NOTIFIER®

Quad Intelligent Audio Transponder XPIQ

Manual

Document 51013
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Fire Alarm System Limitations

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

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

The Manufacturer recommends that smoke and/or heat detectors be located throughout a protected premise following the recommendations of the current edition of the National Fire Protection Association Standard 72-1999 (NFPA 72-1999), manufacturer's recommendations, State and local codes, and the recommendations contained in the Guide for Proper Use of System Smoke Detectors, which is made available at no charge to all installing dealers. A study by the Federal Emergency Management Agency (an agency of the United States government) indicated that smoke detectors may not go off in as many as 35% of all fires. While fire alarm systems are designed to provide early warning against fire, they do not guarantee warning or protection against fire. A fire alarm system may not provide timely or adequate warning, or simply may not function, for a variety of reasons:

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

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

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

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

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

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

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

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

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

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

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

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

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

The most common cause of fire alarm malfunction is inadequate maintenance. To keep the entire fire alarm system in excellent working order, ongoing maintenance is required per the manufacturer's recommendations, and UL and NFPA standards. At a minimum, the requirements of Chapter 7 of NFPA 72-1999 shall be followed. Environments with large amounts of dust, dirt or high air velocity require more frequent maintenance. A maintenance agreement should be arranged through the local manufacturer's representative. Maintenance should be scheduled monthly or as required by National and/or local fire codes and should be performed by authorized professional fire alarm installers only. Adequate written records of all inspections should be kept.

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Installation Precautions

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

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

CAUTION - System Reacceptance Test after Software Changes. To ensure proper system operation, this product must be tested in accordance with NFPA 72-1999 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 or wiring.

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

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

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

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

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

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

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

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

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

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FCC Warning

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

Canadian Requirements

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

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

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This transponder has been designed to comply with standards set forth by the following regulatory agencies:

- Underwriters Laboratories Standard UL 864
- NFPA 72 National Fire Alarm Code
- Underwriters Laboratories of Canada (ULC) ULC - S527-99 Standard for Control Units for Fire Alarm Systems

Before proceeding, the installer should be familiar with the following documents.

NFPA Standards

NFPA 72 National Fire Alarm Code

Note: Audible signal appliances used in public mode applications, are required to have minimum sound levels of 75 dBA at 10 feet (3 meters) and a maximum level of 120 dBA at the minimum hearing distance from the audible appliance.

To ensure that the appliance is clearly heard, the audible appliance sound level must be at least 15 dBA above the average ambient sound level or 5 dBA above the maximum sound level with a duration of at least 60 seconds, depending on which level is greater, with the sound level being measured 5 feet (1.5 meters) above the floor.

Underwriters Laboratories

UL 464 Audible Signaling Appliances

UL 864 Standard for Control Units for Fire Protective Signaling Systems

UL 1481 Power Supplies for Fire Protective Signaling Systems

UL 1638 Visual Signaling Appliances

UL 1711 Amplifiers for Fire Protective Signaling Systems

UL 1950 Telephone Equipment (power cross section)

UL 1971 Visual Signaling Appliances

Underwriters Laboratories of Canada (ULC)

ULC S524 Standard for the Installation of Fire Alarm Systems

Other

NEC Article 250 Grounding

NEC Article 300 Wiring Methods

NEC Article 760 Fire Protective Signaling Systems

Applicable Local and State Building Codes

Requirements of the Local Authority Having Jurisdiction (LAHJ)

SECTION 1 Product Description

The Notifier® XPIQ Quad Intelligent Audio Transponder is a simple solution for distributed multi-channel voice evacuation systems. It is an integrated, multiple channel audio amplification and distribution subsystem remotely controlled by an FACP via the SLC (Signaling Line Circuit). It can direct up to four low level audio signals from the risers to four audio amplifiers. The amplified audio signals are then directed to up to four integrated, continuously supervised speaker circuits. The XPIQ is compatible with the following control panels:

NFS-3030	AFP-400	AFP1010	NFS-640
AFC-600	AM2020	AFP-300	

Refer to the following table for XPIQ-MB and XPIQ-CA compatibility with XPIQ Audio Amplifiers.

	XPIQ-AA25	**XPIQ-AA2270**
XPIQ-MB	all revisions are compatible	XPIQ-MB revision H and higher
XPIQ-CA	all revisions are compatible	XPIQ-CA revision C and higher
Refer to Figure 1.3 on page 14 for the revision location on the XPIQ-MB, and to Figure 1.11 on page 24 for the XPIQ-CA. The revisions are handwritten on the boards.		

Table 1.1 Board Compatibility with Audio Amplifiers

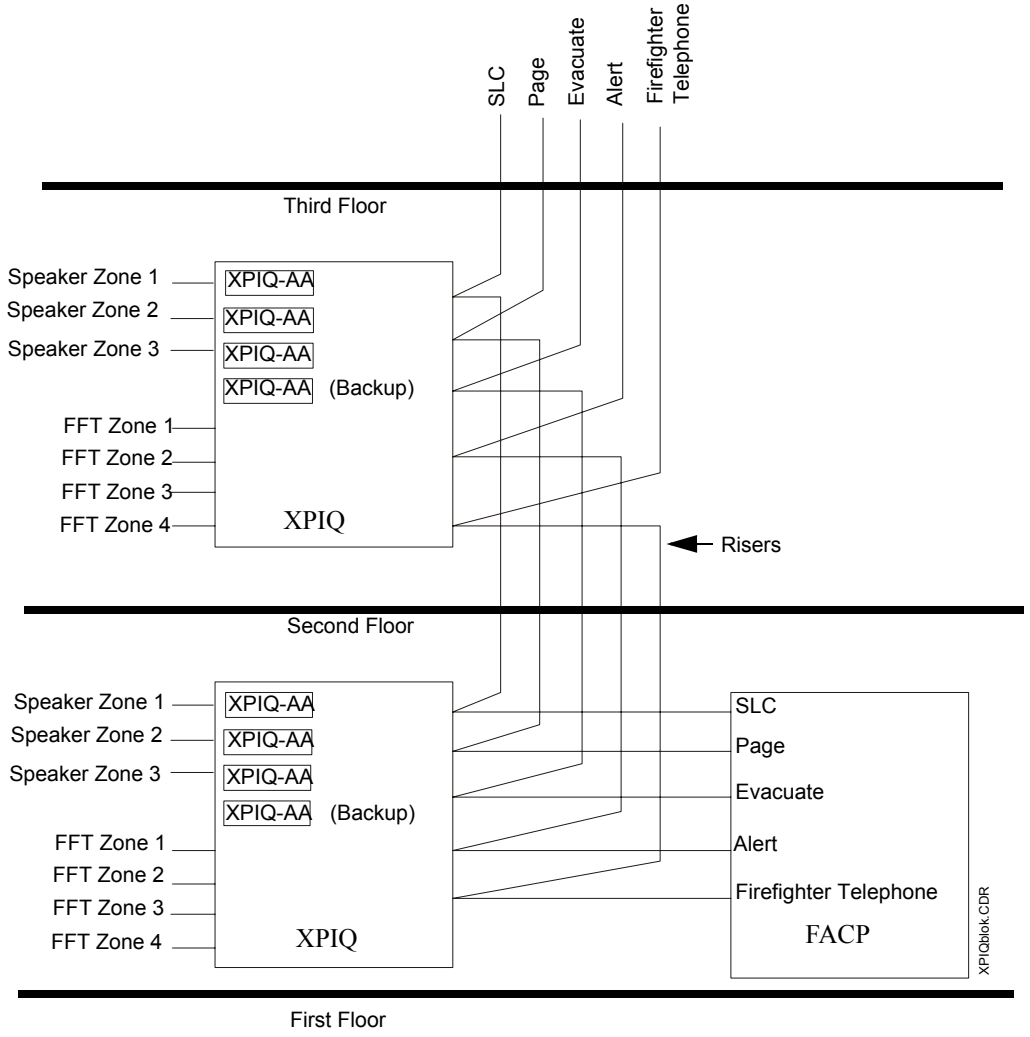


Figure 1.1 XPIQ Distributed Audio Block Diagram

1.1 Overview

Designed for flexibility, future enhancements and expansion, the XPIQ utilizes modular plug-in boards, which simplify installation and maintenance in a cost-effective manner.

The XPIQ transponder consists of the chassis mounted XPIQ-MB motherboard which provides connectors for an audio interface board, a signaling line interface board, a microphone interface board, up to four audio amplifier boards and a Class A speaker zone converter board. A power supply/battery charger, which connects via cables to the motherboard, is also part of the basic system.

The transponder, when utilizing an XPIQ-AIB1/4 Audio Interface Board, accepts low-level analog audio signals as generated by the Notifier® Audio Message Generator (AMG-1/E). The XPIQ-MB provides up to four telephone zones connected to FFT-7 Firefighter Telephones. As an alternative, these four zone circuits can be utilized as NACs (Notification Appliance Circuits) powered from a separate power supply.

The configuration of the XPIQ system is accomplished with the help of PK-XPIQ software installed on a user supplied PC. The configuration data is then downloaded to the motherboard via the serial communication port (EIA-232) and programming cable.

1.2 Equipment Inventory

Components: A single system must include the following:

- ✓ XPIQ-MB Motherboard (includes chassis)
- ✓ XPIQ-PS 120 VAC Power Supply or XPIQ-PSE 240 VAC Power Supply
- ✓ XPIQ-AA25 Audio Amplifier - 25 V_{RMS} , 25 watts, or
  XPIQ-AA2270 - 70.7 V_{RMS} , 22 watts
  (maximum of four per XPIQ Transponder).
- ✓ XPIQ-SLI Signaling Line Interface board for connection to the SLC
- ✓ CAB-3/CAB-4 Series Cabinet (CAB-A3/A4 size cabinets will support minimum system configuration)
- ✓ MP-1/MP-1B Dress Panel
- ✓ Two 12 VDC lead acid batteries

Optional Equipment:

- ✓ XPIQ-AIB1 Audio Interface Board for connection to a single audio source.
- ✓ XPIQ-AIB4 Audio Interface Board for connection to up to four audio sources
- ✓ XPIQ-RMI Remote Microphone Interface board [required for local All Call RM-1(SA)]
- ✓ RM-1 or RM-1SA with CAB-RM(R) Remote Microphone Assembly
- ✓ XPIQ-CA Class A speaker zone converter board
- ✓ CHS-PS chassis for mounting XPIQ-PS in row 1, 2, or 3 of a CAB-3/CAB-4 Series enclosure
- ✓ CHS-BH battery holder mounts to CHS-PS

Requirements for Programming the XPIQ:

- ✓ PK-XPIQ programming kit
- ✓ Laptop or desktop computer for programming must be supplied by user

Each component of the XPIQ system must be ordered separately due to the wide variety of possible XPIQ system configurations. Check carefully to make certain that all ordered parts have been

shipped when the order is received.

1.3 Specifications

1.3.1 XPIQ-PS and XPIQ-PSE Power Supplies

AC Power

120 VAC, 50/60 Hz, 3.0 amperes (XPIQ-PS)
240 VAC, 50/60 Hz, 1.5 amperes (XPIQ-PSE)

Batteries or Battery Backed-up DC Source (Secondary Source Input TB2)

Input Voltage: 24 VDC
Battery Trouble Voltage: less than or equal to 22 VDC
Maximum Current @ 20.4 VDC at full load (four 25 watt amplifiers): 9 amperes
Protection (overcurrent, reverse polarity: 15 ampere automotive minifuse)

24 Volt Lead-acid Battery Charger (TB2)

Float Charge (battery fully charged): 27.6 VDC
Maximum Charging Current: 1.4 amperes
Minimum Capacity: 12 Ah (charges in 24 hours)
Maximum Capacity: 25 Ah (charges in 48 hours)

1.3.2 XPIQ-MB Motherboard

All screw terminal blocks accept wire up to 12 AWG (3.3 mm^2)

Speaker Circuits - TB1, TB2, TB3, TB4

Power-limited output
Operation: Class B (Style Y) circuits or Class A (Style Z) with XPIQ-CA converter module
Continuous (On and Off state) field wiring supervision
Nominal (sinusoidal) output voltage: refer to amplifier specification
Nominal (sinusoidal) output power: refer to amplifier specification
Nominal ELR value for Style Y: 4.7kΩ
Minimum allowed leakage resistance of a speaker circuit (Style Y without ELR or Style Z with wiring disconnected from XPIQ-CA): 45kΩ

FFT Riser/NAC Source Input TB9

Maximum allowed FFT/NAC riser voltage: 30 VDC

FFT/NAC Circuits - TB5, TB6, TB7, TB8

Power-limited output
Operation: four Class B (Style Y) circuits or two Class A (Style Z)
Nominal ELR value for Style Y: 47kΩ
Maximum voltage drop @ 2A on NAC output = 0.5VDC
NAC Output Current: 2 amperes
Nominal FFT Handset DC Resistance: 1.2kΩ
Minimum allowed leakage resistance of an FFT/NAC zone (Style Y without ELR or Style Z with return wiring disconnected):150kΩ

Background Music Input TB11

Input Voltage Level: 1 Vp (peak voltage)
Input Impedance: 75kΩ

1.3.3 XPIQ-SLI Signaling Line Interface

All screw terminal blocks accept wire up to 12 AWG (3.3 mm^2).
Compatible with CLIP and FlashScan protocols
Average SLC current: 1.0 mA
SLC isolation: 500 VDC, limited by transient protection components to 40 VDC
Normally Open local trouble relay TB11 contact rating: 2 amperes @ 32 VDC (resistive)
Maximum length of local SLC loop wiring: 2,000 feet (600 m)
Maximum resistance of the local SLC (from any device to FACP): 50Ω
Maximum resistance of the local SLC (from any device to XPIQ-SLI): 20Ω (Maximum number of detectors and modules = 64)
Maximum SLC local branch current degraded mode: 20Ω (See "Current Draw Tables for Devices on the Local SLC Branch" in Section 2.5.3)

1.3.4 XPIQ-AIB4/AIB1 Audio Input Board (4 channel/1 channel)

All screw terminal blocks accept wire up to 12 AWG (3.3 mm^2)
Nominal Input Voltage: 3.5 Vp (peak voltage)

1.3.5 XPIQ Audio Amplifiers

	XPIQ-AA25	**XPIQ-AA2270**
Built-in short circuit and thermal shutdown protection	✓	✓
Nominal (sinusoidal) output voltage	25 V_{RMS}	70.7V_{RMS}
Nominal (sinusoidal) output power	25 W	22 W
Nominal (sinusoidal) output current	1 ampere	310 mA

1.3.6 XPIQ-RMI Remote Microphone Interface

All screw terminal blocks accept wire up to 12 AWG (3.3 mm^2)
Supply output voltage for RM-1(SA) TB2-1 (+24V), TB2-2 (common): 19- 28 VDC
Nominal audio level: 2.5 V_{RMS}

1.3.7 Entire Audio Path Characteristics

Complies with

- UL requirements - Frequency response: 450 Hz - 3.8 kHz
- ULC requirements - Frequency response: 400 Hz - 4 kHz

1.4 Indicators

LEDs Located on XPIQ-MB Motherboard

- General Trouble - yellow LED turns on for system trouble
- AC Fail - yellow LED turns on when AC is lost (all other nonessential LEDs will turn off to conserve batteries)
- Battery Trouble - yellow LED turns on for low or no battery voltage
- Charger Trouble - yellow LED turns on for charger failure
- FFT/NAC Riser Trouble - yellow LED turns on for FFT riser loss
- Telephone Trouble (Circuits 1 - 4) - yellow LED for each circuit turns on for wiring trouble
- Speaker Trouble (Circuits 1 - 4) - yellow LED for each circuit turns on for wiring trouble
- Speaker Zone On (Circuits 1 - 4) - one green LED for each circuit turns on when active
- Earth Fault - yellow LED turns on for ground fault condition

LEDs Located on XPIQ-PS Power Supply

- ON LINE - green LED turns on to indicate that AC power is applied
- BOOST ON - green LED turns on during battery tests and when amplifiers are used during AC failure

LEDs Located on XPIQ-SLI Signaling Line Interface Board

- On Line LED - green LED turns on to indicate SLC communication presence
- Trouble/Test LED - yellow LED turns on steady for SLC communication trouble
- 7-Segment LED - displays the range of addresses programmed on the XPIQ-MB

LEDs Located on XPIQ Audio Amplifiers

- Trouble LED - yellow LED indicates:
  - ✓ steady on - short (overcurrent)
  - ✓ blinking - gain test failed
- Status LED - green LED indicates if amplifier is primary (on steady) or backup (blinking)

LEDs Located on XPIQ-AIB1/4 Audio Input Board

- Channel 1 through 4 Trouble - one yellow LED for each channel turns on for channel signal loss trouble
- Channel 1 through 4 On - one green LED for each channel turns on to indicate channel condition (steady On indicates channel is ready, Blinking indicates channel is active)

1.5 Controls and Switches

Controls and Switches Located on XPIQ-MB Motherboard

- SW1 Earth Fault Detection - enables or disables the detection of a ground fault
- SW2 Phone Circuits 1 & 2 Wiring Selection - select 2W for two wire Class B (Style Y) or 4W for four wire Class A (Style Z) circuit wiring
- SW3 Phone Circuits 3 & 4 Wiring Selection - select 2W for two wire Class B (Style Y) or 4W for four wire Class A (Style Z) circuit wiring
- SW4 Background Music Volume Control
- Jumpers JP1 & JP2 - used to enable or disable software upgrade for the XPIQ-MB

Controls and Switches Located on XPIQ-SLI Signaling Line Interface Board

- SW1 Rotary Switch - used to set ones digit of starting address on the SLC
- SW3 Rotary Switch - used to set tens/hundreds digit of starting address on the SLC
- SW2 Push-button Switch - used to verify addresses on the XPIQ
- Jumpers JP1 & JP2 - used to enable or disable downloading programming to the XPIQ-SLI

1.6 Basic Components

1.6.1 XPIQ-MB Motherboard

The XPIQ-MB Motherboard is mounted in the backbox with the orientation shown in Figure 1.2 (refer to "Backbox Installation" on page 26 for mounting information).

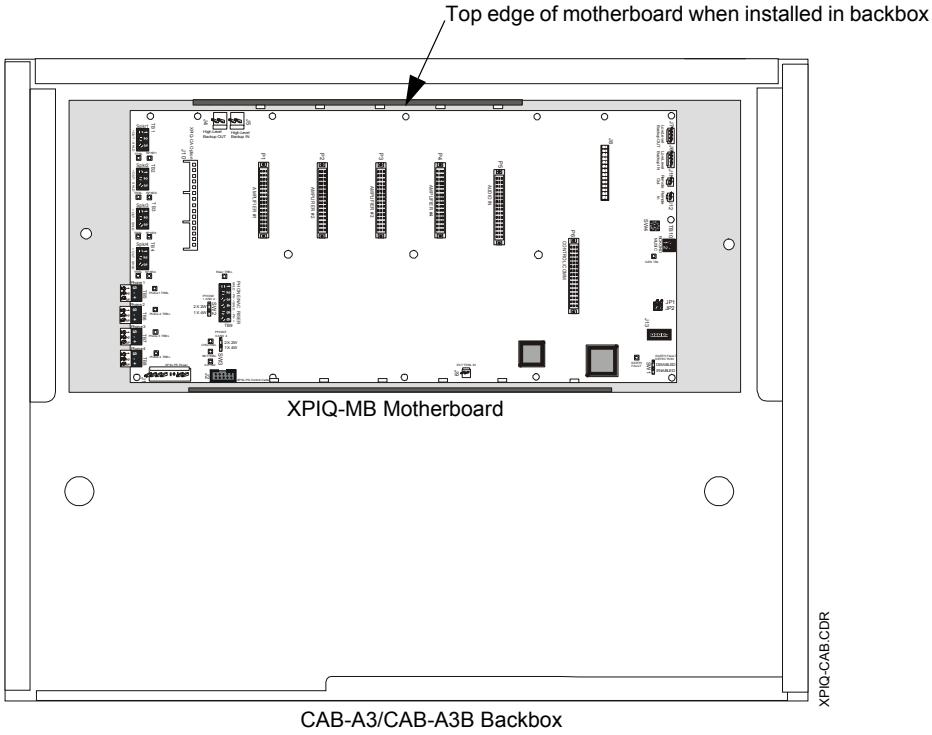


Figure 1.2 XPIQ-MB Orientation in Backbox

The XPIQ-MB Motherboard contains a microcontroller, memory, two tone generators, connectors for option boards and pluggable terminal blocks for field wiring. Standard and optional boards are mounted to connectors on the motherboard providing easy maintenance and system expansion.

