METASYS®

XP Transponder

Installation Precautions

Location of Content Changes

The product that this document supports is UL (Underwriter's Laboratories) Multiple Listed, which requires that the content of the documentation inherited from the manufacturer remain intact. Minor changes clarify information such as vendor-specific product names and literature names and numbers. More significant changes to the original technical content, such as additions or corrections, are identified with Note Numbers **Nx**. For the Note Number content, refer to the *Application and Clarification Notes* section at the end of this document.

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

> ⚠ WARNING: Several different sources of power can be connected to this fire alarm control panel. Disconnect all sources of power before servicing. 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 72-1996 Chapter 7 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, wiring, or operating programmed database.
>
> 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.

Supported Products

This document may contain references to some products that are not supported prior to Metasys® Release 9.01. If you are using this release or earlier releases, please ignore references to the following products:

- NAM-232
- LIB-200A
- LIB-400
- SIB-2048A

Also, the AVPS-24R and AVPS-24RE have been replaced by the APS-6R.

- **This system** meets National Fire Protection Agency (NFPA) requirements for operation at 0-49ºC (32-120ºF) and at a relative humidity of 85% RH (non-condensing) @ 30ºC (86ºF). 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 its peripherals be installed in an environment with a nominal room temperature of 15-27ºC (60-80ºF).
- **Verify that wire sizes are adequate** for all initiating and indicating device loops. [N1] 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 near lightning strikes.* Consult with the Field Support Service 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·lb. Overtightening may damage threads, resulting in reduced terminal contact pressure and difficulty with screw terminal removal.

- **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. Fire Alarm Control Panel (FACP) operation and reliability depend upon proper installation.

Fire Alarm System Limitations

While installing a fire alarm system may make lower insurance rates possible, 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 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.
- **Any fire alarm system** may fail for a variety of reasons:
  - **Smoke detectors** may not sense fire where smoke cannot reach the detectors such as in chimneys, in walls, on or in 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. Furthermore, all types of smoke detectors - both ionization and photoelectric types, have sensing limitations. No type of smoke detector can sense every kind of fire caused by carelessness and safety hazards like smoking in bed, violent explosions, escaping gas, improper storage of flammable materials, overloaded electrical circuits, children playing with matches, or arson.

IMPORTANT:	**Smoke detectors** must be installed in the same room as the control panel [N13] 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.
  - **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.

- **Rate-of-Rise head 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.
- **Equipment used in the system** may not be technically compatible with the control. 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.
- **The most common cause** of fire alarm malfunctions, however, is inadequate maintenance. All devices and system wiring should be tested and maintained by professional fire alarm installers following written procedures supplied with each device. System inspection and testing should be scheduled monthly or as required by national and/or local fire codes. Adequate written records of all inspections should be kept.

FCC Warning

WARNING: This equipment generates, uses, and can radiate radio frequency energy 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 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 apparell numerique n’emet pas de bruits radioelectriques depassant les limites applicables aux appeareils numeriques de la classe A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Cananada.

XP Transponder

Introduction

The XP Series Transponders provide the IFC-1010/2020 Fire Alarm Control Panel (FACP) with an efficient multiplex subsystem capability. The XP Transponder communicates with the FACP and functions as a data-gathering panel for alarm Initiating Device Circuits (IDC) and as a remote switching center for Notification Appliance Circuits (NAC), speaker circuits, telephone circuits, or relays. The XP Series Transponder is designed to be used anywhere a cost-effective, remote data-gathering control panel is needed. The XP Transponders are extremely effective in both high-rise and low-rise buildings where power losses over long wiring distances dictate the use of remote control equipment, amplifiers, or audio/visual power supplies.

The Initiating Device Circuits of the XP Transponder may be used to monitor multiple zones of conventional two wire smoke detectors and normally open contact initiating devices. **N14** The Notification Appliance Circuits may be used to control multiple zones consisting of horns, speakers, two way fire fighters telephones, or dry contact relays. **N15**

Each XP Transponder communicates with, and is controlled by, one of the Signaling Line Circuit (SLC) loops **N1** of the host IFC-1010/2020 control panel. If communication between the control panel and the XP Transponder is lost, the XP Transponder will automatically switch over to degraded Local mode operation (if so programmed), in which it functions as an independent Fire Alarm Control Panel.

To the control panel, the XP Transponder appears to be a cluster of sequentially addressed monitor and control modules, starting from a base address (one module address for every XP point). The XP may share the same LIB SLC loop with other devices such as intelligent detectors or addressable modules. Multiple XP Transponders may be placed on the same LIB SLC loop provided the module address capacity of 99 is not exceeded.

Features

The following features are included:

- Standalone operation during communications failure with the Fire Alarm Control Panel
- Up to 26 field-configurable circuits
- Style B or Style D Initiating Device Circuits
- Style Y or Style Z Notification Appliance Circuits, Speaker Circuits, or Telephone Circuits

- Single Form-C or dual Form-C dry contact relays
- Alarm and trouble status displayed by Light-Emitting Diodes (LEDs) for each point
- Display of output point On/Off status
- Transponder status displays and controls including: Power/On-Line LED, Local Alarm LED, Local Trouble LED, Reset, Signal Silence, and Lamp Test control switch
- MPS-24A/MPS-24AE and MPS-24B/MPS-24BE power limited power supplies, charger, and battery capability in same cabinet. The E suffix on the power supplies represents an export product, which requires 220/240 VAC, 50/60 Hz primary power
- Optical isolation from the Signaling Line Circuit
- Multiple transponders may be mounted in the same cabinet
- Plug-in terminal blocks for ease of installation and service
- Type of trouble indication for ease of troubleshooting

Related Documentation

To obtain a complete understanding of specific features of the XP Series Transponder, or to become familiar with functions in general, make use of the documentation listed in Table 1.

Table 1: Related Documentation

Title	FAN or LIT Number
IFC-200 Technical Manual	*FAN 444*
IFC-1010/2020 Technical Manual	*FAN 448*
500 Series Intelligent Modules Technical Bulletin	*LIT-408100*
Liquid Crystal Display (LCD-80) Technical Bulletin	*LIT-445151*
Device Compatibility Technical Bulletin	*LIT-445180*
NIB-96 Network Interface Board Technical Bulletin	*LIT-445101*
LDM Lamp Driver Module Technical Bulletin	*LIT-445161*

XP Transponder Inventory

The XP Transponder is comprised of the following two categories:

- Basic Equipment Package (BE-XP) [N3]
- Optional XP Transponder Components

The Basic Equipment package includes the minimum parts required in each Transponder system. To complete a remote installation, optional components such as a cabinet and a power supply must be added. For larger systems, up to four XP Transponders can be installed in a single D-size CAB-3 series cabinet.

BE-XP Basic Equipment Package

XPP-1

The XPP-1 is the only required module in the XP Transponder system. This module controls up to three XPC, XPR, or XPM boards installed in any combination in the transponder.

The XPP-1 provides two Form-C relays that can be mapped into the IFC-1010/2020 [N2] system. The base address for the XP Transponder is set by two rotary switches on this module.

Note: The relay contacts on the XPP-1 may be connected to either a power-limited or non power-limited source, but not both.

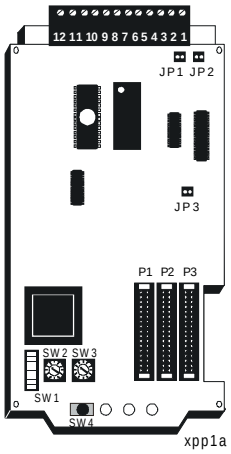


Figure 1: XPP-1

CHS-4

The CHS-4 chassis is used to mount the XP Transponder modules in the cabinet. Each CHS-4 supports the one required XPP-1 module (mounted in the far left-hand position) and up to three additional XPC, XPR, or XPM modules.

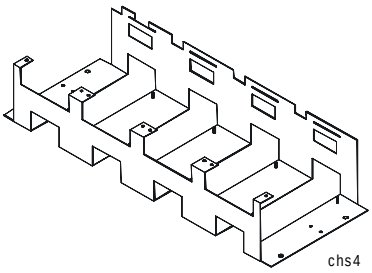


Figure 2: CHS-4

XPDP

The XP dress panel covers one row of XP Transponder modules in the cabinet.

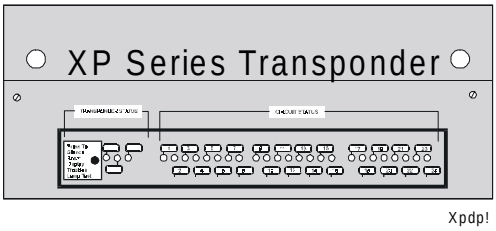


Figure 3: XPDP

XP Transponder Modules

XPM-8 (Power-limited)

The XPM-8 provides eight Style B or four Style D Initiating Device Circuits (IDCs). These circuits can employ two wire conventional detectors [N14] and any normally open contact alarm initiating device (such as manual pull stations, heat detectors, and four wire smoke detectors). Each circuit assumes a separate SLC address in the system and has a separate or dual red status LED at the bottom of the XPM-8 board. The XPM-8 assumes one position in a CHS-4 chassis. It includes eight 2.2K end-of-line resistors.

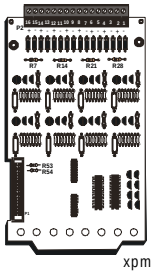


Figure 4: XPM-8

XPM-8L (Power-limited)

Similar to the XPM-8, the XPM-8L permits 1000 ohm IDC line resistance, but does not support two wire smoke detectors or Style D wiring.

The XPM-8L assumes one position in a CHS-4 chassis. It includes eight 10K end-of-line resistors.

XPC-8 (Power-limited)

The XPC-8 provides eight Style Y (Class B) or four Style Z (Class A) Notification Appliance Circuits (NAC). Each circuit assumes a unique address in the system and has a separate or dual green status LED.

With the FFT-7 Fire-Fighters Telephone, the XPC-8 circuits can be employed as telephone circuits by installing phone jacks or Wardens Stations on the NAC.

When used with Audio Message/Tone Generators and Audio Amplifiers, the XPC-8 can distribute audio signals and messages throughout the installation. Power for notification appliances and audio circuits is fed into the XPC in circuit pairs of two or more.

The XPC-8 assumes one position in a CHS-4 chassis. It includes eight 47K ohm end-of-line resistors.

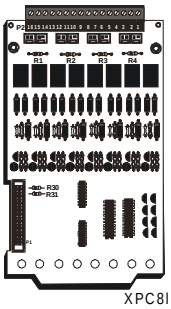


Figure 5: XPC-8

XPR-8

The XPR-8 controls up to eight SPDT Relays. The XPR-8 can alternately employ up to four dual Form-C relays. Each relay assumes a unique address in the system and has a separate or dual green status LED at the bottom of the XPR-8 board.

Note: The relay contacts on the XPR-8 may be connected to either a power-limited or non power-limited source, but not both.

The XPR-8 assumes one position in a CHS-4 chassis.

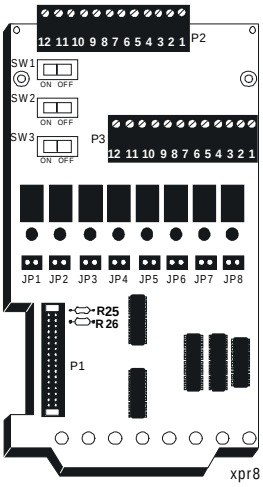


Figure 6: XPR-8

XP Transponder Power Supplies

MPS-24A/ MPS-24AE (Power-limited)

The MPS-24A or MPS-24AE supplies the regulated power needed to run the XP Transponder modules. It also supplies up to 3 amperes of regulated notification appliance power, [N16] permitting the use of a variety of standard UL Listed 24 VDC notification appliances. Up to 1 ampere of resettable power is available for four wire smoke detectors. The MPS-24A/MPS-24AE contains an integral battery charger. See the *Device Compatibility Technical Bulletin (LIT-445180)* for a list of batteries for use with MPS-24A/ MPS-24AE.

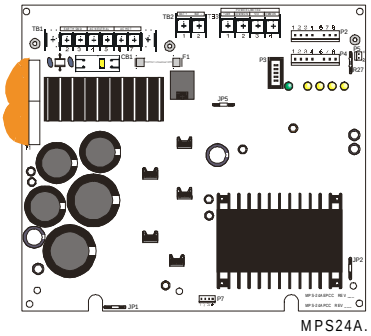


Figure 7: MPS-245A/MPS-24AE

MPS-24B/ MPS-24BE (Power-limited)

The MPS-24B or MPS-24BE may be used to power smaller transponder systems. It supplies up to 2.0 amperes of regulated notification appliance power, [N16] permitting the use of a variety of standard UL Listed 24 VDC notification appliances. Up to 200 mA of resettable power is available for four wire smoke detectors. The MPS-24B/MPS-24BE contains an integral battery charger. See the *Device Compatibility Technical Bulletin (LIT-445180)* for a list of batteries for use with the MPS-24B/MPS-24BE.

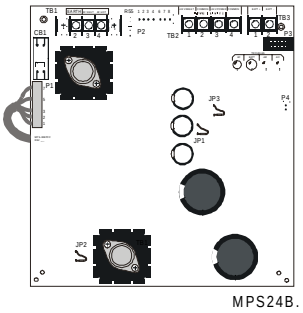


Figure 8: MPS-24B/MPS-24BE (Power-limited)

AA-30/AA-30E, AA-100/AA-100E, AA-120/AA-120E

The AA-30/AA-30E Audio Amplifier provides up to 30 watts of audio power at 25 VRMS for driving speaker circuits. The AA-120/AA-120E provides up to 120 watts at 25 VRMS and the AA-100/AA-100E provides up to 100 watts at 70.7 VRMS. The AA-30/AA-30E, AA-100/AA-100E, and the AA-120/AA-120E amplify the audio signal generated by the Audio Message/Tone Generators (AMG-1 or ATG-2). The AA-30/AA-30E mounts to one-half of a CHS-4L chassis, while the AA-120/AA-120E and AA-100/AA-100E mount directly to the cabinet backbox and consumes an entire row.

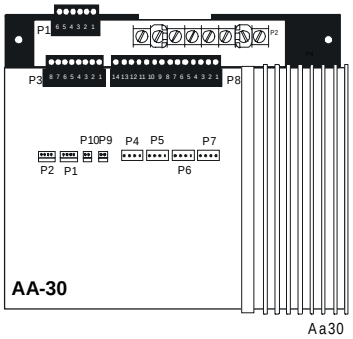


Figure 9: AA-30/AA-30E

AVPS-24 and AVPS-24E (Power-limited)

The AVPS-24/AVPS-24E Audio/Visual Power Supply provides up to 3 amperes of unfiltered, unregulated specific application power for XPC modules. The AVPS-24/AVPS-24E mounts to one-fourth of a CHS-4 chassis. In space-critical applications, the AVPS-24/AVPS-24E can be mounted underneath XP Transponder modules on the CHS-4 chassis. See the *Device Compatibility Technical Bulletin (LIT-445180)* for a list of compatible UL Listed notification appliances. **N17**

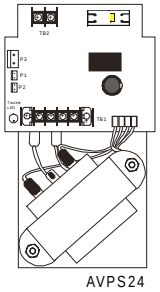


Figure 10: AVPS-24 and AVPS-24E (Power-limited)

APS-6R Auxiliary Power Supply

The APS-6R Auxiliary Power Supply is designed to power devices that require filtered, non-resettable power, such as XP Transponder modules, Notification Appliance Circuit modules, and control modules. It provides two 24 VDC (filtered) output circuits (3A each, 6A total, 4A continuous).

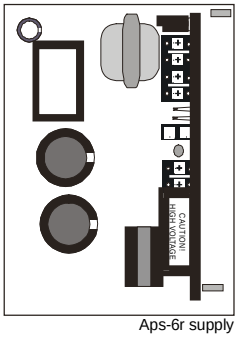


Figure 11: APS-6R Auxiliary Power Supply

Optional XP Transponder Components

XRAM-1 Optional

The XRAM-1 nonvolatile RAM chip is required when the XPP-1 will be programmed for specific local mode operation or Rapid All Call Audio Operation. All information programmed into the XPP-1 is stored on the XRAM-1. The XRAM-1 replaces a RAM chip on the XPP-1.

Figure 12: XRAM-1

MPM-2

The Main Power Meter-2 provides a voltmeter and ammeter that may be used in conjunction with the MPS-24A and MPS-24AE Main Power Supplies only.

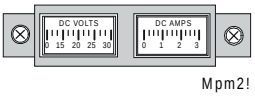


Figure 13: MPM-2

N-ELR

An N-ELR Resistor mounting plate is required in Canada for mounting End-of-Line (ELR) resistors. One N-ELR Resistor mounting plate should used for each ELR resistor.

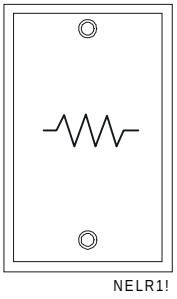


Figure 14: N-ELR

Cabinets

Cabinets for the XP Transponder system include the door and backbox and are offered in the following four sizes:

CAB-A3 - Single Row Cabinet (illustrated)

Note: The CAB-A3 will not support the added installation of Audio Amplifiers.

CAB-B3 - Double Row Cabinet

CAB-C3 - Triple Row Cabinet

CAB-D3 - Quad Row Cabinet

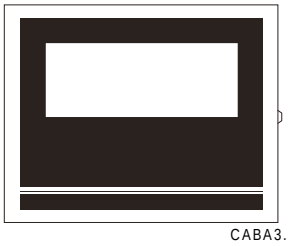


Figure 15: Cabinets

For door and backbox dimension, refer to the *Installation Drawing* packaged with each cabinet or to the *Installing the IFC-1010/2020 Technical Bulletin (LIT-448155).*

DP-1

The Dress Panel (DP-1) covers one row assembly in an XP Transponder cabinet.[N6]

Figure 16: DP-1

CHS-4L

The low-profile CHS-4L is used to mount AA-30/AA-30E Audio Amplifiers, Audio Message/Tone Generators, the Fire Fighters Telephone, or AVPS-24/AVPS-24E Audio-Visual Power Supplies in the same cabinet as the XP Transponder.

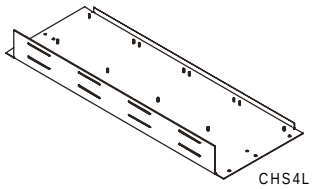


Figure 17: CHS-4L

BP-3

The BP-3 Battery Dress Panel covers the main power supply and the batteries in an XP Transponder cabinet. One BP-3 is required per transponder cabinet.

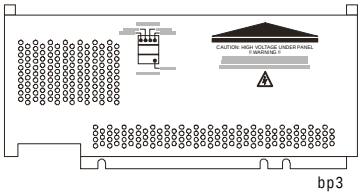


Figure 18: BP-3

VP-2

Use the VP-2 Vented Dress Panel when an XP Transponder is installed in the top row of a cabinet (required in Canada). The VP-2 covers the gap between the Transponder Dress Panel (XPDP) and the top of the cabinet. The VP-2 is secured to the cabinet with two screws (provided).

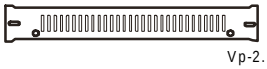


Figure 19: VP-2

XP Transponder Installation

Mounting the Cabinet Backbox

In a clean, dry area, mount the backbox using the four holes provided in the back surface of the cabinet. For backbox dimensions and mounting hole locations, refer to the literature included with each cabinet.

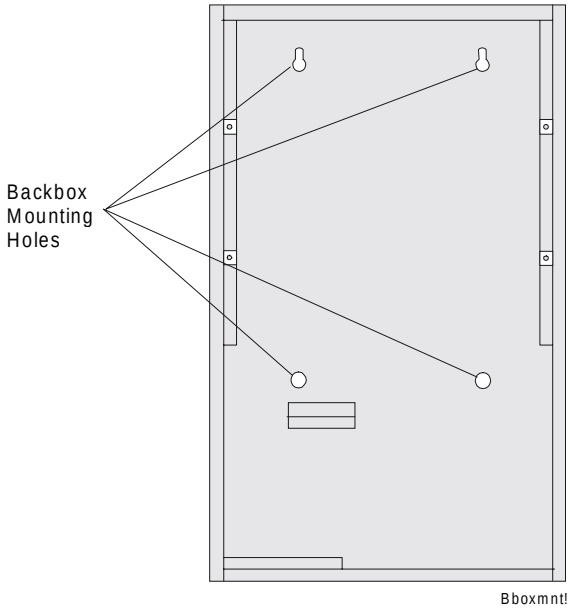


Figure 20: Mounting the Cabinet Backbox

Installing a CHS-4 Chassis

In each row of the cabinet that will employ XP Transponder modules, install a CHS-4 or CHS-4L chassis. For proper grounding of the XPP-1 to the cabinet, connect the grounding cable provided with the XPP-1 to the left chassis mounting screw as illustrated.

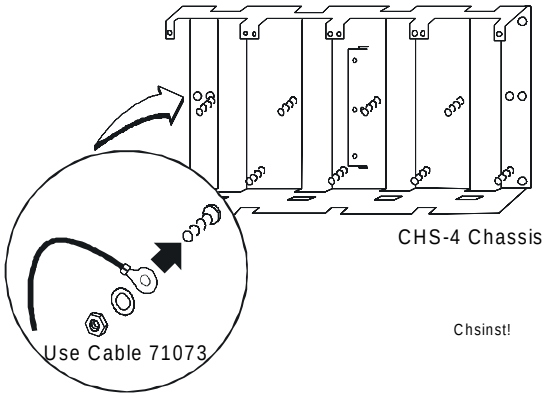


Figure 21: Installing a CHS-4 Chassis

Installing the Main Power Supply

In the bottom of the cabinet, ensuring that the upper bracket engages the support tab on the cabinet, install a main power supply.

Secure the bottom of the power supply to the bottom cabinet support with the two self-tapping screws provided.

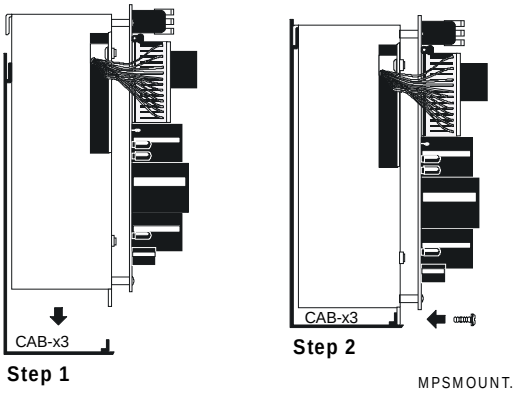


Figure 22: Installing the Main Power Supply

Installing the XPP-1 into the CHS-4

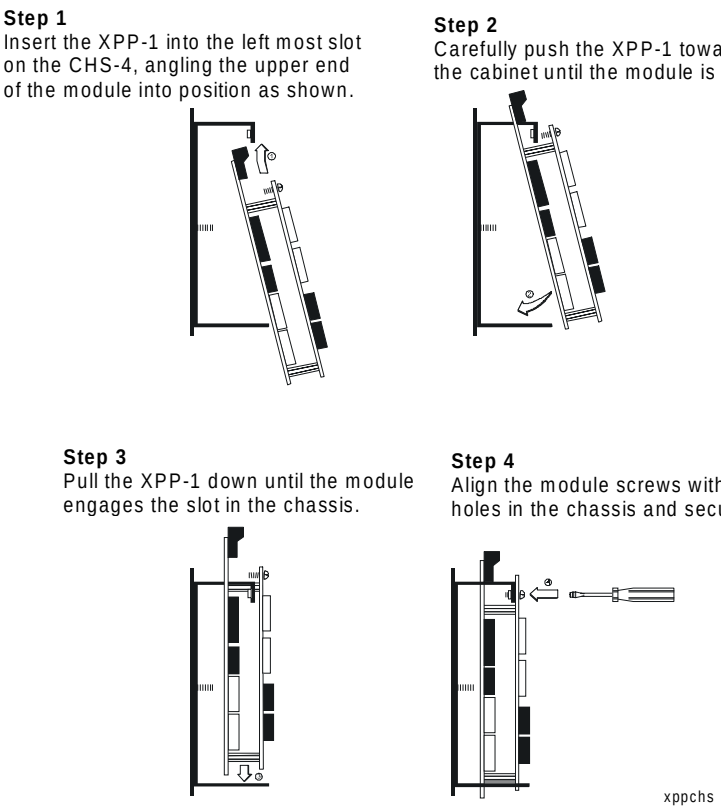


Figure 23: Installing the XPP-1 into the CHS-4

Installing an AVPS-24/ AVPS-24E

Install the AVPS-24/AVPS-24E over the screw mounts on the CHS-4/4L chassis and secure with two nuts.

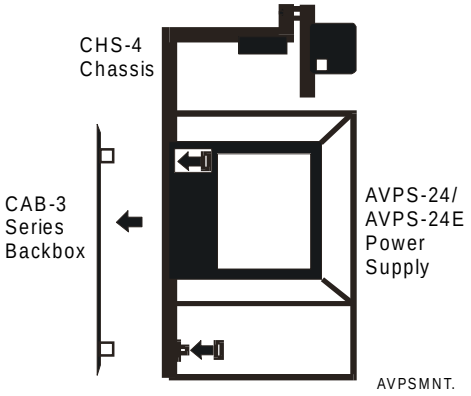


Figure 24: Installing an AVPS-24/AVPS-24E

Installing an APS-6R

Install the APS-6R over the mounts on the CHS-4/4L chassis and secure with standoffs inserted into APS-6R mounting slots.

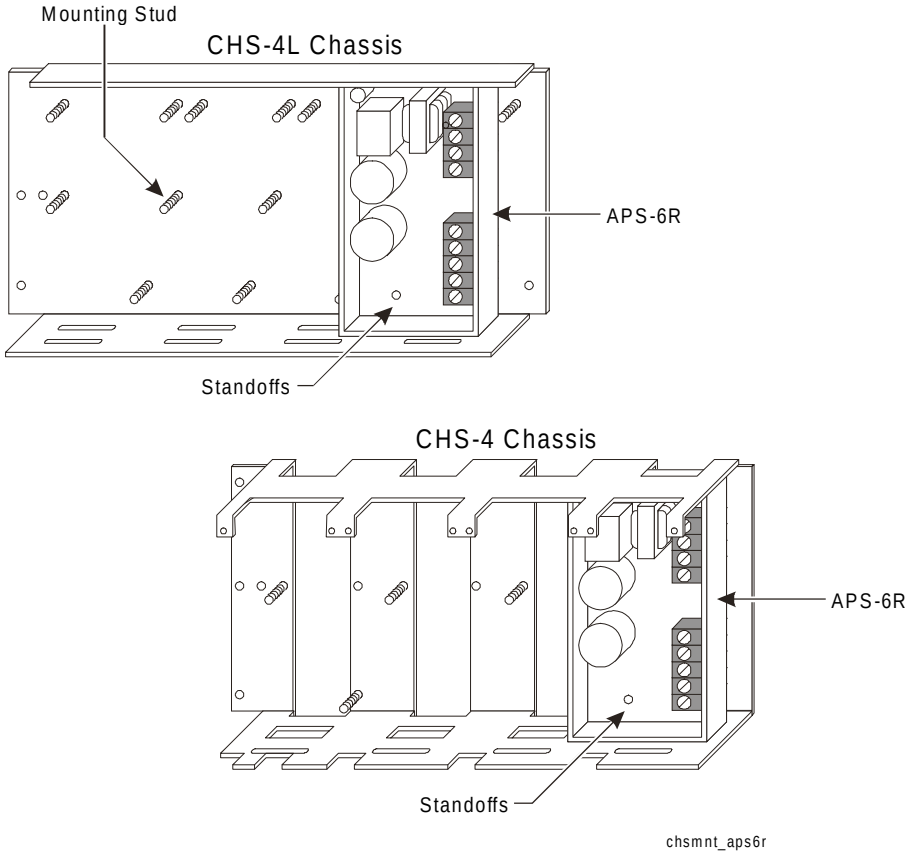


Figure 25: Mounting the APS-6R to a Chassis

Installing the XP Modules

After the XPP-1 module has been installed into the left-most position (Slot 1) of the CHS-4, the remaining system modules may be installed. Interconnecting ribbon cables must be installed at the same time as each XPC, XPM, or XPR module, as outlined on the following pages.

