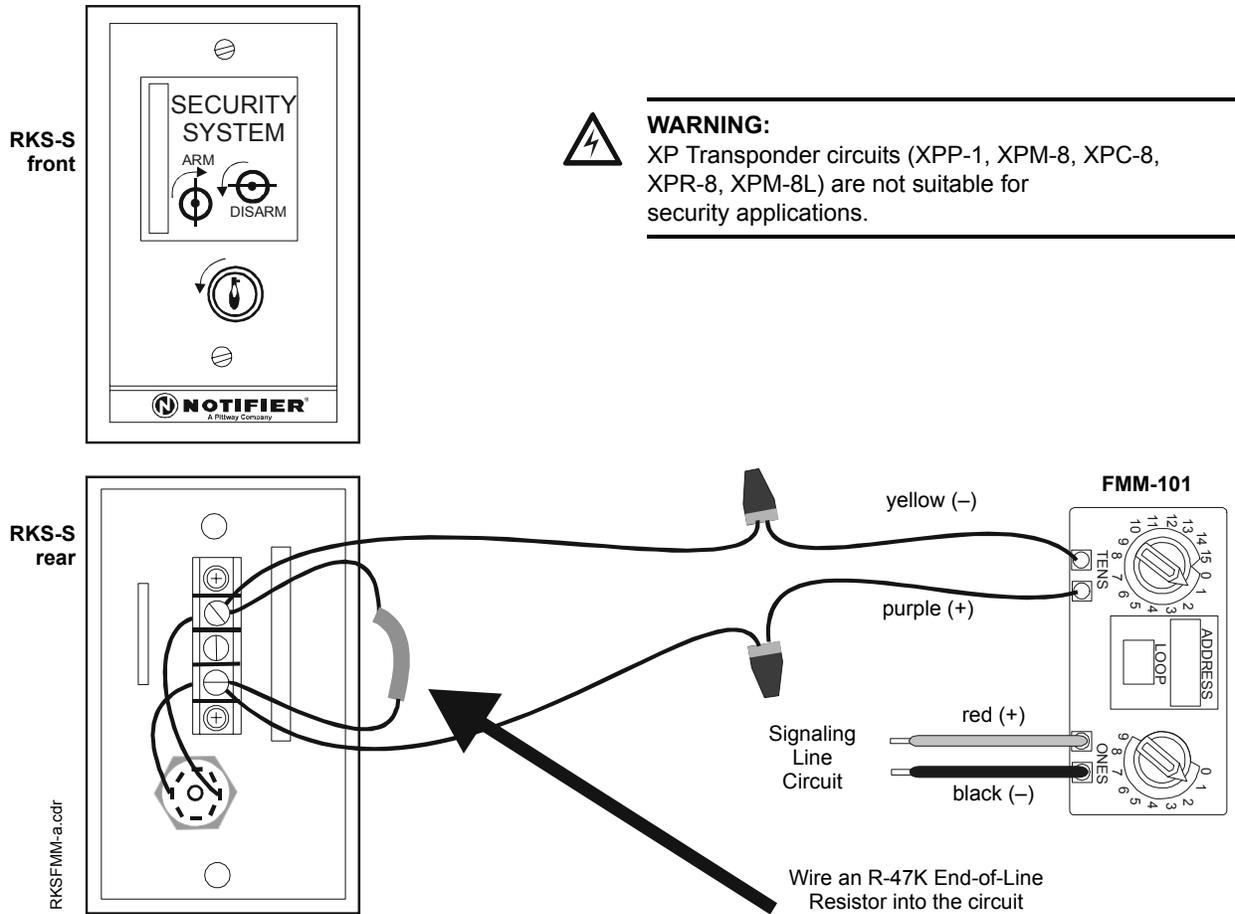
Figure 4.6 Connecting the FMM-101 Module to the RKS-S
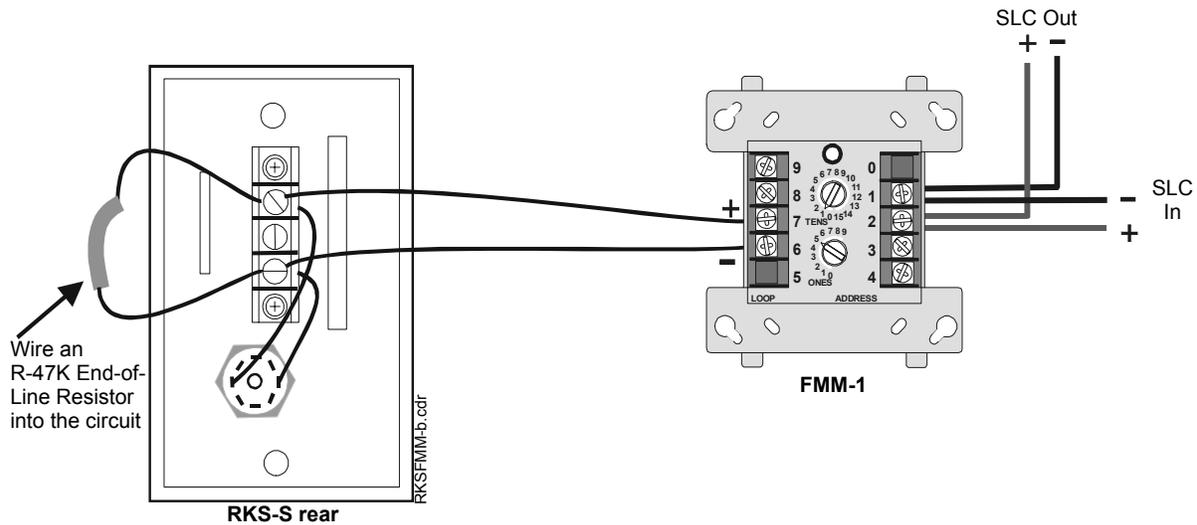
Figure 4.7 Connecting the FMM-1 Module to the RKS-S