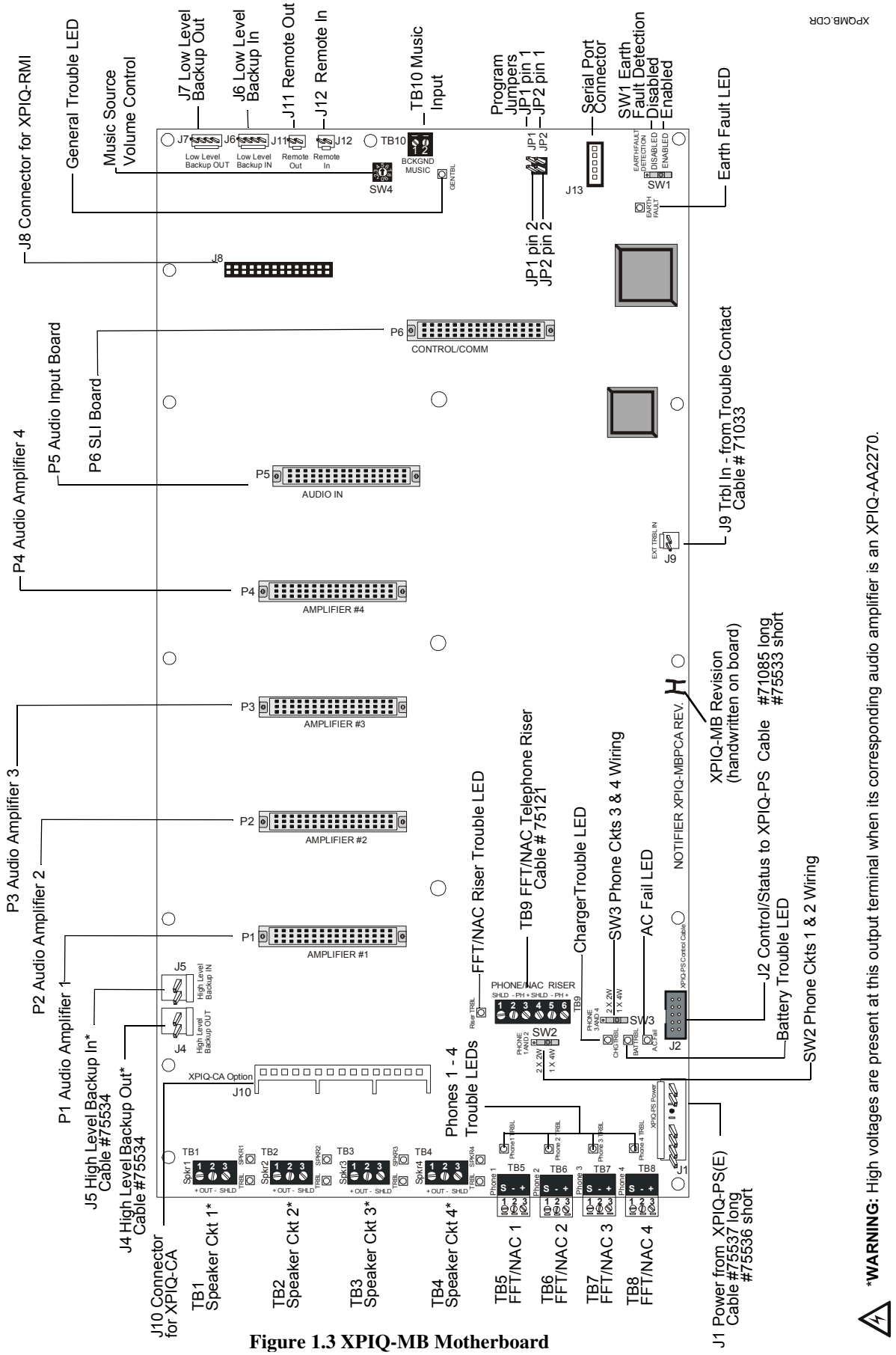


Figure 1.3 XPIQ-MB Motherboard

XPIQ-MB Features

- Four Class B speaker circuits which are continuously supervised in On and Off state
- XPIQ-CA Class A option board for conversion of four Class B speaker circuits to four Class A speaker circuits
- Accepts four audio riser channels from XPIQ-AIB4 option board
- Four amplifier slots
- Continuously supervised amplifiers
- All-call local page capability with optional RM-1(SA) remote microphone and XPIQ-RMI
- Two independent user configurable tone generators either for riser backup or as a main tone source
- Supports routing of all-call page from single remote microphone to other XPIQ-MBs in the same cabinet
- Supports a variety of backup configurations
  - ✓ 1 to 1 backup
  - ✓ 2 to 1 backup
  - ✓ 3 to 1 backup
  - ✓ 2 to 2 backup
  - ✓ 1 to 1 external backup (backup amplifier in another XPIQ)
  - ✓ 2 to 1 external backup (backup amplifier in another XPIQ)
  - ✓ 3 to 1 external backup (backup amplifier in another XPIQ)
  - ✓ 4 to 1 external backup (backup amplifier in another XPIQ)

  Note: Refer to "XPIQ Audio Amplifier Installation" on page 38 for rules that apply when using more than one type of audio amplifier.
- Supports backup amplifier sharing between two or more XPIQs within the same cabinet
- Four Class B or two Class A firefighter telephone zones capable of distinguishing open, short and off-hook states
- Busy tone on firefighter telephone circuits
- Supervised firefighter telephone riser input with in and out terminals
- Alternate use of firefighter telephone circuits as four Class B or two Class A NACs, each rated at 2A, 24 VDC
- XPIQ-PS(E) power supply control/supervision that includes AC, battery and charger monitoring
- AC trouble delay option (none, 8 or 16 hour delay)
- Ground fault detection
- Serial port for configuration download from PC
- Easy software upgrading accomplished by downloading from PC via serial port
- Nonvolatile memory for storing configuration data
- Pluggable terminal blocks for field wiring
- Background music input terminal block
- Ten position background music volume control switch
- Accessory trouble input

1.6.2 XPIQ-PS(E) Power Supply

The XPIQ-PS(E) Power Supply provides power to the XPIQ-MB motherboard via the power cable connected to J1 on the motherboard and J1 on the power supply. The XPIQ-MB controls and monitors the power supply through the supervision cable connected to J2 on the motherboard and J2 on the power supply. The primary source of power is from a dedicated fire alarm AC branch circuit, either 120 VAC @ 3.0A (XPIQ-PS) or 240 VAC @ 1.5A (XPIQ-PSE) with a frequency of 50-60 Hz. Make certain that the AC terminal block cover is installed after connections are made to prevent accidental shock.

WARNING! *Do not apply 240 VAC primary power to the XPIQ-PS since damage to the power supply will result.*

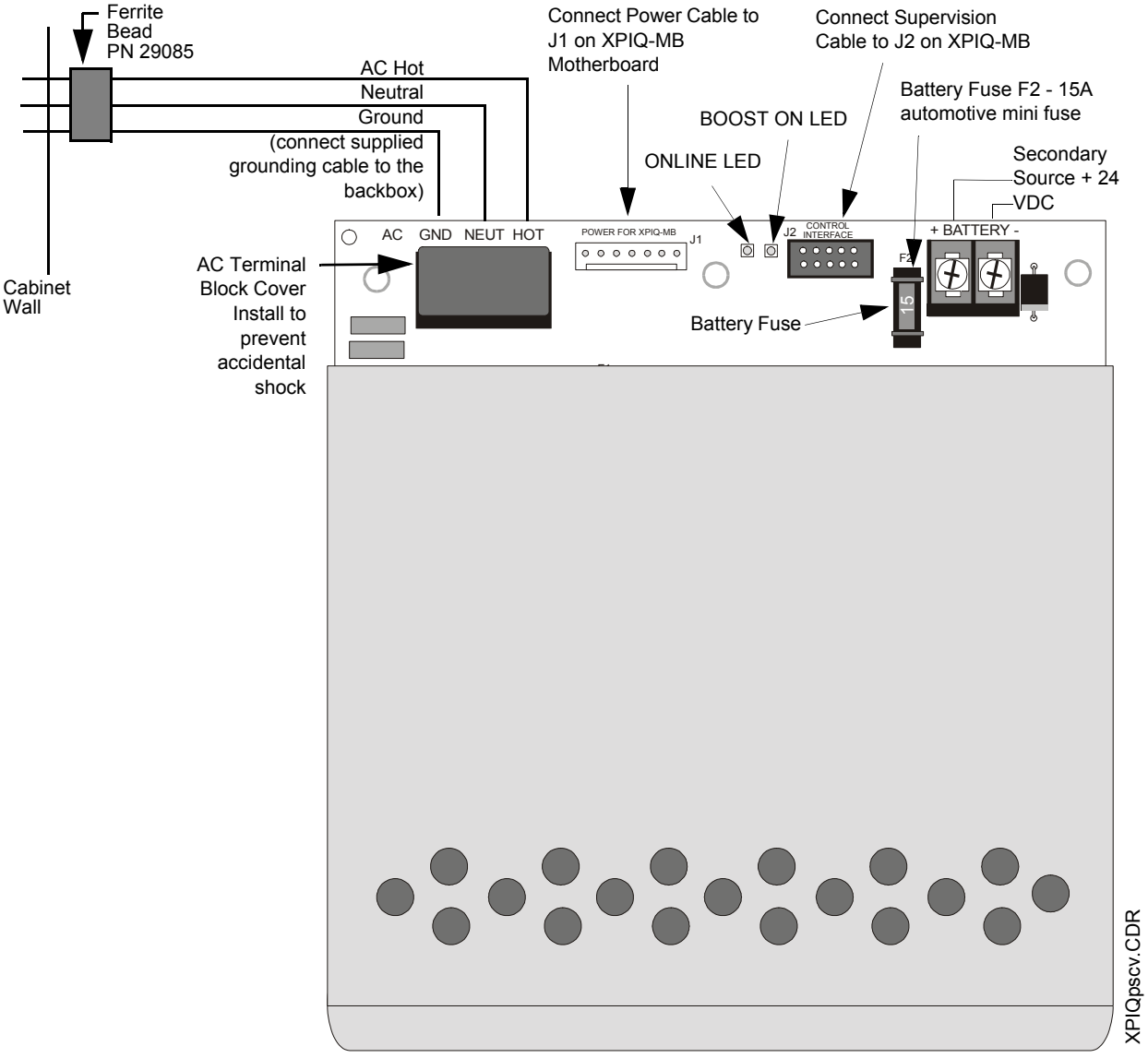


Figure 1.4 XPIQ-PS(E) Power Supply

XPIQ-PS(E) Features

- XPIQ-PS 120 VAC or XPIQ-PSE 240 VAC
- Secondary power source reverse polarity protection
- Lead-acid battery charger from 12 Ah to 25 Ah (two 12 VDC batteries)
- Charger current and battery voltage monitor
- Low battery and no battery detection

XPIQ-PS(E) LEDs

The green ON-LINE LED is normally on with AC power applied. Upon AC power fail, the LED will turn off. The green Boost LED is normally off when the amplifiers are in standby (not active). When an alarm condition occurs, the amplifiers will activate and the Boost LED will turn on.

Secondary Power Source

The XPIQ-PS(E) includes a charger designed for 24 VDC lead-acid, gel cell batteries (set of two 12 VDC batteries), with a capacity range of between 12 Ah and 25 Ah (ampere-hour). The secondary source of power may be either a dedicated battery or battery backed-up external source of 24 VDC. Care must be taken when wiring an external secondary source. Use appropriate wire gauge with low enough resistance to ensure that the minimum voltage on the XPIQ-PS(E) battery terminals, with 10 amperes peak current, is no less than 20 volts. Use separate conduit for nonpower-limited wiring.

When connecting a secondary source, it is important that primary (AC) power be applied first. After applying AC power, wait until the green AC Power LED turns on before connecting the secondary power source. This may take up to ten seconds.

CHS-PS Power Supply Chassis

The optional CHS-PS power supply chassis allows installation of the XPIQ-PS(E) power supply in the upper tiers of the cabinet.

CHS-BH Battery Holder

The CHS-BH battery holder attaches to the CHS-PS. It can hold two 12 V, 12 Ah batteries.

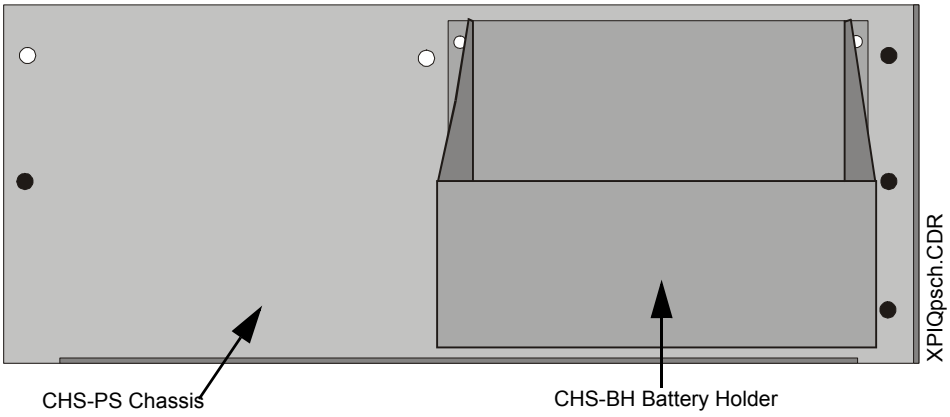


Figure 1.5 CHS-PS Chassis with CHS-BH

Note that the newer version dress panel (P/N: DP-1B, which is offset) must be used when the CHS-BH battery holder is installed to the CHS-PS chassis.

1.6.3 XPIQ-AA25 and XPIQ-AA2270 Audio Amplifiers

XPIQ Audio Amplifiers are used to amplify a low-level audio signal which is routed to the amplifier by the XPIQ-MB motherboard. The amplifiers mount to the motherboard connectors P1, P2, P3 and P4. One fully supervised and power-limited speaker circuit is available on the motherboard for each audio amplifier. One amplifier can be programmed as a backup to multiple primary amplifiers or programming can specify one backup amplifier for each primary amplifier.

An XPIQ audio amplifier must be backed up by an XPIQ audio amplifier of the same type. For example, an XPIQ-AA2270 must back up an XPIQ-AA2270.

XPIQ-Audio Amplifier Features

- Built-in supply voltage electronic circuit breaker (self-restoring)
- Output short circuit protection
- Thermal overload protection
- Green Status LED turns on steady to indicate normal amplifier operation. It will blink on a backup amplifier indicating normal operation
- Yellow Trouble LED will turn on steady in case of overcurrent (short) condition and will blink when the amplifier fails the gain test.

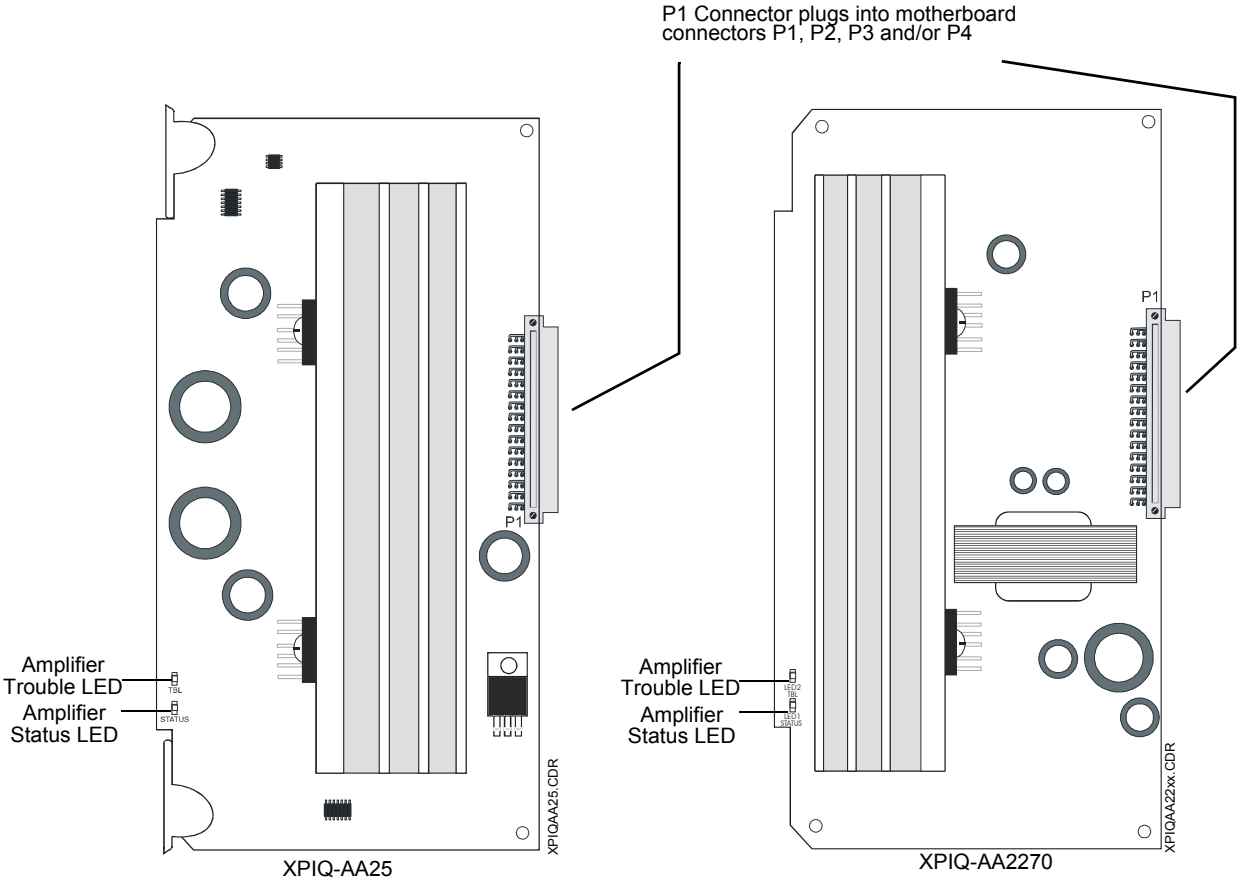


Figure 1.6 XPIQ Audio Amplifiers

1.6.4 XPIQ-SLI Signaling Line Interface Board

The XPIQ-SLI board provides data communication interface between the XPIQ-MB and the SLC (Signaling Line Circuit) of an FACP (Fire Alarm Control Panel). This board acts as a collection of control modules and is designed to use either CLIP protocol or the FlashScan protocol. The number of addresses utilized by the XPIQ-SLI depends on the number of channels, speaker zones, telephone zones and other options selected during configuration by the installer. Two rotary switches are used to set the starting address of the board. A seven-segment display is used to indicate the address range used, when the address verification push-button (SW2) is pressed. The routing of the audio channels to speaker zones is implemented by activating SLC output points in a matrix programmed in the XPIQ. The rows of this matrix represent audio input channels and the columns of this matrix represent speaker circuits. Refer to Table 2.4 through Table 2.19.

The XPIQ-SLI can be wired to the SLC in Style 4, 6 or 7. When configured for Style 4 wiring, the XPIQ-SLI can be utilized to take advantage of the unique degraded mode operation that takes place when SLC communication with the FACP is lost. When in degraded mode, the XPIQ-SLI monitors specific FlashScan detectors/monitor modules and automatically activates the evacuation signal on all speaker zones when an alarm state is detected. Separate alarm contacts on TB3 can be used as an alternate way of communicating a local alarm condition during degraded mode back to the FACP. (See TB3 inset in the figure below.)

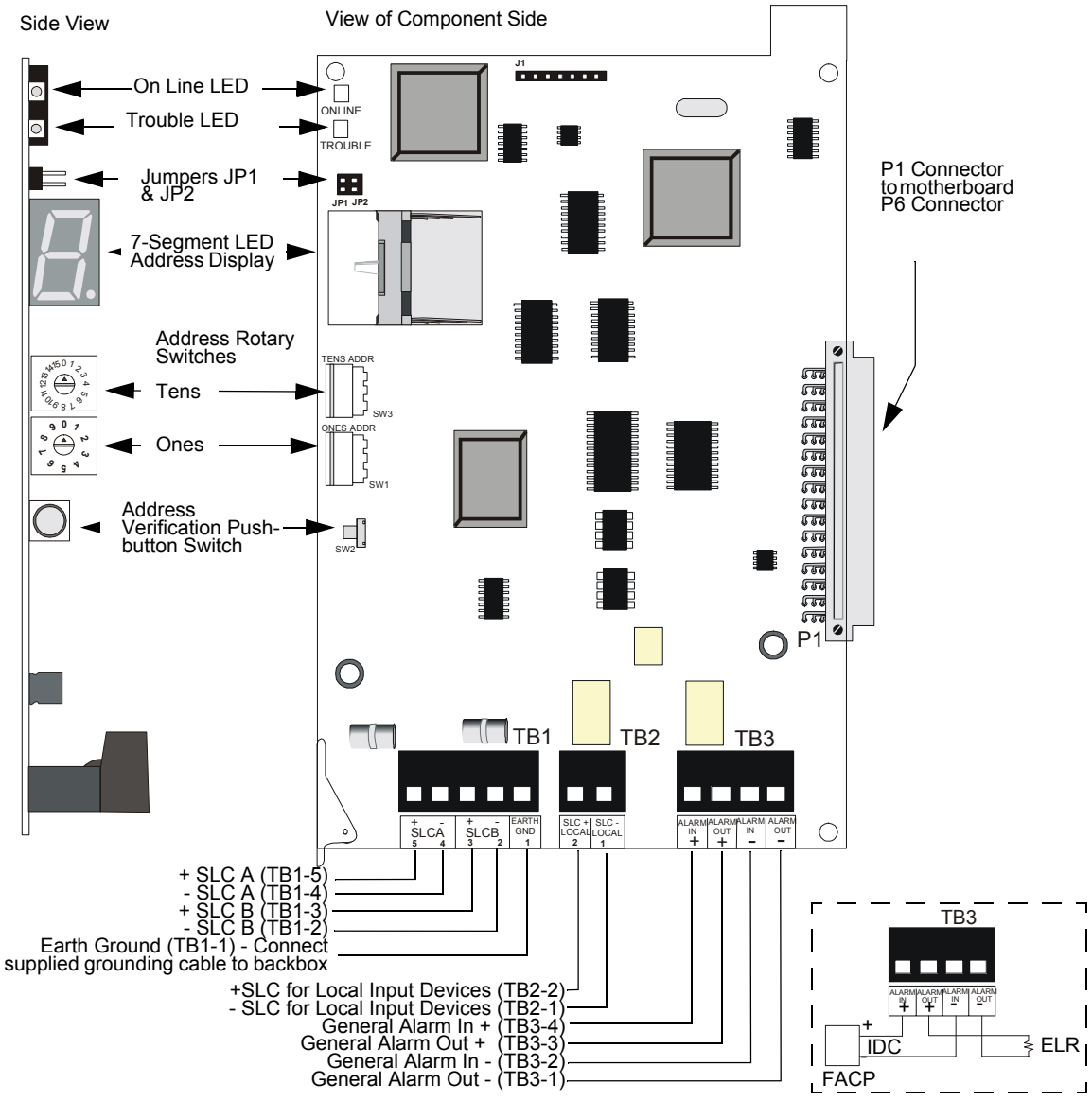


Figure 1.7 XPIQ-SLI Signaling Line Interface

XPIQ-SLI Features

- Terminal blocks for SLC In and Through connections and for direct connection to detectors
- Rotary switches to set starting addresses
- Seven-segment LED display for displaying addresses
- Address Verification push-button
- Local alarm (degraded mode) operation in the event of SLC communication failure
- Green LED indicates On Line status
- Yellow LED indicates trouble
- Software upgrade from PC via serial port on XPIQ-MB

1.7 Optional Modules

1.7.1 XPIQ-AIB4 and XPIQ-AIB1

The XPIQ-AIB4 is a four-channel audio input board that receives and processes four low-level audio signals for the XPIQ system. The XPIQ-AIB1 is a single channel audio input board that receives and processes a single low-level audio signal. The boards accept low-level analog signals generated by the AMG-1, AMG-E, or RM-1/RM-1SA. Each channel monitors incoming audio signal levels and detects the presence of a supervisory tone. Each channel has one green On LED indicating channel activity (steady = ready, blinking = active) and one yellow Trouble LED. Plug-in terminal blocks, designed for ease of installation, accept up to 12 AWG (3.3 mm^2) wire.

Each channel has a priority if more than one channel is active at one time.

- Channel 1 - Highest Priority, should be connected to a paging circuit
- Channel 2 - 2nd Priority, should be connected to an evacuation signal source
- Channel 3 - 3rd Priority, should be connected to an Alert audio source
- Channel 4 - Lowest Priority

The XPIQ-AIB audio input board is required when there is an external low-level audio riser signal input. It is not required for nonvoice system operation in which the motherboard generates tones.