The procedure for mechanical installation of XP Transponder modules into the CHS-4 chassis Figure 26 and Figure 27) and connection of the module ribbon follows on the next pages.

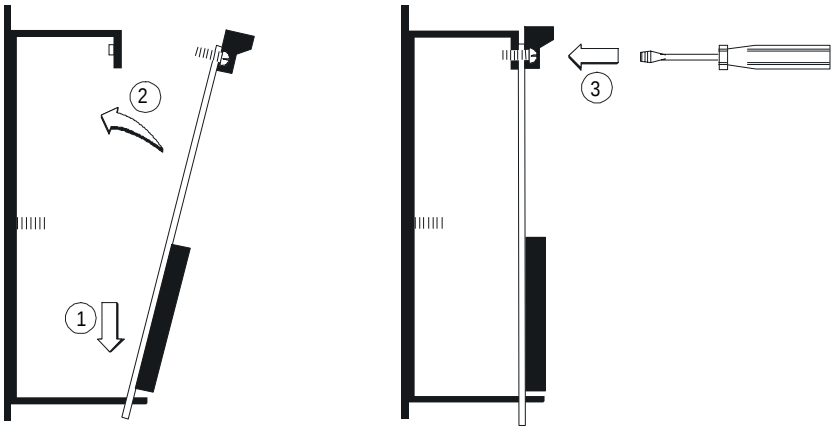
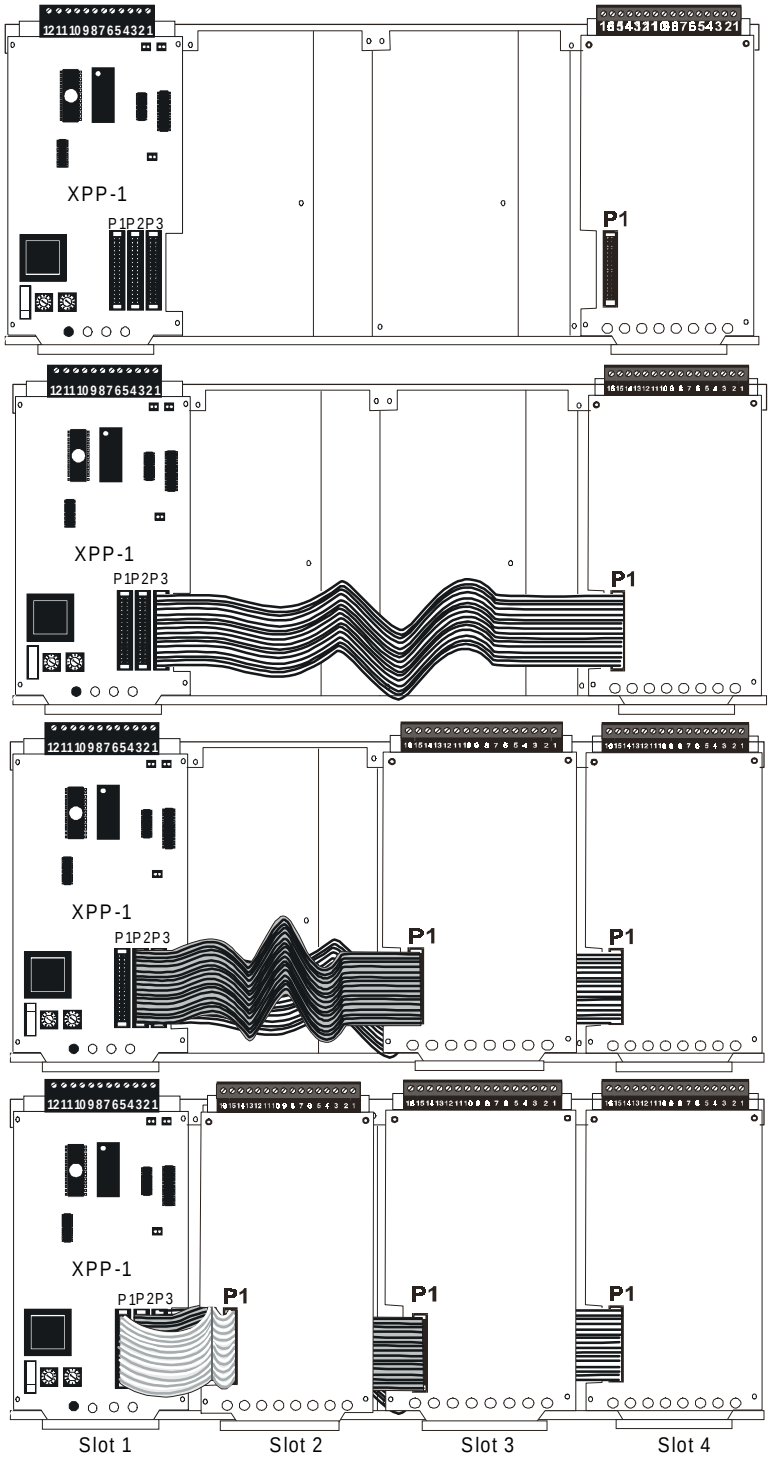


Figure 26: Installing the XPP, XPC, XPM, and XPR Modules



Step 1

Install an expansion module (XPC-8, XPM-8, or XPR-8) in chassis Slot 4.

Step 2

Connect a ribbon cable (Part Number 75095) between XPP-1 Plug P3 and Plug P1 on this module.

Step 3

Install a module in Slot 3 and connect a ribbon cable (Part Number 75095) between XPP-1 Plug P2 and Plug P1 on this module.

Step 4

Install one end of a ribbon cable (Part Number 75095) into XPP-1 Plug P1. Install an expansion module in chassis Slot 2. Connect the other end of the ribbon cable to Plug P1 on this module.

Note: This illustration is based upon the use of three transponder expansion modules. If two expansion modules are used, start at Step 3. If one module is used, start at Step 4.

xpcables

Figure 27: Installing the XP Modules

Power Supplies

MPS-24A and MPS-24AE Main Power Supply

The MPS-24A and MPS-24AE Main Power supplies are capable of powering the XP Transponder continuously during non-alarm and alarm conditions. A total of 3.0 amperes (internal) @ 24 VDC electrically regulated is available from the MPS-24A/MPS-24AE main power supply for operating the system during non-fire alarm conditions. Up to 6.0 amperes @ 24 VDC can be drawn from the MPS-24A/MPS-24AE during an alarm condition, when the transponder is functioning in local mode. If the XP Transponder is being used as a remote panel of an IFC-1010/2020, only 3.0 amperes may be drawn from the MPS-24A/MPS-24AE. Six amperes are available continuously (alarm and non-alarm) when JP1 is cut and the external NR45-24/NR45-24E **N25** or CHG-120 battery charger is employed, in both slave and local mode. JP2 on the MPS-24A/MPS-24AE must be cut for all Transponder applications.

Note: Figure 26 illustrates connections for primary and secondary power to the MPS-24A/MPS-24AE Main Power Supply.

The MPS-24A/MPS-24AE can charge batteries up to 60 ampere-hours. **N20**

Connecting the Primary Power Source

The MPS-24A requires 120 VAC, 50/60 Hz primary power and the MPS-24AE requires 220/240 VAC, 50/60 Hz primary power. The transponder requires connection to a dedicated AC fire alarm circuit, which must be labeled FIRE ALARM. This AC circuit must connect to the line side of the main light and power feed of the protected premises. Not other equipment may be powered from the fire alarm circuit. The AC circuit wire run must continuously, without disconnect devices, from the power source to the transponder power supply. Overcurrent protection for this circuit must comply with Article 760 of the National Electrical Code (NEC) as well as local codes. Use 12 AWG (3.25 mm^2) wire with 600 volt insulation for this circuit. With the circuit breaker at the main power distribution panel turned off, remove the plastic insulating cover from Terminal Block TB1 on the MPS-24A/MPS-24AE. Connect the system primary AC power source. Connect the service ground to TB1-3 and ground the power supply assembly to the cabinet with a chassis ground cable (71073) from TB1-3. Connect the AC Neutral line to TB1-4 and the AC Hot wire to TB1-6. Do not route AC wiring in the same conduit as other XP Transponder circuits. After completion of these connections, reinstall the plastic insulating cover over the terminal block. Leave the main power breaker off until installation of the XP Transponder is complete.

Connecting the Secondary Power Source (24 VDC)

Secondary power (batteries) is required to support the XP Transponder during loss of primary AC power. Batteries may reside in the XP Transponder cabinet, or in a separate NR45-24/NR45-24E Remote Battery Charger [N25] cabinet or the BB-55 Battery Enclosure, which can be mounted up to 20 feet away form the XP Transponder (for connection of an NR45-24/NR45-24E, refer to Figure 38 or Figure 39 for connection of the CHG-120 charger). Connect the Battery Positive Cable (71071) to TB2-1 (+) and Battery Negative Cable (71072) to TB2-2 (-) on the MPS-24A/ MPS-24AE (see Figure 28).

Note: Do not connect the Battery Interconnect Cable (71070) at this time. This connection will be made just after initial system primary power up.

Ground Fault Detection

The MPS-24A/MPS-24AE automatically employs Ground Fault Detection (required in Canada) unless resistor R27 is removed. The detector circuit does not make a distinction between positive and negative faults. It is normal for the MPS-24A/MPS-24AE to indicate Ground Fault Trouble during power up. This feature must be disabled on all but one power supply if multiple power supplies are present and share a common signal reference. [N7]

Resettable Four Wire Smoke Detector Power (24 VDC) (1.0 A) (Power-limited)

Up to one ampere of current for four wire smoke detectors can be drawn from TB3 Terminals 1 (+) and 2 (-) on the MPS-24A/MPS-24AE. Power is removed from these terminals during system reset. This 24 VDC electrically regulated four wire smoke detector is power-limited, but must be supervised via an end-of-line power supervision relay. This power supervision relay is energized by the four wire power circuit and its contact must be connected in series with an XPM-8, XPM-8L, M500MJ, or M501MJ Initiating Device Circuit (IDC). See Figure 47, Figure 49, and Figure 51.

Non-resettable Notification Appliance Power (24 VDC) (3.0 A) (Power-limited)

Up to 3 amperes of electrically regulated and filtered current for powering notification appliances can be drawn from TB3 Terminals 3 (+) and 4 (-) on the MPS-24A/MPS-24AE. The actual amount of power that may be drawn is determined by the calculations in *Appendix B: Power Supply Calculations* in this document. If the MPS-24A/MPS-24AE power supply is powering more than one XPP-1, all these current draws must be added together. Power is *not* removed from these terminals during a system reset. If a resettable power circuit is desired (2 amperes maximum), cut JP5 on the MPS-24A/MPS-24AE. [N18]

Main Power Harness and Supervisory Connections

Internal power for the XP Transponder is provided via the power harness, 75100 (42 inches, 1.067 m) or 75099 (16 inches, 406.4 mm). Connect this harness from P2 or P4 on the MPS-24A/MPS-24AE to plug P9 on the XP Transponder. Connect the supervisory cable (71031) from MPS-24A/MPS-24AE Plug P3 to XPP-1 Plug P7. [N8] Refer to Figure 28 for MPS-24A/MPS-24AE connections.

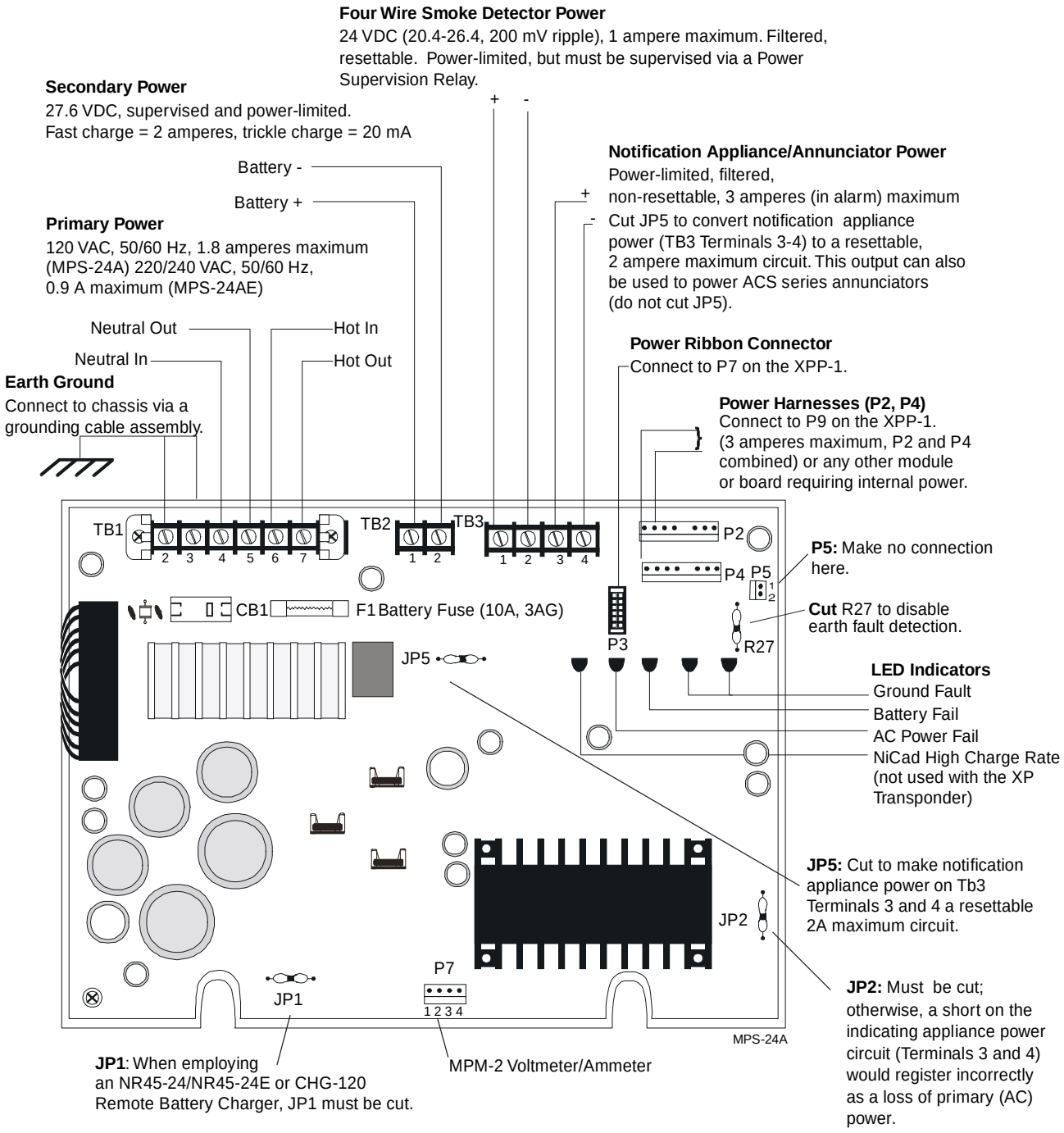


Figure 28: MPS-24A/MPS-24AE Main Power Supply

Optional Main Power Meter

The optional Main Power Meter (MPM-2) can be installed on the Main Power Supply (MPS-24A/MPS-24AE only). One scale on the MPM-2 provides an indication of the voltage across the batteries in the system. A second scale indicates the battery charging current in amperes. Refer to Figure 30 for installation steps.

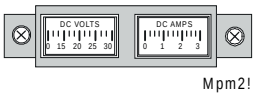


Figure 29: Optional Main Power Meter

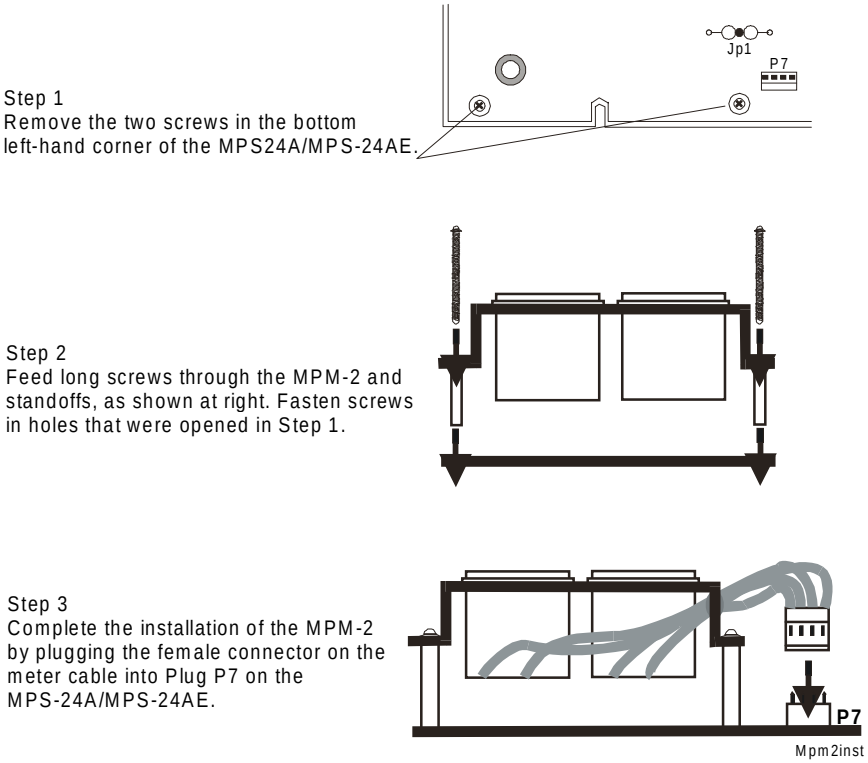


Figure 30: Installing an Optional Main Power Meter

MPS-24B/ MPS-24BE Main Power Supply

The MPS-24B/MPS-24BE Main Power Supply is capable of powering the XP Transponder continuously during an alarm and non-alarm conditions. A total of 750 mA @ 24 VDC electrically regulated is available from the MPS-24B/MPS-24BE Main Power Supply for operating the system during standby conditions.

Note: Figure 31 illustrates connections for primary and secondary power to the MPS-24B/MPS-24BE Main Power Supply.

Connecting the Primary Power Source

The MPS-24B requires 120 VAC, 50/60 Hz primary power and the MPS-24BE requires 220/240 VAC, 50/60 Hz primary power. With the circuit breaker at the main power distribution panel turned off, remove the plastic insulating cover from TB1 on the MPS-24B/MPS-24BE and connect the system primary power source. Connect the service ground to TB1-2 on the MPS-24B/MPS-24BE. Connect earth ground from the power supply to the cabinet with a chassis ground cable (71073) to TB1-2. Connect the AC Neutral line to TB1-3 and the AC Hot line to TB1-4 on the MPS-24B/MPS-24BE. Do not route AC wiring in the same conduit as other XP Transponder circuits. After completion of these connections, reinstall the plastic insulating cover over the terminal block. Leave the main power breaker off until the entire XP Transponder is complete.

Connecting the Secondary Power Source (24 VDC)

Secondary power (batteries) is required to support the XP Transponder during loss of primary power. These batteries reside in the cabinet or in a separate NR45-24/NR45-24E [N25] Remote Battery Charger cabinet or BB-55 battery cabinet. Connect the battery positive cable to TB3-1 (+) and the battery negative cable TB3-2 (-) on the MPS-24B/MPS-24BE.

Note: Do not connect the battery interconnect cable at this time. This connection will be made just after initial primary system power up.

Ground Fault Detection

The MPS-24B/MPS-24BE automatically employs ground fault detection (required in Canada) unless resistor R55 is removed. This feature must be disabled on all but one power supply if multiple power supplies are present and share a common signal reference.[N7]

Resettable Four Wire Smoke Detector Power (24 VDC) (200 mA) (Power-limited)

Up to 200 mA of current for 24 VDC four wire smoke detectors can be drawn from TB2 Terminals 1 (+) and 2 (-) on the MPS-24B/MPS-24BE. Power is removed from these terminals momentarily during system reset (unless jumper JP1 is removed). This regulated four wire smoke detector power is power-limited but must be supervised via an end-of-line power supervision relay. This power supervision relay is energized by the four wire smoke detector power and the relay contact must be wired in series with an XPM-8, XPM-8L, or M502MJ. See Figure 47, Figure 49, and Figure 51.

Main Power Harness Connections

Internal power for the XP Transponder is provided via the power harness 75100 or 75099. Connect this harness from P2 on the MPS-24B/ MPS-24BE to P9 on the XPP-1. Supervisory information is transferred between the XPP-1 and the MPS-24B/MPS-24BE through the supervisory power ribbon cable (71031) which is connected from P7 on the XPP-1 to P3 on the MPS-24B/MPS-24BE.

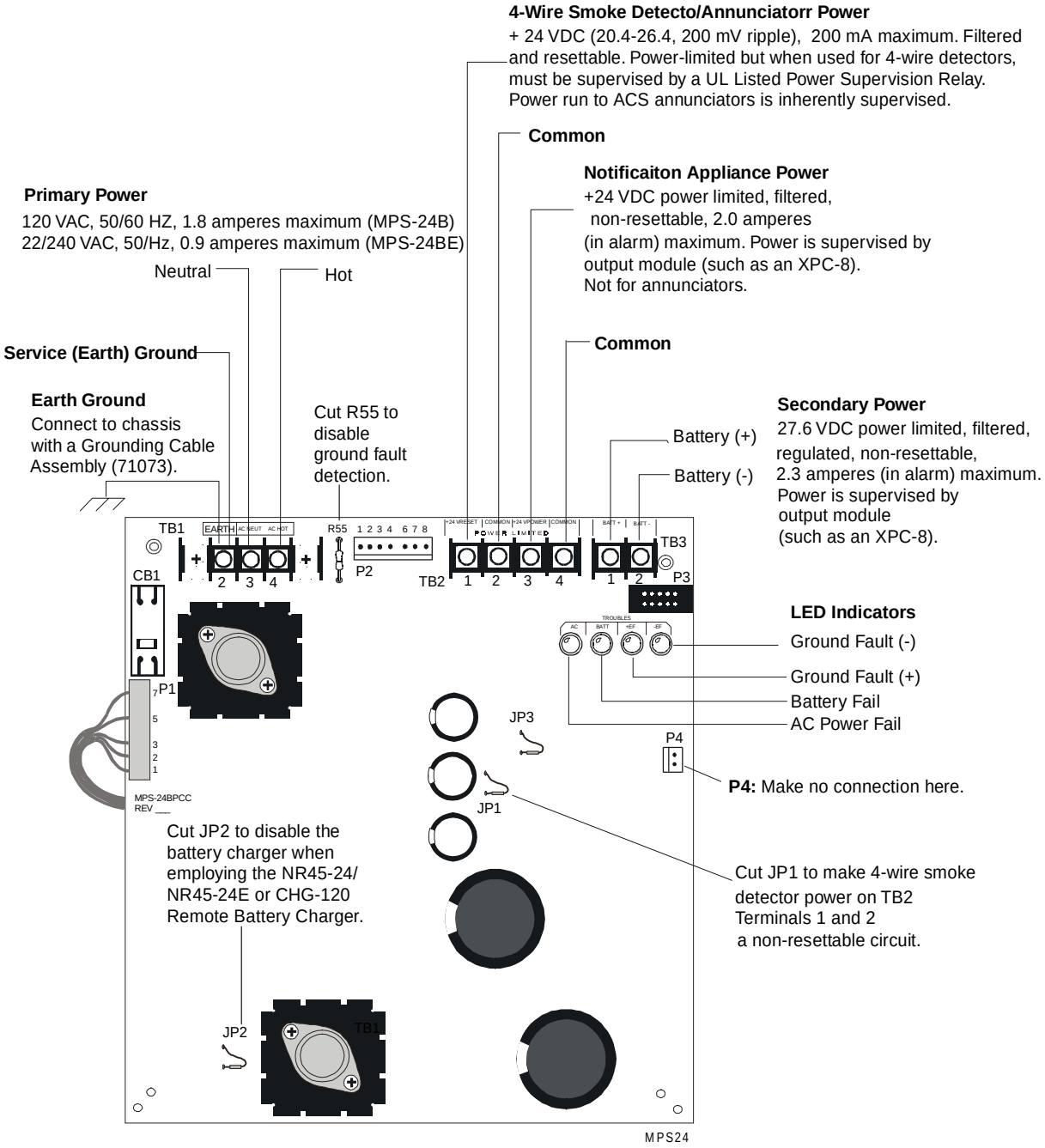


Figure 31: Field Wiring the MPS-24B/MPS-24BE Power Supply

MPS-400 Main Power Supply

The MPS-400 Main Power Supply is capable of powering the XP Transponder if installation within the IFC-400 backbox is desired. Power is provided via the accessories terminal (J1) on the MPS-400. A total of 3.0 amperes @ 24 VDC is available from the MPS-400 Main Power Supply for operating the system during non-fire alarm conditions. Up to 6 amperes @ 24 VDC can be drawn from the MPS-400 in alarm conditions. If uninstalling the XP Transponder remotely from the IFC-400, the MPS-24A/MPS-24AE or MPS-24B must be used.

Ground Fault Detection

The MPS-400 will detect ground faults on the XP Transponder providing JP2 is intact.

Main Power Harness Connection

Internal power for the XP Transponder is provided via the power harness. Part Number 75100 measures 42 inches (1.067m) and Part Number 75099 measures 16 inches (406.4 mm). Connect the appropriate harness from J1 on the MPS-400 to P9 on the XP Transponder.