4.5.8 Single Tenant Security System with Entry/Exit Delay

The following system requirements are illustrated in Figure 4.8.

- One NFS-3030 Control Panel
- Multiple Security Supervisory Circuits Reporting to Central Station as a Single Area
- The minimum security equipment required is as follows:
  —Multiple MM Monitor Modules per Protected Area
  —One Group Interface for security alarm
  —One Group Interface to generate trouble arming system
  —Contact Switch for Each Entry/Exit Door
  —RKS-S Key Switch
  —MM Monitor Modules
  —Remote Annunciator for Each Entry/Exit Door
    (ACM-24AT, ACM-48A, ACM-16AT, ACM-32A)
  —Security Devices
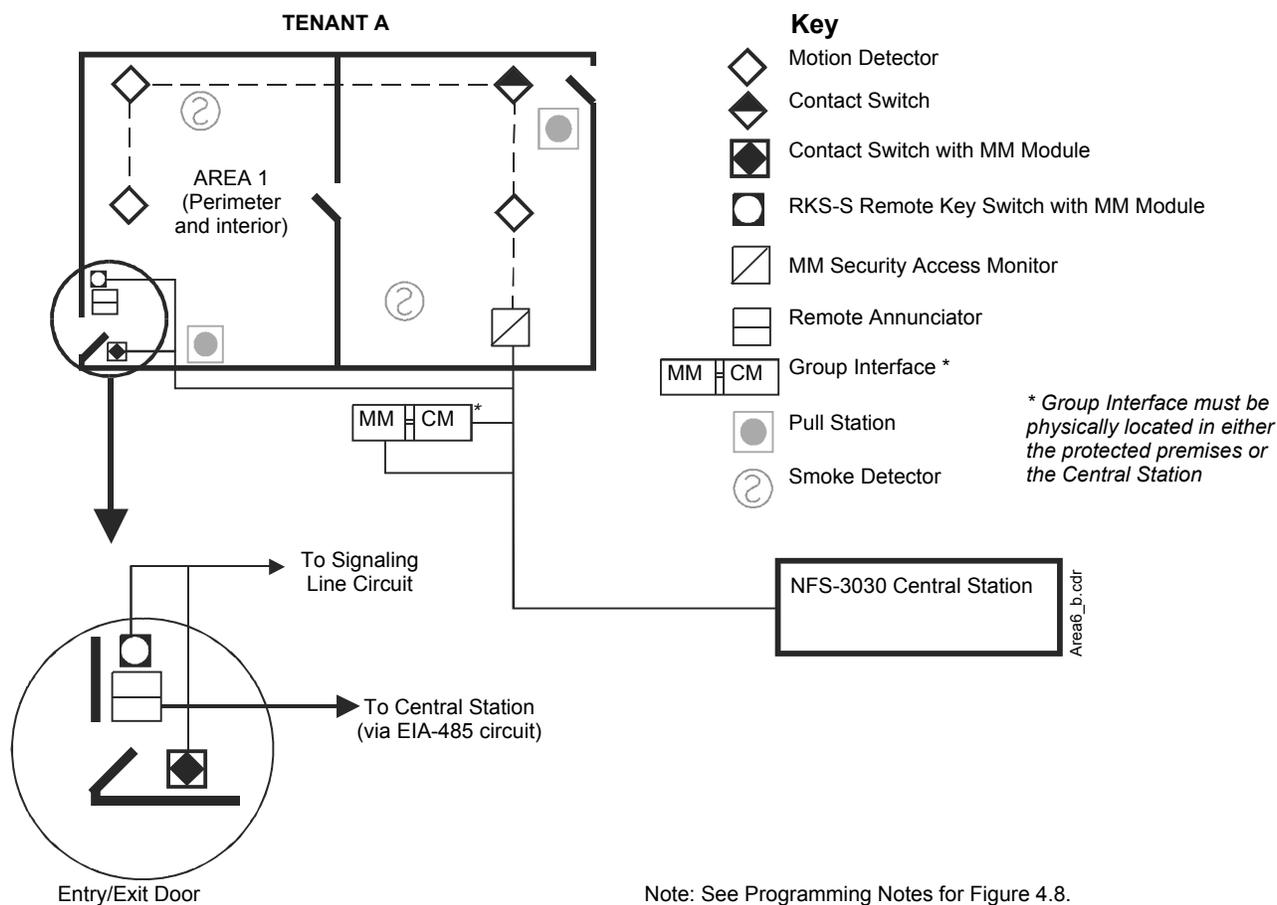
Figure 4.8 Single Tenant Security System with Entry/Exit Delay