XPIQ-AIB1/4 Features

- Pluggable six position input terminal block(s) accepting up to 12 gauge wire
- Input signal loss detector (one per channel)
- Automatic gain control with noise gate (one per channel)
- Supervision signal detection (one per channel)
- Channel status LEDs:
  - ✓ On Line green LED
  - ✓ Trouble (signal loss) yellow LED

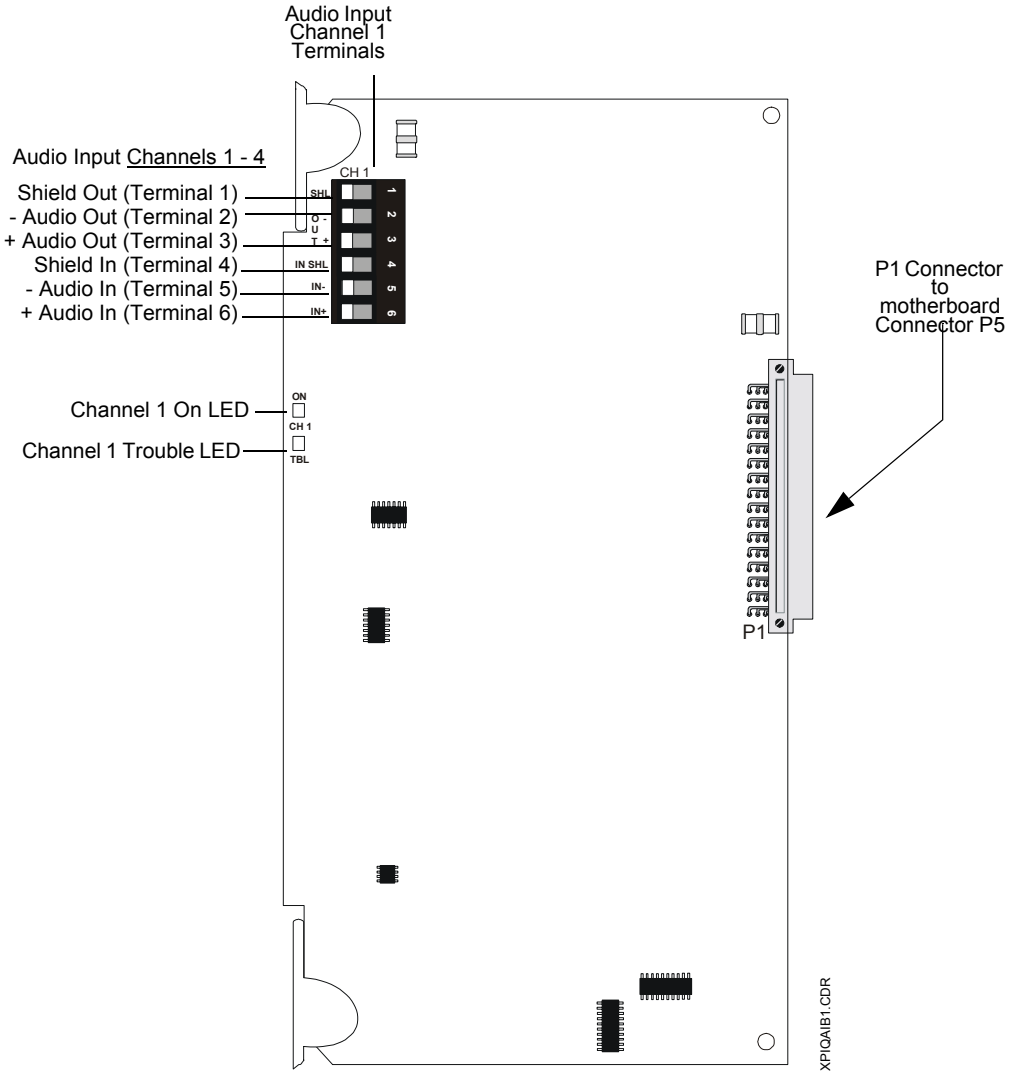


Figure 1.8 XPIQ-AIB1 Audio Input Board

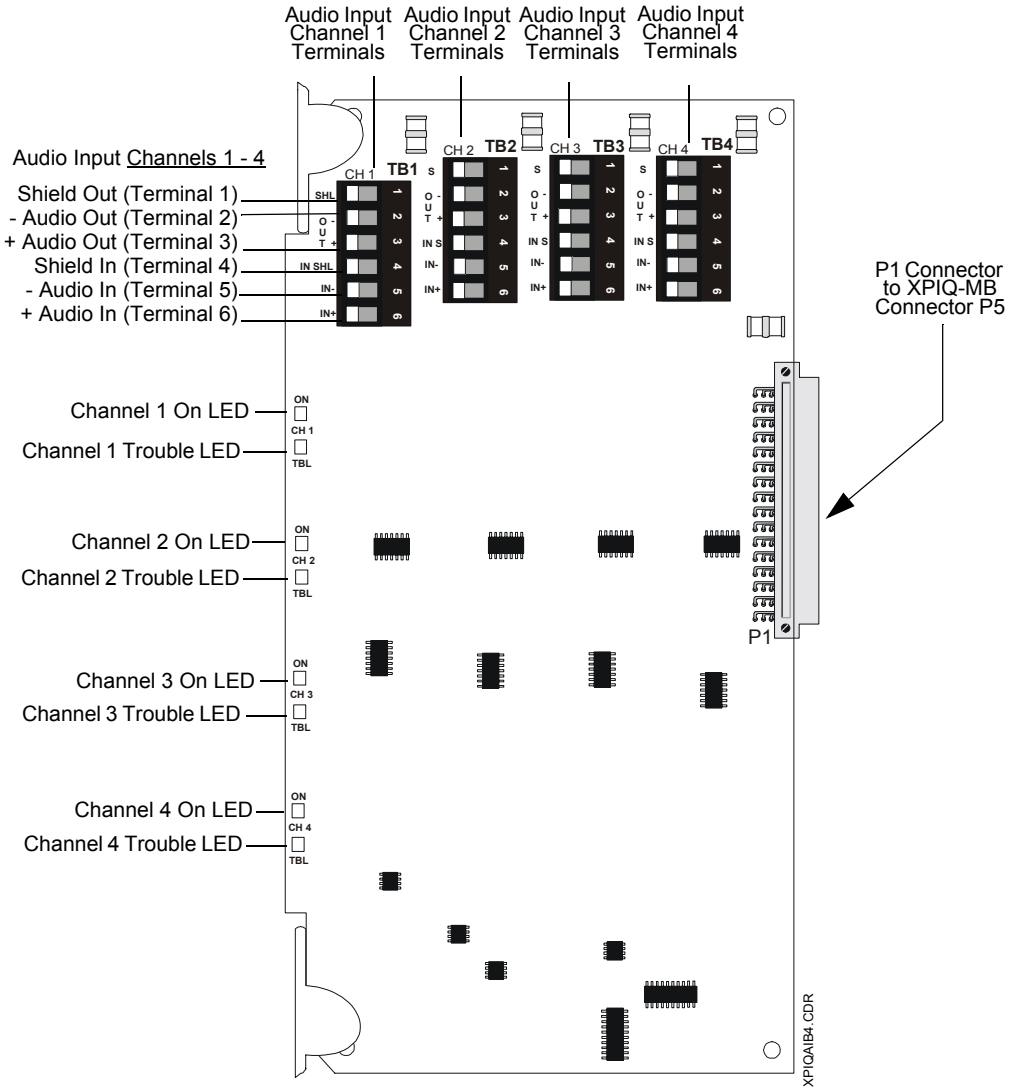


Figure 1.9 XPIQ-AIB4 Audio Input Board

1.7.2 XPIQ-RMI Remote Microphone Interface Board

The optional XPIQ-RMI board, which plugs into connector J8 on the XPIQ-MB motherboard, provides a connection for the RM-1 or RM-1SA remote microphone assemblies. The XPIQ-RMI is required only if the remote microphone is installed.

The remote microphone can be placed at a maximum distance of 1,000 feet (300 m) from the XPIQ-RMI. A minimum of two pairs of twisted, shielded wires are required to provide power to and receive low level audio from the remote microphone assembly.

- TB2 Terminal 1: +24 VDC power to microphone
- TB2 Terminal 2: DC common power return from microphone
- TB1 Terminal 1: + audio input from microphone
- TB1 Terminal 2: - audio input from microphone
- TB1 Terminal 3: shield drain wire of microphone cable

All circuits and wiring are supervised and plug-in terminal blocks are provided for ease of installation and trouble shooting. The R-47K resistor is included and must be installed when connecting the RM-1 microphone assembly. In order for the RM-1(SA) to function correctly, it must receive power from the XPIQ-RMI terminals TB2-1 & TB2-2.

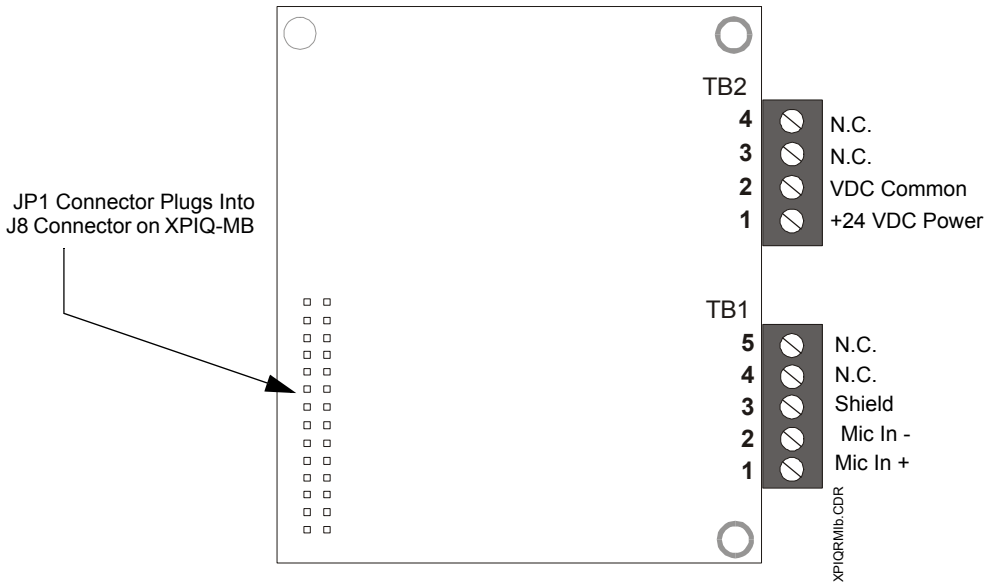


Figure 1.10 XPIQ-RMI Remote Microphone Interface Board

XPIQ-RMI Features

- Power supply connections for remote microphone
- Sense circuit for push-to-talk (activation switch on the microphone)
- Low level audio input from remote microphone
- Wiring supervision
- Removable terminal blocks

1.7.3 XPIQ-CA Class A Converter Board

An optional Class A Converter Board can be plugged into connector J10 of the XPIQ-MB. This module allows the conversion of the four Style Y (Class B) speaker circuits to four Style Z (Class A) speaker circuits.

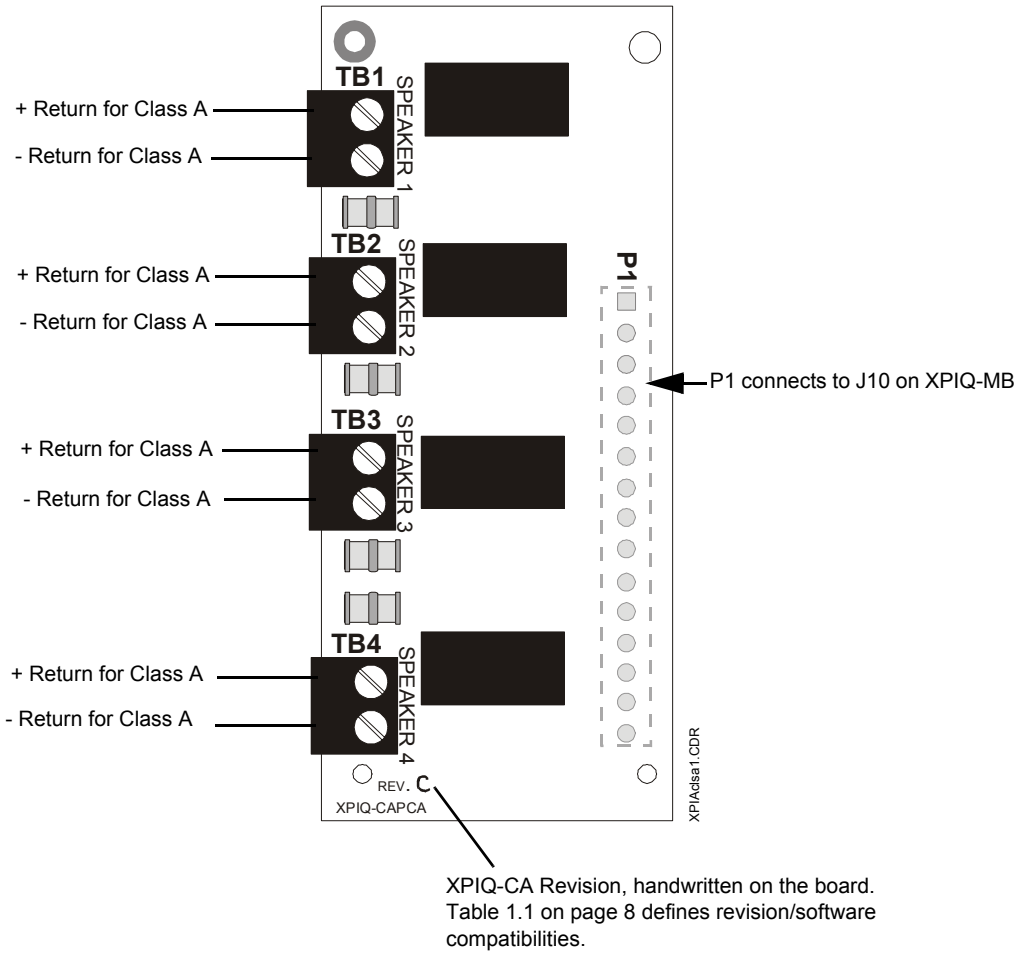


Figure 1.11 XPIQ-CA Class A Converter Module

XPIQ-CA Features

- Removable terminal blocks
- Connector to XPIQ-MB

1.8 Related Documentation

The documentation listed in Table 1.2 provides information related to the XPIQ.

Title	Number	Title	Number
NFS-3030	51330 51344 51345	Annunciator Control System	15842
NFS-640	51332 51333 51334	Automatic Fire Alarm Warden Station Series Product Installation Drawing	50705
AM2020/AFP1010 Fire Alarm Control Panel	15088	Notifier Device Compatibility Document	15378
Canadian Requirements for the AM2020/AFP1010	15631	The UDACT Universal Digital Alarm Communicator/Transmitter	50050
Analog Fire Panel (AFP-300/AFP-400)	50253 50259 50260	FCPS-24/FCPS-24E Field Charger/ Power Supply Installation, Operation and Application Manual	50059
AFC-600	51031 51032 51033	APS-6R Auxiliary Power Supply	50702
Voice Alarm Multiplex	15889 51252	ACPS-2406 Addressable Charger/Power Supply	51304
RM-1SA Series Remote Microphones	51138	CHG-120 Battery Charger	50641
ACT-2	51118	CAB-3/CAB-4 Cabinet Series Product Installation Drawing	15330

The Documentation Chart (DOC-NOT) lists the current revision of the above manuals.

Table 1.2 Related Documentation

SECTION 2 Installation

2.1 CAB-3/CAB-4 Series Mounting Options

The XPIQ can be mounted in an existing CAB-3/CAB-4 Series cabinet if sufficient room is available, or in a separate backbox. The CAB-3/CAB-4 Series cabinet may be surface or semi-flush mounted. A compatible trim ring can be used when the cabinet is semi-flush mounted. Note that for Canadian installations, when an XPIQ is not mounted adjacent to the FACP, it must be placed in a CAB-3/CAB-4 Series enclosure using a door that has a window. Otherwise, it may be placed in a CAB-3/CAB-4 Series enclosure using a blank door assembly.

Carefully unpack the system and check for shipping damage. Mount the cabinet in a clean, dry, vibration-free area where extreme temperatures are not encountered. The area should be readily accessible with sufficient room to easily install and maintain the panel. Locate the top of the cabinet approximately five feet above the floor. Determine the number of conductors required for the boards to be installed. Sufficient knockouts are provided for wiring convenience. Select the appropriate knockout(s) and pull the required conductors into the box. Note that there are no knockouts on the back of the cabinet. All wiring should be in accordance with the National and/or Local codes for fire alarm systems.

2.2 Backbox Installation

Backbox installation is accomplished by using the following procedures:

- ✓ Mark and predrill holes for the top two backbox mounting bolts using the dimensions shown in Figure 2.1. The top of the backbox should be approximately five feet above the floor
- ✓ Install two upper fasteners in the wall with the screw heads protruding
- ✓ Using the upper keyholes, mount the backbox over the two screws
- ✓ Mark and drill the lower two holes
- ✓ Install the remaining fasteners and tighten all fasteners to complete backbox mounting
- ✓ Install the door as described in the CAB-3/CAB-4 Product Installation Drawing. It is advisable to install the door hinges and alignment tabs before installing the XPIQ-MB motherboard and other boards since space is limited once the modules are installed
- ✓ After the area is clean and free of construction debris, install the XPIQ-MB into the cabinet

The CAB-A3 is the cabinet required for a minimum system configuration. The CAB-A3B is the same cabinet with a blank metal door. For information on other CAB-3/CAB-4 or CAB-3B/ CAB-4B Series cabinets, refer to the appropriate Notifier documentation.

Draw wires through the respective knockout locations.

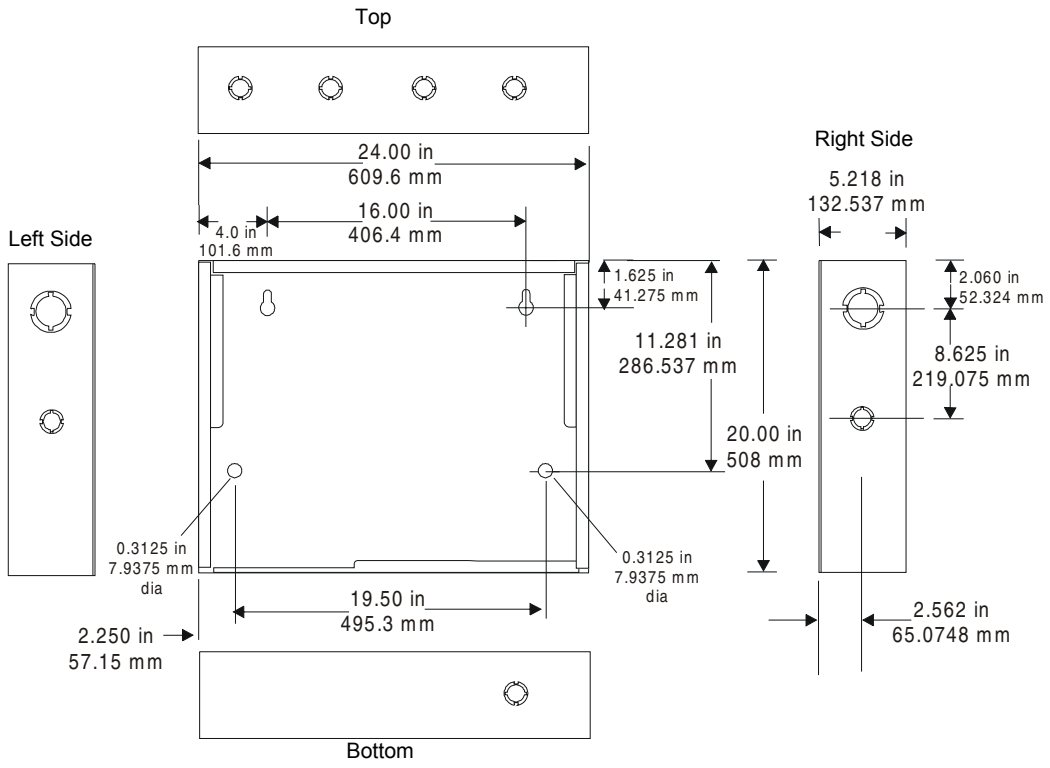


Figure 2.1 CAB-A3/CAB-A3B Dimensions & Knockout Locations

2.3 XPIQ in CAB-3/CAB-4 Series Cabinet

The XPIQ can be installed in the cabinet of an existing FACP or in a separate dedicated cabinet. Various installation configurations are possible. Examples of a few variations are illustrated in the following figure.

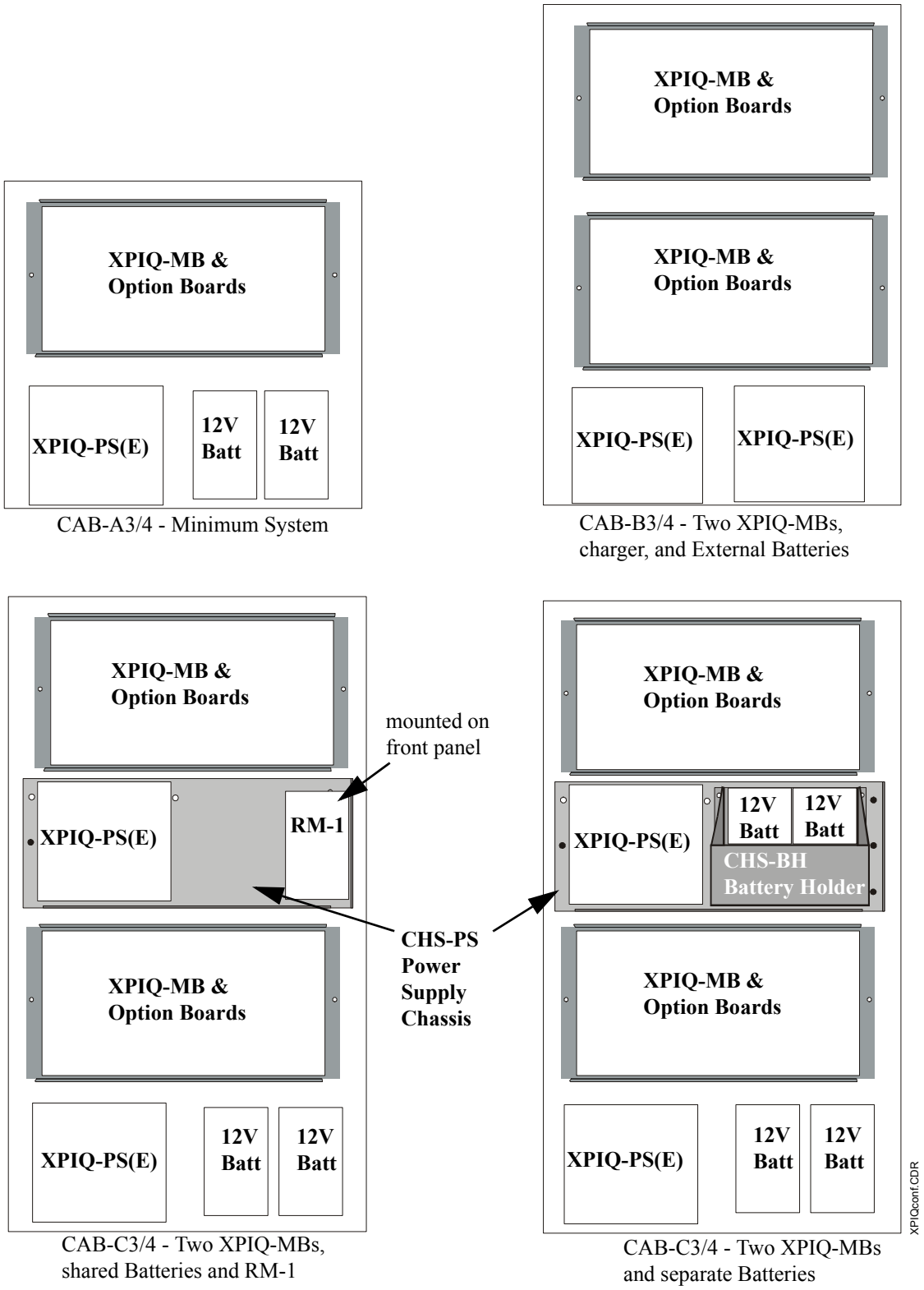


Figure 2.2 XPIQ Placement in CAB-3/CAB-4 Series Cabinet

2.4 Operating Power

WARNING! *Several different sources of power can be connected to the XPIQ. Disconnect all sources of power before servicing. The XPIQ and associated equipment may be damaged by removing and/or inserting cards or cables while the unit is energized.*

2.4.1 XPIQ-PS(E) Power Supply/Battery Charger

AC power connections are made to the XPIQ-PS(E) Power Supply/Battery Charger. Primary power source for the XPIQ-PS is 120 VAC, 50/60 Hz, 3.5A or for the XPIQ-PSE 240 VAC, 50/60 Hz, 1.75A. Run a pair of wires with a ground conductor from the protected premises main circuit breaker box to the XPIQ-PS(E). As per National Electric Code, use 14 AWG (1.6 mm O.D.) or heavier gauge wire with 600 volt insulation. No other equipment may be connected to this circuit. In addition, this circuit must be provided with overcurrent protection and may not contain any power disconnect devices. A separate Earth Ground connection must be made to ensure proper panel operation and lightning and transient protection. Do not rely on conduit for the Earth Ground connection since this does not provide reliable protection. Use a ferrite bead, PN 29085, on AC power wiring entering the cabinet.