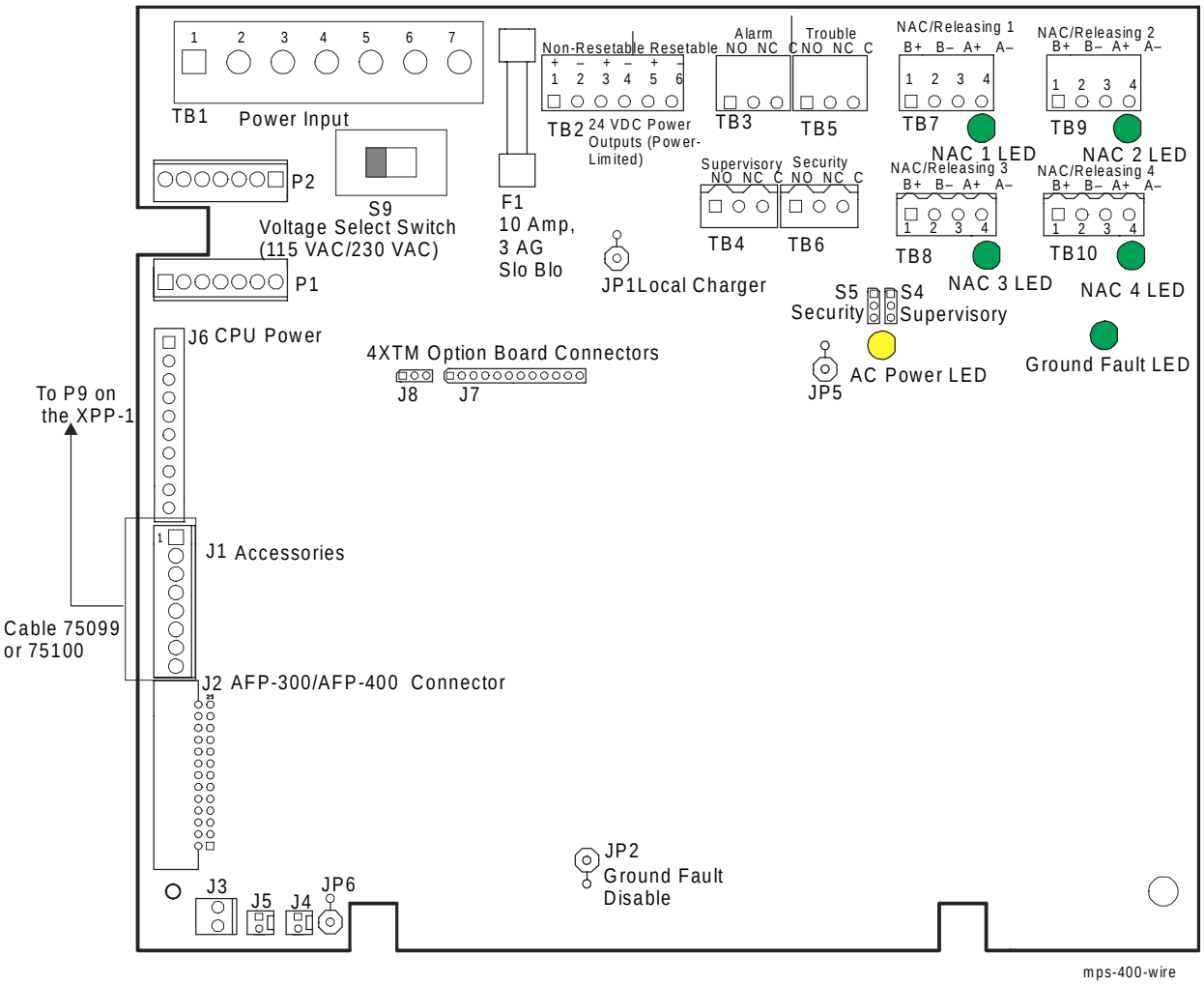


Figure 32: MPS-400 Main Power Supply

AVPS-24/ AVPS-24E Audio Visual Power Supply

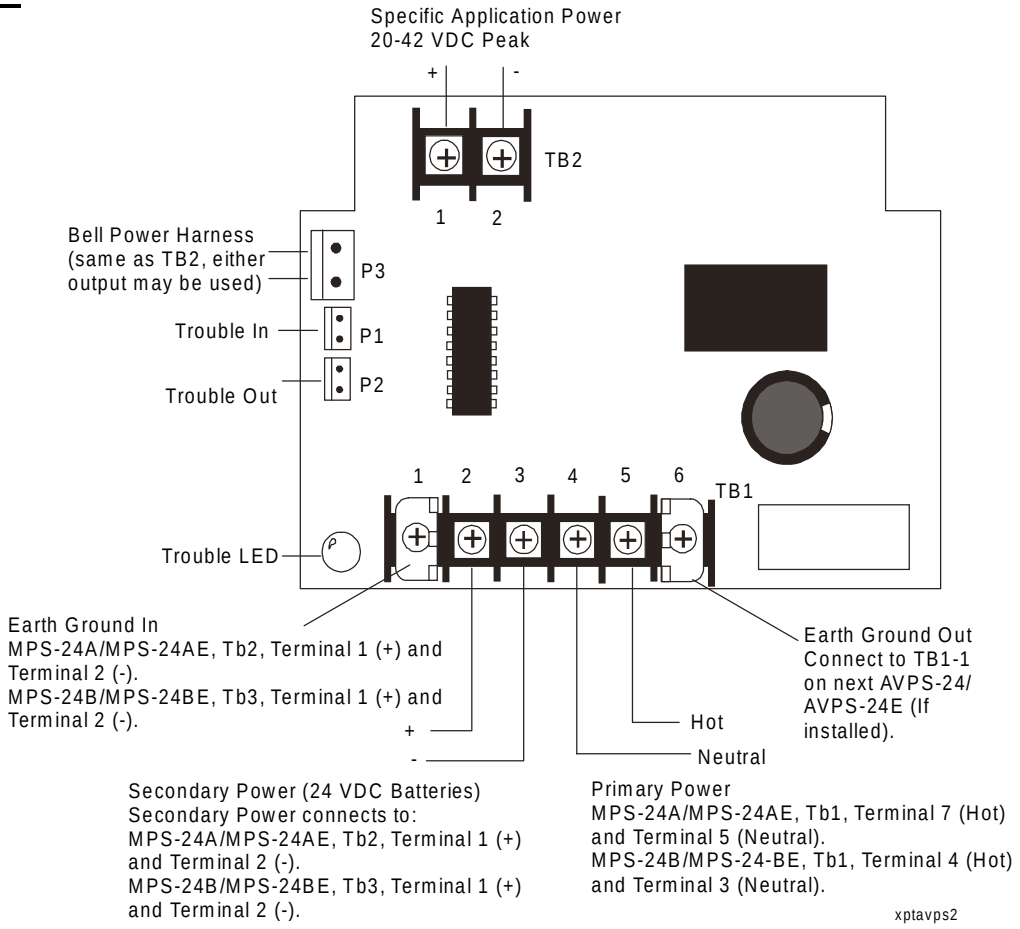


Figure 33: AVPS-24/AVPS-24E Audio Visual Power Supply

> **!** WARNING: The AVPS-24 requires 120 VAC while the AVPS-24E requires 220/240 VAC. The primary voltage requirements of the main power supply **must** match the voltage requirement of the AVPS selected.

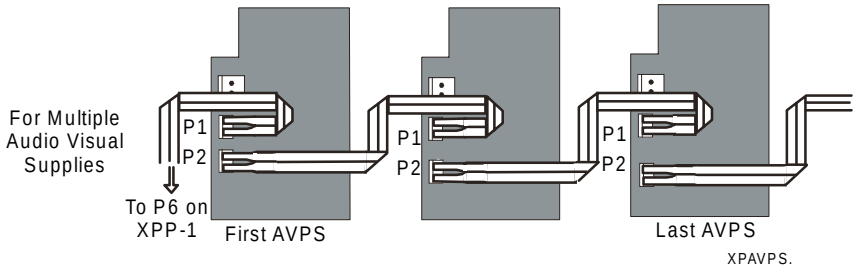


Figure 34: Field Wiring the Optional AVPS-24/AVPS-2

For complete ratings, refer to the *Circuit/Device Ratings and Connections Technical Bulletin (LIT-448160).*

APS-6R Audio Visual Power Supply

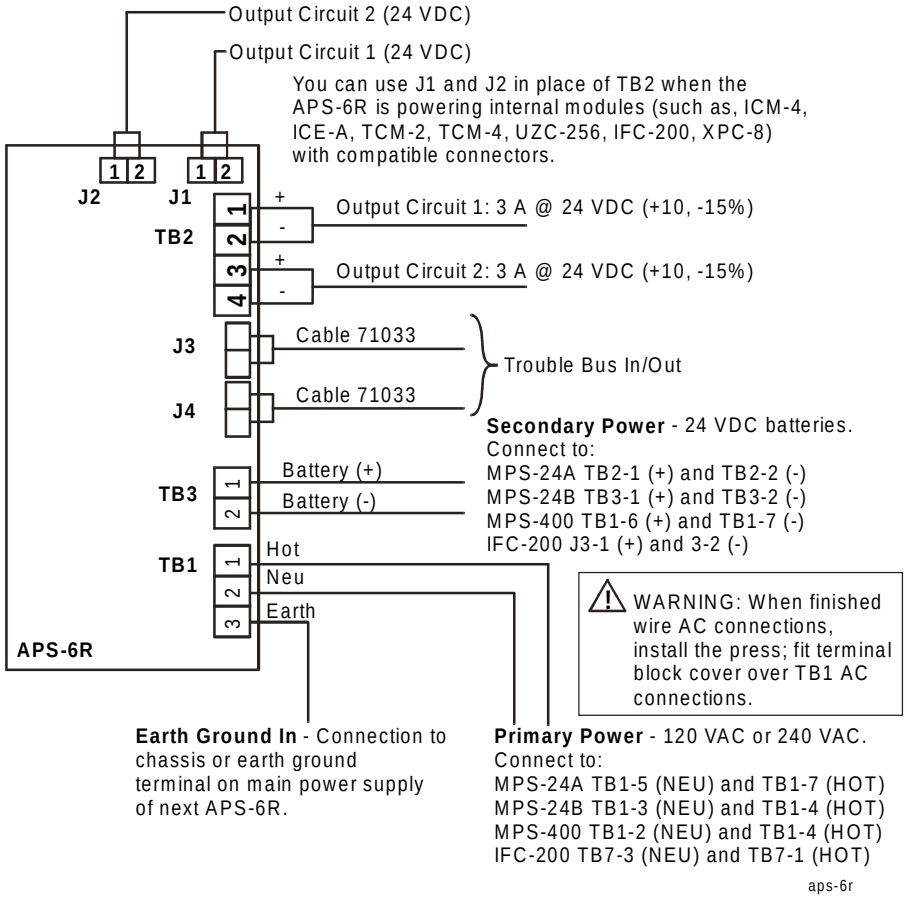


Figure 35: APS-6R Audio Visual Power Supply

> **!** WARNING: The APS-6R requires 120 VAC while the APS-6R requires 220/240 VAC. The primary voltage requirements of the main power supply **must** match the voltage requirement of the APS-6R selected.

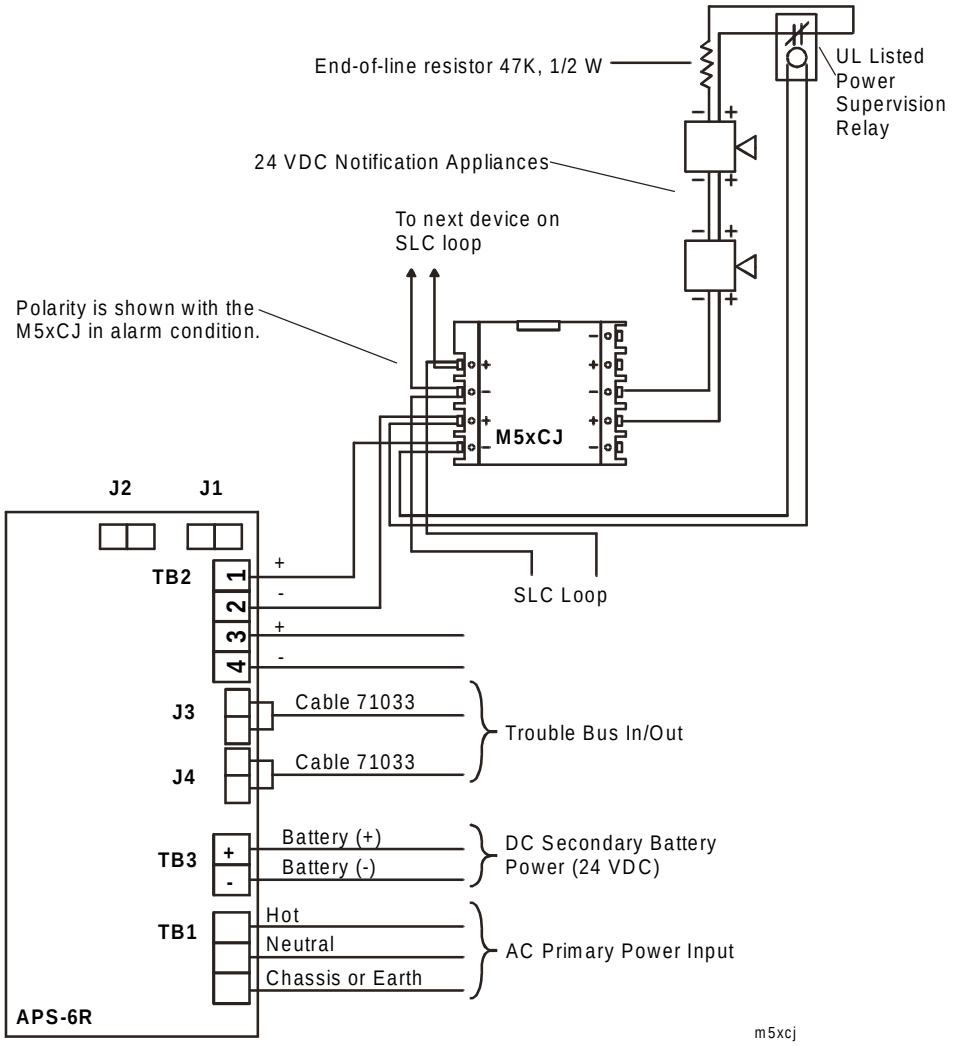


Figure 36: Typical APS-6R Wiring to M5x0CJ [N9]

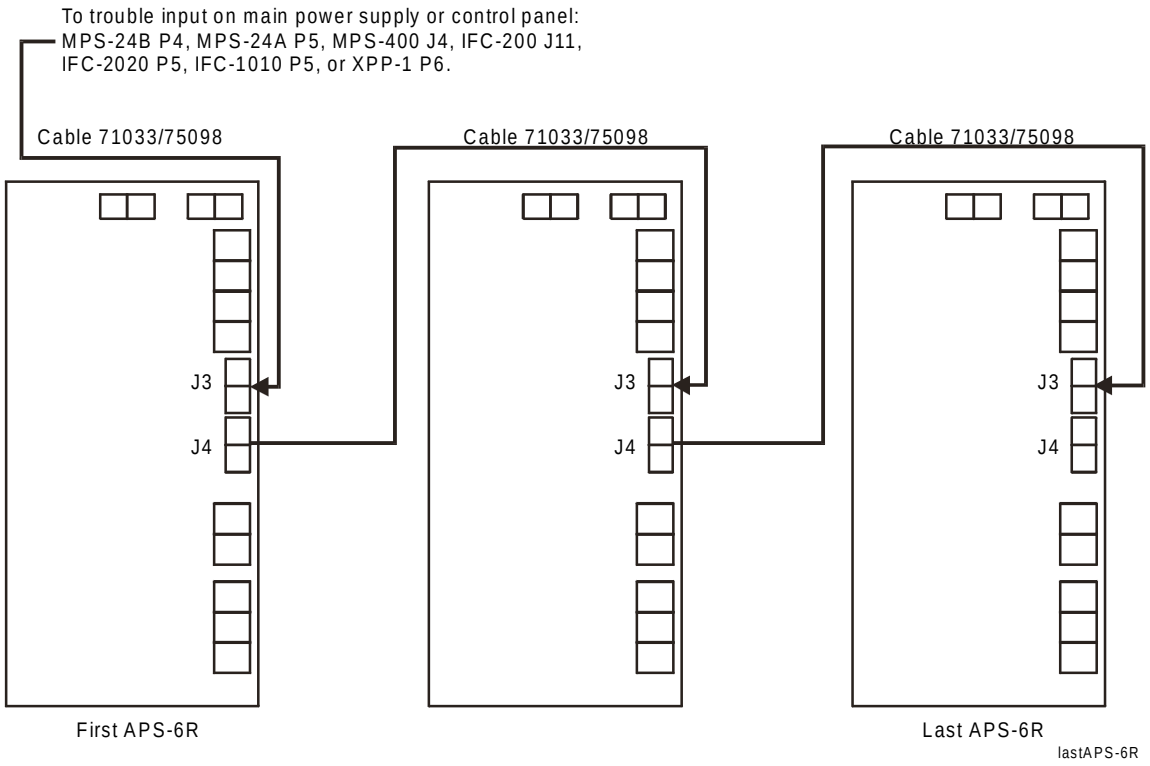


Figure 37: Trouble Bus Connections for Multiple APS-6R Power Supply Configurations

NR45-24 and NR45-24E Remote Battery Chargers [N25]

When more than 3 amperes are required from the MPS-24A/MPS-24AE or when the secondary power source requirements demand larger batteries than can be adequately charged by the MPS-24B/MPS-24BE main power supply, an NR45-24/NR45-24E Remote Battery Charger must be used. The NR45-24/NR45-24E mounts in its own cabinet, up to 20 feet away from the XP Transponder. The NR45-24/NR45-24E is capable of charging up to 55 ampere-hour batteries, which can be contained in the charger cabinet.

Connecting the Primary Power Source

The NR45-24 requires 120 VAC, 50/60 Hz primary power and the NR45-24E requires 220/240, 50/60 Hz. With the circuit breaker at the main power distribution panel turned off, connect the AC Hot line to Terminal 1 on the NR45-24/NR45-24E and the AC Neutral line to Terminal 2. All connections between the XP Transponder cabinet and the NR45-24/NR45-24E must be made in conduit, using 12 AWG wire. Do not route AC wiring in the same conduit as other XP Transponder circuits. Leave the main circuit off until installation of the entire system has been completed.

Connecting the Secondary Power Source (24 VDC)

Do not connect AC power or batteries until the system is completely wired and ready for testing. Refer to *Wiring Diagram and Instructions* for the NR45-24/NR45-24E Charger packaged with the NR45-24/NR45-24E for additional information.

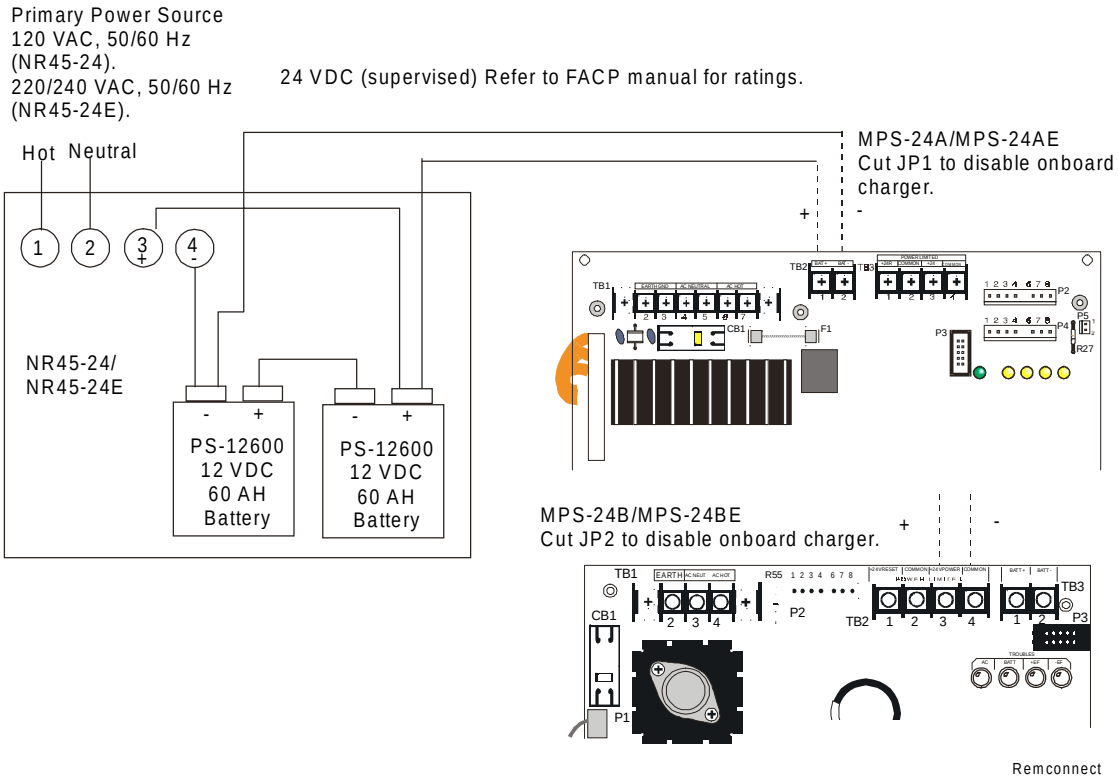


Figure 38: NR45-24/NR45-24E Remote Battery Charger Connections to the Main Power Supply

CHG-120 Battery Charger

The remote battery charger, CHG-120, is capable of charging 25-120 ampere-hour batteries. This unit may be used if the power supply must deliver more than 3 amperes of current when no fire alarm signal is present. Batteries up to 120 AH can be housed with the charger in one or two BB-55 cabinets: batteries up to 25 AH can be housed with charger cabinets CAB-A3, -B3, -C3, **or** –D3.

Connecting the Primary Power Source

With the breaker at the main power distribution panel turned off, connect the primary power source to the corresponding terminal on TB1 of the CHG-120. All connections between the FACP and the CHG-120 must be made in conduit, using 12 AWG (3.25 mm^2) wire. Do not route AC wiring in the same conduit as other control panel circuits. Leave the main power breaker off until installation of the entire system is complete. Refer to Figure 39.

Connecting the Secondary Power Source

Do not apply AC power of batteries until the system is completely wired and ready for testing.

CHG-120
120/240VAC, 50/60 HZ

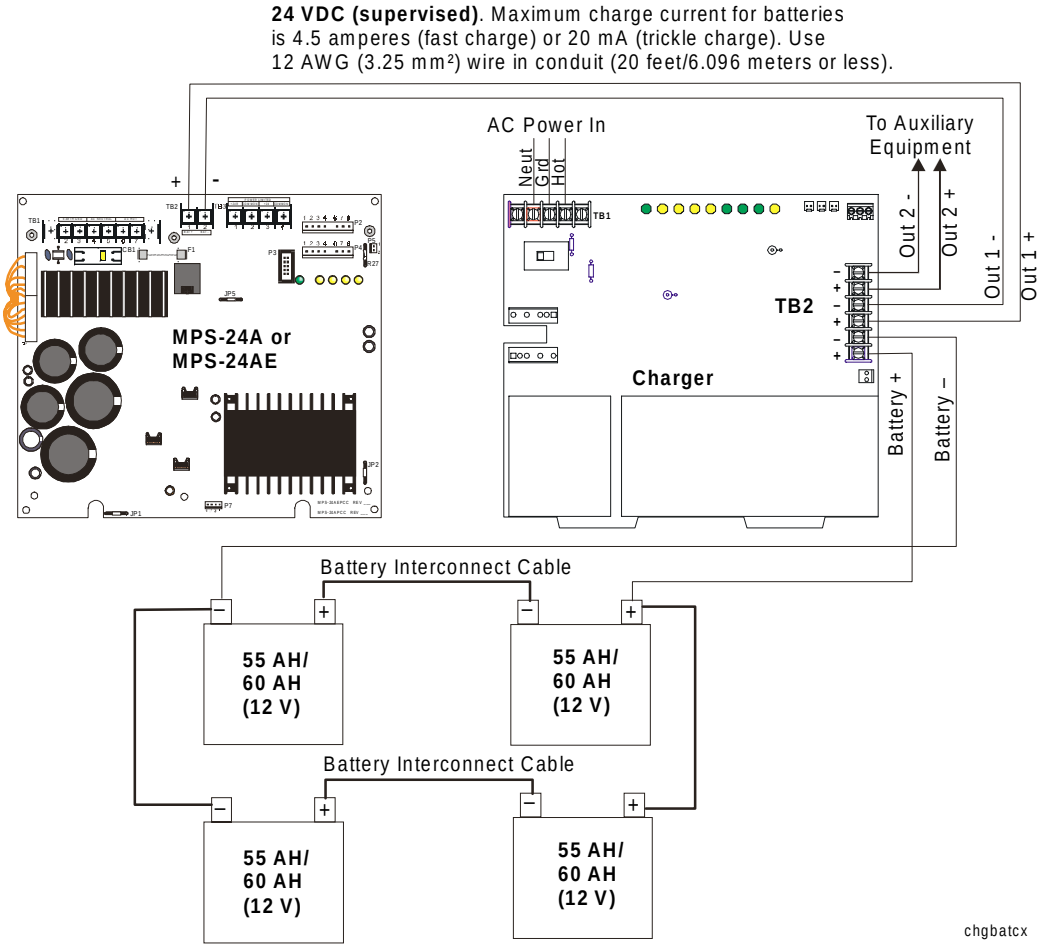


Figure 39: CHG-120 Connections

Field Wiring the XP Transponder

XPP-1 Processor

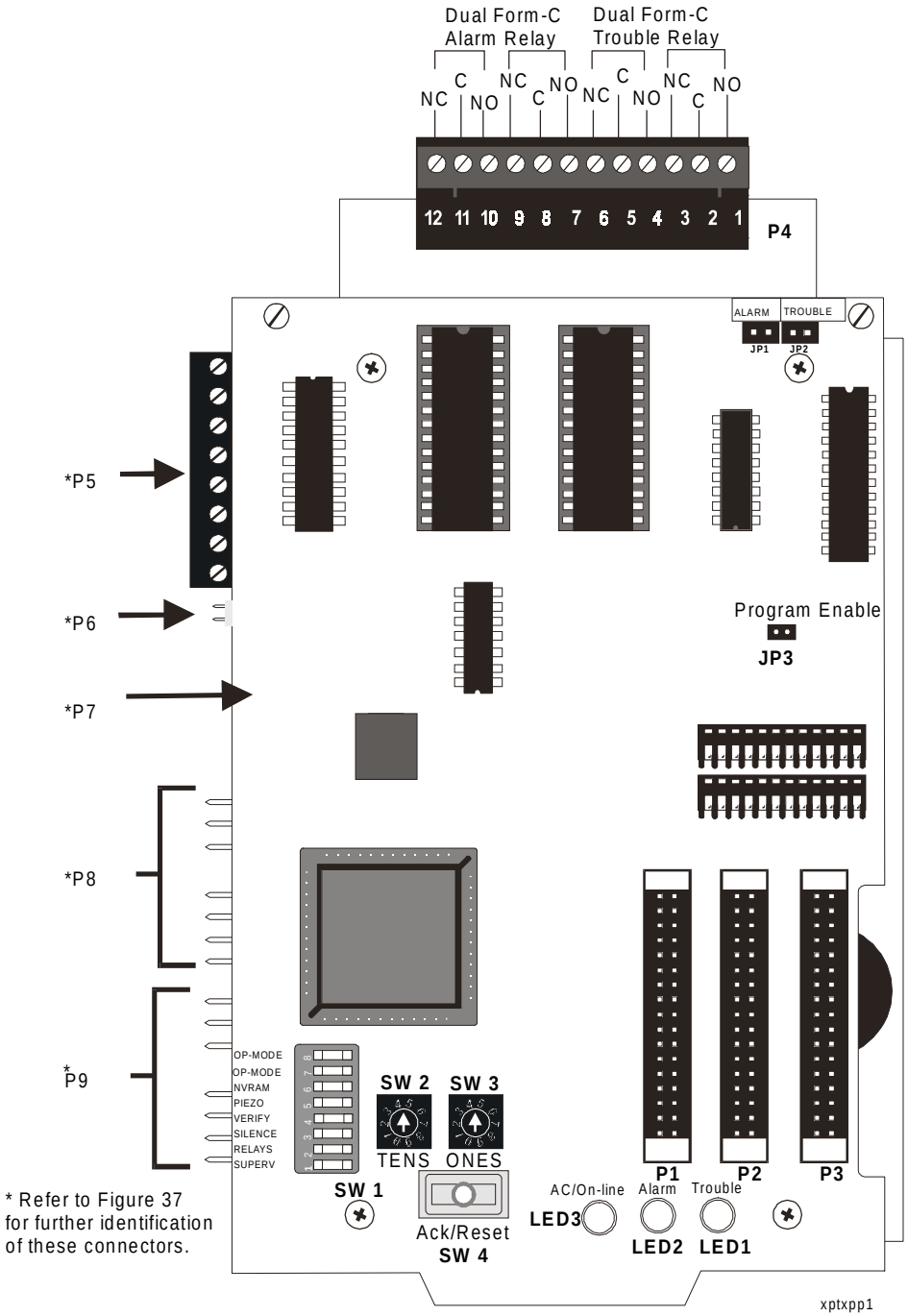


Figure 40: XPP-1 Module

Set the Configuration Switches on DIP Switch SW1

To enable a particular function on DIP Switch SW1 (see Figure 41), set a switch to the ON position by pushing it toward the numbered side of the switch.

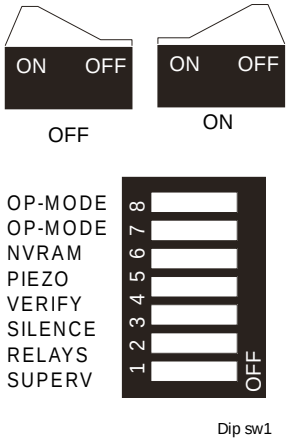


Figure 41: XPP-1 DIP Switch SW1

SW1-1, Supervision Mapping

If set ON, the Transponder Base Address (TBA) is assigned for both power supply supervision and/or for audio supervision (AMG-1, AA-30/AA-30E, AA-120/AA-120E, etc.), wired to P6. At the control panel, this module address should be programmed with an MTRB (Monitor Trouble) Type ID. **N21**

Note: For multiple XP Transponders powered from the same supply, only one XPP-1 module should supervise this power supply. For a transponder located in the same cabinet as the FACP and powered by the same supply, Switch SW1-1 should be set OFF because the FACP will supervise the power supply and any trouble contacts connected to P6 on the XPP-1.