Programming Notes for Figure 4.8

1.   Programming of Key Switch, Access Points, and Motion Detection

RKS Remote Key Switch with Monitor Module
Address: LXXMYYY (arbitrary)
Type ID: ACCESS MONITOR
Zone Map: (none)
Custom Label: Arming Switch

◆ **Contact Switches with Monitor Modules**
Address: LXXMYYY (arbitrary)
Type ID: ACCESS MONITOR
Zone Map: ZA
Custom Label: Exit Door #

▱ **Motion Detectors with Monitor Modules**
Address: LXXMYYY (arbitrary)
Type ID: ACCESS MONITOR
Zone Map: ZB
Custom Label: Motion Detection

2. Programming of Logic Equations

Logic Equation for 1 minute exit delay:
　　　　　ZLa* = DEL(01:00, 00:00, *address of key switch*)
Logic Equation for Trouble arming system:
　　　　　ZLb* = AND (ZA, *address of key switch*, NOT(Zla))
Logic Equation to arm system:
　　　　　ZLc* = AND (ZLa, NOT(ZLb))
Logic Equation providing 30-second entry delay:
　　　　　ZLd* = SDEL(00:30, 00:30, ZA)
Logic Equation for Security Alarm:
　　　　　ZLe* = AND (ZLc, OR (ZLd))
*Follow the following restrictions on values:
　　　　　a < b < c < d <e

3. Programming Group Interfaces

| MM | CM | Group Interface for Trouble when system is armed while access point(s) active
A. CM programming
Address: LXXMYYY (arbitrary)
Type ID: RELAY
Zone Map: ZLb
Custom Label: Arming Trouble Group Output
Signal Silence: No
Walk Test: Yes/No (Installer Specified)
Switch Inhibit: Yes
B. MM Programming
Address: LXXMYYY (arbitrary)
Type ID: TROUBLE MON
Zone Map: (none)

Group Interface for Security Alarm
A. CM programming
Address: LXXMYYY (arbitrary)
Type ID: RELAY
Zone Map: ZLe
Custom Label: Security Group Output
Signal Silence: No
Walk Test: Yes/No (Installer Specified)
Switch Inhibit: Yes
B. MM Programming
Address: LXXMYYY (arbitrary)
Type ID: SECURITY-L
Zone Map: (none)

4.5.9 Security Annunciation

A1P1
Mode: Monitor
Source: ZLc

A1P2
Mode: Monitor
Source: ZLe

A1P3
Mode: Monitor
Source: LXXMYY

A1P4
Mode: Monitor
Source: LXXMYY

Additional doors can be
monitored, up to the number of
available annunciator points.
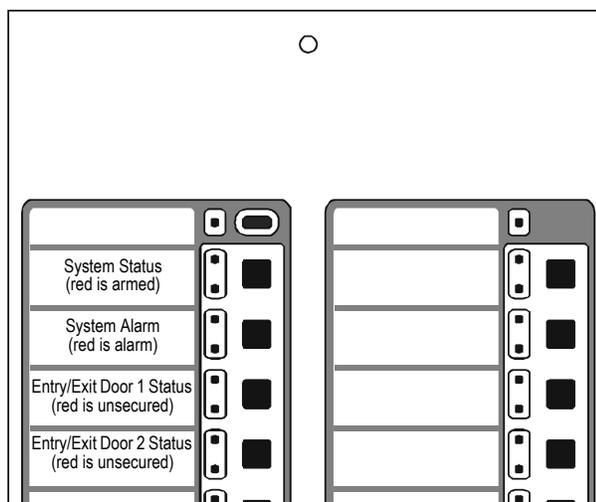
Figure 4.9 Sample Annunciator Display

4.6 Releasing Applications

4.6.1 Overview

This control panel can be used for non-hazardous agent release or preaction/deluge control applications via the SLC loop. In a properly configured system with compatible, listed actuating and initiating devices, this control panel complies with the following NFPA standards for installation in accordance with the acceptable standard:

Standard	Covers
NFPA 13	Sprinkler Systems
NFPA 15	Water Spray Systems
NFPA 16	Foam-Water Deluge and Foam-water Spray Systems
NFPA 17	Dry Chemical Extinguishing Systems
NFPA 17A	Wet Chemical Extinguishing Systems
NFPA 2001	Clean Agent Fire Extinguishing Systems

Table 4.1 NFPA Standards for Releasing Applications

4.6.2 Programming

The control panel supports up to ten releasing software zones. You can map these zones to activate control modules.   Program the FCM-1 module for the appropriate Type Code according to the chart below:

Type Code: RELEASE CKT	Type Code: REL CKT ULC
• For use in UL applications	• For use in UL or ULC applications
• Do not use REL-47K	• Requires REL-47K at solenoid
• Cannot use power-limited wiring	• Power-limited wiring
• Supervised for open circuit only	• Supervised for open circuit and shorts
• Supervised for power loss	• Supervised for power loss

For more information, refer to the *NFS-3030 Programming Manual.*

4.6.3 Wiring

Make sure to keep total system current within the limits of the power supply. You can power the module from the power supply of the control panel or any UL-listed 24 VDC regulated power-limited power supply for Fire Protective Signaling. For more information, refer to the *Device Compatibility Document*.

References to wiring diagrams for releasing applications:

*   To connect a releasing device to a FCM-1 Module, refer to Section 4.7.
*   To connect an NBG-12LRA Agent Release-Abort Station, refer to Section 4.7.1.

4.7 Connecting a Releasing Device to a FCM-1 Module

Typical Connections Figure 4.10 shows typical connections for wiring a releasing device to a module. For ULC applications, REL-47K is required; see chart in Circuit Requirements below.
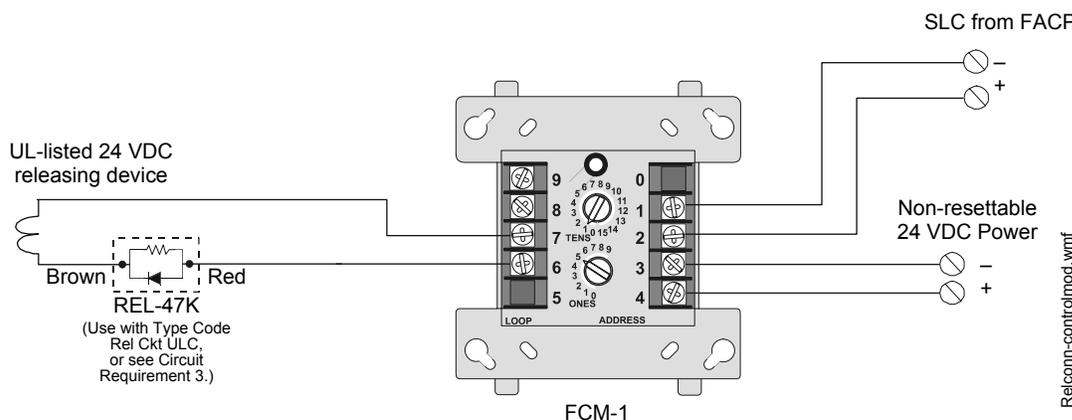
Note: See Circuit Requirements below.
Devices for use in releasing applications **must** be programmed as type code RELEASE CIRCUIT or REL CKT ULC.

Figure 4.10 Typical Connection of a 24 VDC Releasing Device to the FCM-1 Control Module

Circuit Requirements When connecting a releasing device to the FCM-1 control module, note the following:

1. For NFPA 13 and 15 applications, disable the Soak Timer (Soak=0000); for NFPA 16 applications, set the Soak Timer (0600-0900 seconds). Refer to the *NFS-3030 Programming Manual* for instructions on setting the Soak Timer.

2. For applications using power-limited circuits:
    a) Use an End-of-Line device (P/N REL-47K) with the FCM-1 module. Connect the End-of-Line device as shown in Figure 4.10.
    b) All wiring for releasing circuits is supervised against open and shorts.
    c) Program the releasing circuit for Type Code REL CKT ULC.

3. For applications not requiring power-limited circuits:
    a) End-of-Line devices (P/N REL-47K) are not required; however, the releasing device circuit is not supervised against shorts.
    b) Limited energy cable cannot be used for wiring of a releasing device circuit.
    c) Maintain a 0.25 inch (6.35 mm) spacing between the releasing circuit device wiring and any power-limited circuit wiring.
    d) In non-power-limited applications, program the releasing circuit for Type Code RELEASE CKT.