WARNING! *Do not attempt to apply 240 VAC primary power to the XPIQ-PS since damage to the power supply will result.*

2.4.2 Secondary Power Source

Observe polarity when connecting the battery or battery backed 24 VDC power supply. Connect the secondary power source cable to the XPIQ-PS(E). The battery charger is current-limited and capable of recharging sealed lead acid type batteries. Refer to "Power Supply Calculations" on page 70, for calculations of the correct battery rating.

WARNING! *Batteries contain sulfuric acid which can cause severe burns to the skin and eyes and can destroy fabrics. If contact is made with sulfuric acid, immediately flush the skin or eyes with water for 15 minutes and seek immediate medical attention.*

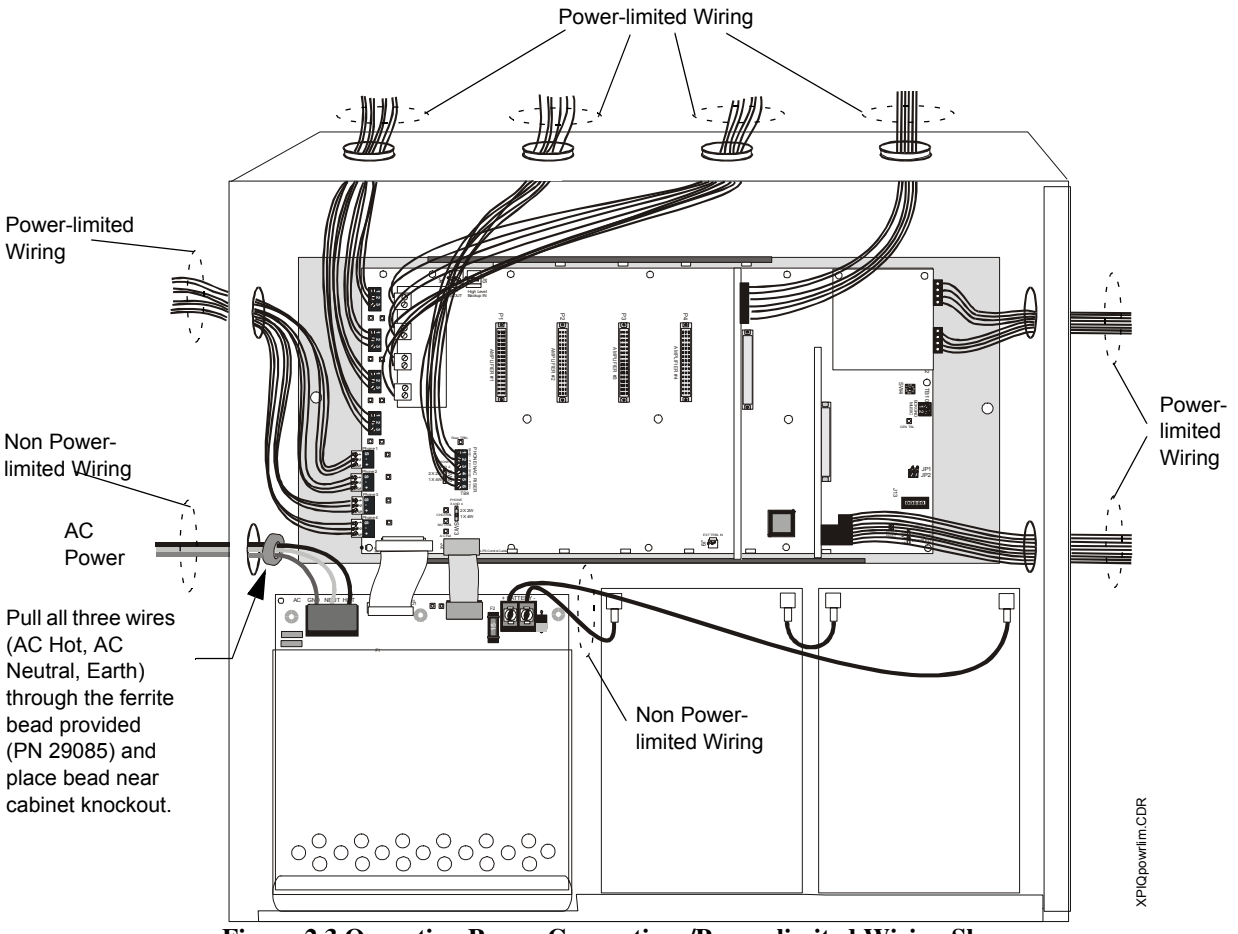


Figure 2.3 Operating Power Connections/Power-limited Wiring Shown

2.5 Circuit Connections

All illustrations of connectors, jumpers and switches in this section are oriented to reflect their position when the XPIQ-MB motherboard and option modules are correctly mounted in the backbox.

2.5.1 XPIQ-MB Motherboard Wiring and Cabling

Notification Appliance (Speaker) Circuits - TB1 through TB4

Four Class B (Style Y) speaker circuits are available at TB1, TB2, TB3 and TB4 on the motherboard. Each supervised and power-limited circuit requires a separate Audio Amplifier. All speaker circuits are supervised at all times whether the circuit is active or inactive. Refer to the Notifier Device Compatibility Document for a listing of compatible speakers.

WARNING: High voltages are present at these terminals when the corresponding audio amplifier is an XPIQ-AA2270.

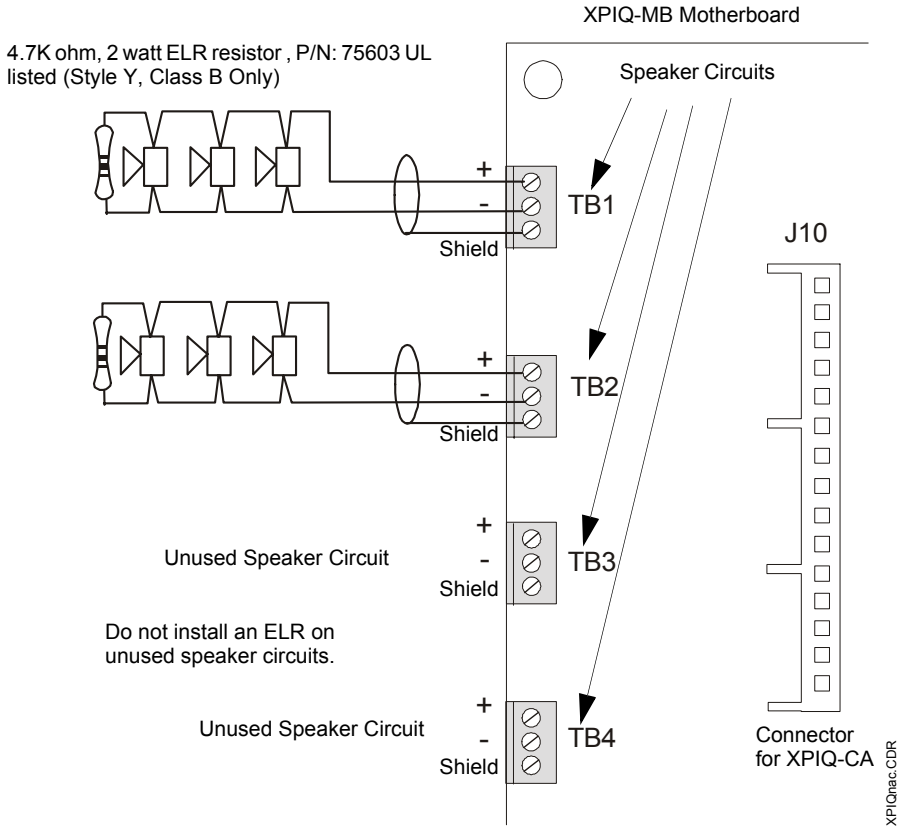


Figure 2.4 Speaker Circuits

An optional XPIQ-CA Class A Converter Module can be plugged into connector J10. This module allows the conversion of the four Style Y (Class B) speaker circuits to four Style Z (Class A) speaker circuits. Refer to Figure 1.11 on page 24 for information on installing the XPIQ-CA Class A Converter Module on the XPIQ-MB motherboard.

High voltages are present at these terminals when the corresponding audio amplifier is an XPIQ-AA2270.

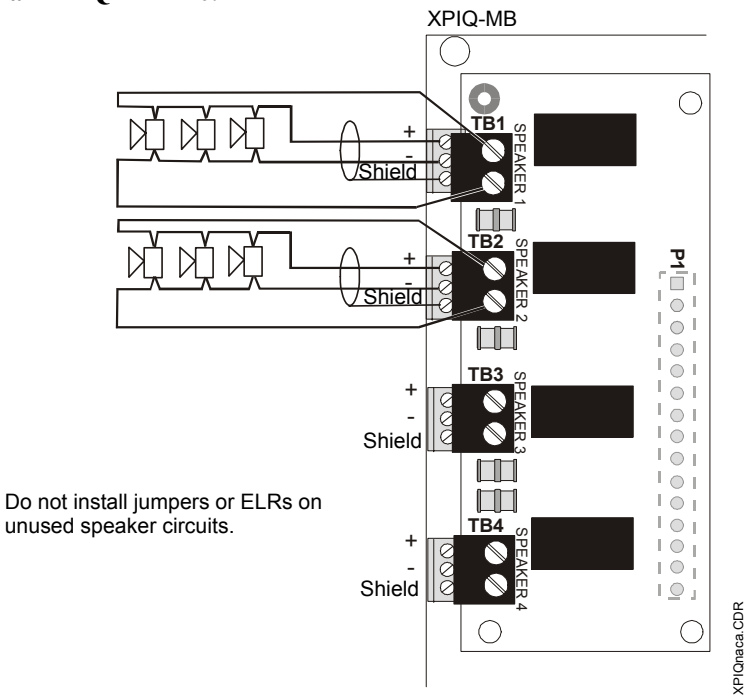


Figure 2.5 XPIQ-CA Class A Converter Module

Firefighter Telephone/NAC Circuits - TB5 through TB8

Four supervised and power-limited telephone/NAC circuits are provided at Terminal Blocks TB5, TB6, TB7 and TB8. Twisted-pair cable should be used for telephone circuit wiring. Figure 2.6 illustrates examples of a Style Y circuit and a Style Z circuit.
IMPORTANT: *Do not mix Styles on any one XPIQ. All telephone circuits must be wired as either up to four Style Y or up to two Style Z circuits.*

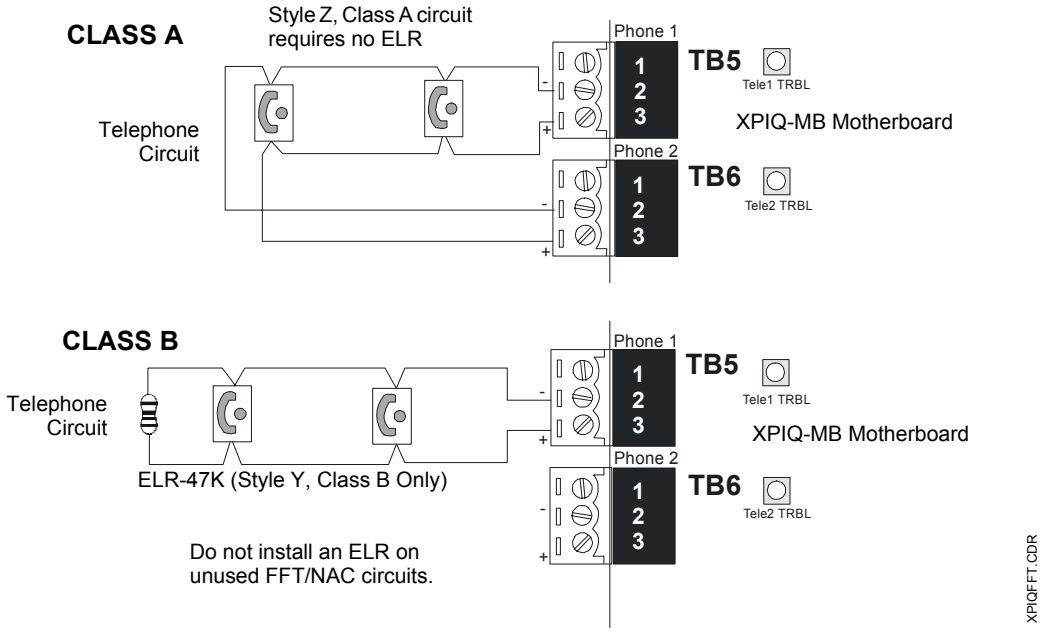


Figure 2.6 Telephone Circuits

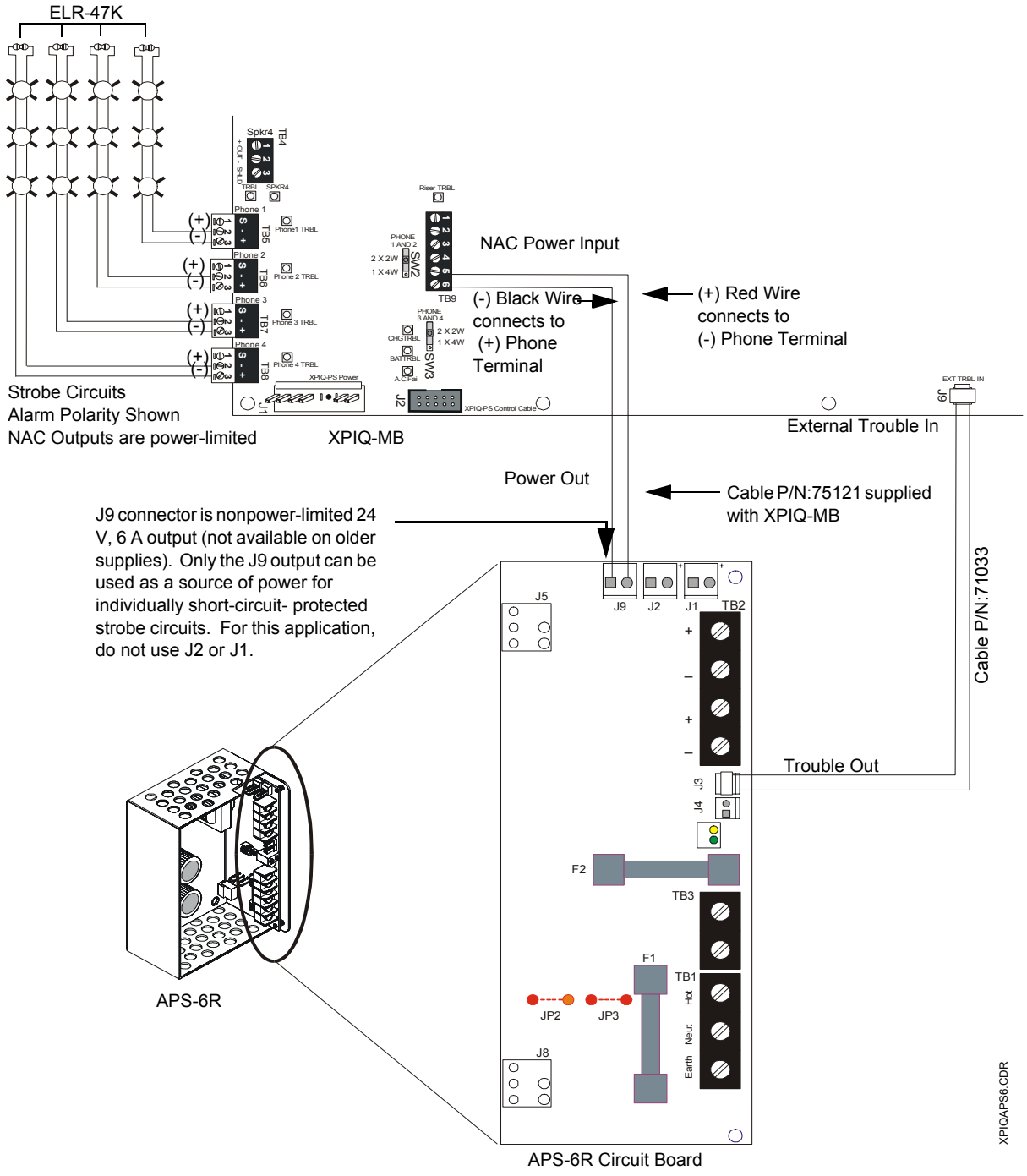


Figure 2.7 APS-6R Powering XPIQ Riser

Notes:

1. Strobe Circuits require termination with ELR-47K resistors supplied with XPIQ-MB
2. Alarm polarity is shown for the Strobe Circuits
3. 2A maximum current is available for each Strobe Circuit
4. 6A total maximum current is available from J9 of the APS-6R
5. When audible NAC devices are needed use coded horns with temporal pattern

WARNING: When using Class A NAC circuits, program the XPIQ for Class A NACs prior to connecting field wiring to TB5, TB6, TB7, and TB8. Failure to do so may result in damage to NAC circuitry on the XPIQ-MB

NACs Controlling an FCPS-24

TB5 through TB8 can also be used to trigger NACs (Notification Appliance Circuits) on an FCPS-24 power supply. Supplying 24 VDC power to the FFT Riser will allow the outputs from these terminals to be used for activation of one or more FCPS-24 power supplies. The connections will be supervised by the XPIQ and a reverse polarity on these circuits will act as a trigger for the FCPS-24.

As illustrated in Figure 2.8 on page 35, this application adds up to 6.0 amperes of notification appliance power. The FCPS-24 can be configured for four Class B (Style Y) outputs or two Class A (Style Z) and two Class B (Style Y) outputs. In this example, the XPIQ FFT/NAC outputs will activate the remote power supply when reverse polarity activation occurs due to an alarm condition. FFT/NAC circuit #1 will activate FCPS-24 outputs 1 & 2 while FFT/NAC circuit #2 will activate outputs 3 & 4. Trouble conditions on the FCPS-24 power supply are monitored by the XPIQ via FFT/NAC circuit connected to Control Input #1 of the FCPS-24(E).

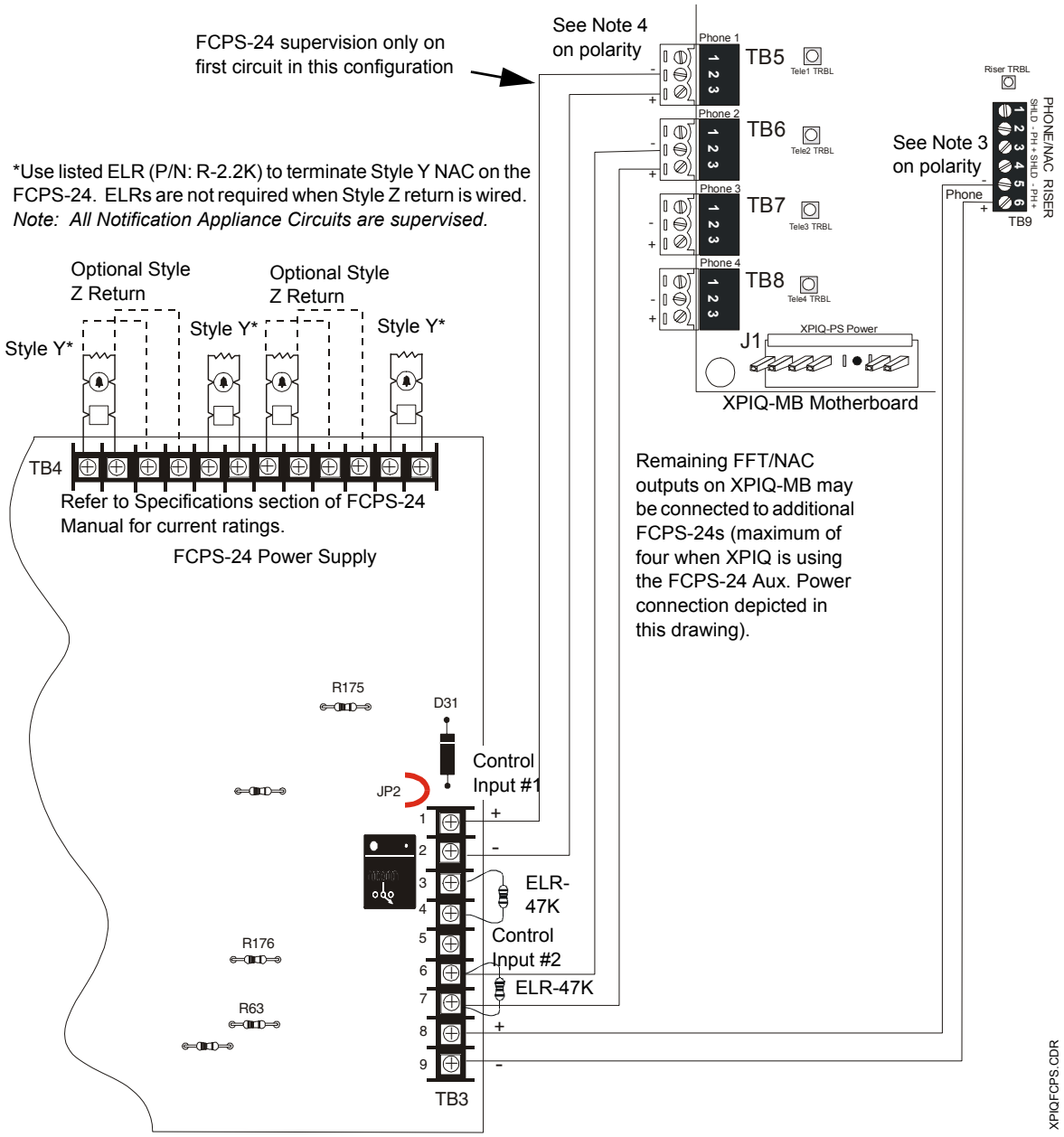


Figure 2.8 XPIQ Control of FCPS-24

Notes:

1. 47k ohm ELRs must be used to terminate the FFT/NAC from the XPIQ
2. Earth fault detection can remain enabled on both the XPIQ-MB and FCPS-24(E)s
3. Polarity of Aux. Power connections to Phone Riser are the reverse of the silk screen markings on the XPIQ-MB for this NAC application
4. Polarity of NAC connections to FCPS-24 are the reverse of the silk screen markings on the XPIQ-MB for this application
5. For a list of compatible devices, refer to the Device Compatibility Document
6. When audible NAC devices are needed, use coded horns with temporal pattern

FFT Firefighter (NAC) Riser - TB9

The FFT Riser can be used to connect Firefighter Telephones throughout the system. The Riser can also be used to convert the FFT circuits to NAC (Notification Appliance Circuits) by connecting 24 VDC power to TB9. The Riser Trouble LED can be used as an aid in troubleshooting the riser.

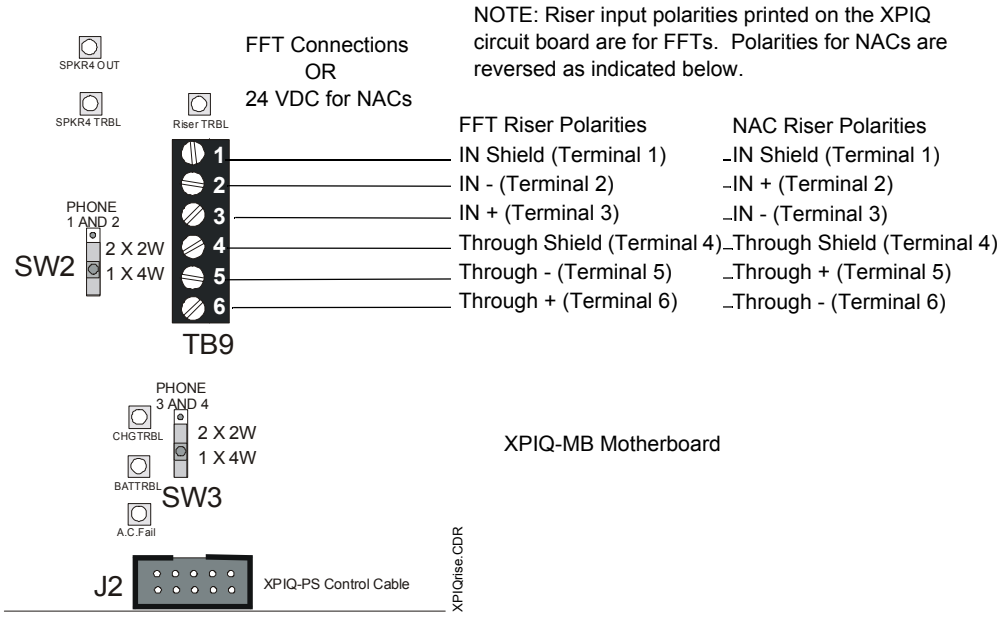


Figure 2.9 FFT Riser

High Level Audio Backup - J4 & J5

The High Level Audio Backup connectors are utilized when a single backup amplifier on one XPIQ-MB is used as an external backup for amplifiers on other XPIQ-MBs. This requires both high and low level backup cable connections.