SW1-2, Relay Mapping

If this switch is set OFF, the two relays on the XPP-1 function as local alarm and local trouble relays (P4 or JP1 and JP2).

Note: These relays respond to alarms and troubles only on their specific transponder.

If this switch is set ON, these relays no longer function as local alarm or trouble relays. Instead, they become mappable relays, which may be activated through Control-By-Event programming from the FACP. **N10**

Note: Typically these two points would be programmed with a FORC or CMXC Type ID (refer to the *IFC-1010/2020 Programming Technical Bulletin (LIT-448060)).* The relay contacts on the XPP-1 may be connected to either a power-limited or non power-limited source, but not both.

SW1-3, Signal Silence

This switch is only used when the XP Transponder is functioning in Local mode operation. When the XP Transponder is operating in Local mode, the ACK/Reset button (SW4) functions as an acknowledge switch (if XPP-1 DIP Switch SW1-3 is set ON). During an alarm condition this button must be pressed for each alarm to silence the local piezo sounder. After all alarms have been acknowledged, pressing the button again will silence the Notification Appliance Circuits (NAC) on the XP Transponder.

Note: The Notification Appliance Circuits and piezo sounder will automatically resound for any subsequent alarm or trouble condition.

SW1-4, Alarm Verification

If this switch is set ON, an alarm signal from a two wire device on any XPM-8/XPM-8L Initiating Device Circuit (IDC) will be verified. To verify this alarm, power is removed from the circuit, when an alarm condition is first sensed on the IDC, thereby resetting the two wire detector, and an alarm confirmation period is started. If the alarm was initiated from a two wire smoke conventional detector and reoccurs within a 60-second confirmation period, the transponder will reenter the alarm state. If a direct short (such as from a pull station or heat detector) is detected, the panel goes directly into alarm. **N26**

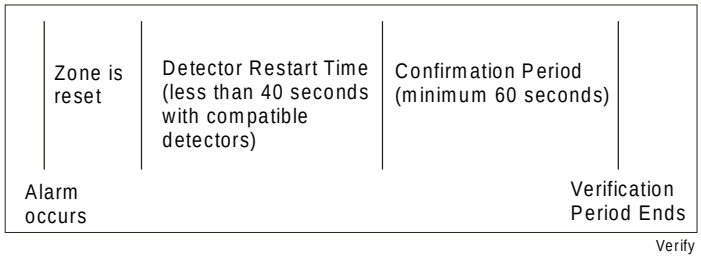


Figure 42: Alarm Verification

SW1-5, Piezo Mode

If set ON, the piezo will sound for all XP Transponder trouble and alarm conditions.

Note: The piezo will always sound regardless of the DIP switch position if the XP Transponder is operating in the Local mode.

SW1-6, Memory Type

Set this switch ON after an XRAM-1 nonvolatile RAM chip has been installed.

Note: Power must be OFF before this switch is changed.

SW-1-7, Operating Mode and SW-8, Operating Mode

These two DIP switch positions configure the XP Transponder operating mode as indicated in Table 2:

Table 2: Switch Configurations and Operating Modes

Switch 7	Switch 8	Operating Mode
OFF	OFF	Enables communication with the FACP. The Reset, Acknowledge, and All Call commands from the FACP are ignored. If communication with the control panel is interrupted or lost, the XPP-1 will automatically assume Local mode operation.
ON	OFF	Local mode operation - no communication with the FACP.
OFF	ON	Enables communication with the FACP. No Local mode operation.
ON	ON	Enables communication with the FACP. The Reset, Acknowledge, and All Call commands from the control panel are accepted. If communication with the control panel is interrupted or lost, the XPP-1 will automatically assume Local mode operation. Note: The IFC-400 only employs the Reset command.

Harnessing the XPP-1

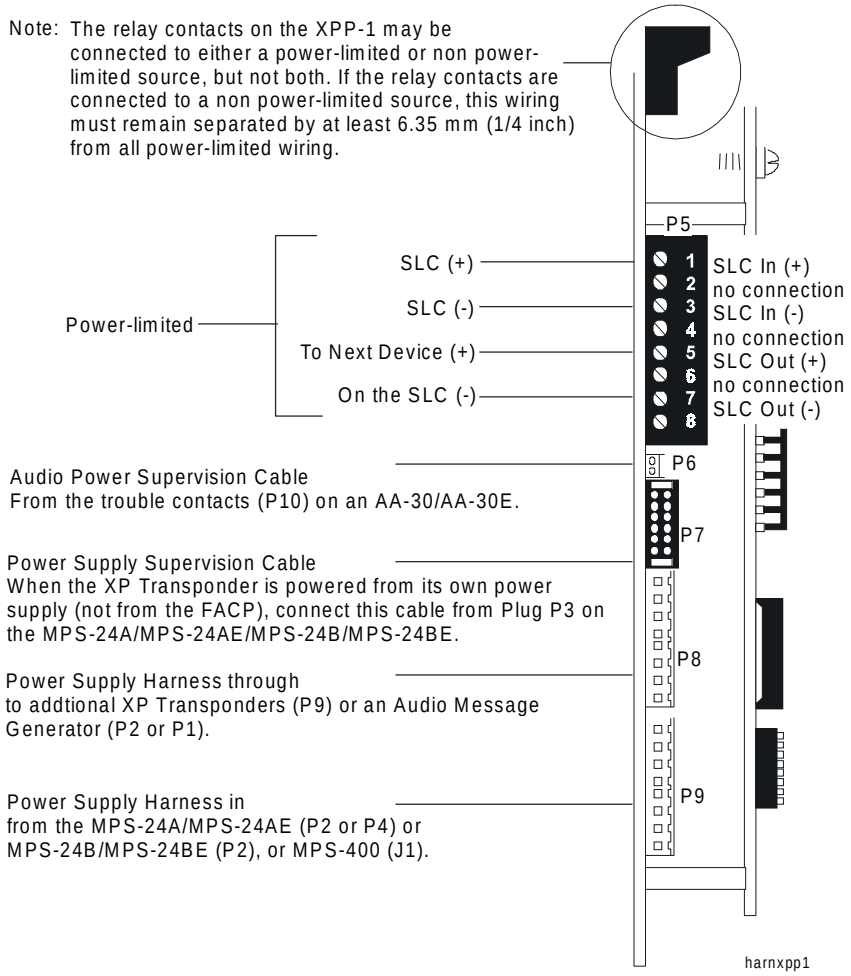


Figure 43: Harnessing the XPP-1

For a complete listing of ratings, refer to *Circuit/Device Ratings and Connections Technical Bulletin (LIT-448160)* in the *IFC-1010/2020 Technical Manual (FAN 448).*

Addressing the XP Transponders

Determining the XP Transponder Address Range

When employed as a peripheral in an FACP, the XP Transponder can assume up to 27 addresses (up to 51 addresses may be consumed if the XP is used in a dual stage configuration) on a LIB SLC loop. This number accounts for an XPP-1 and all three additional XP Transponder expander module positions occupied in a single cabinet row.

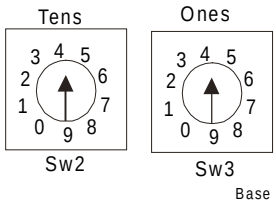


Figure 44: Setting the Base Address

Setting the SLC Base Address

The very first address assigned to the XP Transponder is termed the base address and is set by using a small slotted screwdriver to align the arrows with the desired digits on the Ones and Tens rotary switches on the XPP-1 module. The base address is a two digit number from 01 to 99, the allowable range for modules on the LIB SLC loop (XP Transponder circuits consume module addresses, not detector addresses on the LIB SLC loop). Note that the address set here, as well as the remaining XP Transponder addresses, cannot be used by any other devices on the LIB SLC (such as control or monitor modules). Ensure that the base address is not set to a value that would result in an XP Transponder address exceeding 99. For example a fully loaded, non-dual stage, XP Transponder consumes 27 addresses, therefore, the base cannot exceed 73.

Offsetting the Base Address

All remaining addresses in an XP Transponder are automatically assigned as an offset to the base address in increasing order from left to right. **N11** The total number of addresses consumed by a transponder depends on the following:

- Is power supply supervision enabled?
- Are the XPP-1 Alarm and Trouble Relays mapped into the system?
- How many XP Transponder modules have been installed in the system?
- Which NFPA field wiring style was selected for each XP Transponder module?
- Has dual stage operation been enabled?

Use Table 4 to determine the address range of a particular system.

Note: This table assumes that all eight respective circuits are being used on any XP Transponder module (eight XPM-8/XMP-8L, circuits field-wired NFPA Style B, eight XPC-8 circuits field-wired NFPA Style Y, and eight single Form-C relays). **N22**

If NFPA Style D (four XPM-8 circuits), NFPA Style Z (four XPC-8 circuits), or four dual Form-C relays are to be used on any XP Transponder transponder modules, assign only four addresses to these modules in the address table. **N11**

Example:

Assume the following configuration:

- The base address is set at 40.
- Power supply supervision is not enabled (SW1-1 OFF).
- Form-C relays are mapped into the system (SW1-2 ON).
- One XPC-8 module is wired with four NAC circuits.
- One XPM-8 module is wired with eight IDC circuits.
- One XPR-8 module is using four dual Form-C relays.
- Dual stage operation has not been selected.

The address range on the LIB SLC would be 40 to 57, with specific addresses assigned to the circuits from left to right as illustrated below.

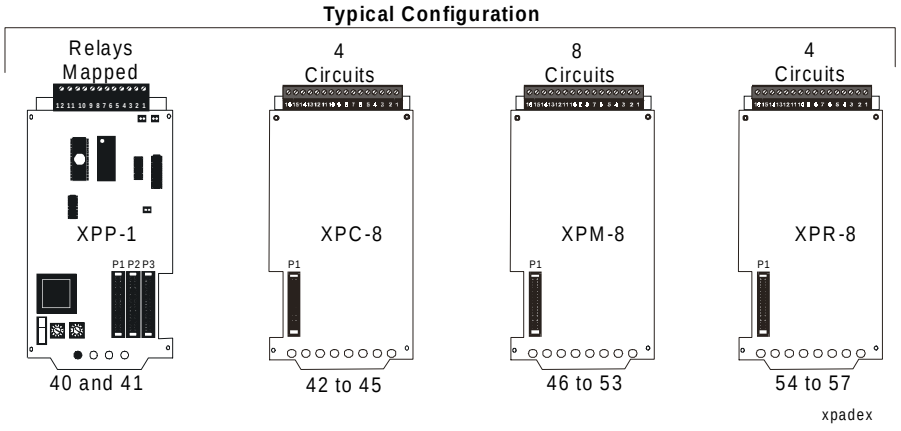
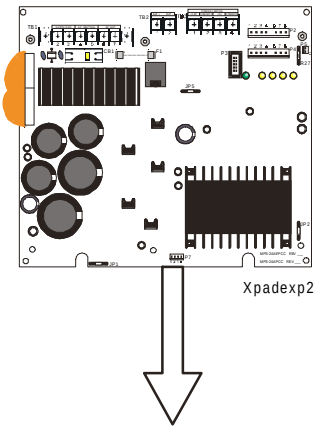
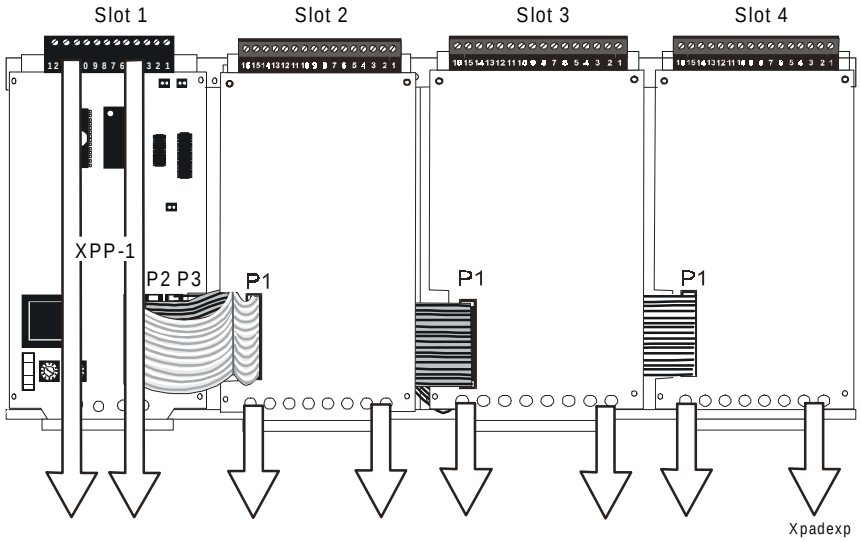


Figure 45: Addressing Example, Typical Configuration

Note: The relay contacts on the XPP-1 may be connected to either a power-limited or non power-limited source, but not both. If the relay contacts are connected to a non power-limited source, this wiring must remain separated by at least 1/4 inch from all power-limited wiring. Refer to Figure 28 and Figure 31 and to the *Installing the IFC-1010/2020 Technical Bulletin (LIT-448155)* for specific power-limited wiring requirements.

Table 3: Determining the System's Address Range

				
If DIP Switch SW1-1 is set to the ON position, the base address is set to supervise the main power supply and any audio amplifiers installed.	If DIP Switch SW1-2 is ON, these relays will be mapped into the IFC-1010/2020.	A module installed in this chassis position must be connected to XPP-1 Plug P1.	A module installed in this chassis position must be connected to XPP-1 Plug P2.	A module installed in this chassis position must be connected to XPP-1 Plug P3.
If Enabled: Base Address	If Mapped: Base+1 to Base+2	If Installed: Base+3 to Base+10	If Installed: Base+11 to Base+18	If Installed: Base+19 to Base+26
If Enabled: Base Address	If Not Mapped: No addresses	If Installed: Base+1 to Base+8	If Installed: Base+9 to Base+16	If Installed: Base+17 to Base+24
If Disabled: No Address	If Mapped: Base address to Base+2	If Installed: Base+2 to Base+9	If Installed: Base+10 to Base+17	If Installed: Base+18 to Base+25
If Disabled: No Address	If Not Mapped: No address	If Installed: Base address to Base+7	If Installed: Base+8 to Base+15	If Installed: Base+16 to Base+23
		Assign only 4 addresses in these blocks using four wire styles.		

XPM-8 Module Style B)

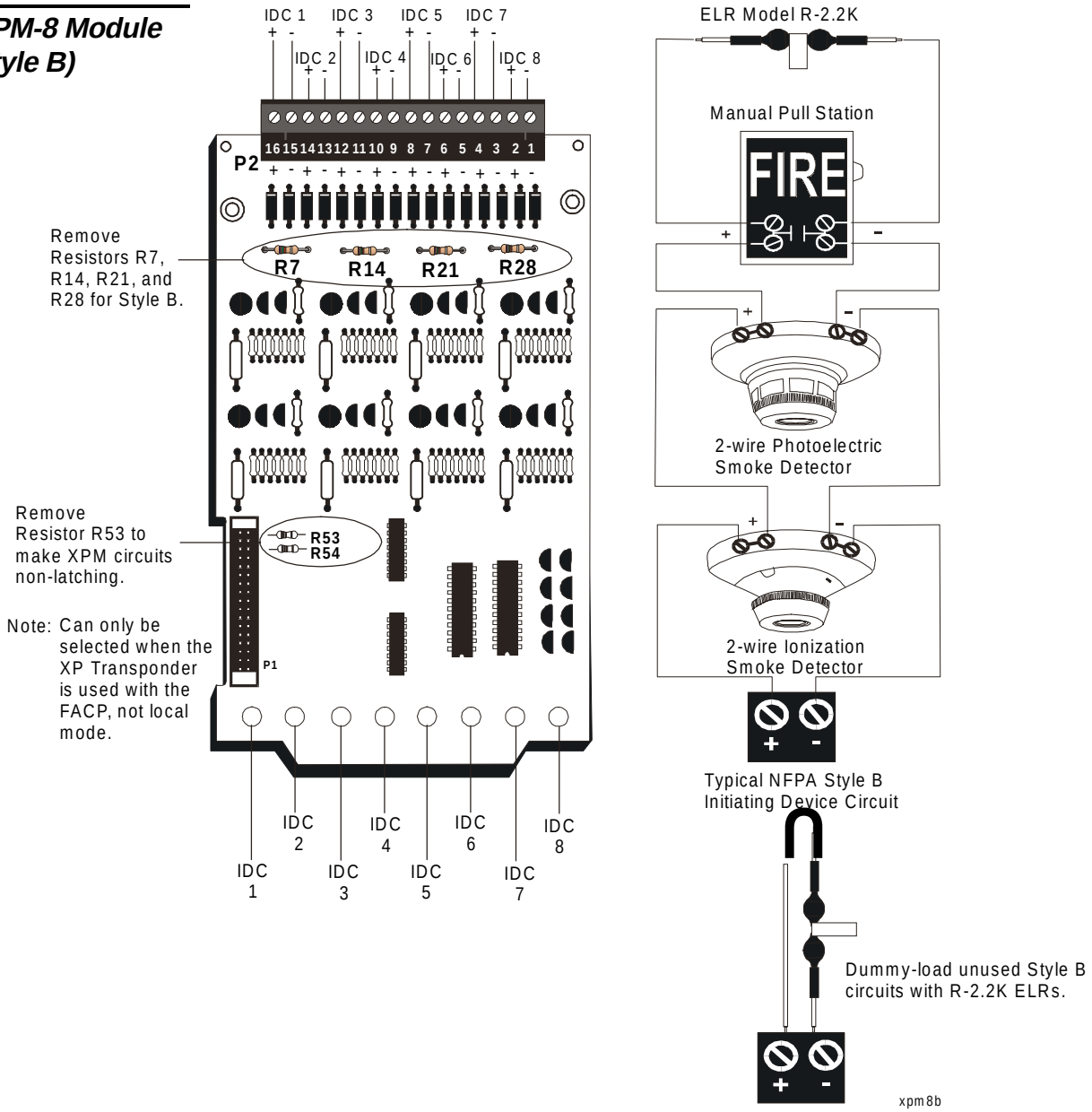


Figure 46: XPM-8 Module (power-limited) with Eight Style B Device Circuits

Notes:

- See the *IFC-1010/2020 Technical Manual (FAN 448)* for additional ratings.
- Size initiating device circuit wiring for no more than 100 ohms maximum line resistance.
- Address assignments for this card within the transponder are made when power is applied to the XPP-1. Check to make sure that all circuits have been wired correctly before application of power, or address assignments may be made incorrectly.

For 4-wire smoke detector connection drawings, see Figure 47. For UL Listed 2-wire conventional smoke detectors, see the *Circuit/Device Ratings and Connections Technical Bulletin (LIT-448160)* in the *IFC-1010/2020 Technical Manual (FAN 448).*

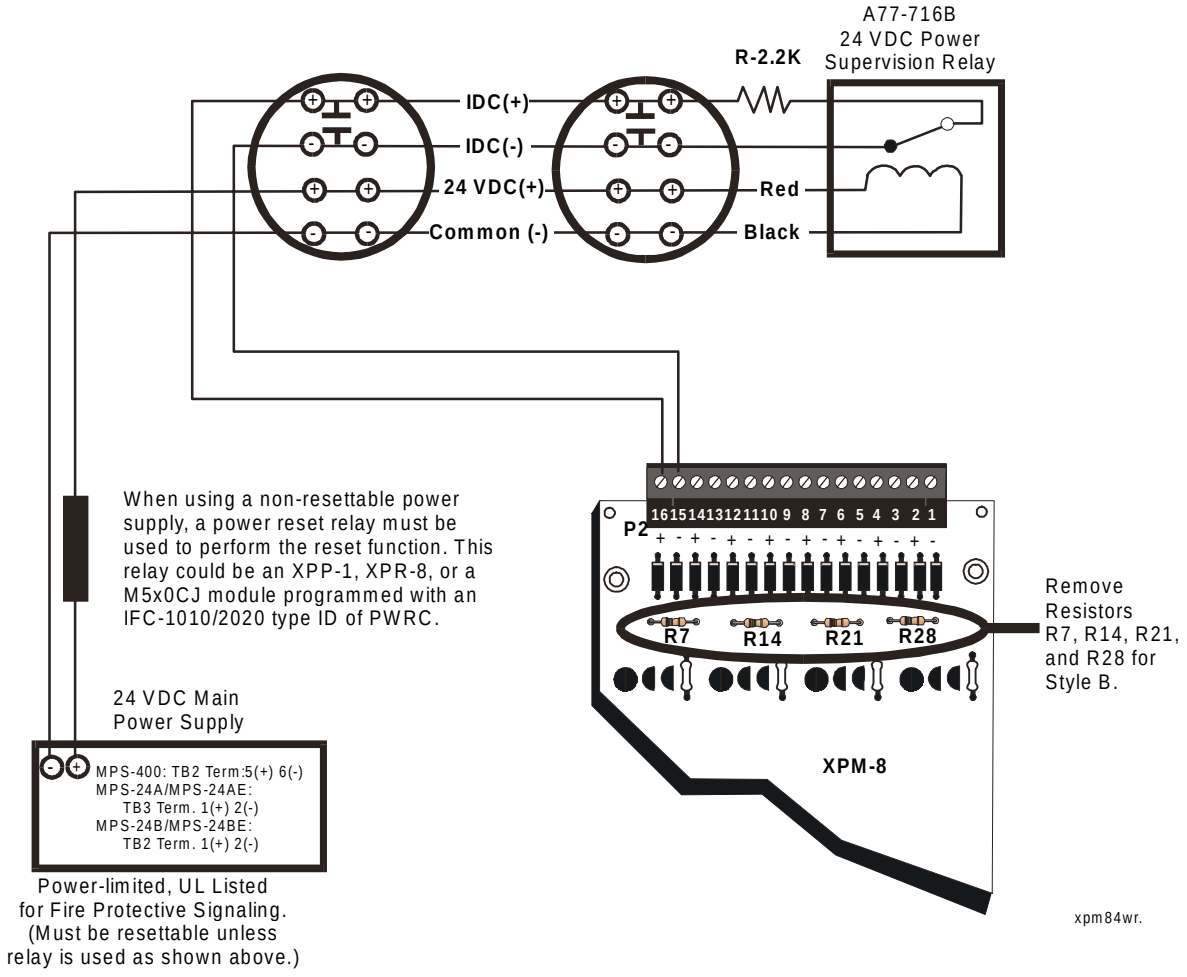


Figure 47: XPM Module (power-limited) with Four Wire Smoke Detectors (Style B)

Notes:

- The Power Supervision Relay coil leads must be connected to the last detector base 24 VDC screw terminals.
- See *Circuit/Device Ratings and Connections Technical Bulletin (LIT-448160)* for additional ratings.
- The power reset relay shown (when properly programmed) performs the reset function for all smoke detectors connected to the IDC.

- Calculation of the maximum allowable resistance in the 24 VDC smoke detector power wiring:
  - **Rmax =** $\dfrac{\textbf{(20.6 – Vom)}}{\textbf{(N)(Is) + (NA)(Ia) + (Ir)}}$
  - Where:

  Rmax- is the maximum resistance of the 24V wires.

  Vom- is the minimum operating voltage of the detector or end-of-line relay, whichever is greater, in volts.

  N- is the total number of detectors on the supply 24V loop.

  Is- is the detector current in non-fire alarm.

  NA- is the number of detectors on the 24V power loop which must function at the same time in alarm.

  Ia- is the detector current in alarm.

  Ir- is the end-of-line relay current.
- Address assignments for this card within the transponder are made when power is applied to the XPP-1. Check to make sure that all circuits have been wired correctly before application of power, or address assignments may be made incorrectly. **N11**

XPM-8 Module (Style D)

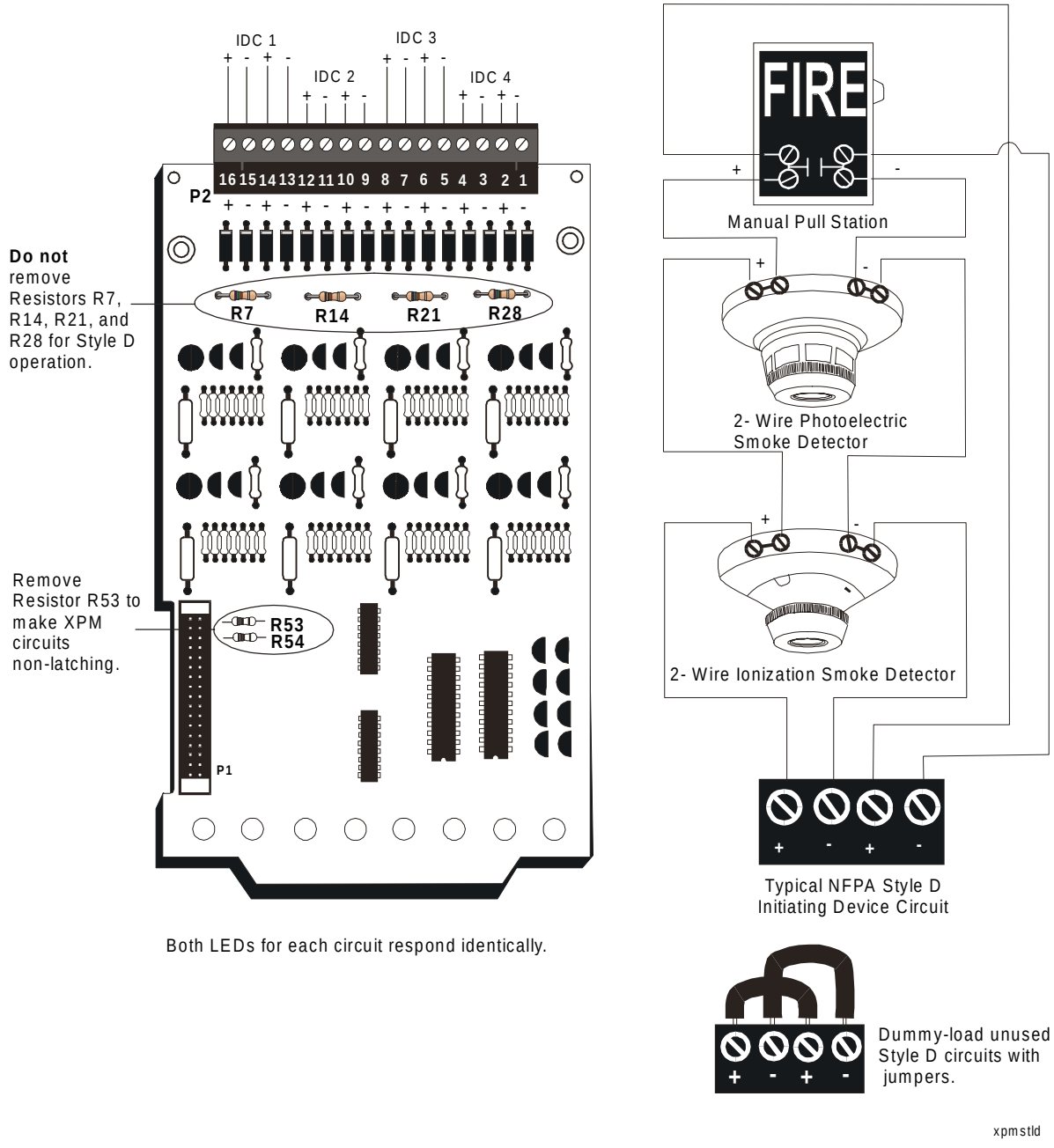


Figure 48: XPM-8 Module (power-limited) with Four Style D Initiating Device Circuits

Notes:

- See the *IFC-1010/2020 Technical Manual (FAN 448*) for additional ratings.
- Size initiating device circuit wiring for no more than 100 ohms maximum line resistance.