4.7.1 Connecting an NBG-12LRA Agent Release-Abort Station

Typical Connections   Figure 4.11 shows typical connections for wiring an NBG-12LRA Agent
Release-Abort Station.
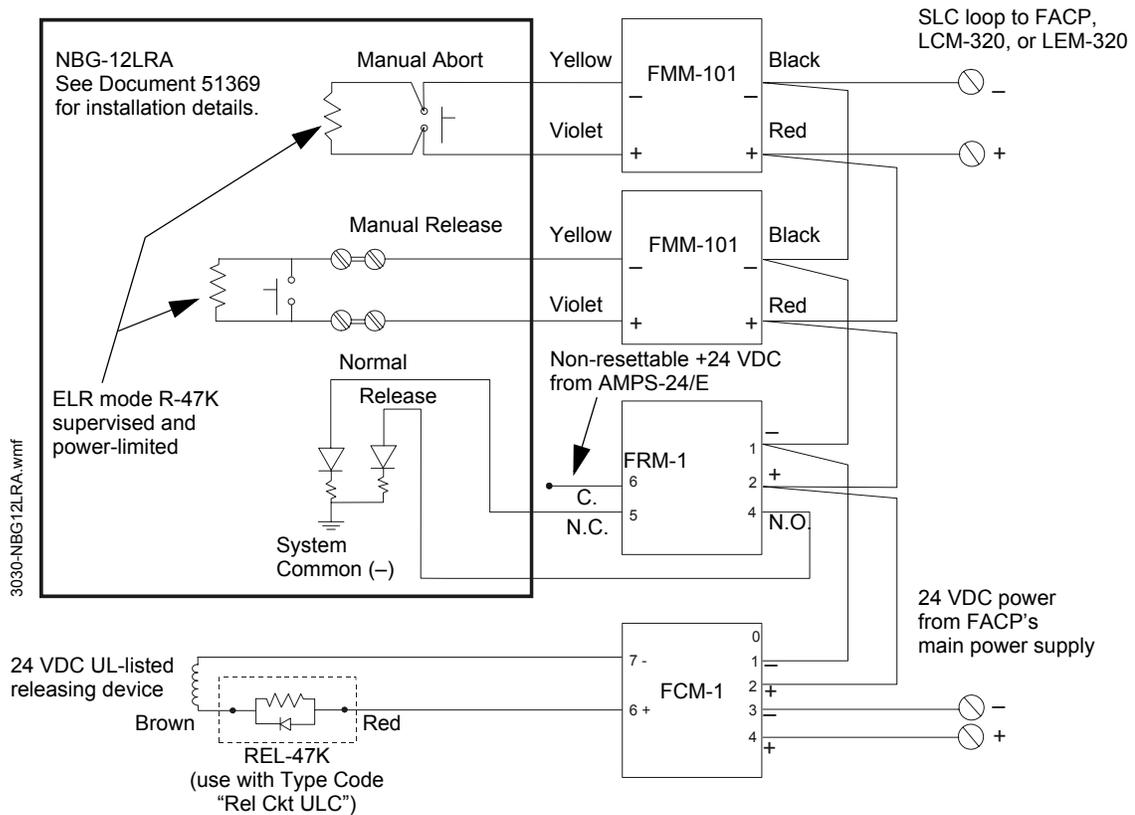
Figure 4.11 Typical Connections for an NBG-12LRA Agent Release-Abort Station

NOTE: See Circuit Requirements for Section 4.7 "Connecting a Releasing Device to a FCM-1
Module" on page 59.

NOTE: Devices for use in releasing applications must be programmed as type code RELEASE
CIRCUIT or REL CKT ULC.

Section 5: Testing the System

5.1 Acceptance Test

When finished with the original installation and all modifications, conduct a complete operational test on the entire installation to verify compliance with applicable NFPA standards. Testing should be conducted by a factory-trained fire alarm technician in the presence of a representative of the Authority Having Jurisdiction and the owner's representative. Follow procedures outlined in NFPA Standard 72-1999, Chapter 7, *Inspection, Testing and Maintenance*.

5.2 Periodic Testing and Service

Periodic testing and servicing of the control panel, all initiating and notification devices, and any other associated equipment is essential to ensure proper and reliable operation. Test and service the control panel according to the schedules and procedures outlined in the following documents:

*   NFPA Standard 72-1999, Chapter 7, *Inspection, Testing and Maintenance*.
*   Service manuals and instructions for the peripheral devices installed in your system. Correct any trouble condition or malfunction immediately.

5.3 Operational Checks

Between formal periodic testing and servicing intervals, the following operation checks should be performed monthly, or more frequently when required by the Authority Having Jurisdiction.

❑ Check that the green POWER LED lights.
❑ Check that all status LEDs are off.
❑ Press and hold the LAMP TEST key. Verify that all LEDs and all LCD display segments work.
❑ Before proceeding: a) notify the fire department and the central alarm receiving station if transmitting alarm conditions; b) notify facility personnel of the test so that alarm sounding devices are disregarded during the test period; and c) when necessary, disable activation of alarm notification appliances and speakers to prevent their sounding.
❑ Disconnect all releasing devices to prevent accidental activation.