Caution: An external backup amplifier must be used to back up the same type of amplifiers on other XPIQ-MBs.

Connectors J4 and J5 are used for bringing high level audio from a backup amplifier to the XPIQ-MB with a failed primary amplifier. To accomplish, make a connection from J4 of the XPIQ-MB with backup to J5 of the XPIQ-MB with the external backup. In the case when multiple XPIQ-MBs with external backup are used, cascade the backup signal as shown in Figure 2.16 on page 41.

WARNING: High voltages are present at these terminals when the corresponding audio amplifier is an XPIQ-AA2270.

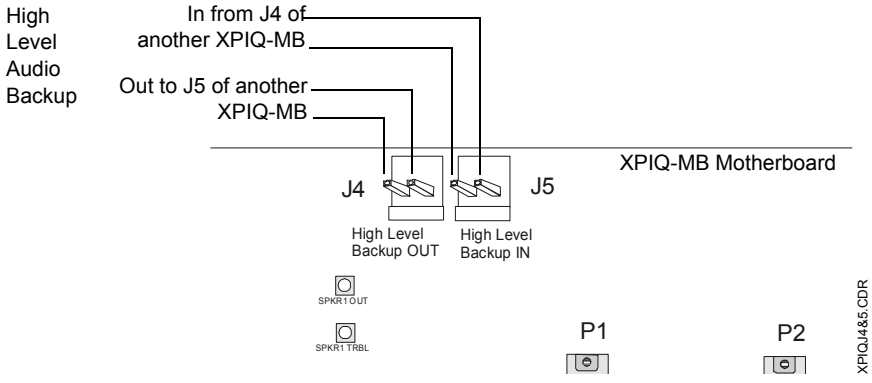


Figure 2.10 High Level Audio Backup

Low Level Audio Backup - J6 & J7

The Low Level Audio Backup connectors J6 and J7 are utilized in three cases:

- In the first case, they are used together with High Level Audio connections for implementing external backup between two or more XPIQ-MBs as illustrated in Figure 2.15 on page 40
- In the second case, they are used together with Remote In (J12) and Remote Out (J11) connectors to implement remote microphone all call paging on more than one XPIQ-MB as illustrated in Figure 2.16 on page 41
- The third case is a combination of the first two cases and is illustrated in Figure 2.17 on page 42

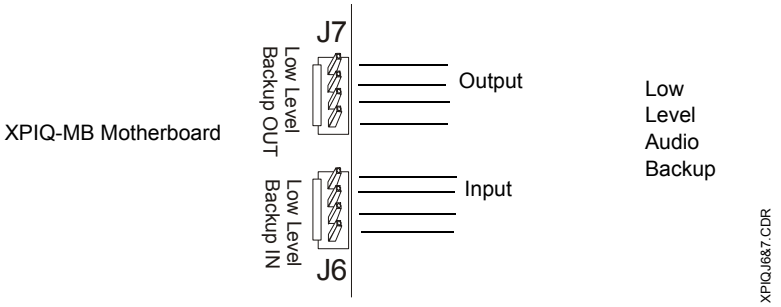


Figure 2.11 Low Level Audio Backup

Remote Out and In - J11 & J12

The Remote In (J12) and Remote Out (J11) connectors together with the Low Level Audio Backup connectors J6 and J7 provide a means of accomplishing an All-call paging on multiple XPIQ-MBs from a single remote microphone connected to one XPIQ-RMI. If more than two XPIQ-MBs are to be involved in cascaded all-call paging, they cannot use the external backup option. In that case, each XPIQ-MB must have local backup amplifier(s) or none. Refer to the wiring diagram shown in Figure 2.16 on page 41. In the case of cascading all-call paging between two XPIQ-MBs, use of an external backup is permitted and is shown in Figure 2.17 on page 42.

Note that J12 (Remote In) of the first XPIQ with the XPIQ-RMI installed and J11 (Remote Out) of the last XPIQ will have no cable connections.

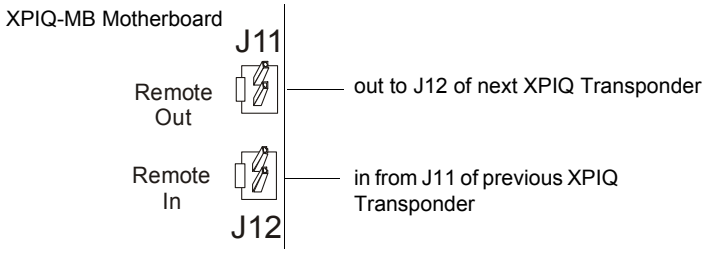


Figure 2.12 All Call Connectors

Music Input - TB10

A music source can be connected to TB10 Terminals 1 & 2. This can provide the capability of background music generation over the XPIQ Transponder speaker circuits.

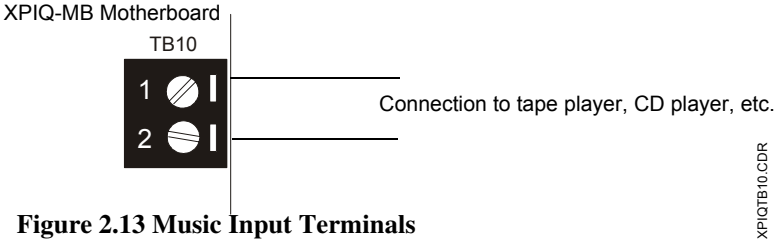


Figure 2.13 Music Input Terminals

2.5.2 XPIQ Audio Amplifier Installation

The XPIQ-MB Motherboard can accommodate up to four XPIQ Audio Amplifier boards. If only one amplifier is employed, it must plug into connector P1 on the motherboard. Additional amplifiers plug into connectors P2, P3 and P4 respectively. Note that the connectors are keyed to prevent the amplifier boards from being installed incorrectly.

The amplifiers are supervised by the motherboard. There are no wiring connections made to the amplifier board and no switch settings required on the board. Two LEDs located on the amplifier board indicate amplifier trouble and amplifier status.

Different types of XPIQ Audio Amplifiers may be installed on the same motherboard. Backup amplification must conform to the requirements described in the paragraph "Backup Amplifiers" on page 39.

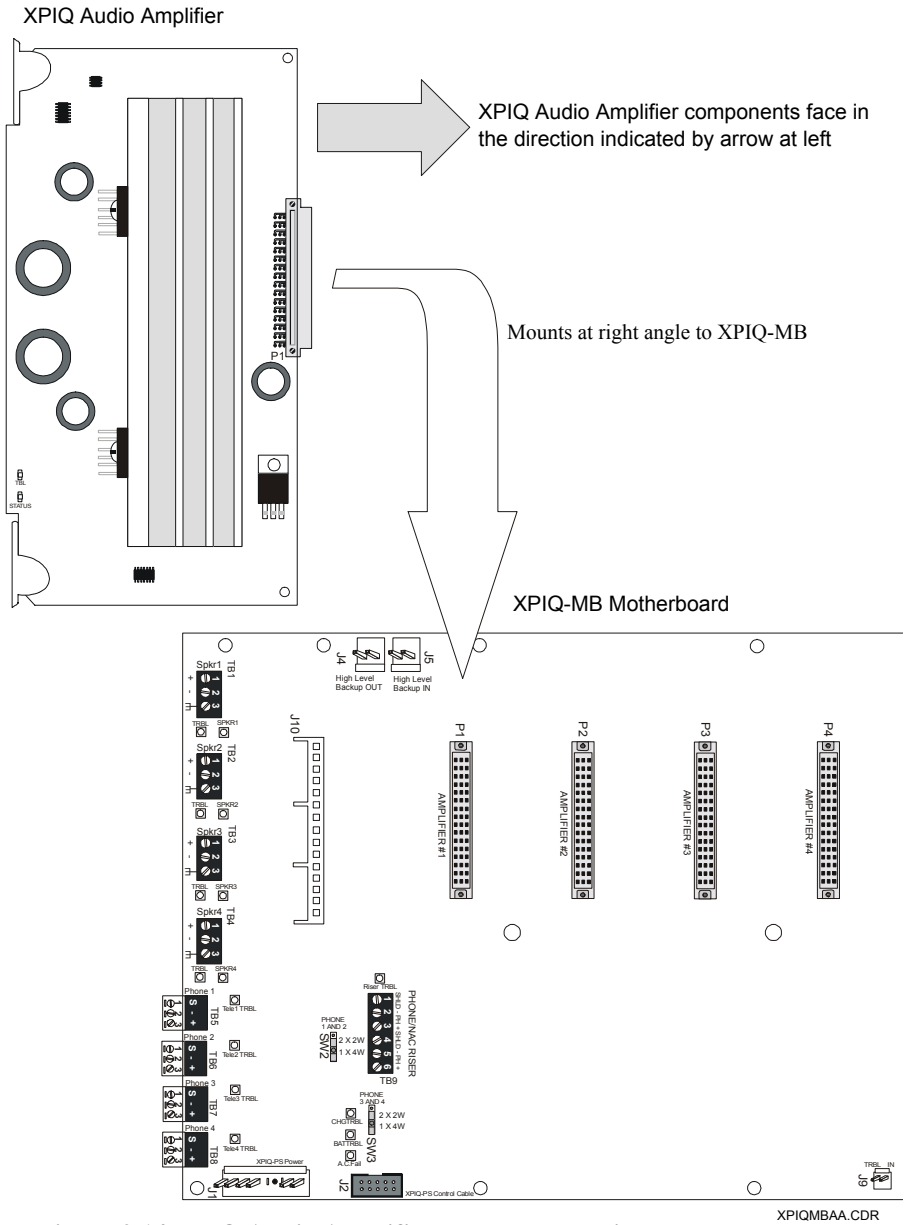


Figure 2.14 XPIQ Audio Amplifier Board Installation

Backup Amplifiers

One or two amplifiers on the XPIQ-MB can be designated as backup amplifiers. If each primary amplifier is to have its own backup amplifier, the amplifier which is plugged into connector P3 will be the backup for the primary amplifier plugged into P1. The amplifier which is plugged into connector P4 will be the backup for the primary amplifier plugged into P2.

When two different types of amplifiers are used on the same motherboard and backup of both is desired, two backup amplifiers must be used, matching type to type. For example, an XPIQ-AA25 may be used as a primary amplifier and plugged into P1, and an XPIQ-AA2270 may be used as a primary amplifier and plugged into P2. To back up both amplifiers, an XPIQ-AA25 must be installed into P3, and an XPIQ-AA2270 must be installed into P4.

An external backup amplifier must be used to back up the same type of amplifiers on other XPIQ-MBs.

An application may occur where a single amplifier is used to back up primary amplifiers on more than one motherboard. The backup amplifier must plug into connector P4 of one of the motherboards. Cabling connectors J4, J5, J6 and J7 (refer to Figure 2.10 on page 36 and Figure 2.11 on page 37) between the two motherboards will enable one amplifier to back up multiple primary amplifiers as illustrated in Figure 2.15. *Note that only one XPIQ-MB can have earth fault detection enabled.* This application requires that all primary amplifiers be the same type as the backup amplifier.

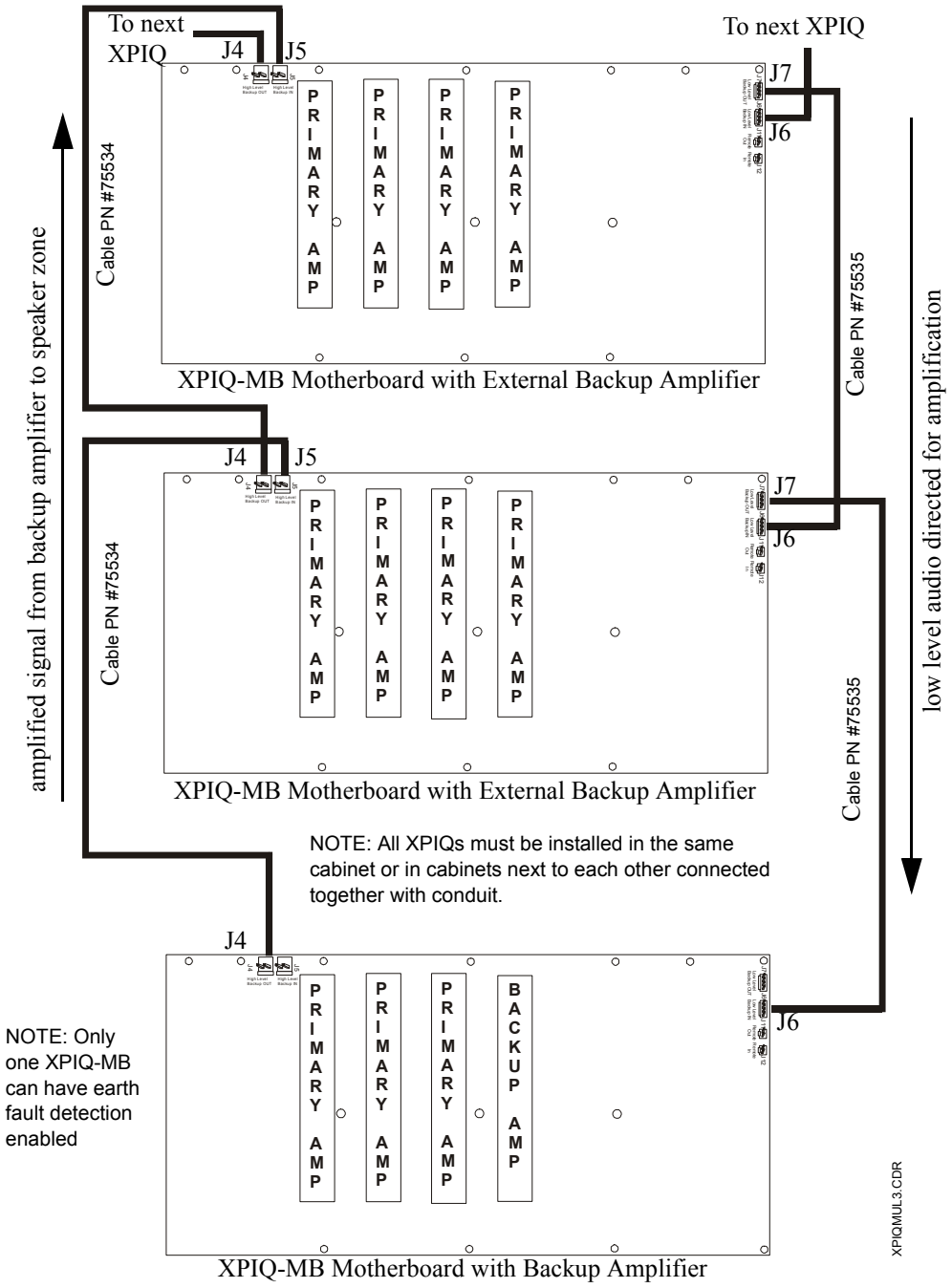


Figure 2.15 Backup Amplifier for Multiple Primary Amplifiers

The following application illustrates multiple XPIQ-MBs, each with its own backup amplifier. One XPIQ-RMI is also being employed for all-call paging. Note that when each XPIQ-MB has its own backup amplifier, all-call paging from a single remote microphone can be accomplished to all XPIQ-MBs. *Note that only one XPIQ-MB can have earth fault detection enabled.*

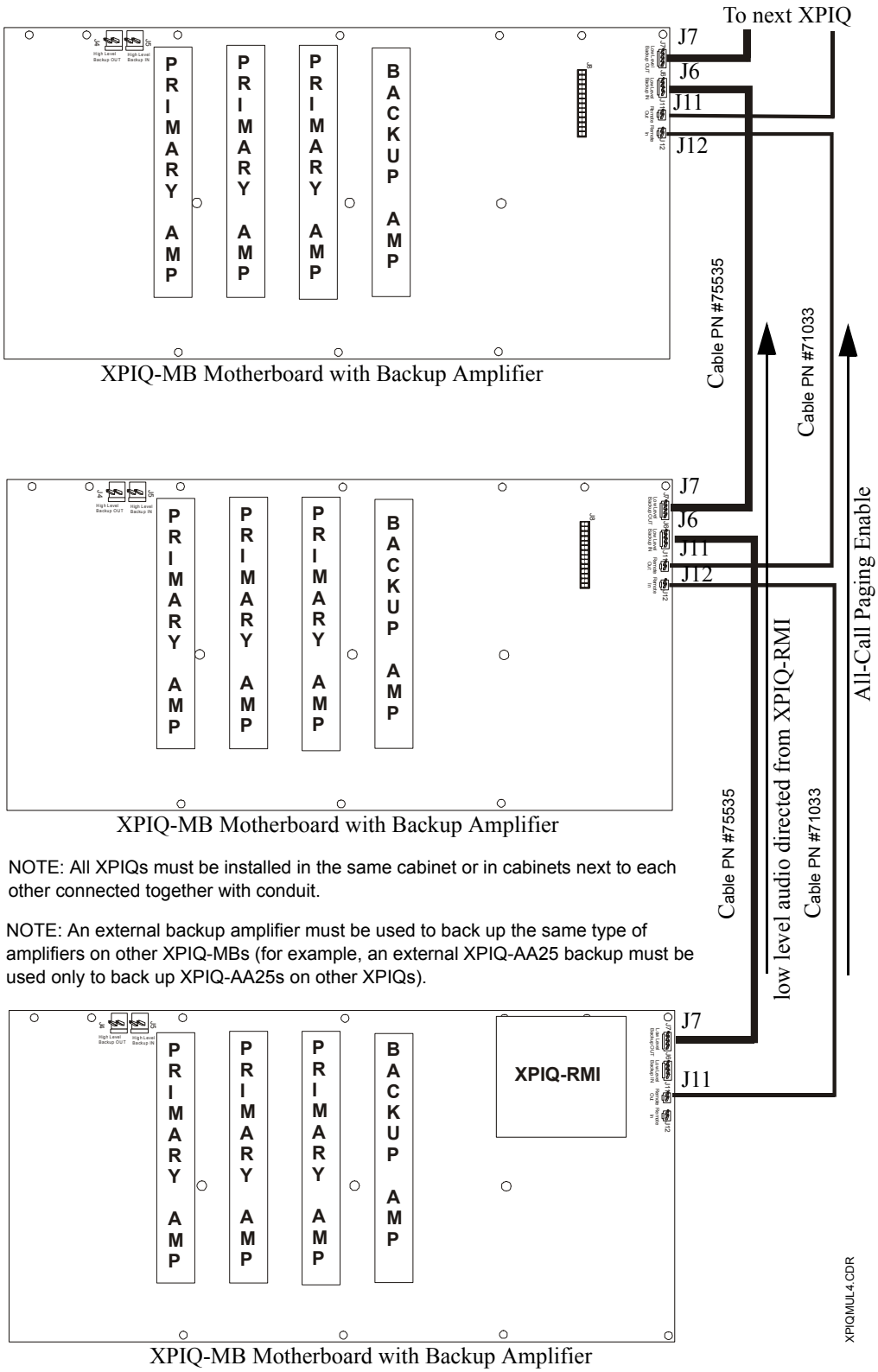
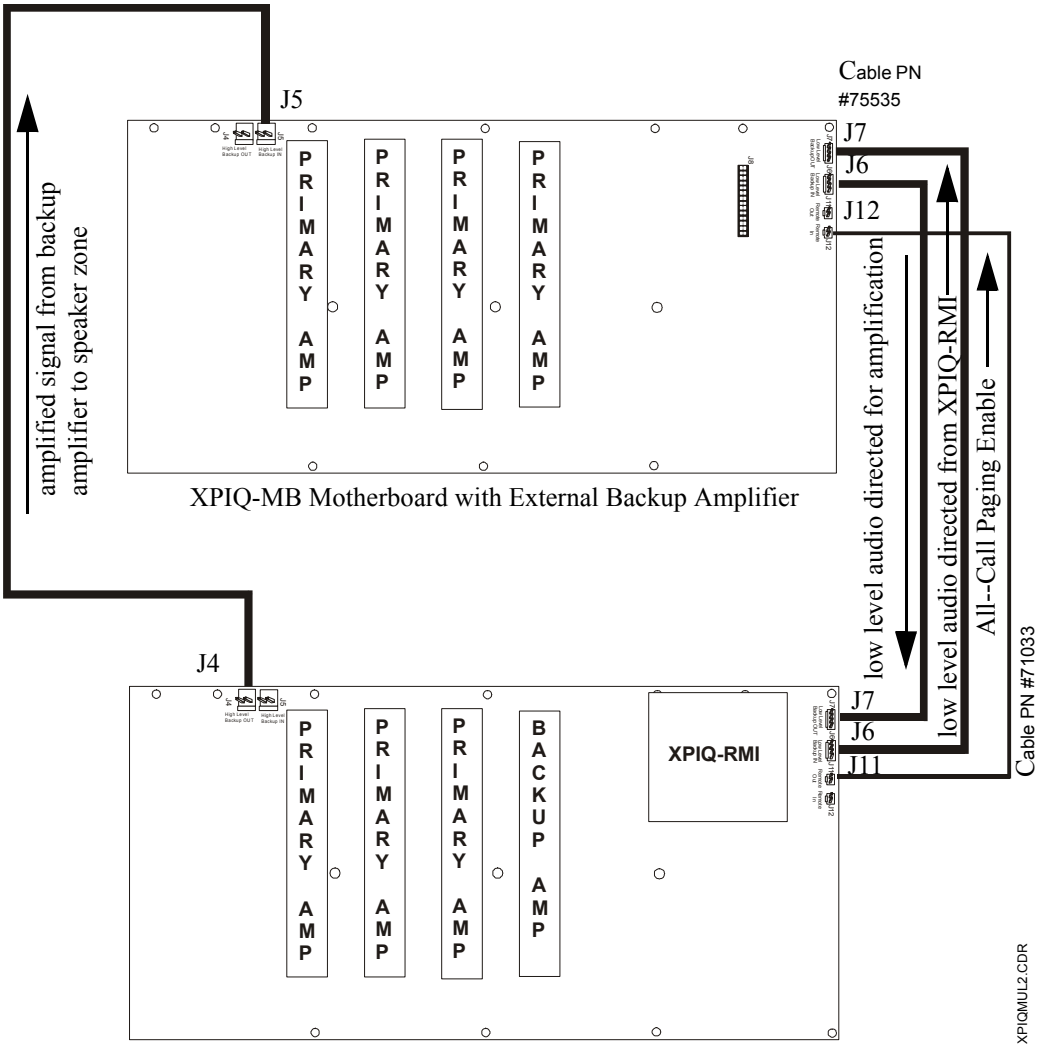


Figure 2.16 Multiple Backup Amplifiers and All-Call

The following application illustrates two XPIQ-MBs with a single backup amplifier. One XPIQ-RMI is also being employed for all-call paging. Note that when an XPIQ-MB is using external amplifier backup with all-call paging from a single remote microphone, a maximum of two XPIQ-MBs can be used. The XPIQ with the backup amplifier must also include the XPIQ-RMI. *Note that only one XPIQ-MB can have earth fault detection enabled.*



XPIQ-MB Motherboard with External Backup Amplifier

XPIQ-MB Motherboard with Backup Amplifier

NOTE: Note that all XPIQs must be installed in the same cabinet or in cabinets next to each other connected together with conduit.