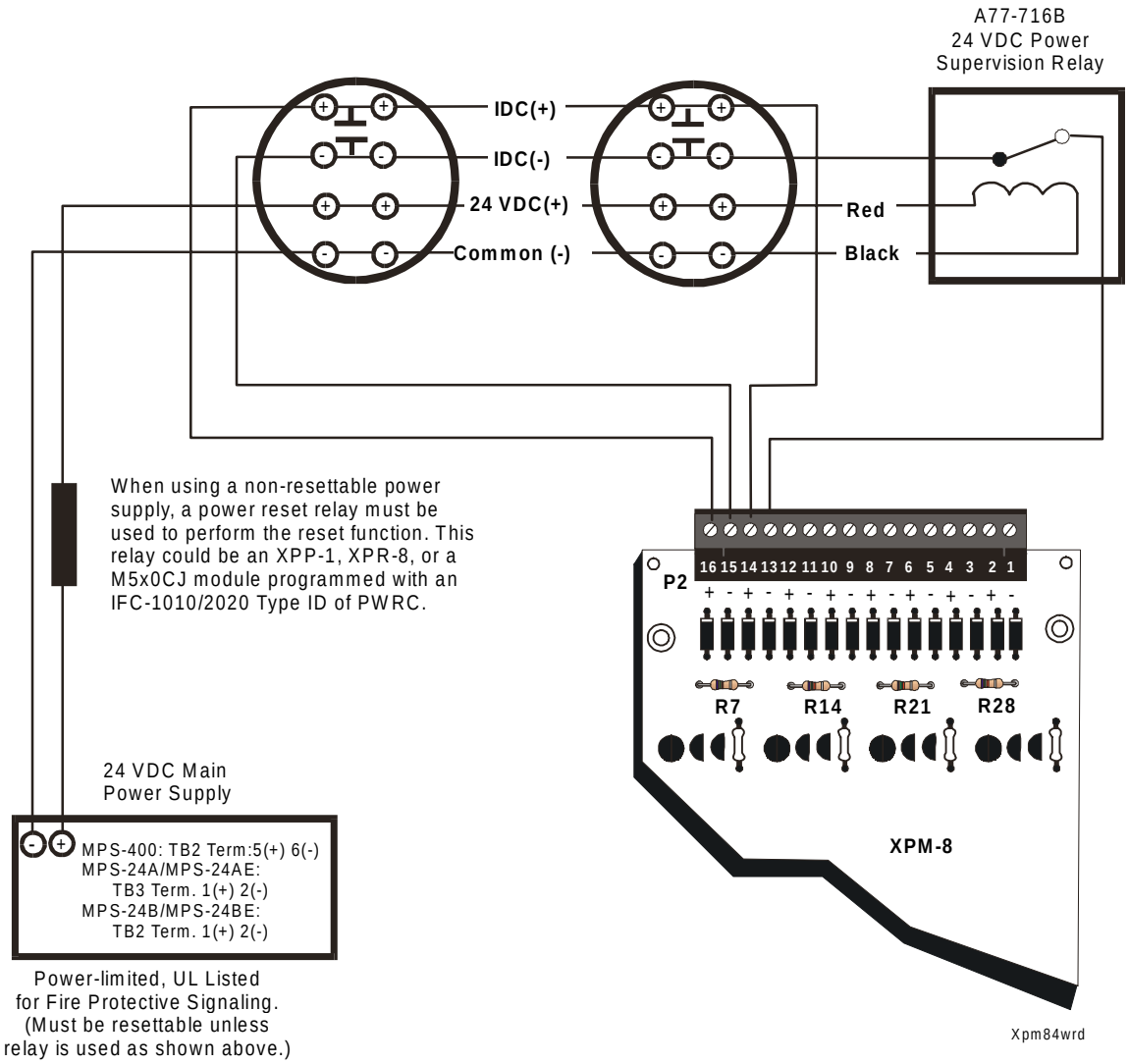


Figure 49: XPM-8 Module (power-limited) with Four Wire Smoke Detectors (Style D)

Notes:

- The Power Supervision Relay coil leads must be connected to the last detector base 24 VDC screw terminals.
- See *Circuit/Device Ratings and Connections Technical Bulletin (LIT-448160)* for additional ratings.
- The power reset relay shown (when properly programmed) performs the reset function for all smoke detectors connected to the IDC.
- Size initiating circuit wiring for no more than 100 ohms maximum line resistance.

- Calculation of the maximum allowable resistance in the 24 VDC smoke detector power wiring:
  - **Rmax =** $\dfrac{\textbf{(20.6 – Vom)}}{\textbf{(N)(Is) + (NA)(Ia) + (Ir)}}$
  - Where:

  Rmax- is the maximum resistance of the 24V wires.

  Vom- is the minimum operating voltage of the detector or end-of-line relay, whichever is greater, in volts.

  N- is the total number of detectors on the supply 24V loop.

  Is- is the detector current in non-fire alarm.

  NA- is the number of detectors on the 24V power loop which must function at the same time in alarm.

  Ia- is the detector current in alarm.

  Ir- is the end-of-line relay current.
- Address assignments for this card within the transponder are made when power is applied to the XPP-1. Check to make sure that all circuits have been wired correctly before application of power, or address assignments may be made incorrectly. **N11**

XPM-8L Module (Style B Only)

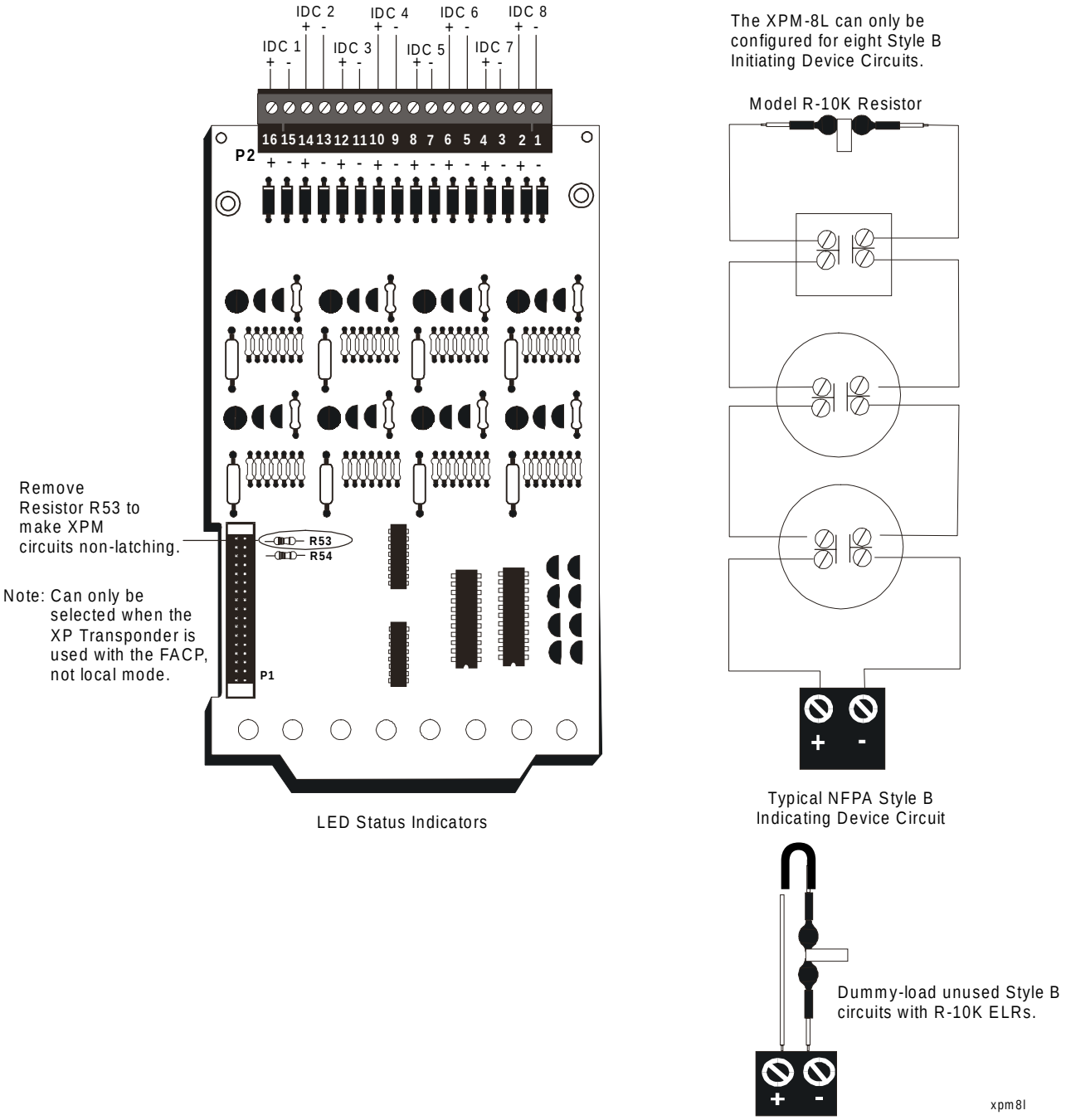


Figure 50: XPM-8L Module (power-limited) with Eight Style B Initiating Device Circuits

Notes:

- See the *IFC-1010/2020 Technical Manual (FAN 448*) for additional ratings.
- The power reset relay (when properly programmed) performs the reset function for all smoke detectors connected to the IDC.
- Size initiating circuit wiring for no more than 1000 ohms maximum line resistance.

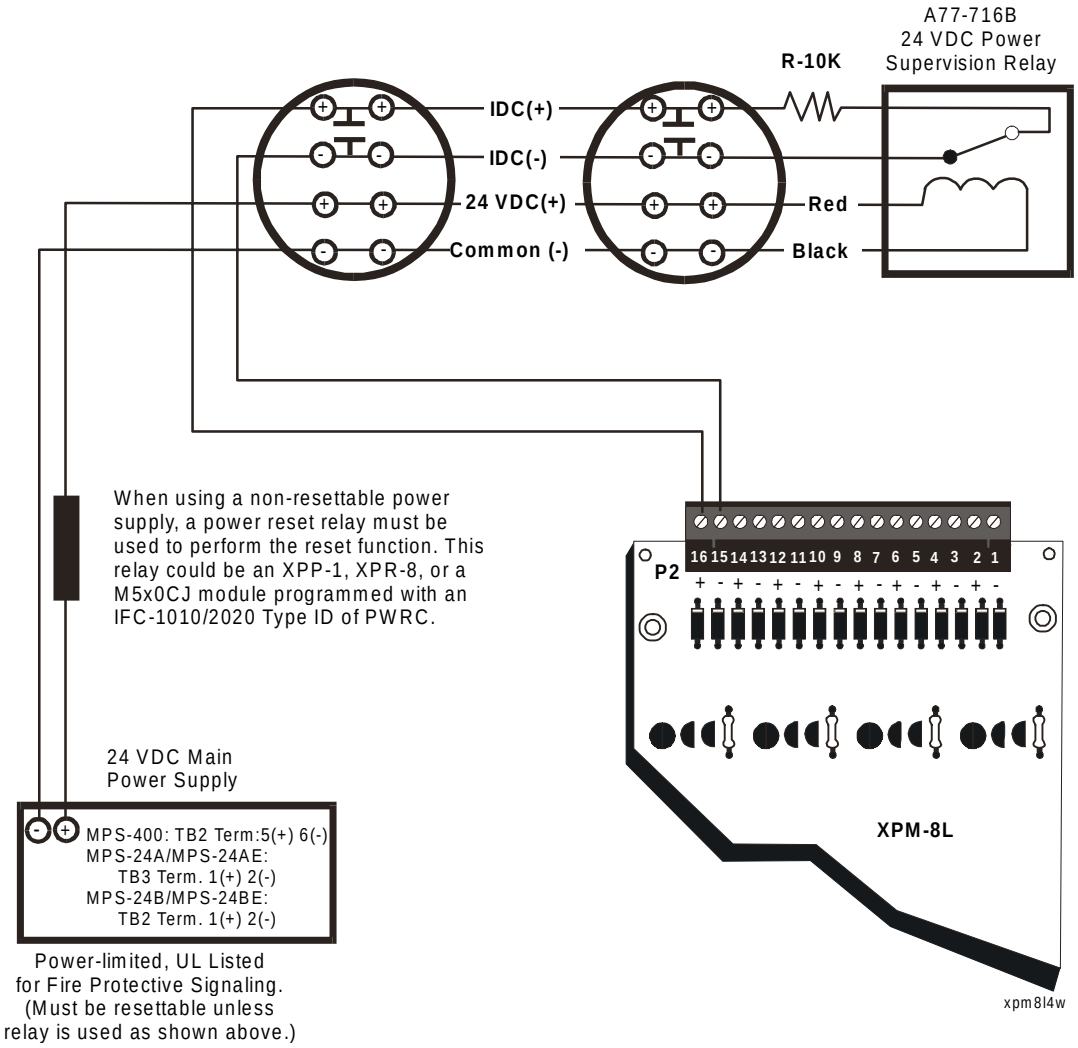


Figure 51: XPM-8L Module (power-limited) with Four Wire Smoke Detectors (Style D)

Notes:

- The Power Supervision Relay coil leads must be connected to the last detector base 24 VDC screw terminals.
- See *Circuit/Device Ratings and Connections Technical Bulletin (LIT-448160)* for additional ratings.

- The power reset relay shown (when properly programmed) performs the reset function for all smoke detectors connected to the IDC.
- Size initiating device circuit wiring for no more than 1000 ohms maximum line resistance.
- Calculation of the maximum allowable resistance in the 24 VDC smoke detector power wiring:
  - **Rmax =** $\dfrac{\textbf{(20.6 – Vom)}}{\textbf{(N)(Is) + (NA)(Ia) + (Ir)}}$
  - Where:

  Rmax- is the maximum resistance of the 24V wires.

  Vom- is the minimum operating voltage of the detector or end-of-line relay, whichever is greater, in volts.

  N- is the total number of detectors on the supply 24V loop.

  Is- is the detector current in non-fire alarm.

  NA- is the number of detectors on the 24V power loop which must function at the same time in alarm.

  Ia- is the detector current in alarm.

  Ir- is the end-of-line relay current.
- Address assignments for this card within the transponder are made when power is applied to the XPP-1. Check to make sure that all circuits have been wired correctly before application of power, or address assignments may be made incorrectly. **N11**

XPC-8 Module (Style Y)

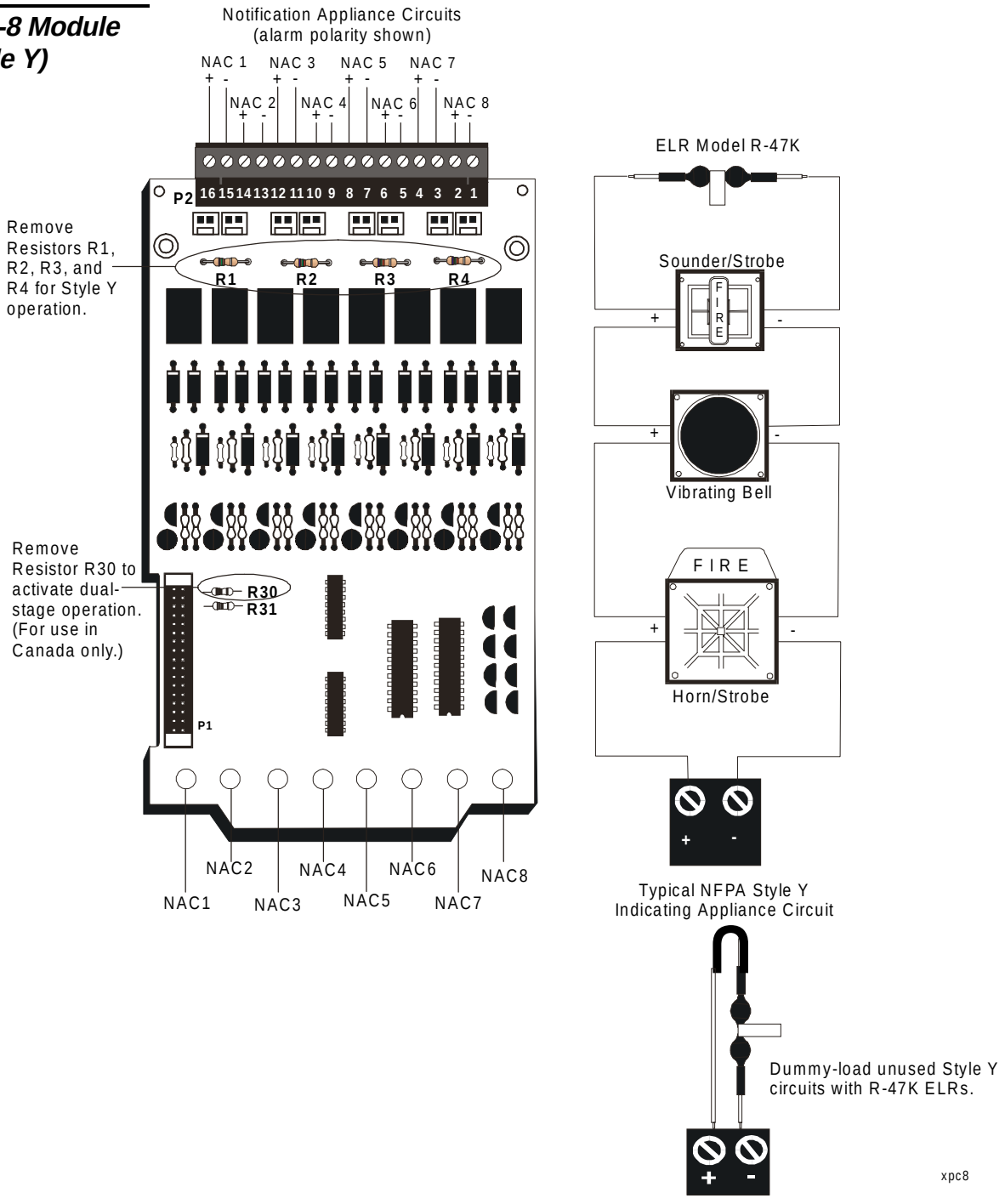


Figure 52: XPC-8 Module (power-limited) with Eight Style Y Notification Appliance Circuits

Note: Address assignments for this card within the transponder are made when power is applied to the XPP-1. Check to make sure that all circuits have been wired correctly before application of power, or address assignments may be made incorrectly. **N11**

XPC-8 Module (Style Z)

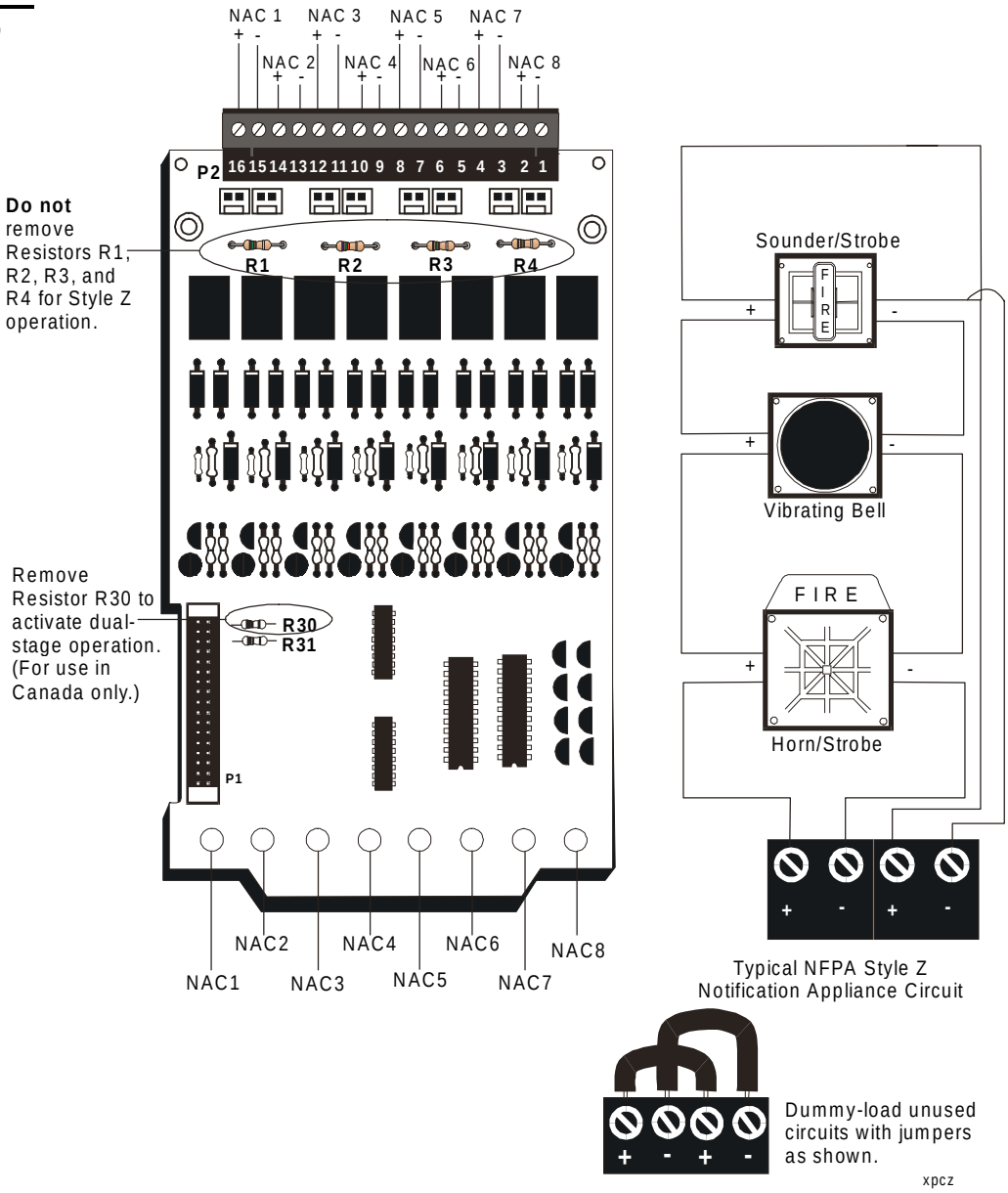


Figure 53: XPC-8 Module (power-limited) with Four Style Z Notification Appliance Circuits

Note: Address assignments for this card within the transponder are made when power is applied to the XPP-1. Check to make sure that all circuits have been wired correctly before application of power, or address assignments may be made incorrectly. **N11**

Notification appliance power (and audio power in Voice Alarm applications) is fed to XPC-8 circuits in pairs of two or more if the NACs are configured for Style Y, or power is fed to each circuit if configured Style Z. The following examples illustrate some of the typical power feed configurations.

Full-Share Configuration

Notification appliance, audio, or telephone audio power fed into Plug P3 and jumpered throughout the XPC-8 module will be shared by all the circuits on the module.

Example:

If the notification appliance power from the main power supply is connected to one XPC-8 module as shown in Figure 54 (and nothing else), the main power supply will be shared by eight Style Y or four Style Z Notification Appliance Circuits on that module.

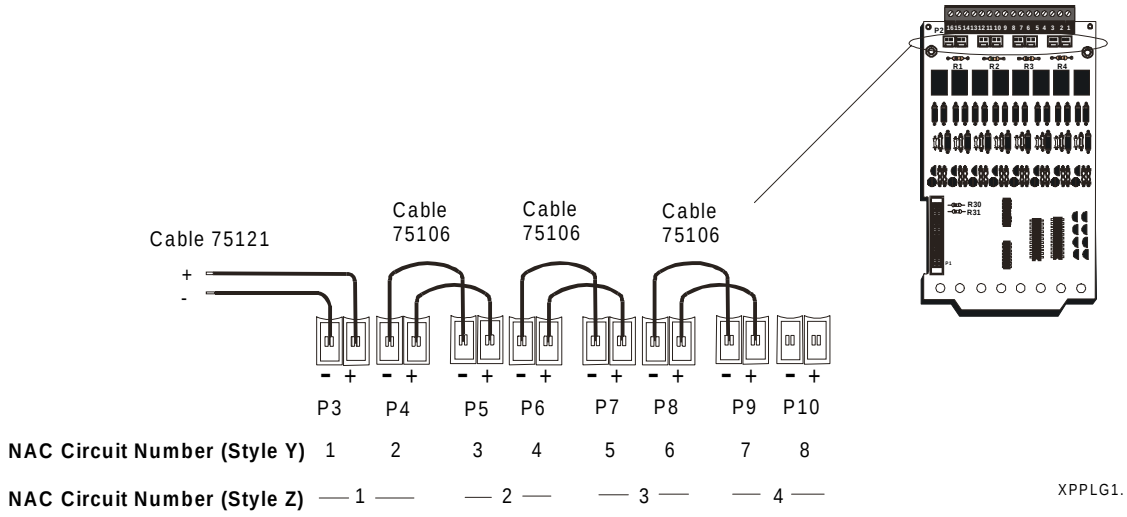


Figure 54: Full-Share Configuration

Half-Share Configuration

Notification appliance or audio power fed into the XPC-8 module from two different sources can be used to increase the power to individual circuits see Figure 55.

Example:

If the notification appliance power from the main power supply is connected to P3 and jumpered from P4 to P5 on the XPC-8, the main power supply will be shared by Notification Appliance Circuits 1-4 (Style Y) or Circuits 1 and 2 (Style Z). Additional power can be fed from an AVPS-24/AVPS-24E or APS-6R into P7, and jumpered from P8 to P9 to Power Circuits 5-8 (Style Y) or 3 and 4 (Style Z).

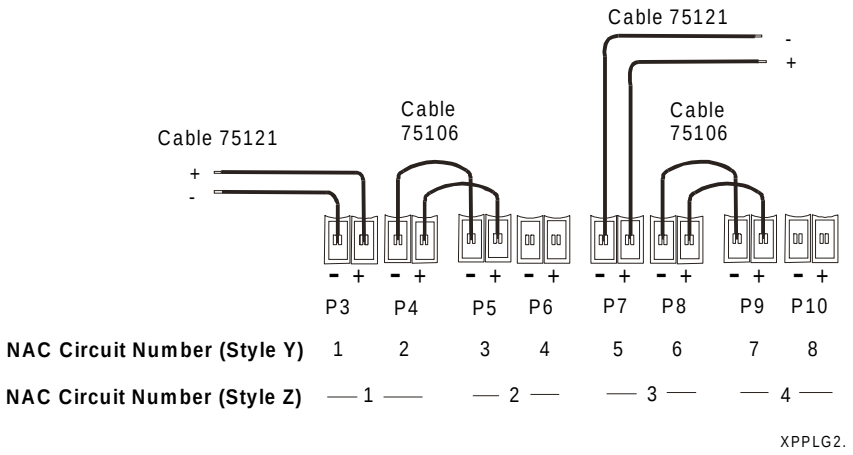


Figure 55: Half-Share Configuration

Quarter-Share Configuration

To provide a maximum amount of power to circuit pairs on the XPC-8, four separate power supplies can be used. Power from each supply is fed to Plug P3, P5, P7, and P9 (see Figure 56).

Example:

If the notification appliance power from four AVPS-24/AVPS-24E Audio Visual Power Supplies is connected to P3, P5, P7, and P9 respectively, the AVPS-24/AVPS-24E output power will be shared by each Style Y circuit pair or each of four Style Z circuits.