⚠ **WARNING:** Releasing devices should be physically disconnected.
Do not use software disable functions in the panel as lockout.

❑ Activate an Initiating Device Circuit using an alarm initiating device or an addressable initiating device on the SLC and check that all programmed active notification appliances function. Reset the alarm initiating device, the control panel, and any other associated equipment. In voice alarm applications, confirm that the proper tone(s) and/or messages sound during alarm conditions. Select the paging function and confirm that the message can be heard in the affected fire zones. Repeat the above step with each Initiating Device Circuit and each addressable device.

📄 **NOTE:** SLC Resistance Values:
The total DC resistance of the SLC pair cannot exceed 50 ohms.
For instructions on how to measure the total DC resistance of a populated SLC pair, refer to the "Measuring Loop Resistance" section of the *SLC Wiring Manual* (P/N 51253)The minimum DC resistance between conductors of an unpopulated SLC pair cannot be less than 1 K ohms.
Measure DC resistance on an unpopulated loop as shown in Figure 5.1 on page 62.

❑ On systems equipped with a firefighter's telephone circuit, make a call from a telephone circuit and confirm a ring indication. Answer the call and confirm communication with the incoming caller. End the call and repeat for each telephone circuit in the system.

❑ Remove AC power, activate an Initiating Device Circuit through an alarm initiating device or an addressable initiating device on the SLC, and check that programmed active notification appliances sound, and alarm indicators illuminate. Measure the battery voltage with notification appliances active. Replace any battery with a terminal voltage less than 21.6 VDC and reapply AC Power.

NOTE: The battery test requires fully charged batteries. If batteries are new or discharged due to a recent power outage, allow the batteries to charge for 48 hours before testing.

❑ Return all circuits to their pretest condition.

❑ Check that all status LEDs are off and the green POWER LED is on.

❑ Notify fire, central station and/or building personnel when you finish testing the system.

Step 1. Disconnect the SLC channel B (Out) and SLC channel A (Return) at the control panel.
Step 2. Measure and record the resistance at SLC Out.
Step 3. Measure and record the resistance at SLC Return.

The minimum resistance is the lesser of two and three.
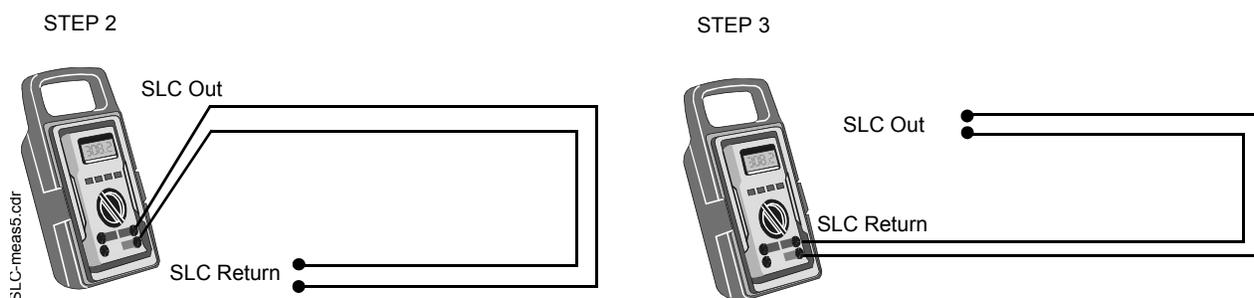
Figure 5.1 Measuring DC Resistance on an Unpopulated SLC Loop

5.4 Battery Checks and Maintenance

Maintenance-free sealed lead-acid batteries used in the system do not require the addition of water or electrolyte. These batteries are charged and maintained in a fully charged state by the main power supply's float charger during normal system operation. A discharged battery typically charges at 1.5–1.8 A and reaches the float voltage of 27.6 VDC within 48 hours.

Follow the local AHJ and manufacturer recommendations for battery replacement intervals. Minimal replacement battery capacity appears on the control panel marking label. Immediately replace a leaking or damaged battery. You can get replacement batteries from the manufacturer.

WARNING: Batteries contain Sulfuric Acid,
which can cause severe burns to the skin and eyes and damage to fabrics.

• If a battery leaks and contact is made with the Sulfuric Acid, immediately flush skin and/or eyes with water for at least 15 minutes. Water and household baking soda provides a good neutralizing solution for Sulfuric Acid.

• If Sulfuric Acid gets into eyes, seek immediate medical attention.

• Ensure proper handling of the battery to prevent short circuits.

• Take care to avoid accidental shorting of the leads from uninsulated work benches, tools, bracelets, rings, and coins.

CAUTION:
Shorting the battery leads can damage the battery, equipment, and could cause injury to personnel.