NOTE: An external backup amplifier must be used to back up the same type of amplifiers on other XPIQ-MBs (for example, an external XPIQ-AA25 backup must be used only to back up XPIQ-AA25s on other XPIQs).

Figure 2.17 XPIQs With Single Backup and All-Call

2.5.3 XPIQ-SLI Signaling Line Interface Board

The XPIQ-SLI plugs into connector P6 on the XPIQ-MB motherboard. The SLI provides a Style 4 (Class B), Style 6 or Style 7 (Class A) interface for the SLC (Signaling Line Circuit) which allows communication between the XPIQ Transponder and host FACP (Fire Alarm Control Panel). Rotary switches on the XPIQ-SLI are used to set the transponder address for SLC communication. The XPIQ-SLI receives and transfers commands to the XPIQ-MB motherboard to operate individual XPIQ points, such as speaker zones, telephone circuits, etc.

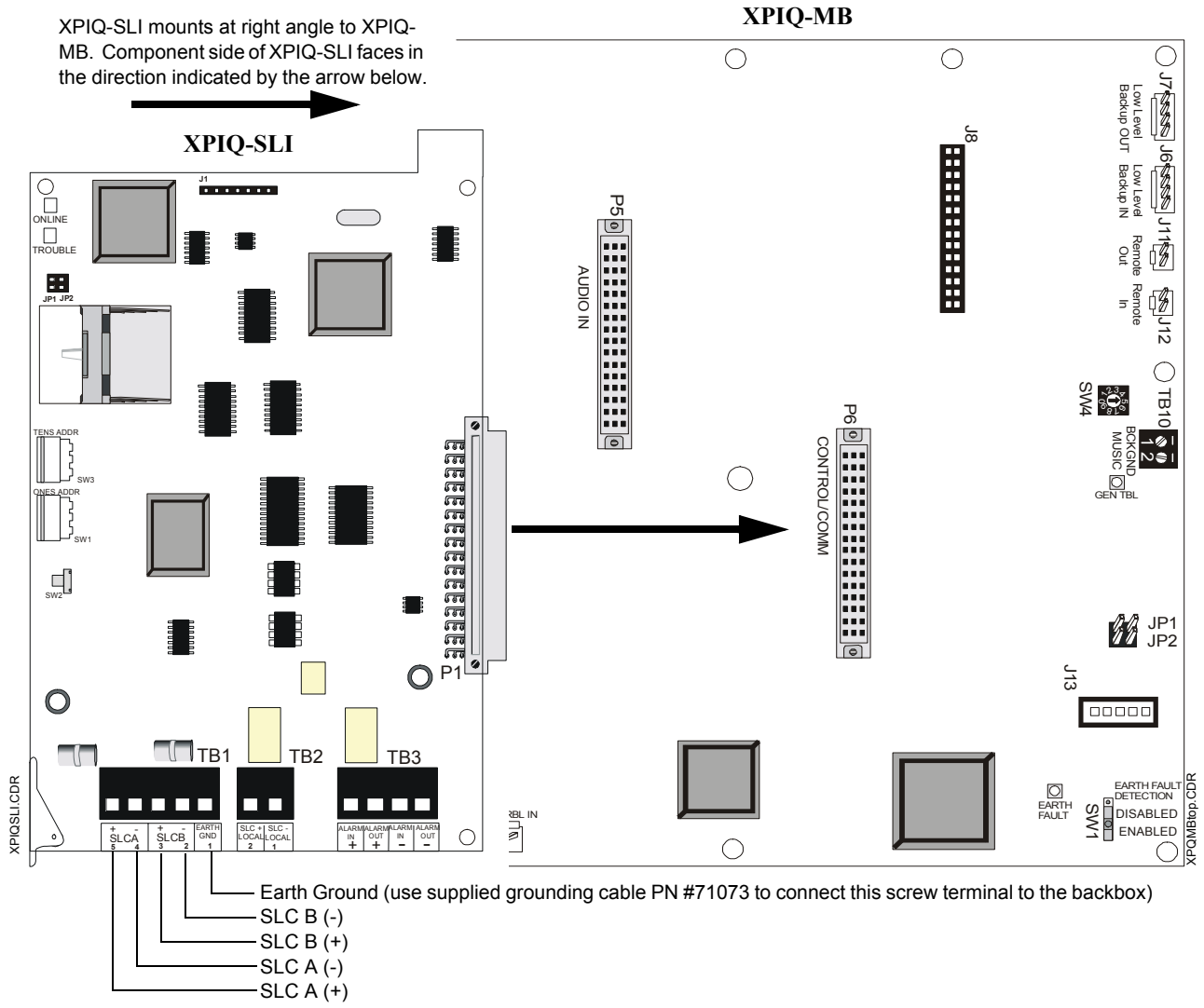


Figure 2.18 XPIQ-SLI Signaling Line Interface Board

XPIQ-SLI Wiring Style 4

The SLC, which is connected to the XPIQ-SLI, can be wired Style 4, Style 6 or Style 7. Figure 2.19 illustrates the SLC wired to the XPIQ-SLI in a Style 4 configuration. In this configuration, if SLC communication is lost between the FACP and XPIQ-SLI, the XPIQ will be unable to detect alarm conditions and activate notification appliances on the local branch.

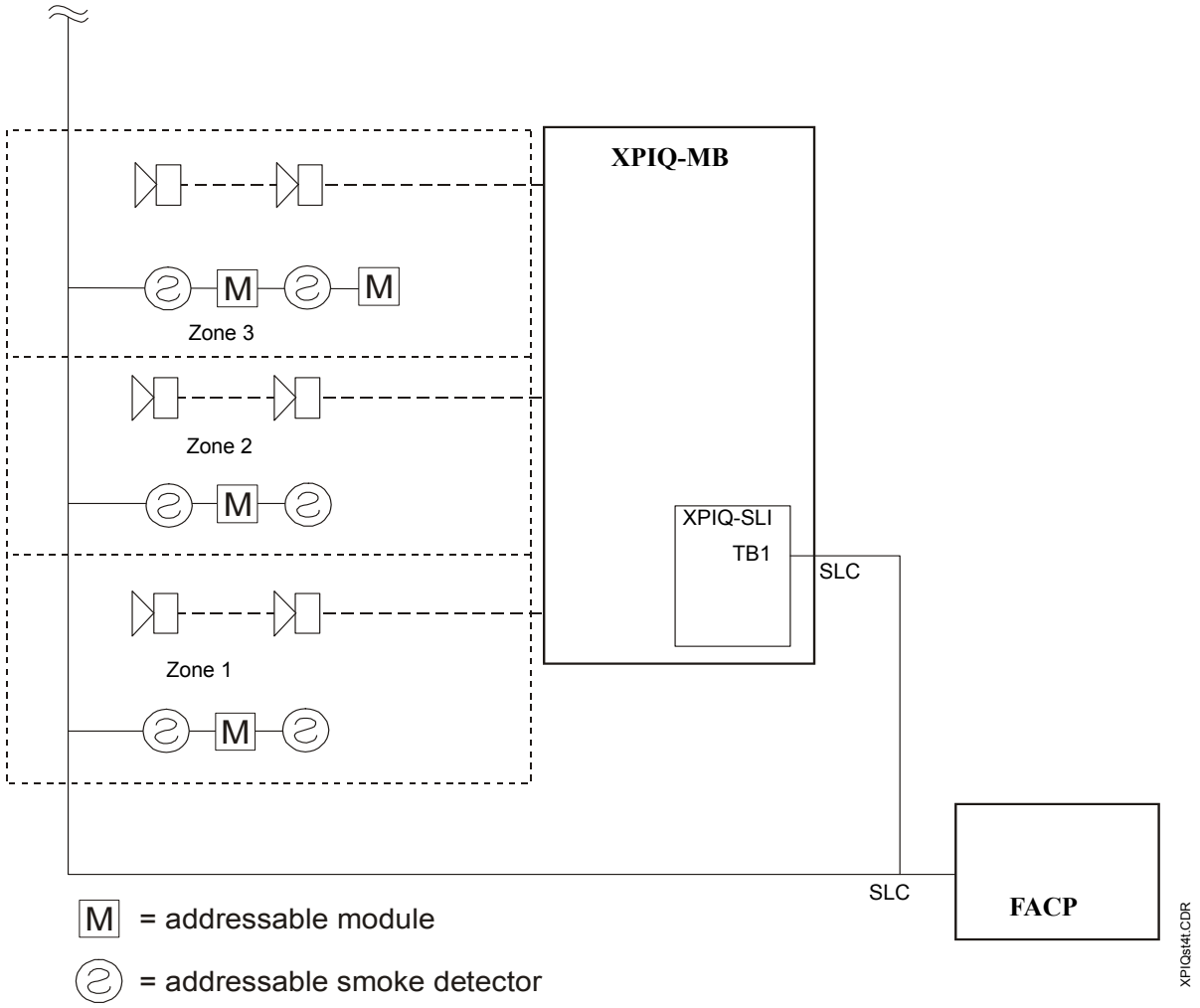


Figure 2.19 SLC Style 4 With T-taps (No Degraded Mode)

XPIQ-SLI Wiring Style 4 With Degraded Mode

An XPIQ-SLI, wired Style 4 and configured for degraded mode operation, is illustrated in Figure 2.21 and Figure 2.22. The initiating devices that are compatible with degraded mode are the FSI-751, FSP-751, FMM-1 and XP5-M.

The FMM-1 monitor modules must have terminals 3 and 4 jumpered and XP5-M switches SW201, SW202, SW203, SW204 and SW205 must be on to enable the degraded mode operation. Refer to the documentation supplied with each device for additional information.

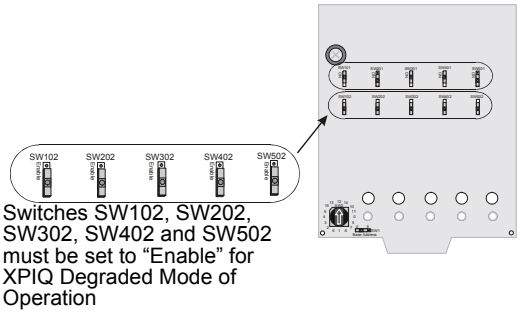


Figure 2.20 XP5-M Switches Enabling Degrade Mode

Degraded mode operation allows for detection of alarm conditions on the local branch in the event that communication is lost between the XPIQ and FACP. When the XPIQ-SLI detects loss of the SLC signal, it disconnects the local branch from the SLC and monitors the local branch smoke detectors and monitor modules for an alarm condition. Once an alarm is detected, the XPIQ will automatically send an evacuation tone from the local tone generator (tone generator #1) to all local speaker zones and it will close the alarm contacts on TB3. These contacts may be connected to a separate circuit monitored by the FACP. This type of alarm state is nonlatching and will clear once the local branch devices return to the normal (standby) state. The control modules installed on the local branch will not be controlled and will remain in the state they were in prior to the loss of SLC communication. The SLC devices located on the local SLC branch are not supervised during degraded mode of operation. The degraded mode of operation is solely intended for enabling alarm detection before qualified personnel arrive to service the system.

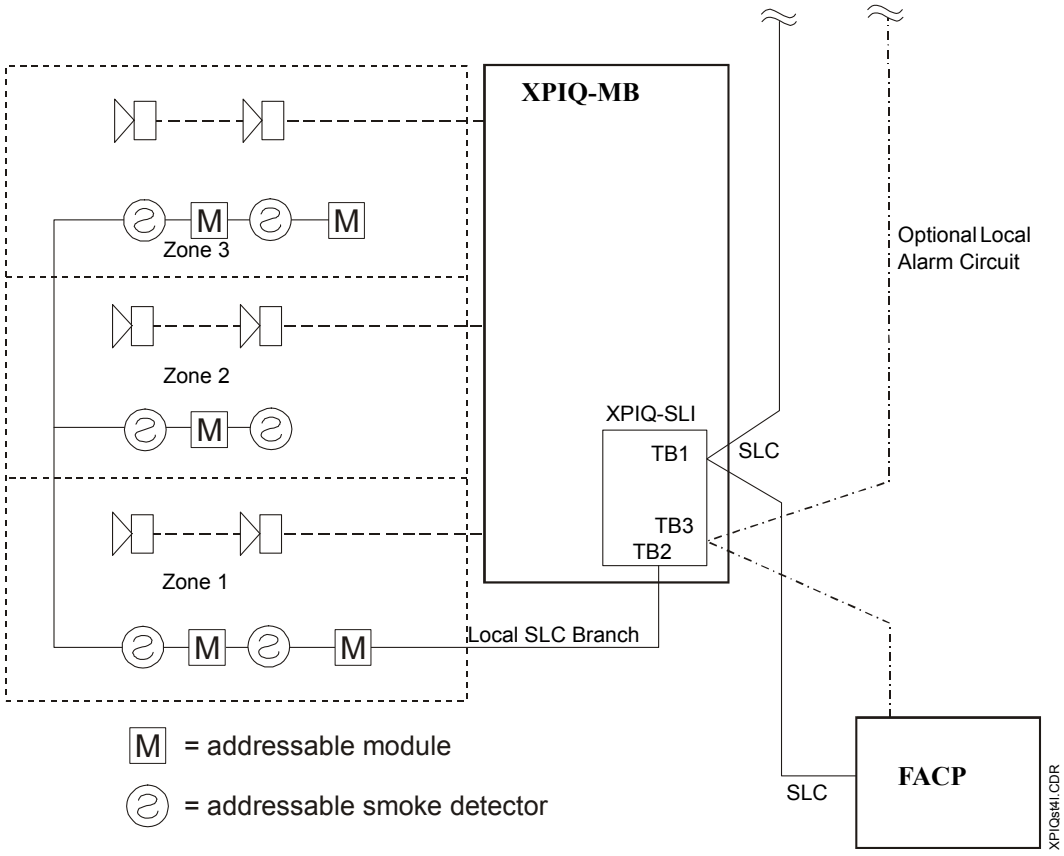


Figure 2.21 SLC Style 4 (with Degraded Mode)

Wiring the Local SLC Branch for Degraded Mode Operation

The XPIQ-SLI terminal block TB2 provides a connection for local addressable initiating devices. Wiring is connected only as Style 4 (Class B) with T-tapping allowed. The local devices are powered by the SLC as long as communication is established. If SLC communication is lost, the XPIQ-SLI switches to degraded mode providing power and direct monitoring of the local devices. If a local device alarms during stand-alone mode, a local evacuation signal from a tone generator will be sent to all speaker zones on the XPIQ. Devices do not latch in degraded mode, therefore clearing the initiating device will also reset the alarm.

Figure 2.22 Local Communications Loop

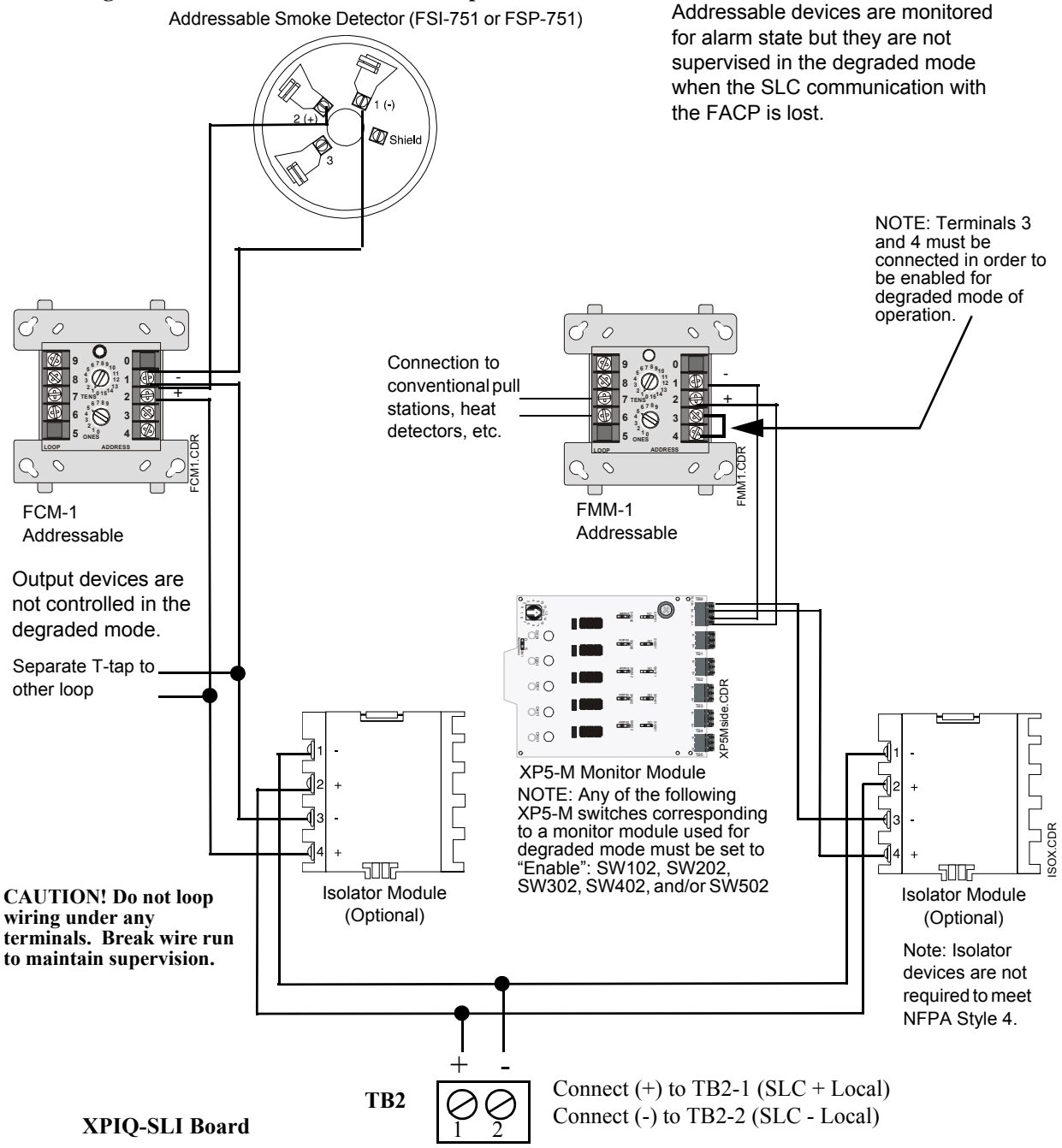


Figure 2.22 Wiring Local SLC Branch for Degraded Mode Operation

Current Draw Tables for Devices on the Local SLC Branch

The current necessary for local SLC branch operation must be calculated by determining the current draw of the devices on it. Use Table 2.1 and Table 2.2 to calculate the current draw.

The total local SLC branch current (the sum of the Table Totals from Table 2.1 and Table 2.2) can not be greater than 20 mA.

Device	Qty		Current (mA)		Total
FSI-751	[ ]	X	0.270	=	
FSP-751	[ ]	X	0.270	=	
FSP-751T	[ ]	X	0.270	=	
XP5-M	[ ]	X	1.651	=	
Other Devices	[ ]	X		=	
Table Total (Sum of “Total” column)					mA

Table 2.1 Current Draw of Devices Participating in Degraded Mode on Local SLC

Device	Qty		Current (mA)		Total
ISO-X	[ ]	X	0.450	=	
FCM-1	[ ]	X	0.300	=	
FRM-1	[ ]	X	0.200	=	
XP5-C (Relay)	[ ]	X	0.840	=	
XP5-C (NAC)	[ ]	X	1.481	=	
Other Devices	[ ]	X		=	
Table Total (Sum of “Total” column)					mA

Table 2.2 Current Draw of Devices Not Participating in Degraded Mode on Local SLC

[Table Total from Table 2.1]	+	[Table Total from Table 2.2]	=	mA*
*This figure can not be greater than 20 mA.				

Table 2.3 Total Current Draw of All Devices on Local SLC

XPIQ-SLI Wiring Style 6

Style 6 wiring is illustrated in Figure 2.23. This wiring configuration allows uninterrupted communication if a single open exists on the SLC wiring. Style 7 is similar to Style 6 with the added requirement that isolation modules be installed on both sides of every SLC device, including the XPIQ-SLI. Each isolator device must be close nippled on each side of the detector/module, or within 20 feet (6.1 m) of the detector/module in conduit.

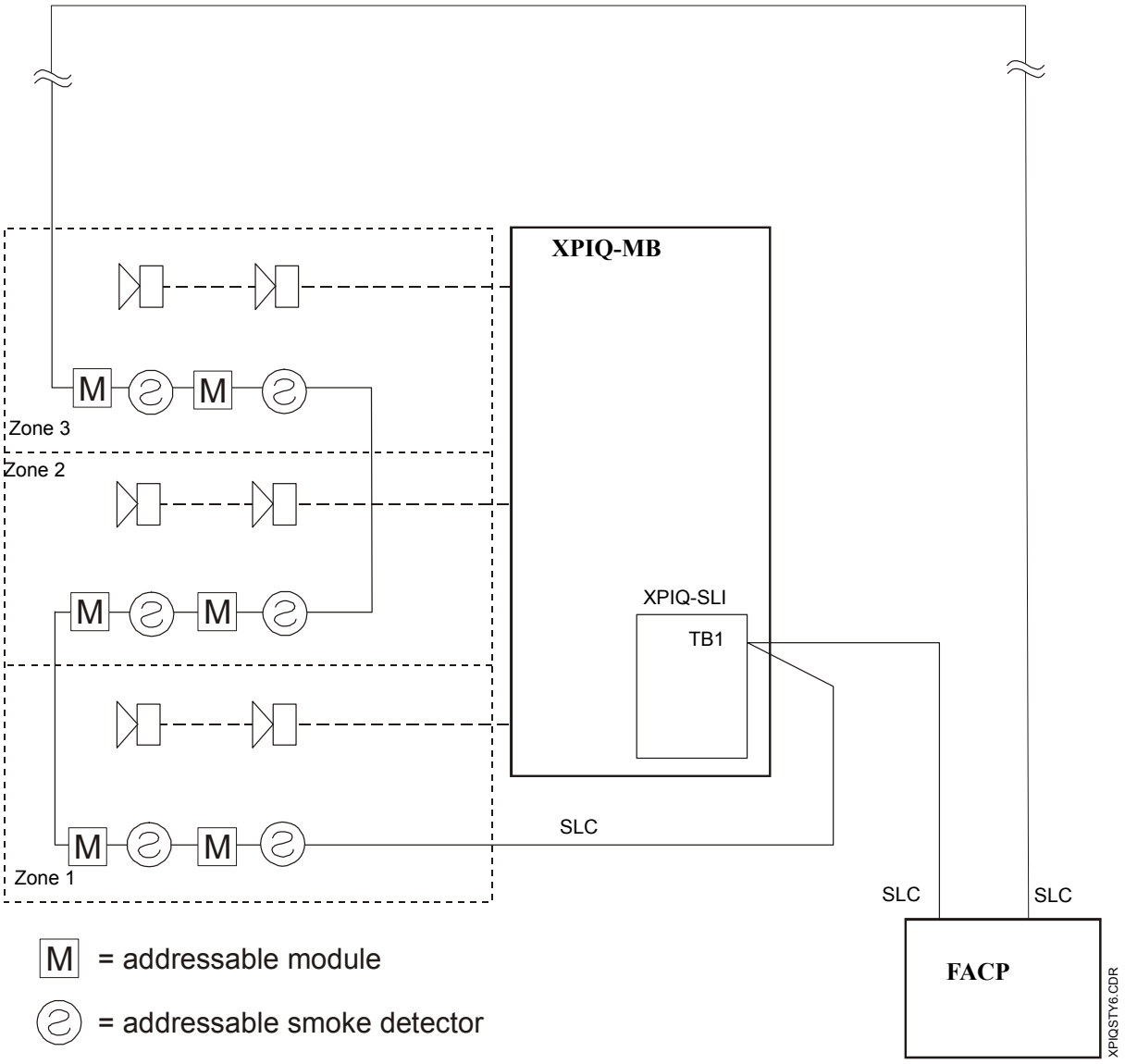


Figure 2.23 SLC Style 6

SLC Shield Terminations

When shielded wire is required, refer to the following figures for proper shield termination.