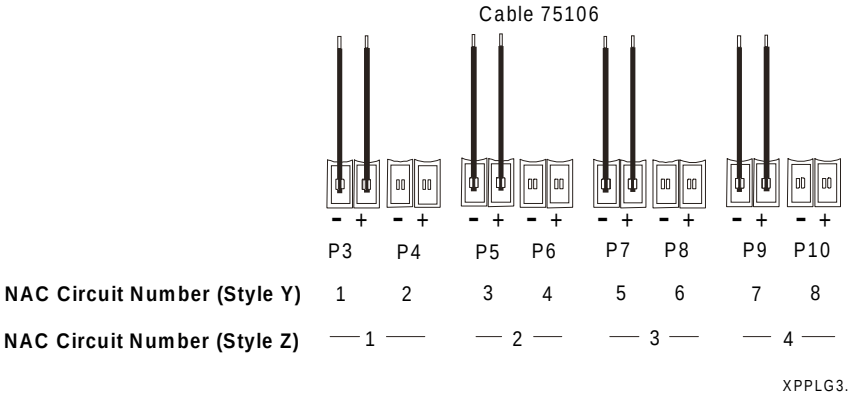


Figure 56: Quarter-Share Configuration

Supplying Power to a Style Y Audio Circuit

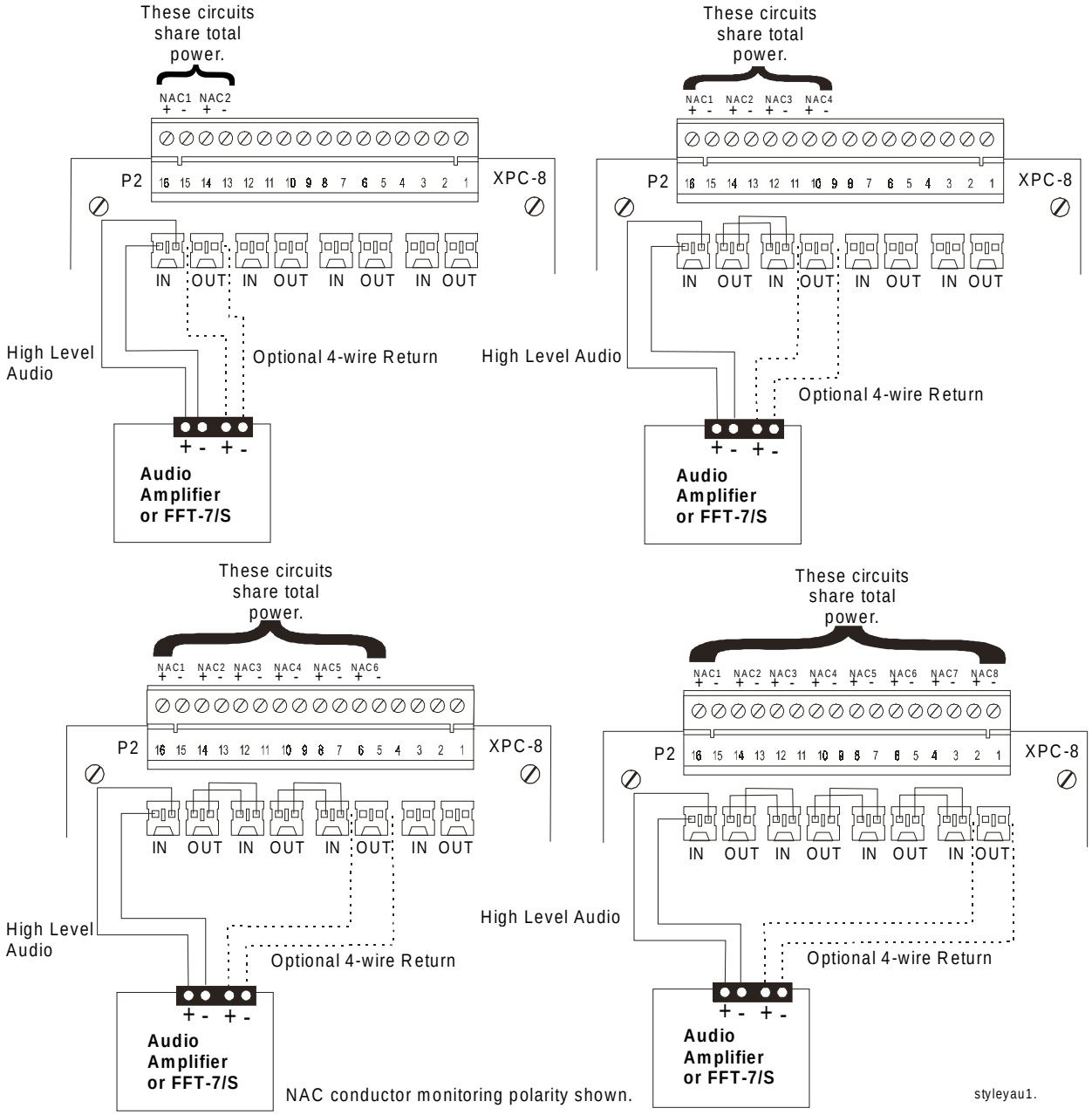


Figure 57: Wiring Style Y Audio Circuits with High Level (Amplified) Audio or Telephone Circuits

Note: All outputs are power-limited.

Supplying Power to a Style Y XPC-8 Circuit

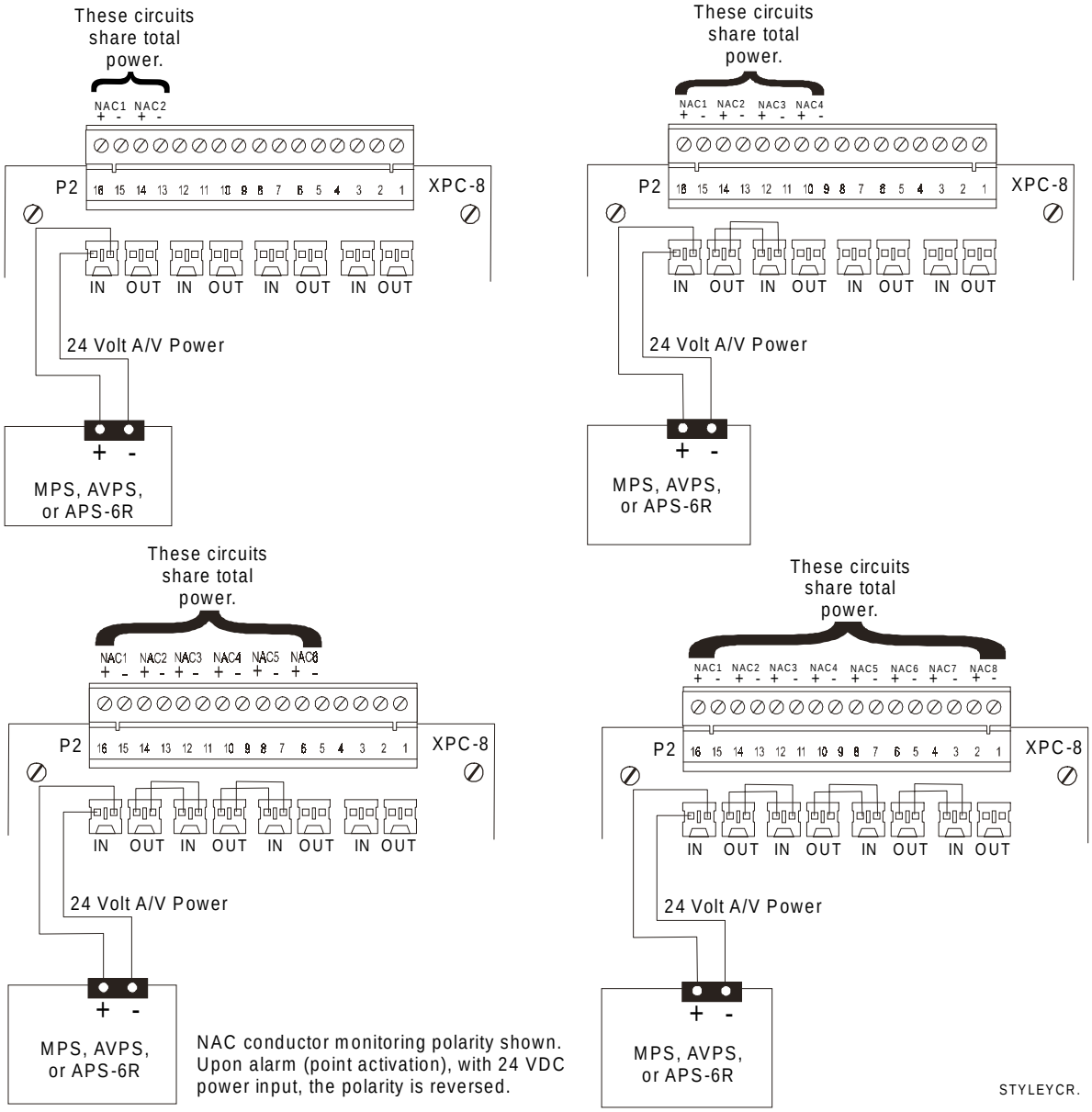


Figure 58: Wiring Style Y Circuits with 24 VDC Power

Note: All outputs are power-limited.

Wiring a Mix of Style Y Circuits

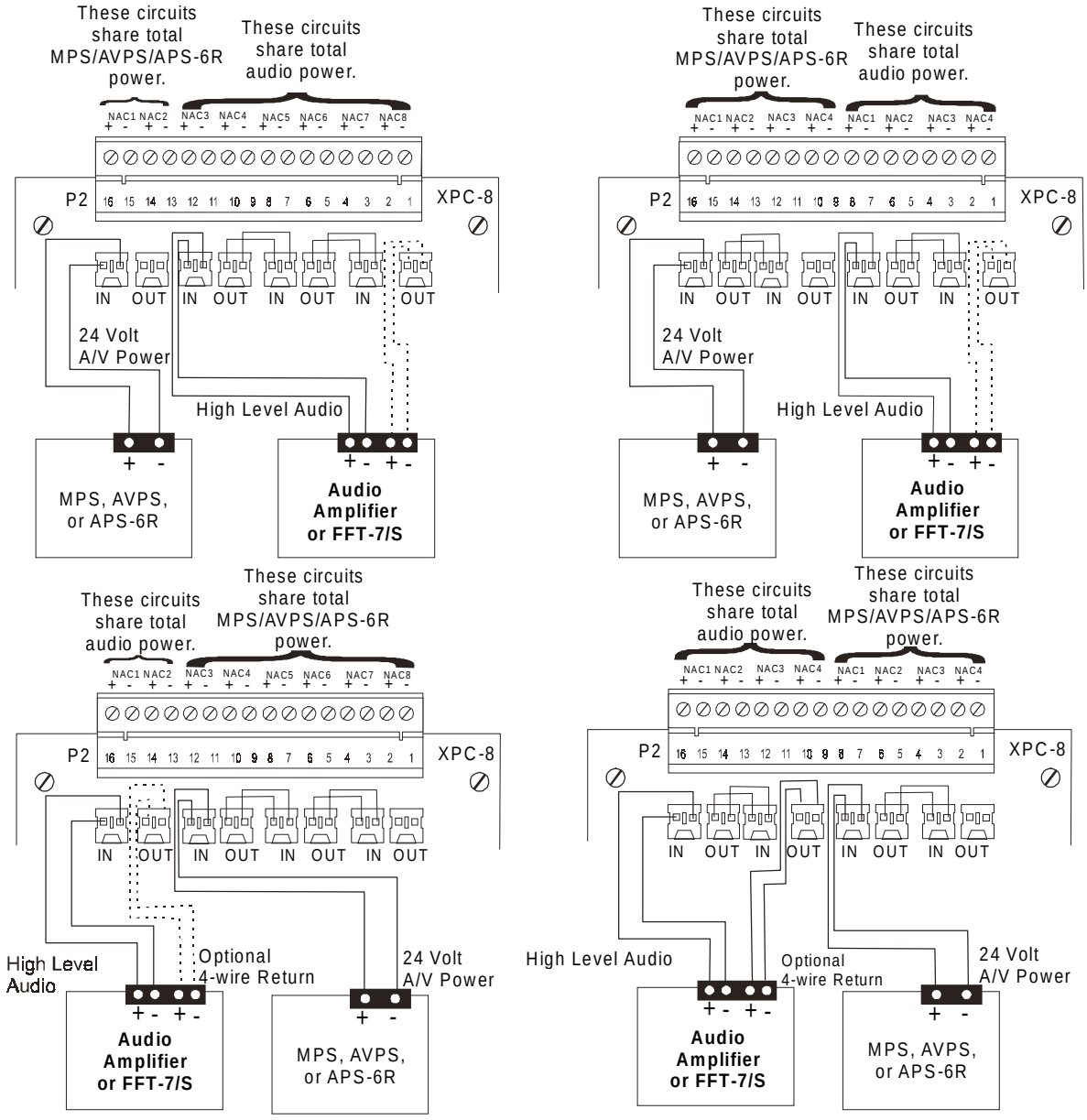


Figure 59: Wiring a Mix of Style Y Circuits with A/V Power and High Level (Amplified) Audio or Telephone Circuits

Notes: All outputs are power-limited. Conductors polarity is shown in the non-alarm state.

XPR Module with Eight Form-C Relays

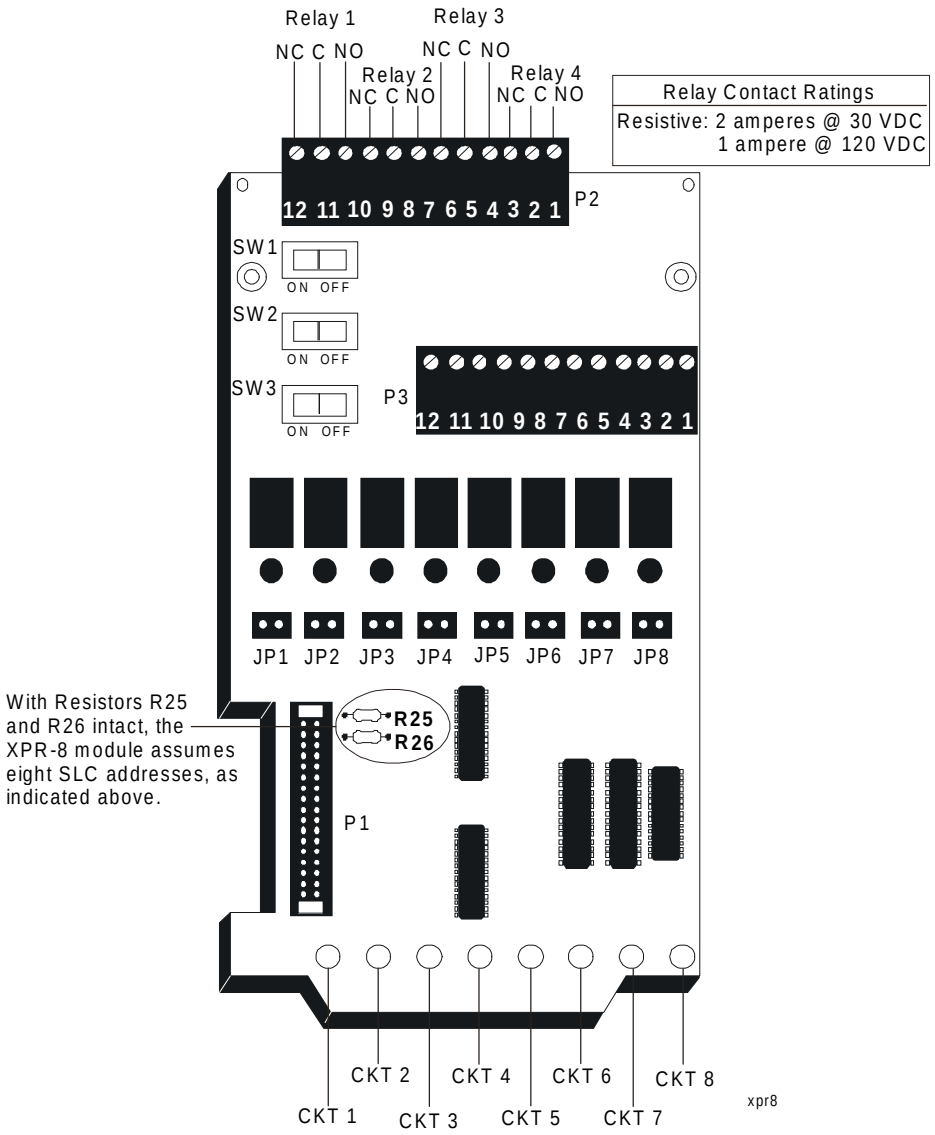


Figure 60: XPR Module with Eight Form-C Relays

Notes: The relay contacts on the XPR-8 may be connected to either a power-limited or non power-limited source, but not both. If the relay contacts are connected to a non power-limited source, this wiring must remain separated by at least 1/4 inch (6.25 mm) from all power-limited wiring.

If the relay contacts on the XPR-8 are connected to a power-limited source they must be noted on the power-limited label on the FACP door.

For complete ratings, refer to *Circuit/Device Ratings and Connections Technical Bulletin (LIT-448160*).

XPR Module with Four Dual Form-C Relays

The relay contacts on the XPR-8 may be connected to either a power-limited or non power-limited source, but not both. If the relay contacts are connected to a non power-limited source, this wiring must remain separated by at least 1/4 inch from all power-limited wiring.

If the relay contacts on the XPR-8 are connected to a power-limited source they must be noted on the power-limited label on the FACP door.

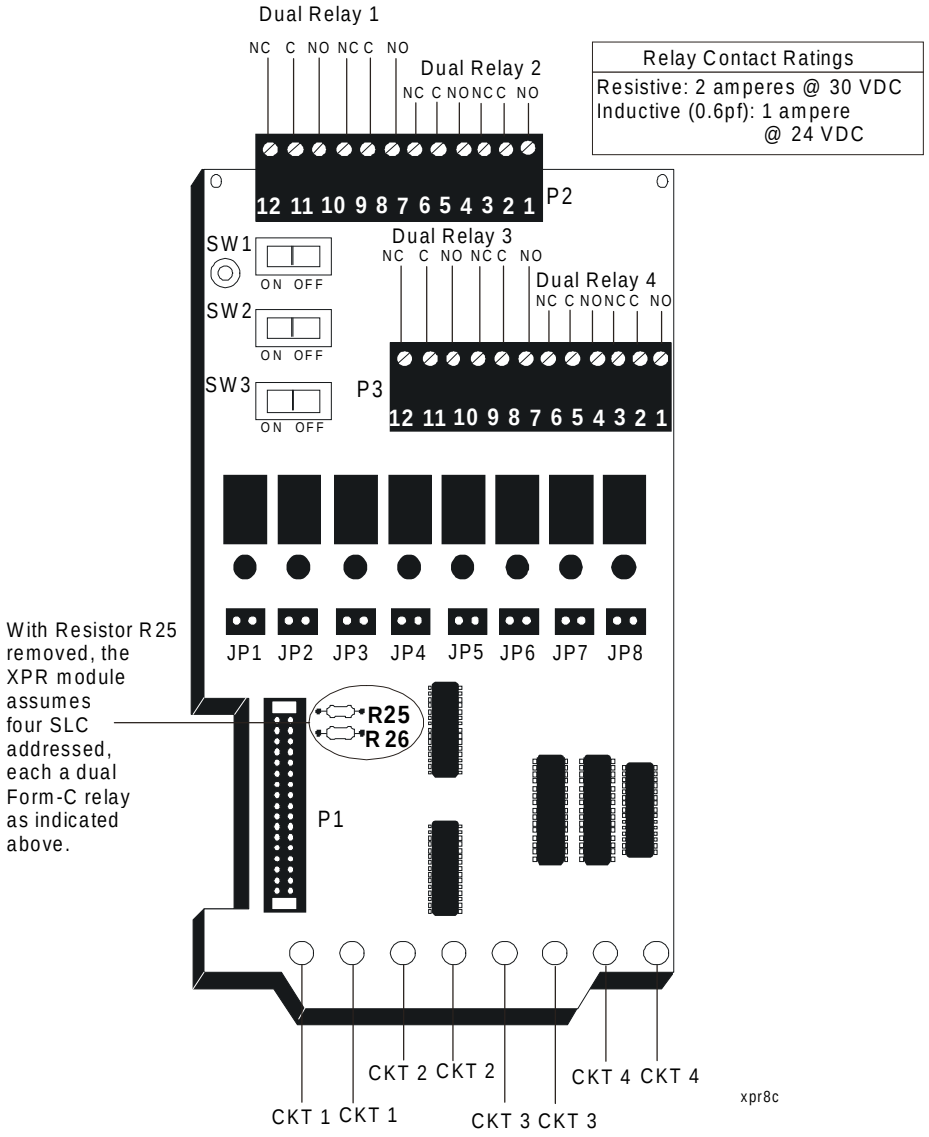


Figure 61: XPR Module with Four Dual Form-C Relays

For complete ratings, refer to *Circuit/Device Ratings and Connections Technical Bulletin (LIT-448160).*

Internal Connection of Relay Contacts for Multi-Channel Applications

Slide Switches SW1, SW2, and SW3 on the XPR-8 Relay Module can be used to internally connect relay contacts on Connectors P2 and P3. This capability eliminates the need to make wire connections between terminals in multiple-channel voice alarm applications.

With **SW1** set ON, the following terminals share a common connection:

- P2 Terminal 12 and P2 Terminal 6
- P2 Terminal 10 and P2 Terminal 4
- P2 Terminal 9 and P2 Terminal 3
- P2 Terminal 7 and P2 Terminal 1

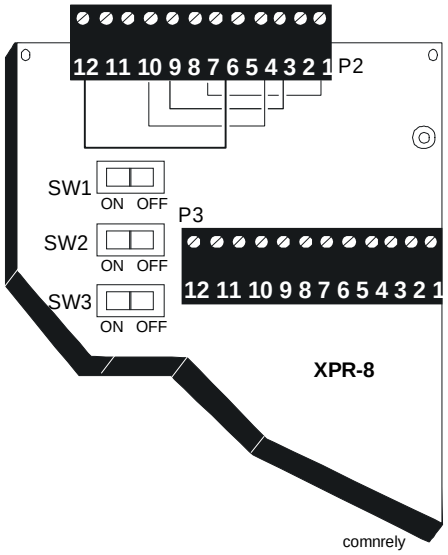


Figure 62: Terminal Connections

With **SW1** and **SW2** set ON, the following terminals share a common connection:

- P2 Terminal 12 and P2 Terminal 6 and P3 Terminal 12
- P2 Terminal 10 and P2 Terminal 4 and P3 Terminal 10
- P2 Terminal 9 and P2 Terminal 3 and P3 Terminal 9
- P2 Terminal 7 and P2 Terminal 1 and P3 Terminal 7

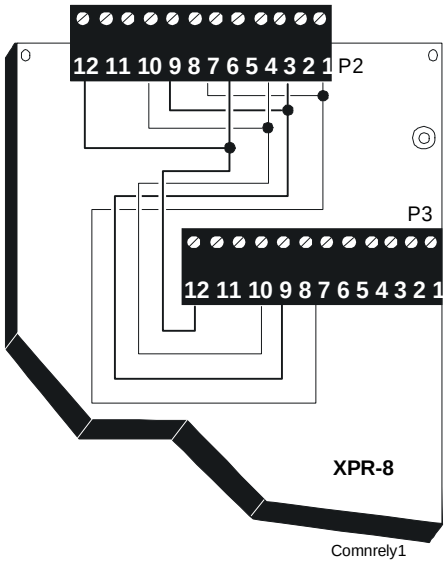


Figure 63: Terminal Connections

With **SW1, SW2 and SW3** set ON, the following terminals share a common connection:

- P2 Terminal 12, P2 Terminal 6, P3 Terminal 12, and P3 Terminal 6
- P2 Terminal 10, P2 Terminal 4, P3 Terminal 10, and P3 Terminal 4
- P2 Terminal 9, P2 Terminal 3, P3 Terminal 9, and P3 Terminal 3
- P2 Terminal 7, P2 Terminal 1, P3 Terminal 7, and P3 Terminal 1

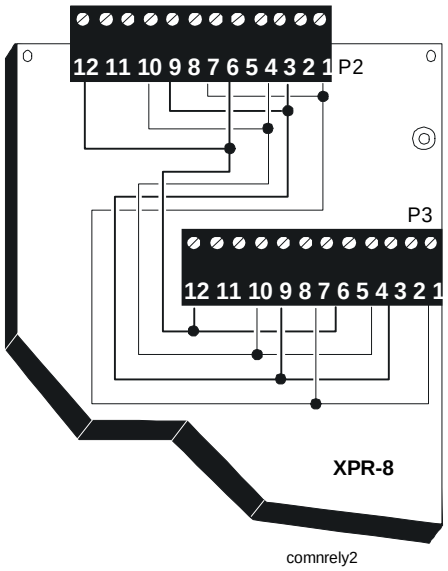


Figure 64: Terminal Connections

Typical XP Transponder Cabinet Wiring

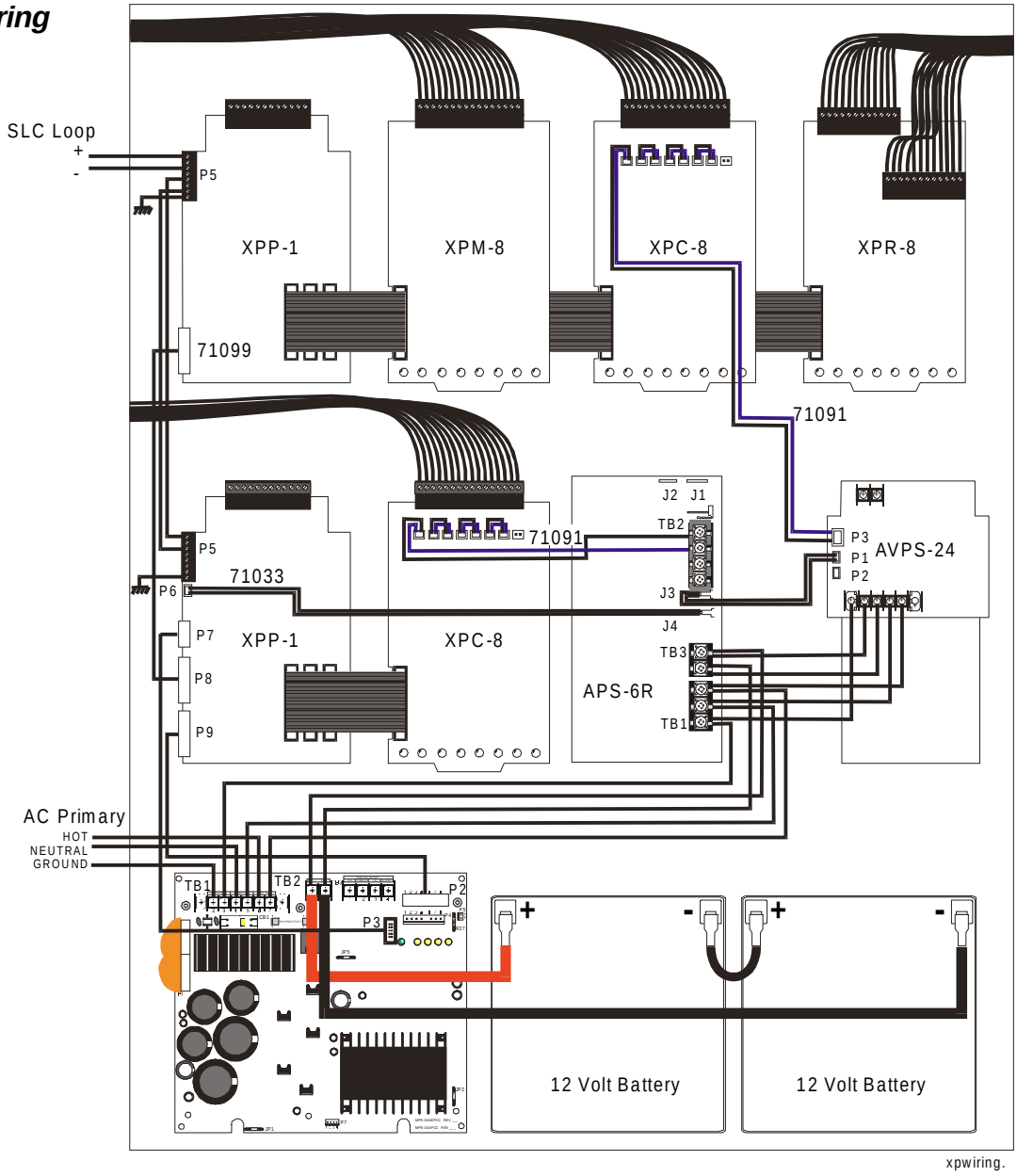


Figure 65: XP Transponder Cabinet Wiring (Full View)

Note: The above illustration shows a typical XP Transponder cabinet. All wiring connected to power-limited circuits must remain at least 1/4 inch (6.35 mm) away from wiring connected to non power-limited circuits.