Appendix A: Electrical Specifications

A.1 Operating Power

DC Power The control panel requires connection to a +24 VDC regulated power supply, UL/ULC-listed for fire protective service, that can supply 0.1 amps continuous for CPU-3030ND (0.3 amps for CPU-3030D). For complete battery/current draw calculations, refer to the main power supply manual; if using an auxiliary power supply, there may be additional calculations in that manual.

A.2 SLC Loops

Listed below are specifications for a Signaling Line Circuit loop:

Item	Value
Voltage	24 VDC nominal, 27.6 VDC maximum
Maximum length	The maximum wiring distance of an SLC using 12 AWG (3.25 mm^2) twisted-pair wire is 12,500 ft. (3810 m) per channel. **Note:** Refer to Appendix A.4 "Wire Requirements" for limitations.
Maximum current	130 mA: LCM-320 100 mA: LEM-320 400 mA max*: Single SLC loop *Max short circuit...circuit will shut down until short circuit condition is corrected.
Maximum resistance	50 ohms (supervised and power-limited). For additional notes on SLC resistance values, see Section 5.3 "Operational Checks".

A.3 Notification Appliance Circuits

Notification Appliance Circuits are provided by panel circuit modules and SLC loop devices. Non-hazardous agent releasing devices may be connected on the SLC loop.

Item	Value
Max. wiring voltage drop	2 VDC (except CMX-2 which is 1.2 VDC)
Nominal operating voltage	24 VDC
Current for all accessories connected to the AMPS-24/E	1.0 A continuous
End-of-Line Resistors (ELRs)	ICM-4RK, ICE-4, VCM-4RK, VCE-4, and DCM-4RK: 4.7K, 1/2 watt (2 watts on 70 Vrms audio) XP5-M, XP5-C, FCM-1 Modules: 47K, 1/2 watt

If using an auxiliary power supply, refer to that installation manual for product-specific specifications. Refer to the *Device Compatibility Document* for compatible devices and notification appliances.

A.4 Wire Requirements

Each type of circuit within the Fire Alarm Control System requires use of a specific wire type to ensure proper circuit operation. The wire gauge of a particular circuit depends on the length of that circuit and the current traveling through it. Use Table A.1 on page 64 to determine the specific wiring requirements for each circuit.

Compliance with the Federal Communications Commission (FCC) and Canadian Department of Communication regulations on electrical energy radiation requires the following: Use twisted-pair

shielded wire for any non-SLC-loop wiring entering or exiting the cabinet that is not enclosed in conduit. Use twisted-pair unshielded wiring for SLC-loop wiring.

> **NOTE:** If running an SLC in conduit with Notification Appliance Circuits, you can reduce problems by exclusively using electronic sounders (such as the MA/SS-24 Series) instead of more electronically noisy notification appliances (such as electromechanical bells or horns).

Circuit Type	Circuit Function	Wire Requirements	Distance (feet/meters)	Typical Wire Type[*]
SLC (power limited)	Connects to intelligent and addressable modules.	Twisted-unshielded pair, 12 to 18 AWG (3.25 to 0.75mm^2). 50 ohms, maximum per length of Style 6 & 7 loops. 50 ohms per branch maximum for Style 4 loop.	12,500 ft (3,810 m) 9,500 ft. (2,895.6 m) 6,000 ft. (1,828.8 m) 3,700 ft. (1,127.76 m)	12 AWG 14 AWG 16 AWG 18 AWG
	or	Twisted-shielded pair.	10,000 ft (3048 m)	12 AWG
	or	Untwisted, unshielded wire, in conduit or outside of conduit.	1,000 ft (304.8 m)	12 to 18 AWG
EIA-485 ACS Connection (power limited)	Connects to ACS devices such as annunciators and UDACT	Twisted-shielded pair with a characteristic impedance of 120 ohms. 18 AWG (0.75mm^2) minimum.	6,000 ft (1829 m) (max)	16 AWG/1.30mm^2
EIA-485 RDP Connection (power limited)	Connects to RDP devices such as LCD-160	Twisted-shielded pair with a characteristic impedance of 120 ohms. 18 AWG (0.75mm^2) minimum.	4,000 ft (1219 m) (max)	16 AWG/1.30mm^2
EIA-232 (power limited)	Connects to Printers or PC.	Twisted-shielded pair. 18 AWG (0.75mm^2) minimum.	50 ft (15.24 m) without modem	16 AWG/1.30mm^2
IDC Initiating Device Circuit	FMM-1, FMM-101 XP5-M (power limited)	12-18 AWG Maximum circuit resistance is 20 ohms.		12 to 18 AWG (3.25 to 0.75mm^2)
NAC Notification Appliance Circuit	XP5-C, FCM-1 (power limited)	12-18 AWG. MPS-24A: At alarm current level, no more than a 1.2 V drop at the end of the circuit, or sized to provide the minimum rated operating voltage of the appliances used.	To meet 1.2 V drop, or sized to provide the minimum rated operating voltage of the appliances used.	12 to 18 AWG (3.25 to 0.75mm^2)
24 VDC Power Runs (power-limited)	To TM-4 Transmitter, Annunciator and FCM-1 modules	12-18 AWG. Size wire so that no more than 1.2 V drop across wire run from supply source to end of any branch.	To meet 1.2 volt drop	12 to 18 AWG (3.25 to 0.75mm^2)
CHG-120	External battery charger	12 AWG in conduit	20 ft (6.1 m) maximum	12 AWG (3.25mm^2)