SLC Wiring Without Conduit

When the SLC wiring is not enclosed in conduit, do not allow the shield drain wire to enter the system cabinet. Connect the drain wire to the outside of the cabinet via a BX-type connector.

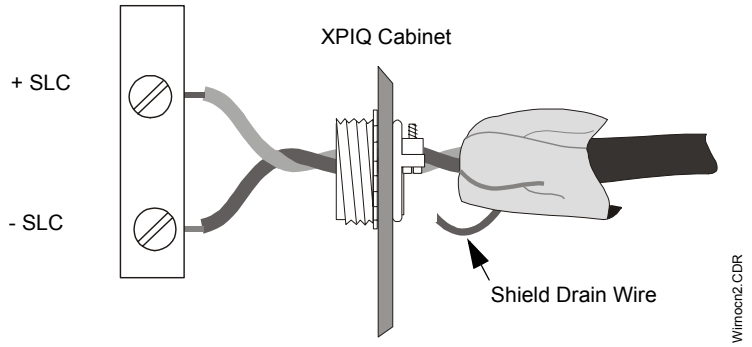


Figure 2.24 Shield Termination With No Conduit

SLC Wiring In Full Conduit

The shield drain wire must not be connected to the negative (-) side of the loop. Do not allow the shield drain wire or the shield foil to touch the system cabinet.

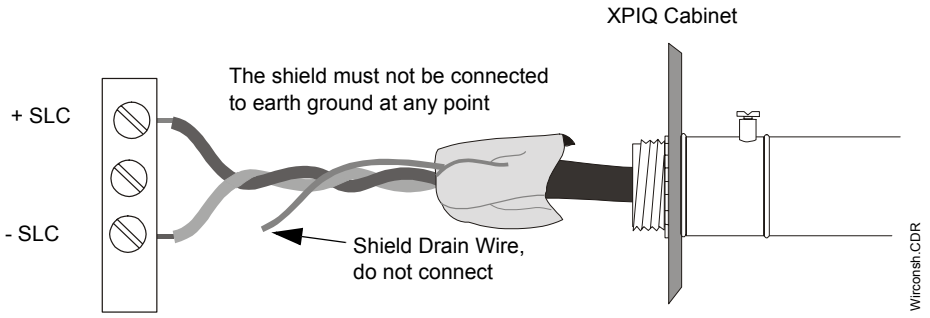


Figure 2.25 Shield Termination In Full Conduit

SLC Wiring In Partial Conduit

Do not allow the shield drain wire to enter the system cabinet or the conduit. Do not connect the drain wire to the termination point of the conduit run. The conduit cannot be longer than 20 feet (6.1 m).

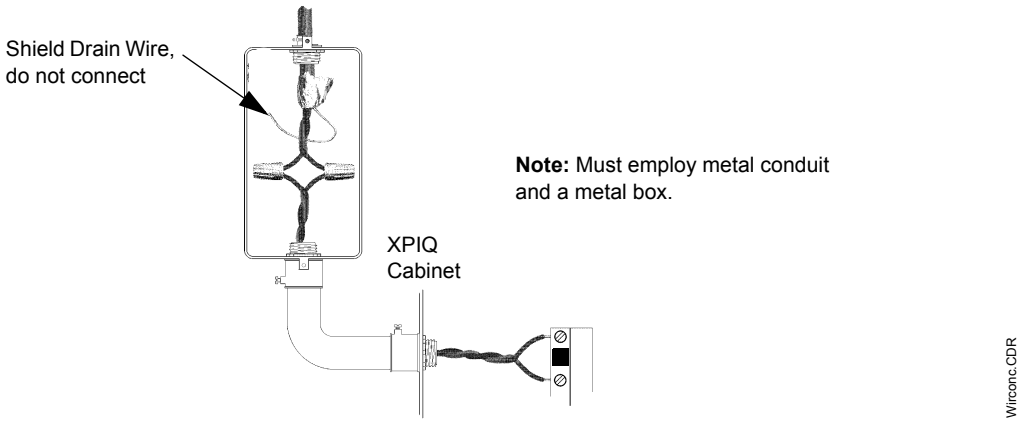


Figure 2.26 Shield Termination In Partial Conduit

2.5.4 XPIQ-AIB Audio Input Board

The Audio Input Board plugs into connector P5 on the XPIQ-MB motherboard. It provides a connection for external low level audio sources such as the AMG-1/E. The XPIQ-AIB1 provides connection for one audio source and the XPIQ-AIB4 provides connections for up to four audio sources.

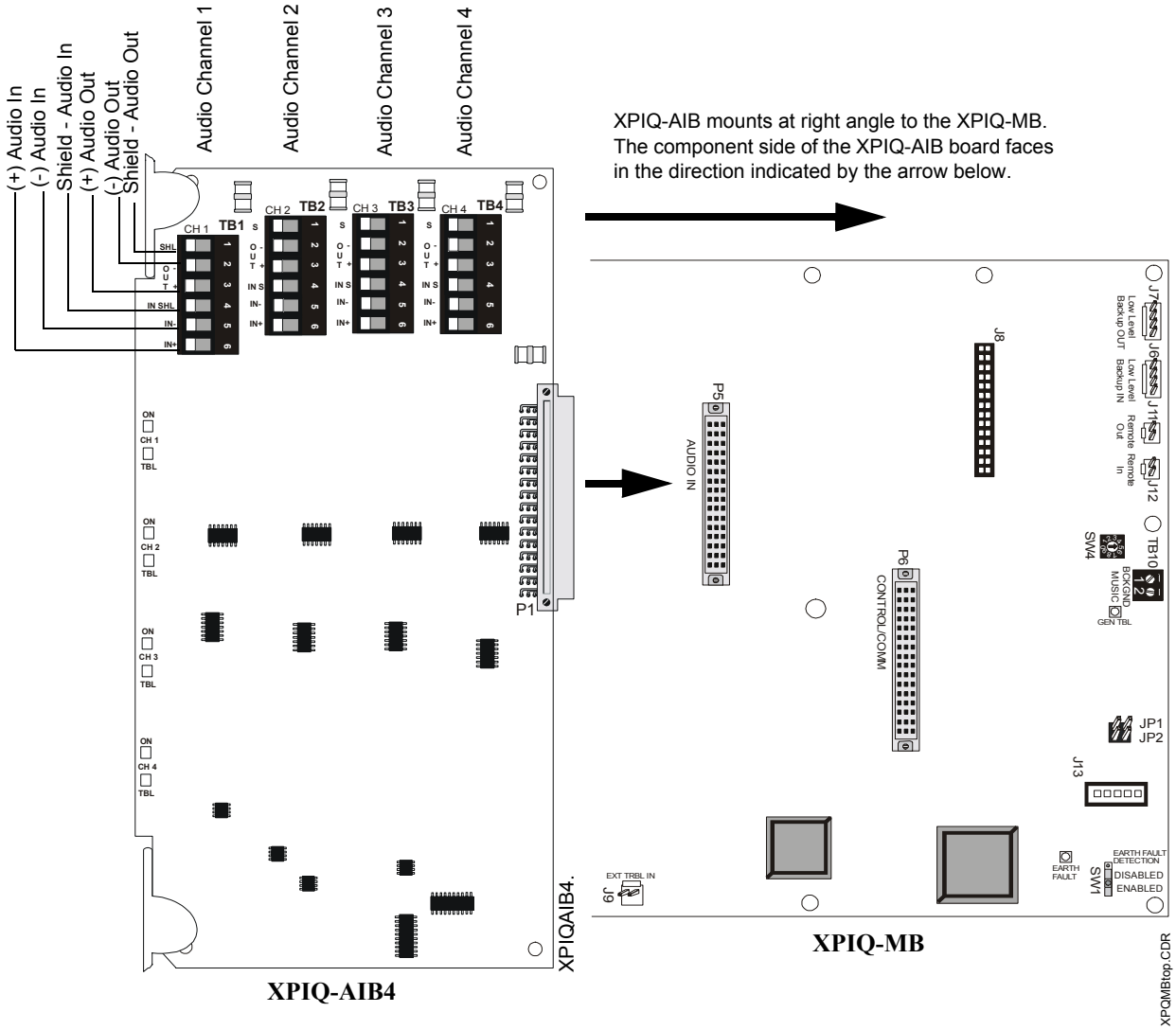


Figure 2.27 AIB-4 Audio Input Board

2.5.5 AIB-4/AIB-1 and ACT-2

The ACT-2 Audio Coupling Transformer provides a means to drive a large number of remote audio amplifiers in large system applications. It isolates inputs from outputs and also provides common mode noise rejection. Refer to the ACT-2 Product Installation Document for detailed information.

Note: When using the ACT-2, it must be installed on an AIB-4/AIB-1 which is mounted only in the top row of the cabinet. The ACT-2 will not fit in any other cabinet position.

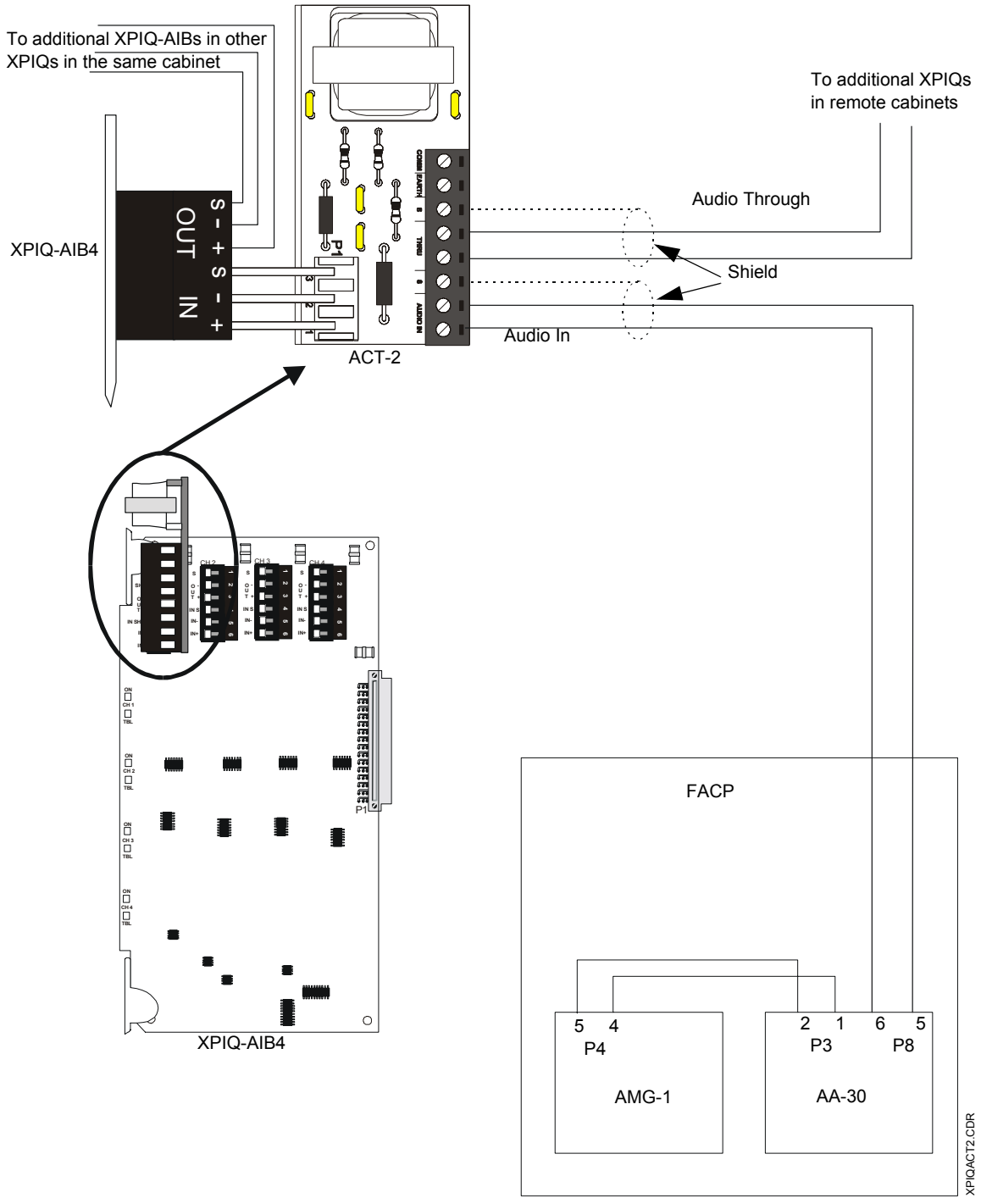


Figure 2.28 XPIQ-AIB Using an ACT-2

2.5.6 XPIQ-RMI Remote Microphone Interface

The Remote Microphone Interface board plugs into connector J8 on the XPIQ-MB motherboard and mounts to three supplied standoffs installed on the XPIQ-MB motherboard. The XPIQ-RMI provides a connection for an RM-1/RM-1SA microphone which can be remotely located up to 1,000 feet (300 m) from the XPIQ-RMI.

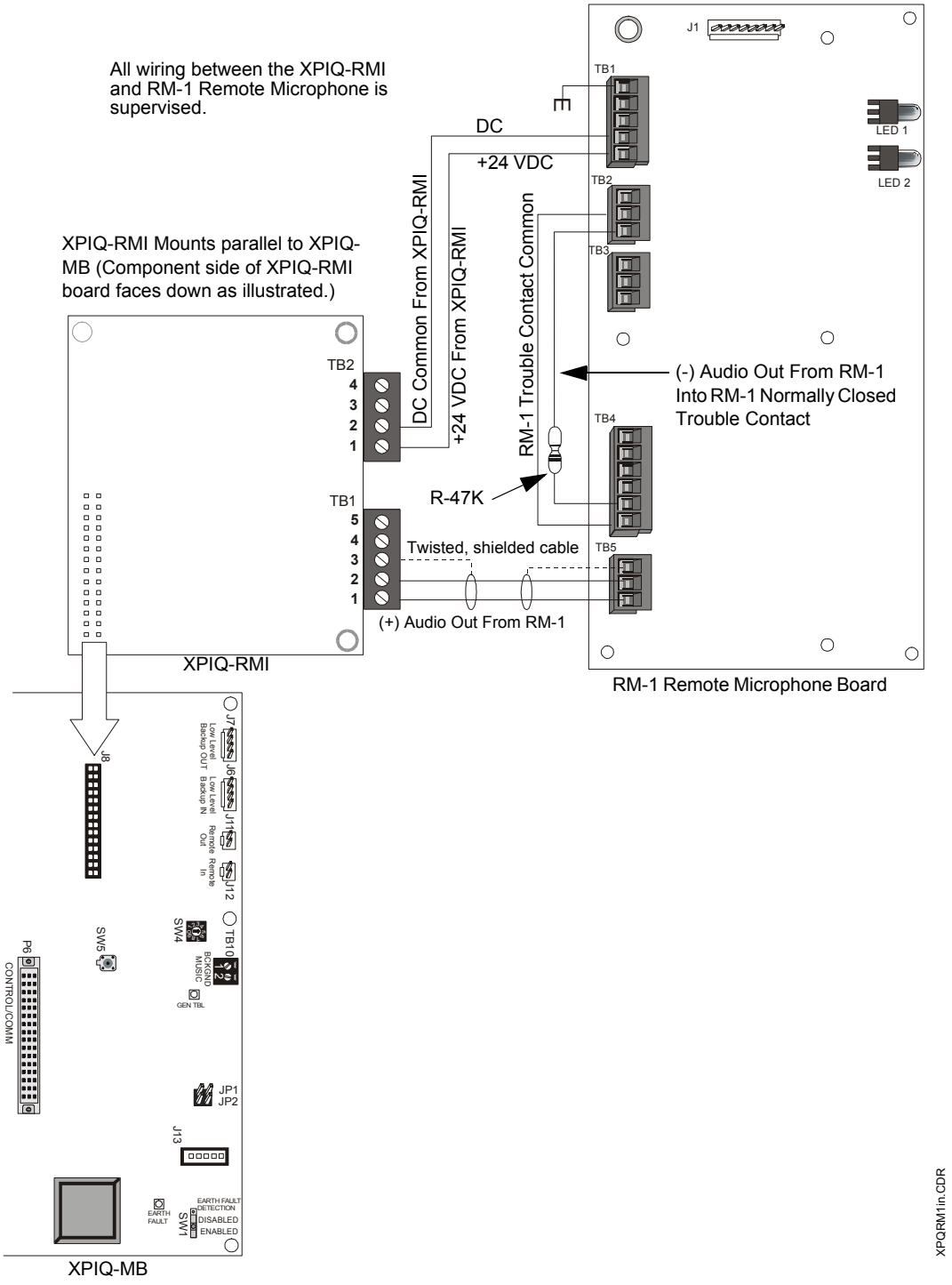


Figure 2.29 XPIQ-RMI Remote Microphone Interface

2.6 Switch and Jumper Settings

2.6.1 XPIQ-SLI Signaling Line Interface

2.6.1.1 Addressing - SW1 and SW3 Rotary Switches

The first address assigned to the XPIQ is termed the 'Base Address'. The base address is a three-digit number which can be set for any value up to the maximum number of addresses allowable on the Signaling Line Circuit (SLC) by the FACP (from 001 to 159 for FlashScan mode, or 01 to 99 for CLIP mode). When setting this base address, keep the following points in mind:

- ✓ The base address, which is set with SW1 and SW3 rotary switches, plus any additional addresses assigned to the XPIQ circuits by the motherboard, may not be used by any other device on the SLC.
- ✓ The base address cannot be set to a number that would exceed 159 or 99, depending on the FACP used, when all the addresses consumed by the XPIQ are added to the base address. For example, if an XPIQ consumes 20 addresses plus the base address, the setting for the base address could not exceed 139 (139 + 20 = 159) for a panel that uses 159 addresses.
- ✓ All addresses are sequential, beginning with the base address, with no gaps
- ✓ PK-XPIQ software, which is used to program the XPIQ, will assign the various points to the sequential addresses, beginning with the base address.

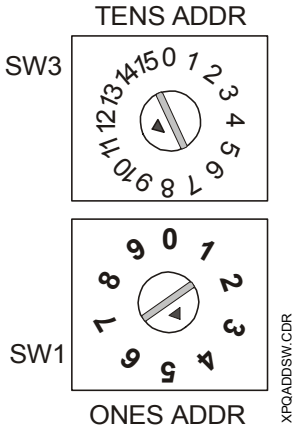


Figure 2.30 XPIQ-SLI Rotary Switches

To set the base address of the XPIQ, turn switch SW3 (Tens Address) until the arrow on the switch points to the number corresponding to the most significant digits (tens or hundreds/tens digits) of the address. Turn switch SW1 (Ones Address) until the arrow on the switch points to the number corresponding to the least significant digit (ones digit) of the address.

The base address setting illustrated in Figure 2.30 is 114. The arrow on SW3 (Tens Address) is pointing to '11' and the arrow on SW1 (Ones Address) is pointing to '4.'

All remaining addresses on an XPIQ system are automatically assigned by the motherboard in increasing order starting from the base address. The amount of the remaining addresses that will be consumed by an XPIQ system depends upon the number of channels and the number of speaker zones being used in the system.

Address Consumption

The total number of addresses used by the XPIQ is determined by the data programmed into the XPIQ via the PK-XPIQ software. The address points are assigned in order by the software. For ease in describing the addressing process, these address points have been assigned to groups and are described below. Addresses are assigned in the order of the groups: B, G, S, F, M.

B Base Address (SW1 & SW3 settings) - the base address is the first of the sequential addresses used by the XPIQ. This address acts as a monitor module which is reserved to indicate General Trouble.

G This variable has a value of 0 or 3, depending on what is selected when programming the "XPIQ Monitor Point Selection" option. If the "System Trouble Monitor Point" option is selected, G has a value of 0. If the "Trouble Monitor Points (General, AC Loss, Battery, Earth Fault" option is selected (required in Canada), G has a value of 3. If the separate points of this second option are not selected, all three troubles are reported as General Trouble using the Base Address.

S The addresses included in this group act as control modules that direct an XPIQ audio input channel to an audio amplifier speaker circuit. S can have a value of one through 16, depending on the points that are programmed. Note that only the points actually programmed will consume an address. For example, if a single audio channel is programmed to a single audio amplifier speaker circuit, only one address (Base Address + 1) will be used. If two audio channels are selectively programmed to two audio amplifier speaker circuits, four addresses will be used since each amplifier can be programmed to two different circuits. Refer to Table 2.4 through Table 2.19, which follow this section, for more information on various channel and speaker configurations.

F The addresses in this group act as control modules which are used to activate from one to four FFT (Firefighter Telephone circuits) or NACs (Notification Appliance Circuits). F can have a value from 0 to 4. If no circuits are programmed, F=0.

M M can have a value of 0 or 1. The address acts as a control module which can be programmed by the user for background music control. M=0 if background music is not controlled. M=1 if background music is controlled.

Once each of the above groups has been given a numerical value based on the number of addresses within the group, the total number of addresses consumed by the XPIQ is determined by adding together all the addresses:

Total number of FACP addresses used by the XPIQ = B + G + S + F + M

Channel and Speaker Configurations

The following tables detail the various channel and speaker configurations. The address for each combination appears at the intersection of the rows representing the input channels to be directed to an amplifier and the columns representing the amplifier speaker circuit to be activated. S has been given a numerical value.