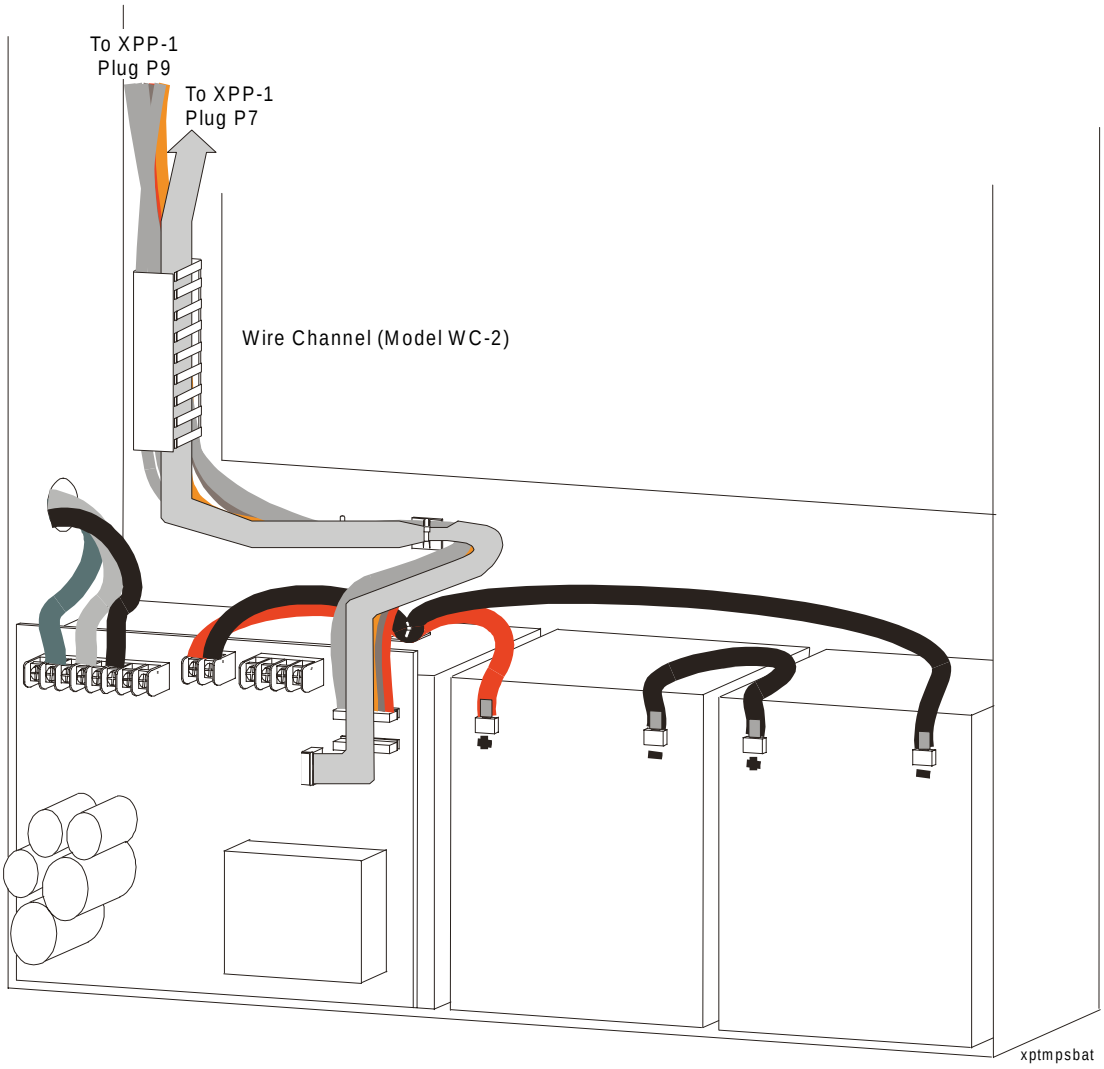


Figure 66: XP Transponder Cabinet Wiring for Main and Secondary Power Supplies

Note: The above illustration shows a typical XP Transponder cabinet. All wiring connected to power-limited circuits must remain at least 1/4 inch (6.35 mm) away from wiring connected to non power-limited circuits.

Typical XP Transponder Cabinet Wiring Notes

The XP Transponder wiring on Figure 65 and Figure 66 illustrates the connections between multiple transponders in the same cabinet.

Power Supply Supervision

The XPP-1 module in the second row in Figure 65 supervises the main power supply through the P3 to P7 connection. Note also that this XPP-1 supervises the condition of the two audio/visual power supplies as well, since these supplies are monitored XPP-1 via a connection at P6.

Notification Appliance Power

The XPC-8 in the second row in Figure 65 can draw notification appliance current from the APS-6R. This current is shared between the eight NFPA Style Y circuits since the four supply feeds on this module are jumpered together.

The XPC-8 in the first cabinet in Figure 65 row can draw power from the AVPS-24 power supply on the right in the second row. Since the notification appliance power provided by the AVPS-24/AVPS-24E/APS-6R is UL Listed as a Special Application power supply, only those devices listed in the *Device Compatibility Technical Bulletin (LIT-448160)* may be used.

Dual Stage Operation (For Use in Canada Only)

Dual Stage Operation enables the Notification Appliance Circuits of an XPC-8 to generate a pulsing output of either 20 pulses per minute (alert rate) or 120 pulses per minute (evacuation rate). Dual Stage Operation is enabled by cutting resistor R30 on the XPC-8 module. This configuration doubles the number of addresses consumed by the XPC-8 module. If the XPC-8 is configured as four Style Z circuits, it will now consume eight addresses. If the XPC-8 is configured as eight Style Y circuits, it now consumes sixteen addresses.

The additional addresses are used to select between the alert signal (20 ppm) of the evacuation signal (120 ppm) for each of the Notification Appliance Circuits on the XPC-8. Example: Each Notification Appliance Circuit consumes two addresses, the first address controls the actual pulsing rate (20 ppm/120 ppm). The Type ID for this second point must be FORC (IFC-1010/2020) or relay (IFC-400). When the pulsing rate is OFF, the corresponding NAC will pulse at the alert rate (20 ppm). When the pulsing rate is ON, the NAC will pulse at the evacuation rate (120 ppm).

If an alarm occurs and is acknowledged within five minutes (either from the FACP or from the XP), the Notification Appliance Circuits will continue to pulse at their respective rates, evacuation or alert, as determined by their corresponding pulsing rate point. However, if an alarm occurs and it is ***not*** acknowledged within five minutes, all Notification Appliance Circuits that were active at 20 ppm will begin pulsing at the evacuation rate of 120 ppm. If the alarm is acknowledged after five minutes, it will have no affect on the NACs pulse rates.

If the NACs are *silenced*, either manually or automatically (Signal Cut Out) and a new alarm occurs, they will resound at:

- Their respective rates, either 20 ppm or 120 ppm, if the initial alarm was acknowledged within five minutes.
- The temporal pattern rate if the original alarm was not acknowledged within five minutes.

Some Canadian jurisdictions do not yet accept the temporal evacuation signal provided with software Part Number XPPV2.1. Software Kit AROM-SPP contains additional signal options for Canadian Dual Stage Operation in IFC-1010/2020s. These options include a continuously ON second stage evacuation signal and a 120 pulse per minute second stage evacuation signal.

Programming the XP Transponder

XRAM-1

The XRAM-1 is an optional nonvolatile RAM chip that can be installed in the XPP-1. With the XRAM-1, input circuits can be mapped to any specific output circuits. This mapping defines how the XP Transponder will operate during stand alone operation and during Local mode operation under loss of communication with the FACP.

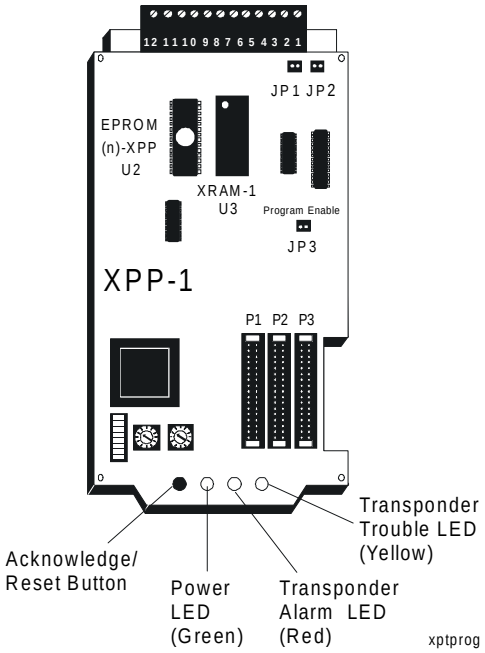


Figure 67: Installing the XRAM-1

Step One: Installing XRAM-1

Power must be removed from the XP Transponder before the XRAM-1 can be installed. After installing the XRAM-1, DIP Switch SW1-6 must be set to the ON position to tell the XP Transponder that the non-volatile RAM has been installed.

Note: The power must be OFF when changing DIP Switch SW1-6. If the switch is changed with power ON, an `Installation Error` will occur. Return the switch to its previous position if this happens. Failure to follow this procedure may result in all programming information being erased form the XRAM-1.

Step Two: Initializing the XRAM-1

After the XRAM-1 has been installed and DIP Switch SW1-6 has been set ON, perform the following initialization procedure:

1. Turn operating power for the Transponder ON.
2. Wait 30 seconds.
3. Turn operating power for the Transponder OFF.
4. Wait 60 seconds.
5. Turn operating power for the Transponder ON.

The XP Transponder will enter an `Installation Error` trouble condition (8 beeps). The trouble contacts on the XPP-1 will activate (if they have not been mapped to the FACP and are functioning as local trouble contacts). The XRAM-1 must now be programmed.

Notes: Before removing or connecting any power or supervisory cables, perform the following:

1. Remove battery/secondary power.
2. Remove AC power.
3. Wait 60 seconds.

When finished installing/removing components:

1. Check to see that all boards, cables, and components are properly installed.
2. Apply AC power.
3. Connect battery/secondary power.

WARNING: Never remove or install boards, internal cables or components with power applied. Failure to follow the procedure outlined above may result in irreparable damage to the system components. This damage may adversely affect the operation of this control unit but its effect may not be readily apparent.

Step Three: Programming the XRAM-1

A shunt lug acts as the programming key to enter the XRAM-1 Programming mode. Its storage position is at JP1 and JP2 on the XPP-1, where it straddles both jumpers.

Note: The Transponder will **not** function as a fire alarm control panel while the XRAM-1 is being programmed.

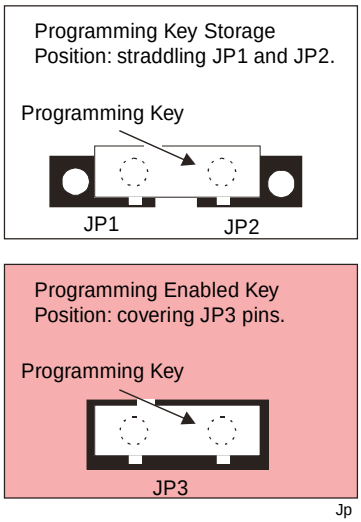


Figure 68: Programming the XRAM-1

To enter the Programming mode:

1. Place this programming key over the programming pins (JP3) then push and release the Reset switch.
2. Remove the programming key and return it to its storage position.

The green AC Power LED on the XPP-1 will flash to indicate that the XPP-1 is now in Program mode. The XRAM-1 has a default program that automatically maps each initiating device circuit to all output/relay circuits. To modify this default program, select an initiating circuit on an XPM-8 for mapping by shorting the positive (+) terminal to a negative (-) terminal of that circuit. The initiating circuit's LED will illuminate (two LEDs for Style D-wired circuits). All output/relay circuits that are currently mapped to this circuit will be indicated by illuminated green LEDs.

Outputs are mapped (or unmapped) to the selected initiating circuit by shorting the positive (+) and negative (-) terminals of the notification circuits or by shorting the jumper Pins J1 through J8 of the of XPR-8 or JP1 and JP2 of the XPP-1. The initiating circuit's LED will flash with the first change made to the programming map. An output circuit will change state (from mapped to unmapped, or unmapped to mapped) each time it is shorted.

After mapping the initiating circuit, push the Reset switch to store the programming. All LEDs on the XP Transponder will turn OFF except the LEDs on the XPP-1.

Repeat this procedure for all initiating circuits that require mapping.

Note: XP Transponder circuits do not have to be programmed in sequential fashion. They can be programmed and reprogrammed in any order. However, after each circuit is programmed, it should be stored by pressing the Reset button.

The user may exit programming mode by placing the programming key over the programming pins (JP3) and pressing the Acknowledge/Reset button on the XPP-1. Remove the programming jumper and return it to its normal position.

Note: Program mode will time out after two minutes of inactivity.

Default Programming

Any initiating circuit that is not individually programmed will retain a default mapping. This default program maps each initiating circuit to every other circuit and relay, except XPP-1 relays.

Programming the XP Transponder for Rapid All Call Activation (Audio IFC-1010/2020 Systems Only)

Note: The Rapid Activation All Call feature requires Release 6.5, 6.6 (and higher), or M2.7 (and higher) software in the IFC-1010/2020 and XPP-1 software chip 73326 (or later). **N23**

The Rapid Activation All Call feature can be used in any mode of operation except Local mode. To enable this feature, enter the Program mode as described in *Step Three: Programming the XRAM-1* section of this document. Once in the Program mode, ensure that all LEDs on the XP Transponder are OFF with the exception of the XPP-1 LEDs. (If LEDs other than those on the XPP-1 are on, review *Step Three: Programming the XRAM-1* section.)

Momentarily press the XP Transponder Acknowledge/Reset switch. If All Call has not been previously programmed, all green LEDs on every XPC board should turn on steady indicating that the All Call feature is disabled. This is the default setting of an unprogrammed XRAM-1.

To program the All Call feature for an individual circuit, apply a momentary short between the positive (+) and negative (-) terminals of the speaker circuit. The LED (one LED for two wire, two LEDs for four wire circuit) will begin blinking, indicating the circuit is now programmed for All Call. Applying the short a second time will disable the All Call feature. Repeat this procedure for each circuit to be programmed for All Call operation.

Once All Call programming is completed, momentarily press the XPP-1 Transponder Reset switch to store the program. All XPC-8 circuit LEDs should turn OFF.

You may now resume circuit mapping, reenter All Call mode or leave programming. To exit Program mode, place the programming key (jumper) over the Program Enable pins (JP3) on the XPP-1 and momentarily press the Acknowledge/Reset switch on the XP Transponder. Programming mode will also be exited after two minutes of inactivity.

Rapid Activation All Call operation is intended for speaker circuits only. Therefore any XPC-8 modules with resistors R30 or R31 (see Figure 52) removed (dual stage operation) and intended for horns or bells cannot be programmed for Rapid All Call.

Operating the XP Transponder

Normal (No Alarm or Trouble) Condition

All notification appliances and the piezo trouble sounder should be silenced. The green LED should be lit, indicating that AC power is present. If the Transponder is employed as a peripheral to an IFC-1010/2020, and communication with the control panel has been enabled, the green LED will flicker to the communication rate between the two. All other status LEDs should be OFF.

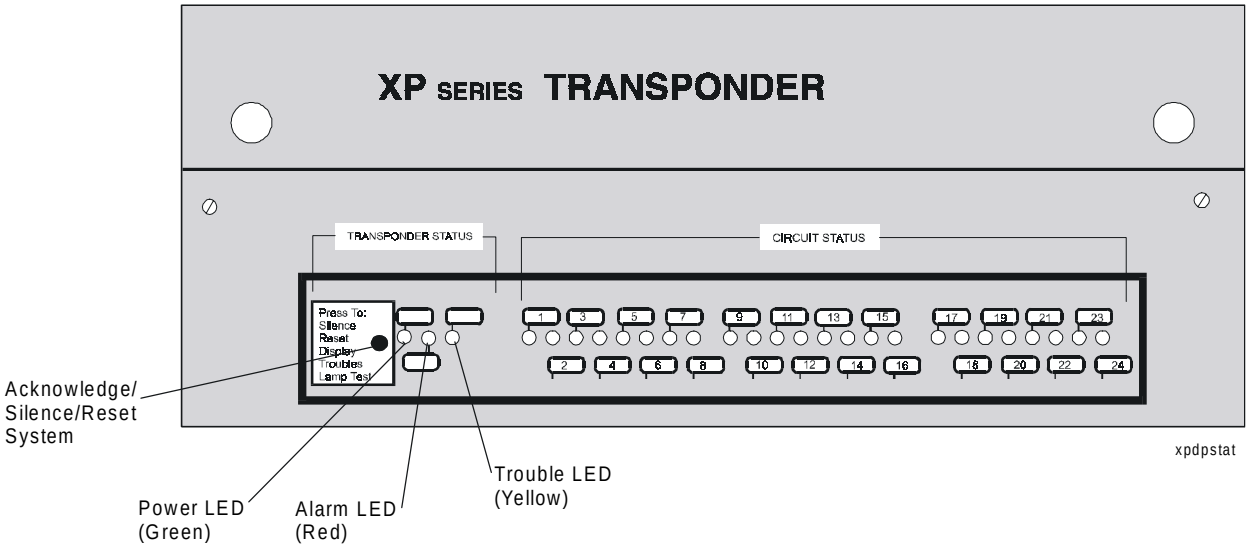


Figure 69: XP Transponder LEDs

Alarm Condition

The red system alarm LED on the XPP-1 will be lit from the moment of alarm. Alarm indicators on all alarmed zones will flash at the rate of five times per second until acknowledged.

If Alarm Verification has been selected, the zone-specific red LED on the XPM-8 will flash twice per second (slower rate) during the verification period.

Acknowledging Alarms

Press the Acknowledge/Silence/Reset Button. Do not hold in for more than five seconds or the Transponder will be reset. The Acknowledge/Reset button must be pushed once for each initiating device circuit in alarm. As each initiating device circuit is acknowledged, its red Alarm LED will light steadily.

Lamp Test and System Reset

Press the Acknowledge/Reset button and hold in for more than five seconds. Release the button and the XPP-1 will reset and execute a sequential Lamp Test of all the LEDs on the XP Transponder modules. Following this, the starting address of each module is displayed in Binary Coded Decimal (BCD) format.

Example:

An XPC-8 module with a starting address of 34 will produce the following LED display at the conclusion of Lamp Test:

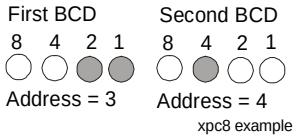


Figure 70: Lamp Test LED Display

Trouble Condition

The yellow Trouble LED on the XPP-1 will be flashing a code that corresponds to a specific type of trouble condition. The piezo sounder will "beep" to the same code as the flashing Trouble LED. If more than one trouble exists in one XP Transponder system (row), the Trouble LED will annunciate each error sequentially, and repeat the procedure until each trouble has been cleared. See *Appendix C: Troubleshooting the XP Transponder* in this document for error codes.

Acknowledging Troubles

Press the Acknowledge/Reset button momentarily. Do not hold in for more than five seconds or the transponder will be reset. Each trouble in the system must be acknowledged individually. If the particular trouble being acknowledged is due to a fault on a IDC or NAC (Field Trouble), the XP Transponder will momentarily light the LED of the circuits in trouble. After all troubles have been acknowledged, the piezo sounder will be silenced (if enabled, otherwise it will never sound). The Trouble LED will continue to flash the codes of troubles that still exist. Once a trouble clears, the transponder will stop flashing its error code.

Appendix A:

NFPA Standard-Specific Requirements

The XP Series Transponder is an expandable multiplex fire alarm control panel designed for use in commercial, industrial, and institutional applications. The XP Transponder meets the requirements for service under the National Fire Protection Association (NFPA) Standards outlined in this appendix. This appendix covers the requirements for employing the XP Transponder as a standalone fire alarm control panel under the appropriate NFPA standard. The minimum system components required for compliance with the appropriate NFPA standard are listed in each area.

NFPA 72-1996 Local Protective Signaling System

Minimum Equipment Required

The minimum equipment required:

BE-XP Basic Equipment Package which includes the Transponder Processor Module (XPP-1), CHS-4 Chassis, and XPDP Transponder Dress Panel.

MPS-24A/MPS-24AE or MPS-24B/MPS-24BE Main Power Supply

An XP Transponder Cabinet, Batteries (refer to *Appendix B: Power Supply Calculations*), and **BP-1 Battery Dress Panel.**

VP-2 Vented Dress Panel

XPM-8/XPM-8L Transponder Monitor Module providing initiating device circuits for connection of two (XPM-8 only) or four wire smoke detectors, manual pull stations, and heat detectors.

XPC-8 Transponder Control Module providing up to eight Style Y or four Style Z Notification Appliance Circuits for connection of UL Listed 24 VDC alarm notification appliances. **N24**

Installation

This unit must be installed as outlined in *Field Wiring the XP Transponder* (*XPM Module* and *XPC Module*).

Set the SW1 DIP switches on the XPP-1 as follows:

OFF	(Standalone operation)*
ON	(Standalone operation)*
?	NVRAM
ON	(Piezo will always sound)
?	Alarm Verification - set as desired
?	Signal Silence - set as desired
?	XPP-1 Relays - set as desired
ON	Supply Supervision - (Standalone operation)*

Xpp Dip switch

Figure 71: XPP-1 NFPA 72-1996 DIP Switch Settings

*****Note: If the XP Transponder is to be used as a remote panel in an IFC-1010/2020 system but is to function in accordance with NFPA 72 Local during loss of LIB SLC loop communication, set DIP Switch 7 to the OFF position.

NFPA 72-1996 Auxiliary Protective Signaling System

Minimum Equipment Required

The minimum equipment required:

BE-XP Basic Equipment Package which includes the Transponder Processor Module (XPP-1), CHS-4 Chassis, and XPDP Transponder Dress Panel.

MPS-24A/MPS-24AE or MPS-24B/MPS-24BE Main Power Supply

An XP Transponder Cabinet, Batteries (refer to *Appendix B: Power Supply Calculations*), and **BP-1 Battery Dress Panel.**

VP-2 Vented Dress Panel

XPM-8/XPM-8L Transponder Monitor Module providing initiating Device Circuits for connection of two (XPM-8 only) or four wire smoke detectors, manual pull stations, and heat detectors.

XPC-8 Transponder Control Module providing up to eight Style Y or four Style Z Notification Appliance Circuits for connection of UL Listed 24 VDC alarm notification appliances.

MBT-1 Municipal Box Trip [N24]

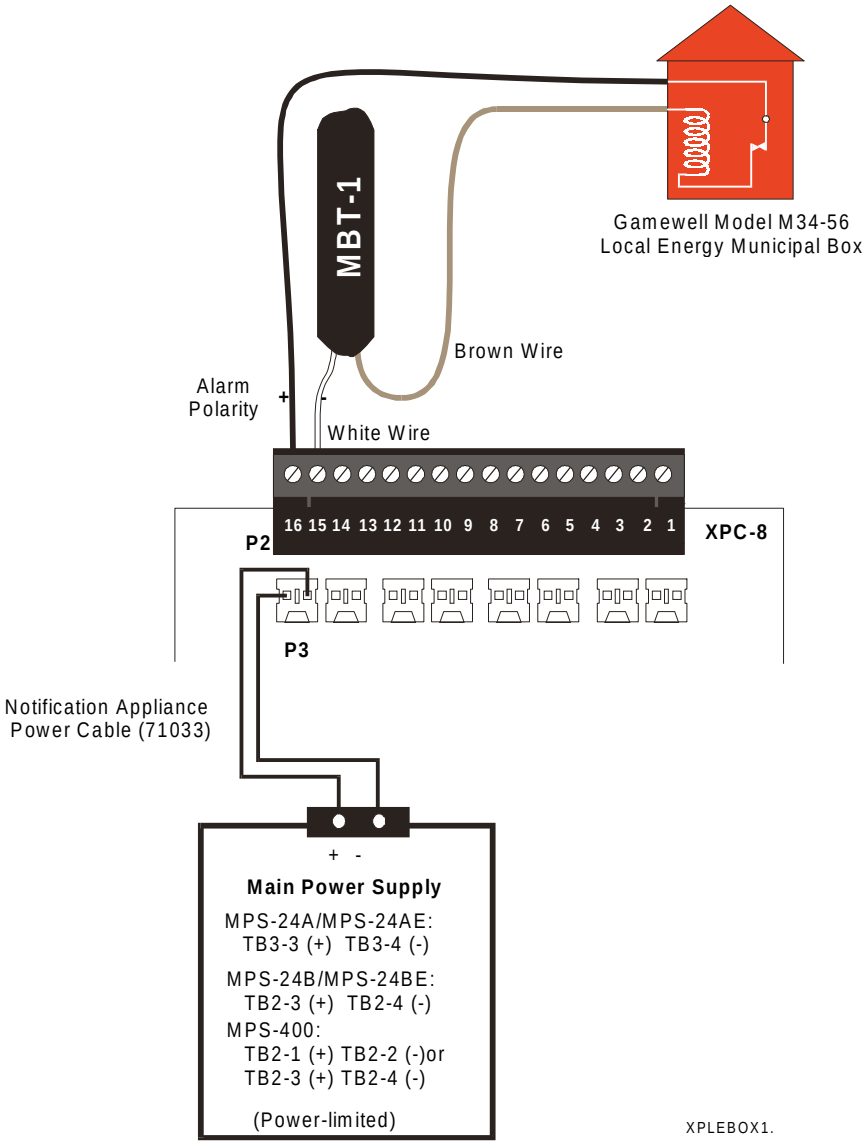


Figure 72: NFPA 72-1996 Auxiliary Supervising Station Fire Alarm System

Note: The municipal box output is not power-limited. The wiring connected to this output must remain separated by at lease 1/4 inch (6.35 mm) from all power-limited wiring.

If the wiring of the MBT-1 circuit leaves the building, it must satisfy the following parameter:

1. It may not exceed 1000 meters (3280.8 feet) in length.
2. It must not cross any power lines.
3. It must not be in the vicinity of any high voltage source of power.

All connections are power-limited and supervised.

Installation

This unit must be installed as outlined in *Field Wiring the XP Transponder* (*XPM Module*) and Figure 72.

Set the SW1 DIP switches on the XPP-1 as follows:

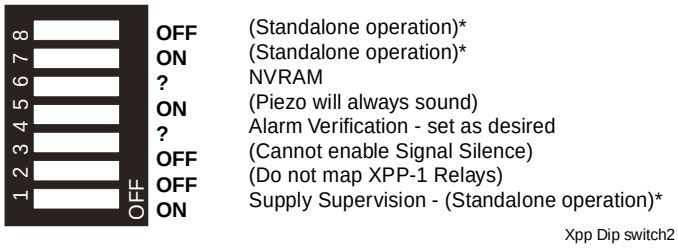


Figure 73: NFPA 72-1996 Auxiliary Protective Signaling System DIP Switch Settings

*****Note: If the XP Transponder is to be used as a remote panel in an IFC-1010/2020 system, ignore this section and follow the section of this appendix named *NFPA 72-1996 Proprietary Fire Alarm System.*

NFPA 72-1996 Proprietary Fire Alarm System

Minimum Equipment Required

The minimum equipment required:

BE-XP Basic Equipment Package which includes the Transponder Processor Module (XPP-1), CHS-4 Chassis, and XPDP Transponder Dress Panel.

MPS-24A/MPS-24AE or MPS-24B/MPS-24BE Main Power Supply

An XP Transponder Cabinet, Batteries (refer to *Appendix B: Power Supply Calculations*), and **BP-1 Battery Dress Panel.**

VP-2 Vented Dress Panel

XPM-8/XPM-8L Transponder Monitor Module providing initiating Device Circuits for connection of two (XPM-8 only) or four wire smoke detectors, manual pull stations, and heat detectors.

The IFC-1010/2020 **serves as the NFPA 72 Central Station Receiving unit.** Signaling occurs through **two** M500MJ **Monitor Modules** connected to the alarm and trouble relays on the XPP-1.