Table A.1 Wire Requirements

* Notifier brand cable is recommended; see the product catalog available from Paige Electric.

Appendix B: Canadian Applications

B.1 Standalone Application

CPU-3030D, with its integral keypad/display, meets Canadian requirements for standalone applications. Its 640-character, multi-line display complies with ULC requirements for primary displays.

B.2 Local Network Application

To meet ULC requirements, the network's Manual Controls may only be operated from one location at any given time.

When panels are networked (using NCM Network Control Modules), employ AKS-1 Key Switch on each panel's Primary Annunciator to enable its functions. NCA may be a Primary Annunciator when AKS-1 is installed. Refer to the *NCA Manual* (P/N 51482) for more information.

NOTE: Only one key should be issued for a networked system.

An NCA or Network Control Station (NCS) may be employed as a Display and Control Center. In the event that communication fails between the panels and the Control Center, the panels will continue to function in local/standalone mode.

B.3 Automatic Alarm Signal Silence

If selecting this feature for a system requiring annunciators, consult the Authority Having Jurisdiction.

B.4 Annunciator Applications

1. In Canada, the ACM series annunciator modules must be used to annunciate the fire alarm input points/zones only, if no multi-line sequential display is installed.
2. For Canadian applications, the following LED colors must be employed:
    – Red must be used to indicate active alarm inputs.
    – Yellow must be used to indicate supervisory, burglary or trouble signals.
    – Green must be used to indicate the presence of power or an activated output.

B.5 Releasing Devices

Supervision for shorts is required; use REL-47K and type code REL CKT ULC. Refer to Section 4.6 "Releasing Applications".

Notes

Notes

Notes

Index

Limited Warranty

NOTIFIER® warrants its products to be free from defects in materials and workmanship for eighteen (18) months from the date of manufacture, under normal use and service. Products are date stamped at time of manufacture. The sole and exclusive obligation of **NOTIFIER®** is to repair or replace, at its option, free of charge for parts and labor, any part which is defective in materials or workmanship under normal use and service. For products not under **NOTIFIER®** manufacturing date-stamp control, the warranty is eighteen (18) months from date of original purchase by **NOTIFIER®**'s distributor unless the installation instructions or catalog sets forth a shorter period, in which case the shorter period shall apply. This warranty is void if the product is altered, repaired or serviced by anyone other than **NOTIFIER®** or its authorized distributors or if there is a failure to maintain the products and systems in which they operate in a proper and workable manner. In case of defect, secure a Return Material Authorization form from our customer service department. Return product, transportation prepaid, to **NOTIFIER®**, 12 Clintonville Road, Northford, Connecticut 06472-1653.

This writing constitutes the only warranty made by **NOTIFIER®** with respect to its products. **NOTIFIER®** does not represent that its products will prevent any loss by fire or otherwise, or that its products will in all cases provide the protection for which they are installed or intended. Buyer acknowledges that **NOTIFIER®** is not an insurer and assumes no risk for loss or damages or the cost of any inconvenience, transportation, damage, misuse, abuse, accident or similar incident.

NOTIFIER® GIVES NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR OTHERWISE WHICH EXTENDS BEYOND THE DESCRIPTION ON THE FACE HEREOF. UNDER NO CIRCUMSTANCES SHALL **NOTIFIER®** BE LIABLE FOR ANY LOSS OF OR DAMAGE TO PROPERTY, DIRECT, INCIDENTAL OR CONSEQUENTIAL, ARISING OUT OF THE USE OF, OR INABILITY TO USE **NOTIFIER®** PRODUCTS. FURTHERMORE, **NOTIFIER®** SHALL NOT BE LIABLE FOR ANY PERSONAL INJURY OR DEATH WHICH MAY ARISE IN THE COURSE OF, OR AS A RESULT OF, PERSONAL, COMMERCIAL OR INDUSTRIAL USE OF ITS PRODUCTS.

This warranty replaces all previous warranties and is the only warranty made by **NOTIFIER®**. No increase or alteration, written or verbal, of the obligation of this warranty is authorized.

"**NOTIFIER**" is a registered trademark.

Warn-NL-03-2005.fm

NOTIFIER®