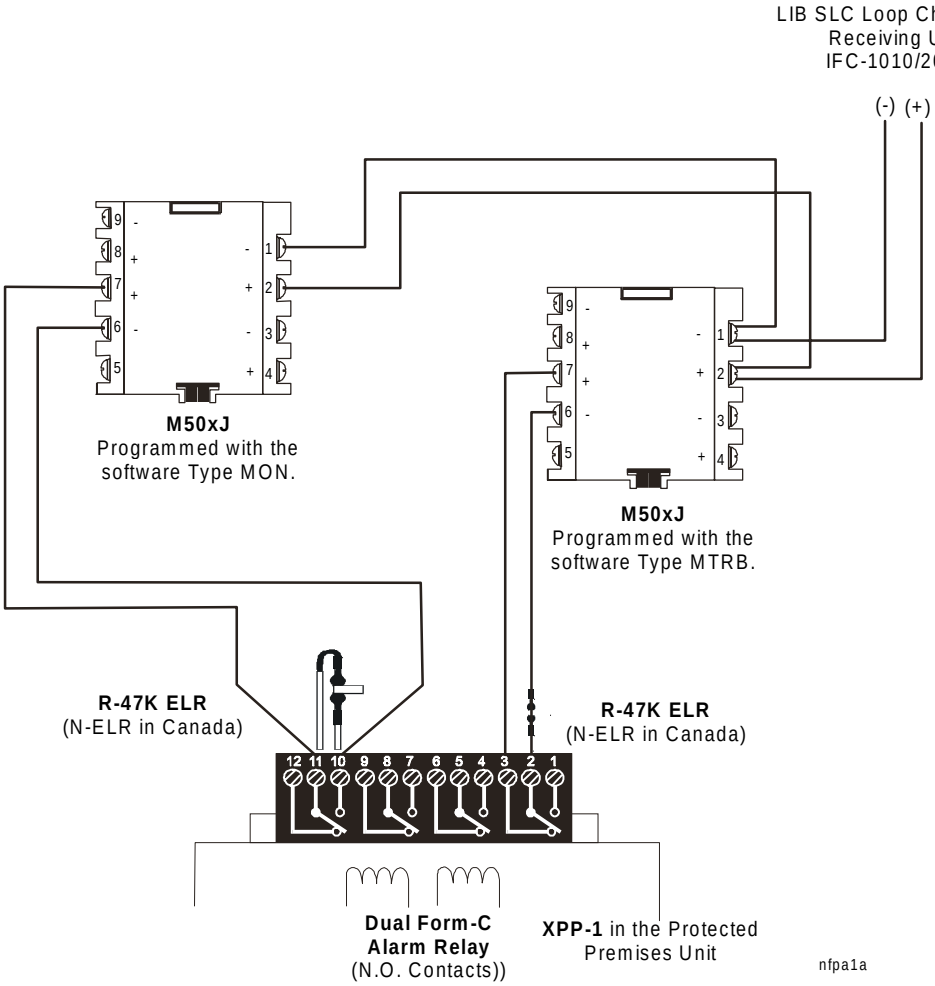


Figure 74: Proprietary Supervising Station Fire Alarm Connections

Notes:

- If the wiring of the LIB-200 leaves the building, it must satisfy the following parameters:
  1. It may not exceed 3280.8 ft (1000m) in length.
  2. It must not cross any power lines.
  3. It must not be in the vicinity of any high voltage sources of power.
  4. The above restrictions do not apply to the LIB-200A and the LIB-400.
- All circuits are supervised and power limited. 18 AWG (0.755mm^2) minimum. Maximum of 65 ohms resistance on M50xJ loops. 10,000 ft (3048m) at 12 AWG (3.25 mm^2) (LIB-200) and 12,500 ft (3810m) at 12 AWG (3.25 mm^2) (LIB-200A/LIB-400) maximum distance between receiving unit and the M50xJ modules.

This application is not suitable for transmission of sprinkler supervisory conditions.

Installation

This unit must be installed as outlined in *Field Wiring the XP Transponder* (*XPM Module*) and Figure 74. Refer to the *IFC-1010/2020 Technical Manual* for additional information on installing M500MJ Monitor Modules.

Set the SW1 DIP switches on the XPP-1 as follows:

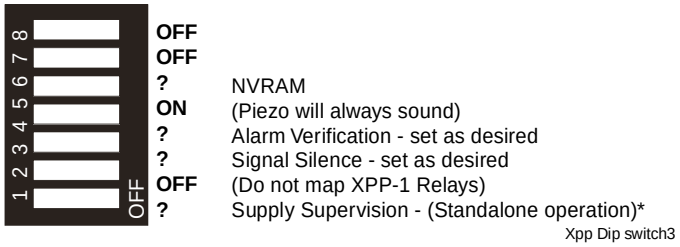


Figure 75: XPP-1 NFPA 72-1996 Proprietary Fire Alarm System DIP Switch Settings

Appendix B:

Power Supply Calculations

AC Branch Circuit

The XP Transponder requires connection to a separate dedicated AC branch circuit, which must be labeled FIRE ALARM. This branch circuit must connect to the line side of the main power feed of the protected premises. No other equipment may be powered from the fire alarm branch circuit. The branch circuit wire run must run continuously, without disconnect devices, from the power source to the fire alarm control panel. Overcurrent protection of this circuit must comply with Article 760 of the national Electrical Code as well as local codes. Use 12 AWG (3.25 mm^2) wire with 600 volt insulation for this branch circuit.

Table 4 and Table 5 below calculate the total amount of current, in AC amperes, that the AC service must be capable of supplying to an XP Transponder system.

Table 4: 120 VAC Branch Current Requirements

Device Type	Number of Devices	Current Draw (amperes)		Total Current/Device
APS-6R	[ ]	X 2.5	=	
AVPS-24	[ ]	X 1.0	=	
AA-30	[ ]	X 1.0	=	
AA-100/AA-120	[ ]	X 1.85	=	
CHG-120	[ ]	X 2.0	=	
Main Power Supply MPS-24A or MPS-24B	[ ]	X 1.8	=	
NR45-24	[ ]	X 1.0	=	
Sum Column for AC Branch Current Requirements			=	amperes

Table 5: 220/240 VAC Branch Current Requirements

Device Type	Number of Devices	Current Draw (amperes)		Total Current/Device
APS-6R	[ ]	X 1.2	=	
AA-30E	[ ]	X 0.5	=	
AA-100E/AA-120E	[ ]	X 0.9	=	
CHG-120	[ ]	X 1.0	=	
Main Power Supply MPS-24AE or MPS-24BE	[ ]	X 0.9	=	
NR45-24E	[ ]	X 0.5	=	
Sum Column for AC Branch Current Requirements			=	amperes

Filtered Supply

The Main Power Supply must be capable of powering all internal XP Transponder devices continuously during inactivated conditions. Use Table 6 to determine the inactive current load. A finite amount of additional current must be provided by the power supply during an activated condition. Use Table 7 to determine the activated load. The requirements for inactive and active current loads cannot exceed the capabilities of the power supply in either case.

A total of 3.0 amperes (internal) @ 24 VDC is available from the MPS-24A/MPS-24AE Main Power Supply during inactive conditions. No more than 6 amperes @ 24 VDC can be drawn from the MPS-24A/MPS-24AE during active conditions (only if the XP Transponder is in Local mode). If the XP Transponder is not in Local mode only, 3.0 amperes may be drawn in an activated state. The MPS-24B/MPS-24BE provides 750 mA of regulated power for system modules and 2.0 amperes for notification appliances.

Note: The XPM-8 and XPC-8 transponder modules draw different current levels depending upon whether they are employed as four circuit or eight circuit modules. Complete the following tables accordingly.

Table 6: Regulated Power Requirements (Not Activated) @ 24 VDC

Device Type	Number of Devices	Current Draw (amperes)		Total Current/Device
MPS-24A/MPS-24AE	[ ]	X 0.064	=	
MPS-24B/MPS-24BE	[ ]	X 0.062	=	
APS-6R	[ ]	X 0.025	=	
AVPS24/AVPS-24E	[ ]	X 0.008	=	
XPP-1	[ ]	X 0.023	=	
XPM-8 (Style B)	[ ]	X 0.147	=	
XPM-8 (Style D)	[ ]	X 0.086	=	
XPM-8L (Style B only)	[ ]	X 0.085	=	
XPC-8 (Style Y)	[ ]	X 0.033	=	
XPC-8 (Style Z)	[ ]	X 0.017	=	
XPR-8	[ ]	X 0.004	=	
Four Wire Smoke Detectors	[ ]	X Standby current draw	=	
Listed Power Supervision Relays	[ ]	X Relay current draw	=	
Sum Column for Current Load			=	amperes

Table 7 allows the system designer to determine the percentage of the system that should be supported by the main power supply during an activated condition. Enter the number of circuits, by device type, that the main power supply should power simultaneously in an activated state.

Note: Typically, a system should be designed around the capacity to activate all output circuits and relays, and support shorts on no less than 10% of initiating device circuits (subject to the Local Authority Having Jurisdiction).

The sum of the standby and activated current loads cannot exceed 750 mA on the MPS-24B/MPS-24BE.

Table 7: Filtered Power Requirements (Activated) @ 24 VDC

Device Type	Number of Devices	Current Draw (amperes)		Total Current/Device
XPP-1 Relays	[ ]	X 0.009	=	
XPM-8 Zones	[ ]	X 0.022	=	
XPM-8L Zones	[ ]	X 0.03	=	
XPC-8 Circuits	[ ]	X 0.009	=	
XPR-8 Relays	[ ]	X 0.009	=	
Four Wire Smoke Detectors	[ ]	X Alarm current draw	=	
Sum Column for Current Load			=	amperes

The sum of the standby and activated current loads cannot exceed 750 mA on the MPS-24B/MPS-24BE.

Table 8 calculates the total current required of the main power supply during an activation of outputs condition. This figure cannot exceed 6.0 amperes for the MPS-24A/MPS-24AE or 2.0 amperes for the MPS-24B/MPS-24BE. The MPS-24A/MPS-24AE and MPS-24B/MPS-24BE provides regulated supply for notification appliance circuits, permitting the use of 24 VDC notification appliances UL Listed for Fire Protective Signaling. Enter in Table 8 the respective current draws of notification appliances and other external devices to be powered by the MPS-24A/MPS-24AE or MPS-24B/MPS-24BE when activated.

Table 8: Total Filtered Activated Output Requirements @ 24 VDC

Device Type	Number of Devices	Current Draw (amperes)		Total Current/Device
Bells	[ ]	X [ ]	=	
Horns	[ ]	X [ ]	=	
Sounders	[ ]	X [ ]	=	
Strobes	[ ]	X [ ]	=	
Flashing Lights	[ ]	X [ ]	=	
Other Devices Drawing Power from TB3 Terminals 3 and 4 of the MPS-24A/MPS-24AE or TB2 Terminals 3 and 4 of the MPS-24B/MPS-24BE	[ ]	X [ ]	=	
Current Load (From Table 7)			=	
Current Load (From Table 12)			=	
Sum Column for Current Load			=	amperes

Secondary Power

During loss of primary AC power, the secondary power source (batteries) must be capable of supplying the XP Transponder's internal needs for 24 or 60 hours, and the external needs for 5 minutes. Use Table 10 to calculate the internal power requirements of the batteries during an inactivated state. Use Table 11 to determine the activated state load on the secondary power source and Table 12 to determine the size of the batteries, in ampere hours, needed to support the system for the required number of hours.

Note: No more than 9 amperes of DC current can be fed though the main power supply from the secondary power source at any time when employing Johnson Controls 25 ampere-hour batteries or 20 amperes from 60 ampere-hour batteries.

Table 9: Secondary Power Source Requirements (Not Activated) @ 24 VDC

Device Type	Number of Devices		Current Draw (amperes)		Total Current/Device
MPS-24A/MPS-24AE	[ ]	X	0.104	=	
MPS-24B/MPS-24BE	[ ]	X	0.022	=	
XPP-1 (Include Sonalert)	[ ]	X	0.025	=	
XPM-8 (Style B)	[ ]	X	0.147	=	
XPM-8 (Style D)	[ ]	X	0.086	=	
XPM-8L (Style B Only)	[ ]	X	0.085	=	
XPC-8 (Style Y)	[ ]	X	0.033	=	
XPC-8 (Style Z)	[ ]	X	0.017	=	
XPR-8	[ ]	X	0.004	=	
Four Wire Smoke Detectors	[ ]	X	Standby current draw	=	
Listed Power Supervision Relays	[ ]	X	Relay current draw	=	
APS-6R	[ ]	X	0.025	=	
AVPS-24/AVPS-24E	[ ]	X	0.008	=	
AA-30/AA-30E	[ ]	X	0.045	=	
AA-100/AA-100E or AA-120/AA-120E	[ ]	X	0.05	=	
Sum Column for Current Load				=	amperes

The secondary alarm state load cannot exceed 9.0 amperes with 25 ampere-hour batteries or 20 amperes with 60 ampere-hour batteries.

Table 10: Secondary Power Source Requirements (Activated) @ 24 VDC

Device Type	Number of Devices	Current Draw (amperes)		Total Current/Device
APS-6R	[ ]	X 6	=	
AVPS-24/AVPS-24E	[ ]	X 3	=	
AA-30/AA-30E	[ ]	X 3	=	
AA-100/AA-100E or AA-120/AA-120E	[ ]	X 7.3	=	
Current Load from Table 9			=	
Sum Column for Current Load			=	amperes

Select batteries that provide at least the calculated ampere-hour capacity.

Table 11: Battery Charger Ampere-Hour Range

Device Type	Ampere-Hour Range
MPS-24A/MPS-24AE	9-60 AH
MPS-24B/MPS-24BE	6.5-17 AH
NR45-24/NR45-24E	20-60 AH
CHG-120	25-120 AH

Table 12: Calculating Capacity for Batteries

Current Load from Table 8	X	Required Inactive State Time (24 or 60 hours) [ ]	=	
Current Load from Table 10	X	Required Inactive State Time (for 5 minute, enter 0.084) [ ]	=	
Sum Column for Ampere Hours			**=**	
Multiply by Derating Factor			**X**	**1.2**
Total Ampere-Hour Batteries Required			**=**	**amperes**

Appendix C:

Troubleshooting the XP Transponder

The XP Transponder contains a self-diagnostic feature that flashes the yellow system Trouble LED and beeps the piezo sounder in codes that correspond to a variety of trouble conditions. The piezo sounder will beep a certain number of times, followed by a two second break, and will either repeat the code again (if only one trouble exists) or will sequence onto the next trouble code. When the XPP-1 sequences through the codes of all troubles in the XP Transponder, it will cycle through the procedure again. The yellow system Trouble LED on the XPP-1 module will also flash to the same code. Each state-change at the XP Transponder must be acknowledged by pushing the Acknowledge button. If any other troubles exist in the system, the XP Transponder will then sound the respective code for the next unacknowledged trouble. Once all trouble conditions have been acknowledged, the piezo is silenced. The Trouble LED continues to flash the codes of all existing troubles in the system. Only when a particular trouble condition is cleared, will the XP Transponder stop flashing that code.

Trouble Codes

Field Trouble

A problem exists with field wiring on a module, such as an open on an Initiating Device Circuit or an open or short on a Notification Appliance Circuit. This problem may indicate improper wiring of an Input/Output Circuit or failure of a relay coil on an XPR-8 module. The Trouble LED illuminates steady and the sounder will sound continuously until the Acknowledge/Reset button is pressed. Then the sounder will be silenced and Trouble LED will repeat flash twice, followed by a pause. This trouble overrides all other troubles until it is acknowledged. Numbers next to the trouble code represent the number of beeps and flashes.

Table 13: Field Troubles

Trouble	Beeps/ Flashes	Description
Signals Silenced	1	Notification circuits and output devices have been silenced.
Acknowledged Field Trouble	2	A field wiring problems has been acknowledged.
Audio Supervision	3	An error condition that occurs when the normally open trouble contacts on an audio device or AVPS power supply being supervised by the XPP-1 have been activated. These contacts are wired to P6 on the XPP-1.
AC Fail	4	The main power supply is signaling the XPP-1 that the primary power source (AC) has failed and the system is operating on secondary (battery) power. Note that this could result from a bad or improperly seated power supply supervision cable, which connects to the XPP-1 on Plug P7.
Battery Fail	5	The main power supply is signaling the XPP-1 that the secondary power source (battery) has failed.
Communication Loss	6	Loss of communication with the FACP (if enabled).
Mapping Error	7	The base address has been set too high (an XP Transponder offset address has exceeded 99, the maximum allowable range on the LIB SLC).
Installation Error	8	A modules ribbon cable has been installed in an incorrect connector on the XPP-1 or not installed at all. Module must be connected sequentially from left to right on the XPP-1. An installation error will also result after installation of (and prior to programming) an XRAM-1 chip. This error also occurs if XPP-1 DIP Switch SW1-6 (MEMORY TYPE) is altered with power applied to the XP Transponder.

Appendix D:

Application and Clarification Notes

The IFC-1010/2020 product is listed as a UL Multiple Listing, in association with its original manufacturer. This allows Johnson Controls to provide the latest products, upgrades, and updates available from the manufacturer to the customer at the fastest rate and lowest cost. To conform to this UL Multiple Listing process, this documentation must closely reflect that which is distributed by the product's original manufacturer.

To supplement the UL Multiple Listed text given in this document, the following table of descriptive Number Notes has been added.

Table 14: Number Note Reference Table

Note Number	Section	Note
N1	Supported Products, Introduction	The term "loop" is used in a general sense. It refers to a Class A, looped circuit, only when referencing one of the following: • Style 6/7 for an SLC • Style D for an Initiating Device Circuit (IDC) • Style Y for a Notification Appliance Circuit (NAC) The RS-485 Annunciator Trunk circuit is not looped. It simply runs from the SIB serially (daisy-chained) through all devices on the circuit, to the 470 ohm end-of-line load resistor located at the last device on the circuit.
N2	BE-XP Basic Equipment Package: XPP-1	In addition to the two addressable control relays on the XPP-1, one addressable monitor is available. The XPP-1 monitor point is used to monitor trouble condition reports from other equipment, such as amplifiers, in the cabinet.
N3	XP Transponder Inventory	To assemble a minimal XP Transponder you need the following:, • the BE-XP • an MPS -24A power supply, along with properly sized batteries • a CAB-3 series cabinet for mounting the CHS-4 equipment mounting chassis • a VP-2 Vent Plate for mounting at the top of the CAB-3 enclosure, above the XPDP Dress Plate • a BP-3 Battery Dress Panel to cover the power supply and batteries located at the bottom of the CAB-3 cabinet. These items must be ordered separately. Note that the MPS-24A may serve more than one XPP-1 transponder module in a single cabinet. Only one VP-2 and one BP-1 are needed per CAB-3 cabinet.
N4		Not Used.
N5		Not Used.
N6	DP-1	This would be used to cover an empty row or a row containing something other than a transponder, such as amplifiers or up to four APS-6R power supplies. This cover is not designed to be used in place of the XPDP Transponder Dress Plate (XPDP).

Continued on next page . . .

Note Number (Cont.)	Section	Note
N7	Ground Fault Detection	System components share a common signal reference if there is a hard-wire connection between components. If the only connection between a transponder and the IFC-1010/2020 panel's main power supply (MPS-24A) is the SLC, then there is no common signal reference because the XPP-1 has opto-isolation on its SLC connection. In this case, the transponder power supply should have its ground fault detector circuit active (R27 not cut on the MPS-24A). However, if the transponder power supply provides operating power to a field device that is not electronically isolated from the IFC panel's main power supply, then the transponder power supply ground fault detection circuit should be disabled to prevent false ground fault reports, by cutting R27 on the transponder power supply (see Figure 8). An example of an electrical connection between the transponder and the IFC power supplies through a hard-wired field device would be if the transponder power supply provided 24 VDC operating power to a remote annunciator such as the ACM-16AT. Since the EIA-485 circuit connection between the SIB and the annunciator is hard-wired, there is a common signal reference between the two power supplies. Any time the ground fault detection circuit is disabled on a remote power supply, a 16 AWG wire should connect the system common (TB3 Terminal 4) of the remote power supply to the system common of the main power supply. This assures consistent ground fault detection.
N8	Main Power Harness and Supervisory Connections	Refer to Figure 76 in this section.
N9	APS-6R Audio Visual Power Supply	To enable the reporting of troubles to the IFC panels seen on P6 of the XPP-1, the monitor point must be enabled on the XPP-1 (see *Set the Configuration Switches on DIP Switch SW1* in the *XPP-1 Processor* section and Figure 32).
N10	SW1-2, Relay Mapping	These relays will use two SLC addresses and will behave as if they were an M510CJ or M500CJ control module configured for Form-C operation.
N11	Offsetting the Base Address, XPM-8 Module (Style B), XPM-8L Module (Style B only), XPC-8 Module (Style Y), XPC-8 Module (Style Z)	Each time power is applied to the transponder, each XPM-8, XPM-8L, and XPC-8 module will configure to the number of SLC addresses needed. There are eight IDC or NAC circuits respectively which can be connected to each module. The circuits are paired for power distribution on the XPC-8 (see the *XPC-8 Module* section) and for SLC address assignment. If there is an end-of-line resistor on both pair of IDC or NAC power up, the module will assign one SLC address to each circuit. However, if there is no end-of-line resistor on either of the circuit terminals, the assumption is a Class A circuit to be employed and only one SLC address will be assigned to the two circuit terminal (four terminals).
N13	Fire Alarm System Limitations	NFPA requires a smoke detector at each control units, which includes the fire alarm control panel, as well as transponders, and other control units such as NAC power supplies and boosters.
N14	XP Transponder Introduction, XP Transponder Modules: XPM-8 (Power-limited)	Two wire smoke detectors should only be connected to M502MJ or XPM-8 modules if they are UL Compatibility Listed for use with this system. See the *Device Compatibility Technical Bulletin (LIT-445180).*
N15	Introduction	Notification appliances (signals) should be UL Compatibility Listed, as listed in the *Device Compatibility Technical Bulletin (LIT-445180)* if the power supply providing operating power for the appliances is UL Listed as a Special Application power supply.

Continued on next page . . .

Note Number (Cont.)	Section	Note
N16	MPS-24A/ MPS-24AE (Power-limited) MPS-24B/ MPS-24BE (Power-limited)	While the MPS-24A, MPS-24B, APS-6R, and RCPS-24 power supplies are electrically regulated, they are UL Listed as Special Application power supplies. This means that notification appliances (signals) that are powered by these supplies must be listed in the *Device Compatibility Technical Bulletin (LIT-445180).*
N17	AVPS-24 and AVPS-24E (Power-limited)	The AVPS-24A has been replaced by the APS-6R power supply. The APS-6R is UL Listed as a Special Applications power supply.
N18	Non-resettable Notification Appliance Power (24 VDC) (3.0 A) (Power-limited)	Since the MPS-24A/MSP-24AE are UL Listed as Special Application power supplies, only notification appliances (signals) listed in the *Device Compatibility Technical Bulletin (LIT-445180)* should also be used.
N19	Not Used	
N20	MPS-24A and MPS-24AE Main Power Supply	See Figure 76 for connections between the power supply and the XPP-1 module.
N21	SW1-1, Supervision Mapping	If SW1-1 is set to ON, the XPP-1 will report as a trouble for the base address set on the XPP-1, when any equipment such as APS-6Rs, amplifiers, etc., connected to the XPP-1 Audio Power Supervision monitoring connector (P6) is in a trouble condition.
N22	Offsetting the Base Address	Each address used by the transponder should be programmed into the IFC panel's operating database, even if some of the points on the expander modules are not being currently used (connected to field devices).
N23	Programming the XP Transponder for Rapid All Call Activation (Audio IFC-1010/2020 Systems only)	The XRAM-1 chip is also required for Rapid Activation All Call operation.
N24	Minimum Equipment Required	In order to interlock input (XPM) specific points to specific output (XPC or XPR) points, the XRAM-1 chip should be added to the XPP-1.
N25	MPS-24A and MPS-24AE Main Power Supply	The NR45-24/NR45-24E battery charger has been discontinued and is replaced by the CHG-120.
N26	SW1-3, Signal Silence	The Alarm Verification should not be enabled unless all IDCs on all of the XPM-8/XPM-8L boards are connected to 2-wire conventional smoke detectors. If any of the IDCs associated with the transponder are connected to 4-wire conventional smoke detectors or to contact devices such as manual pull stations, heat detectors, sprinkler tamper switches, sprinkler flow switches, etc., the Alarm Verification switch (SW1-4) should be in the OFF position.

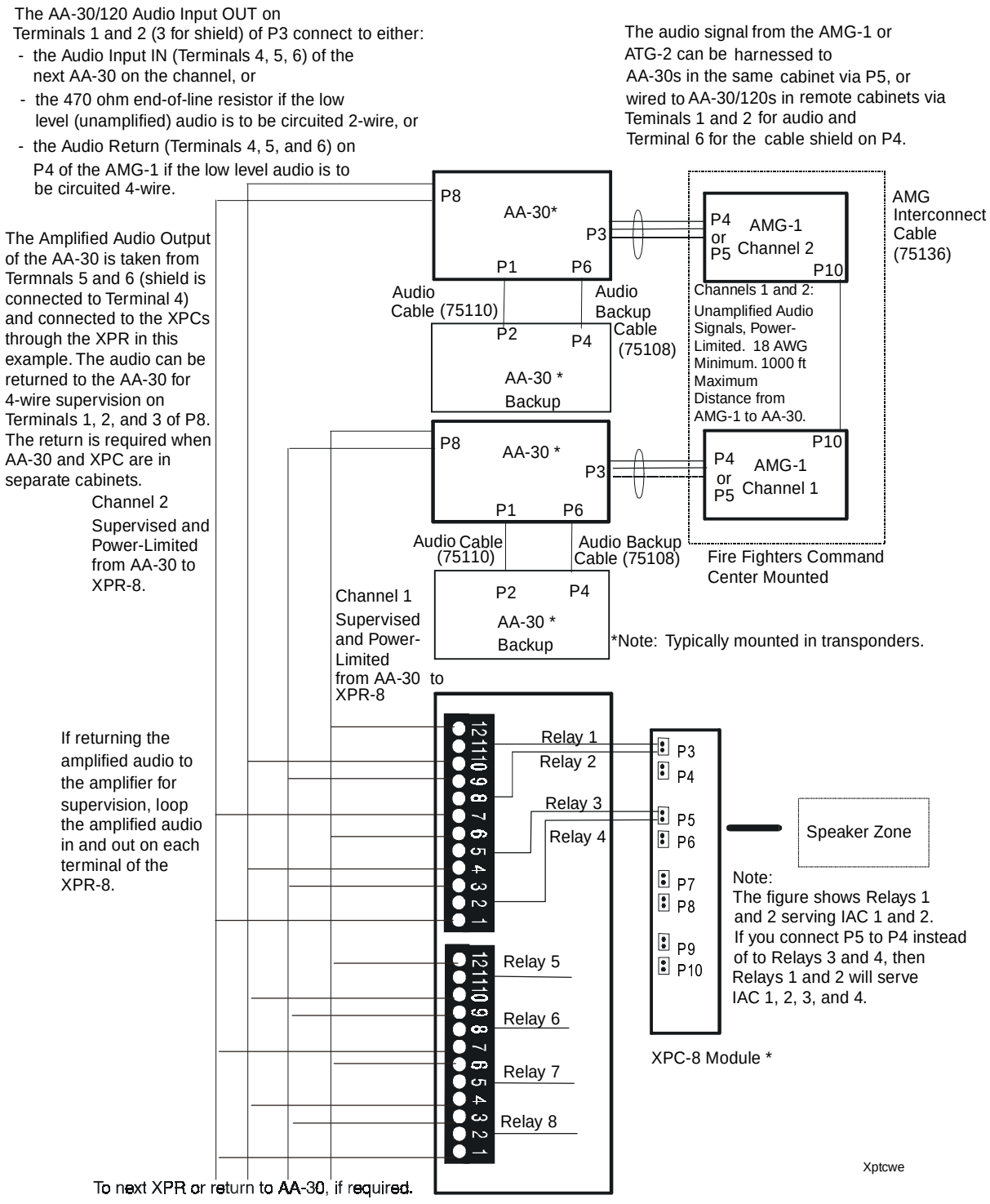


Figure 76: Typical Dual Channel Audio Evacuation (Amplified Channel Selection)