Table 2.4 Single Channel, Single Speaker Zone

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	**B** + G + 1			
Channel 2				
Channel 3				
Channel 4				

F = 0, M = 0

Table 2.5 Single Channel, Two Speaker Zones

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	**B** + G + 1	B + G + 2		
Channel 2				
Channel 3				
Channel 4				

F = 0, M = 0

Table 2.6 Single Channel, Three Speaker Zones

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1	B + G + 2	B + G + 3	
Channel 2				
Channel 3				
Channel 4				

F = 0, M = 0

Table 2.7 Single Channel, Four Speaker Zones

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1	B + G + 2	B + G + 3	B + G + 4
Channel 2				
Channel 3				
Channel 4				

F = 0, M = 0

Table 2.8 Two Channels, Single Speaker Zone

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1			
Channel 2	B + G + 2			
Channel 3				
Channel 4				

F = 0, M = 0

Table 2.9 Two Channels, Two Speaker Zones

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1	B + G + 2		
Channel 2	B + G + 3	B + G + 4		
Channel 3				
Channel 4				

F = 0, M = 0

Table 2.10 Two Channels, Three Speaker Zones

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1	B + G + 2	B + G + 3	
Channel 2	B + G + 4	B + G + 5	B + G + 6	
Channel 3				
Channel 4				

F = 0, M = 0

Table 2.11 Two Channels, Four Speaker Zones

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1	B + G + 2	B + G + 3	B + G + 4
Channel 2	B + G + 5	B + G + 6	B + G + 7	B + G + 8
Channel 3				
Channel 4				

F = 0, M = 0

Table 2.12 Three Channel, Single Speaker Zone

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1			
Channel 2	B + G + 2			
Channel 3	B + G + 3			
Channel 4				

F = 0, M = 0

Table 2.13 Three Channels, Two Speaker Zones

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1	B + G + 2		
Channel 2	B + G + 3	B + G + 4		
Channel 3	B + G + 5	B + G + 6		
Channel 4				

F = 0, M = 0

Table 2.14 Three Channels Three Speaker Zones

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1	B + G + 2	B + G + 3	
Channel 2	B + G + 4	B + G + 5	B + G + 6	
Channel 3	B + G + 7	B + G + 8	B + G + 9	
Channel 4				

F = 0, M = 0

Table 2.15 Three Channels, Four Speaker Zones

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1	B + G + 2	B + G + 3	B + G + 4
Channel 2	B + G + 5	B + G + 6	B + G + 7	B + G + 8
Channel 3	B + G + 9	B + G + 10	B + G + 11	B + G + 12
Channel 4				

F = 0, M = 0

Table 2.16 Four Channels, Single Speaker Zone

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1			
Channel 2	B + G + 2			
Channel 3	B + G + 3			
Channel 4	B + G + 4			

F = 0, M = 0

Table 2.17 Four Channels, Two Speaker Zones

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1	B + G + 2		
Channel 2	B + G + 3	B + G + 4		
Channel 3	B + G + 5	B + G + 6		
Channel 4	B + G + 7	B + G + 8		

F = 0, M = 0

Table 2.18 Four Channels, Three Speaker Zones

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1	B + G + 2	B + G + 3	
Channel 2	B + G + 4	B + G + 5	B + G + 6	
Channel 3	B + G + 7	B + G + 8	B + G + 9	
Channel 4	B + G + 10	B + G + 11	B + G + 12	

F = 0, M = 0

Table 2.19 Four Channels, Four Speaker Zones

	Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
Channel 1	B + G + 1	B + G + 2	B + G + 3	B + G + 4
Channel 2	B + G + 5	B + G + 6	B + G + 7	B + G + 8
Channel 3	B + G + 9	B + G + 10	B + G + 11	B + G + 12
Channel 4	B + G + 13	B + G + 14	B + G + 15	B + G + 16

F = 0, M = 0

2.6.1.2 Canadian Dual Stage With XPIQ Generated Stage 1 and Stage 2 Tones

The Canadian Dual Stage mode of operation involves automatic FACP activated change from Stage 1 (Alert) to Stage 2 (Evacuate). A central AMG-1/E and control panel ACS annunciator provide microphone paging, using only a single voice riser. For this application, the XPIQ uses a single channel XPIQ-AIB1. The number of addresses used by the XPIQ is the same as for a three channel system. Stage 1 Alert is a 20 PPM (Pulse Per Minuter) tone generated locally on the XPIQ which uses channel 3 addresses. Stage 2 Evacuate is an XPIQ generated temporal tone tone which uses channel 2 addresses. The highest priority paging channel uses channel 1 addresses. There is no synchronization of tones between speaker zones from any two XPIQs. If synchronization is required, it is necessary to use an XPIQ-AIB4 for a three channel system. Program options are as follows:

- Change Temporal to steady tone
- Change Temporal to 120 PPM

Local Address Assignments

The following tables describe the speaker zone addressing for Canadian Dual Stage mode. In each table, **B** designates the starting address which is set by using switches SW1 and SW3 on the XPIQ-SLI. The starting address is dedicated to the general trouble function.

Table 2.20 Two Speaker Zones (1:1 Backup Amplifiers)

		Speaker Zone 1	Speaker Zone 2
PAGE	(XPIQ-AIB1 Input)	B + G + 1	B + G + 2
EVACUATE	(XPIQ-MB Evacuate Tone Generator)	B + G + 3	B + G + 4
ALERT	(XPIQ-MB Alert Tone Generator)	B + G + 5	B + G + 6

Table 2.21 Three Speaker Zones (3:1 Backup Amplifier)

		Speaker Zone 1	Speaker Zone 2	Speaker Zone 3
PAGE	(XPIQ-AIB1 Input)	B + G + 1	B + G + 2	B + G + 3
EVACUATE	(XPIQ-MB Evacuate Tone Generator)	B + G + 4	B + G + 5	B + G + 6
ALERT	(XPIQ-MB Alert Tone Generator)	B + G + 7	B + G + 8	B + G + 9

Table 2.22 Four Speaker Zones (No Backup Amplifiers)

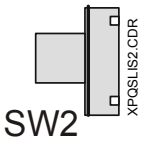
		Speaker Zone 1	Speaker Zone 2	Speaker Zone 3	Speaker Zone 4
PAGE	(XPIQ-AIB1 Input)	B + G +1	B + G + 2	B + G + 3	B + G + 4
EVACUATE	(XPIQ-MB Evacuate Tone Generator)	B + G + 5	B + G + 6	B + G + 7	B + G + 8
ALERT	(XPIQ-MB Alert Tone Generator)	B + G + 9	B + G + 10	B + G + 11	B + G + 12

Operation is as follows:

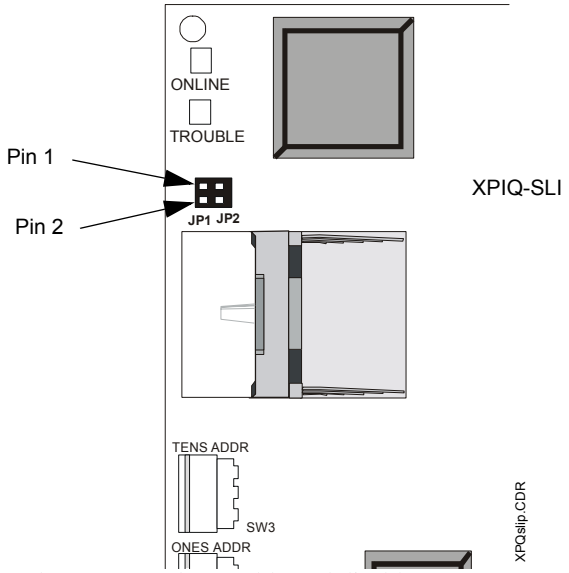
- ✓ Activation of Page points at any time causes the respective amplifier and speaker circuit to activate using the voice riser as the input. These points have the highest priority
- ✓ Activation of Evacuate points at any time causes the respective amplifier and speaker circuit to activate with the Stage 2 tone as the input. This takes priority over the Stage 1 Alert
- ✓ Activation of Alert points causes the respective speaker circuits to activate with the Stage 1 tone

2.6.1.3 SW2 Push-button Switch

Switch SW2 is used to verify the addresses programmed into the XPIQ. Pressing SW2 will cause the address to be displayed one digit at a time on the 7-segment LED display.

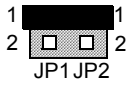


2.6.1.4 JP1 & JP2 Jumpers

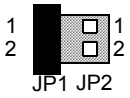


Jumpers JP1 and JP2 are used to enable and disable XPIQ-SLI software upgrade:

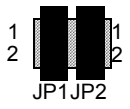
✓ Normal - Disable XPIQ-SLI software upgrade - Jumper JP1 Pin 1 to JP2 pin 1 (factory default setting)



✓ Enable Software Upgrade - XPIQ-SLI reprogramming or upgrade of the Flash memory (system program data) - Jumper JP1 pin 1 to JP1 pin 2



✓ Enable Boot Upgrade - When upgrading the Boot Sector, the PC will prompt for insertion of jumpers (shunts) as follows: - Jumper JP1 pin 1 to JP1 pin 2, and jumper JP2 pin 1 to JP2 pin 2. The PK-XPIQ gives the programmer the option of changing the XPIQ's boot code.

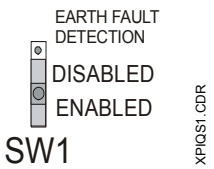


NOTE: The boot code allows the application software to function and would not be changed under normal circumstances. It would become necessary to alter the boot code only when future hardware additions or changes require substantial differences in the mechanism for downloading. In this case, instructions will be supplied for altering the boot code.

2.6.2 XPIQ-MB Motherboard

2.6.2.1 SW1 Slide Switch - Earth Fault Detection

The Earth Fault Detection circuit monitors all wiring and various circuits for a ground fault condition (low resistance to ground). The detection circuit can be enabled to monitor for ground faults by placing switch SW1 in the Enabled position. The switch to the right is illustrated in the Enabled position.

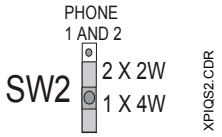


The detection circuit can be disabled from monitoring for ground faults by placing switch SW1 in the Disabled position. The ground fault detection circuit might be disabled for systems with components that have their own detection circuits. Only one ground fault detection circuit can be enabled in interconnected components. Note that Earth Fault Detection must also be enabled in programming. This acts as a safety feature since ground fault programming and SW1 switch position must agree or a trouble will be generated.

2.6.2.2 SW2 Slide Switch - Phone Circuits 1 & 2 Wiring

Telephone/NAC circuits 1 & 2 can be configured as two Class B (Style Y) circuits or one Class A (Style Z) circuit. Switch SW2 is used to configured the circuits as follows:

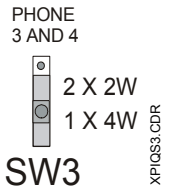
Class B (Style Y) - place SW2 in the 2W position (2 wire)
Class A (Style Z) - place SW2 in the 4W position (4 wire)
as illustrated in the figure to the right



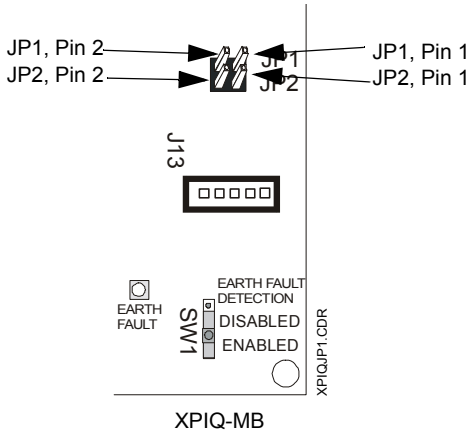
2.6.2.3 SW3 Slide Switch - Phone Circuits 3 & 4 Wiring

Telephone/NAC circuits 3 & 4 can be configured as two Class B (Style Y) circuits or one Class A (Style Z) circuit. Switch SW3 is used to configured the circuits as follows:

Class B (Style Y) - place SW3 in the 2W position (2 wire)
Class A (Style Z) - place SW3 in the 4W position (4 wire)
as illustrated in the figure to the right



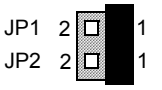
2.6.2.4 JP1 & JP2 Jumpers



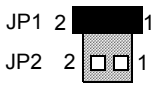
XPIQ-MB

Jumpers JP1 and JP2 are only used to enable or disable the software upgrade of the XPIQ-MB motherboard. The jumper must remain in the Normal position during XPIQ programming configuration. The following describes the shunt (jumper) positions:

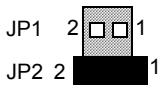
✓ Normal - Disable XPIQ-MB software upgrade
Jumper JP1 Pin 1 to JP2 pin 1 (factory default setting)



✓ Enable Software Upgrade - Enable XPIQ-MB software upgrade
Jumper JP1 pin 1 to JP1 pin 2



✓ Enable Boot Upgrade - Enable XPIQ-MB reprogramming or upgrade of the Boot Sector memory (boot file)
Jumper JP2 pin 1 to JP2 pin 2



SECTION 3 Programming

3.1 Overview

The XPIQ must be programmed using the PK-XPIQ programming utility installed on a user supplied PC (Personal Computer). A program file, containing site-specific configuration data, can be easily created and stored on the PC and then downloaded to the XPIQ via the serial port. Program files can also be retrieved from the XPIQ, modified and then downloaded back into the XPIQ.

It is important to note that each time a new program is created or an existing program is modified and downloaded to the XPIQ, the fire alarm system must be thoroughly tested to ensure proper operation.

In addition to programming, the PK-XPIQ can be used to retrieve information about current software revisions, system troubles, installed hardware, parameters and status.

3.2 Inventory

XPIQ programming is accomplished using the PK-XPIQ Programming Kit, which is ordered separately. The kit consists of the following:

- ❒ PK-XPIQ software on CD-ROM
- ❒ Programming cable (P/N: 75554) which connects between J13 on the XPIQ motherboard and the serial port (EIA-232) on the PC

3.3 PK-XPIQ Software Installation

The PK-XPIQ software, which is supplied on a CD-ROM (Compact Disk), must be installed on the PC hard drive. Insert the CD-ROM, access the CD-ROM drive and double-click the SETUP.EXE file. During the installation, a screen will indicate the default drive as **C:** for loading the software to the hard drive. The default drive and directory can be changed by clicking the appropriate screen button and entering the new drive name and/or directory.

3.4 Connection of XPIQ to PC

The PK-XPIQ software can be used in two ways:

- Off-line: the XPIQ does not have to be physically connected to the PC's serial port in order to use the programming application. Program files can be created or modified for later downloading
- On-line: the XPIQ must be physically connected to the PC's serial port. Program files can be transferred between the XPIQ and PC

3.5 Using PK-XPIQ Software

Following completion of the software installation, an XPIQ icon is created. Clicking the icon will launch the program. An On-line Help feature has been incorporated into the software. For information about a screen option, click the question mark (**?**) which is located in the upper right corner of each screen.

3.6 Programming the XPIQ

3.6.1 Serial Port Configuration

Clicking the XPIQ Interface icon will display the initial programming screen. If this is the first time the program is run, the PC should be configured for connection to an XPIQ by selecting an available COM Port and Baud Rate:

✓ Click **Options** in the upper left corner of the screen

✓ View the available serial ports by clicking **COM PORT**

✓ Choose from **COM1**, **COM2**, **COM3** or **COM4** by clicking it

✓ View the available baud rate by clicking **Baud Rate**

After selections have been made, they will not change unless the programmer repeats the preceding procedures.

3.6.2 Program Screen Options

Four options are available in the initial programming screen:

- Work Off-line: create or modify a program file. The XPIQ does not have to be connected to the PC for this option
- Print Address Data: prints a list of XPIQ SLC points and addresses for the parameters and SLC starting address which have been previously programmed. The XPIQ does not have to be connected to the PC for this option
- Connect to XPIQ: connect to XPIQ to retrieve information about current software revisions, system troubles, installed hardware, parameters and status information. The XPIQ must be connected to the PC for this option
- Load XPIQ Software: download to XPIQ the software program created or modified in the first option. The XPIQ must be connected to the PC for this option

It is important to note that, for proper system operation, the parameters programmed into the XPIQ must agree with the installed hardware and switch settings on the XPIQ. When XPIQ programming is completed, check the yellow general trouble LED. If this LED is on, check for system errors or mismatches by reconnecting and clicking the *Connect to XPIQ* option in the PK-XPIQ program.

3.6.3 Work Off-line

Clicking the Work Off-line button will display a window with the options:

- *Load Parameter File* which allows editing of an existing program file. Clicking this option will prompt for the file name
- *Start New Parameter File* which allows creation of a new program file
- *Cancel* to return to main screen

Choosing *Load Parameter File* or *Start New Parameter File* will allow the programmer to step through a series of seven parameter screens by clicking the *Next* button. The screens are used for:

✓ Audio Selection Setup

✓ Speaker Zone Info

✓ Amplifier Setup

✓ Telephone/NAC Setup

✓ Microphone Setup

✓ General Setup

✓ Data Communication Setup

3.6.3.1 Audio Selection Setup

Source
The source *Audio Selection Setup* screen allows the programmer to configure the XPIQ for one to four audio channels with or without backup audio. The audio source selection for audio channel 1 will determine the available audio sources for channels 2 through 4 as described in the following table:

Selected Audio Source	Available Audio Sources		
Channel 1	Channel 2	Channel 3	Channel 4
Tone Generator 1 (evacuation)	Tone Generator 2 (alert)	None	None
AIB-1	Tone Generator 1 (evacuation)	Tone Generator 2 (alert)	None
AIB-4 (Input 1)	AIB-4 (Input 2)	AIB-4 (Input 3)	AIB-4 (Input 4)

Backup Tone Source
A backup tone source can be selected to take over upon failure of the primary audio source. The primary audio source selection for each channel will determine the available backup tone source.

	Primary Audio Source	Backup Audio Source
Channel 1	Tone Generator 1	Tone Generator 2
	AIB-1	Tone Generator 1 or 2
	AIB-4 (Input 1)	Tone Generator 1 or 2
Channel 2	Tone Generator 1	Tone Generator 2
	Tone Generator 2	None
	AIB-4 (Input 2)	Tone Generator 1 or 2
Channel 3	Tone Generator 2	None
	AIB-4 (Input 3)	Tone Generator 1 or 2
Channel 4	AIB-4 (Input 4)	Tone Generator 1 or 2

Tone Chip Tone Selection

The tone selection can be made for Tone Chip 1 (Tone Generator 1) and Tone Chip 2 (Tone Generator 2) by clicking the corresponding Tone Chip window to display a pull-down window. Select the tone by clicking the desired choice within the window.

3.6.3.2 Speaker Zone Info Screen

This screen is used to configure the quantity and type of speaker circuits connected to the XPIQ.

Number of Speaker Zones
Enter the total number of speaker circuits (1 - 4) for the XPIQ

Speaker Wiring Type
Select either Class A or Class B wiring by clicking the switch illustration in this screen.

Background Music Enable
Background music can be controlled by an SLC control module point if desired. This will allow programming control of all controlled speaker circuits instead of having them enabled for background music all of the time. Click the *Controlled* check box after the zones which are to be controlled through programming.

3.6.3.3 Amplifier Setup Screen

Available options in the *Amplifier Setup* screen are determined by the number of speaker circuits selected in the *Speaker Zone Info* screen. Select "*25V 25 Watt Amplifier", "70.7V 22 Watt Amplifier",* or "*None"* for Amplifier 1 through 4 and then select *None*, *One*, *Two* or *External* for Backup Amplifier.

Quantity of Speaker Circuits	Primary Amplifiers Required	Maximum Internal Backup Amplifiers[1]
1	1	1
2	2	2
3	3	1
4	4	None

Table Footnote

1. External amplifiers can be used as an alternative to the internal amplifiers

3.6.3.4 Telephone/NAC Setup Screen

Telephone Circuits or Notification Appliance Circuits can be connected to the XPIQ. If the circuits are wired Class A, a maximum of two circuits can be accommodated. If they are wired Class B, a maximum of four circuits can be connected.

Use the Telephone/NAC Setup screen to select either Telephone or NAC circuits, wiring style Class A or Class B and the total number of circuits (maximum 2 Class A or 4 Class B).

3.6.3.5 Microphone Setup Screen

The Microphone Setup screen is used to program the XPIQ for use with an XPIQ-RMI (Remote Microphone Interface) board. Use this screen to select whether the Microphone is to be used for Emergency Paging (operates during AC failure) or Nonemergency Paging (does not operate during AC failure or when any channel is active).

If the microphone is configured for emergency use, select Microphone Priority where High Priority allows microphone paging over all channels or Low Priority allows paging over all channels except channel 1.

Microphone Cascading should be enabled only if the XPIQ with the XPIQ-RMI is either a source or receiver of an external Remote Microphone.

3.6.3.6 General Setup Screen

The General Setup screen is used to configure a variety of XPIQ features as described below:

Earth Fault Select
The earth fault detection circuit should normally be enabled on a single XPIQ. If multiple XPIQs are connected together, one earth fault detection circuit should be enabled and the others disabled. Consult the LAHJ (Local Authority Having Jurisdiction) before disabling earth fault.

XPIQ Monitor Point Selection
To enable one address point as System Trouble (XPIQ Base Address), select the System Trouble Monitor Point option. To enable additional trouble monitor points, select the "General, AC Loss, Battery, Earth Fault" selection. Four SLC address points will be consumed with this selection. (The first of these address points is the XPIQ Base Address.)

AC Failure Reporting Delay
Select *None* for no delay in reporting an AC power failure, *8 Hours* for an eight hour delay (24 hour standby time) in reporting an AC power failure or *16 Hours* for a sixteen hour delay (60

hour standby time).

Data Communication Setup Screen
Use this screen to select whether or not an XPIQ-SLI Serial Link Interface board is installed, and if the XPIQ-SLI degraded mode should be enabled.

Click Finish to view the file save window and then save the program using a job-specific name.

3.6.4 Print Address Data

The Print Address Data option is used only as a reference. Clicking the *Print Address Data* button will display the Parameter File Load window. Select and load an XPIQ program from the available list of programs.

In the Select SLC Base Address screen, enter the Base Address that is physically set on the XPIQ. Note that the Base Address must be a value which, when added to all points consumed by the XPIQ, does not exceed 159 or 99, depending on the panel used. The resulting screen will display each point being used by the XPIQ and its corresponding address. This information can be used for programming the Fire Alarm Control Panel to which the XPIQ is connected.

3.6.5 Connect to XPIQ

Clicking the *Connect to XPIQ* button will display a screen with a variety of options which allow retrieving and viewing of various XPIQ parameters and conditions. When the connection is made between the XPIQ and PC, the XPIQ-SLI 7-segment LED Display will flash the letters **OFF** to indicate that the XPIQ is Off Line and connected to the PC.

The various options are accessed by clicking the appropriate button. The available options during this mode of operation include the following:

- View Boot Code* - displays on the PC monitor the XPIQ Boot Program information
- View Application Code - displays on the PC monitor the XPIQ Application Program information
- View SLI Boot Code* - displays on the PC monitor the XPIQ-SLI Boot Program information
- View SLI Application Code - displays on the PC monitor the XPIQ-SLI Application Program information
- Save Parameter - allows the operator to retrieve the parameters from the XPIQ and save the information in a file
- View Parameter - allows the operator to view on the PC monitor the parameters from the XPIQ
- Display Current Address - displays a list of XPIQ SLC points and addresses for the parameters and SLC starting address which has been physically set on the XPIQ addressing switches
- View Trouble Info - provides a list of possible troubles which can occur on the XPIQ. Current troubles are shown in red
- View XPIQ Status - displays in real-time the status of XPIQ circuits such as Speakers, NACs, etc.
- View Current Configuration - displays a list of actual hardware which is installed in the XPIQ
- View XPIQ Meter - displays meters which indicate the battery current and charger current
- Reset - disconnects the XPIQ from the PC and returns the XPIQ to an On Line condition

* The boot code allows the application software to function and would not be changed under normal circumstances. It would become necessary to alter the boot code only when future hardware additions or changes require substantial differences in the mechanism for downloading. In this case, instructions will be supplied for altering the boot code.

3.6.6 Load XPIQ

Clicking the *Load XPIQ* button will display a screen with a variety of options which allow programming the XPIQ from the PC. When the connection is made between the XPIQ and PC, the XPIQ-SLI 7-segment LED Display will steadily display the letter **b** to indicate that the XPIQ is connected to the PC and ready to receive any of the programmed options listed below.

The various options are accessed by clicking the appropriate button. The available options during this mode of operation include the following:

- Boot Code - allows downloading of the selected boot program to the XPIQ
- Parameter - allows downloading of the selected parameter file to the XPIQ
- Application Code - allows downloading of the selected application program to the XPIQ
- SLI Boot - allows downloading of the selected boot program to the XPIQ-SLI
- SLI Application - allows downloading of the selected application program to the XPIQ-SLI
- Reset - disconnects the XPIQ from the PC and returns the XPIQ to an On Line condition

3.7 Panel Programming

The XPIQ must be programmed at the FACP with Software Type IDs that are panel-specific. Refer to the tables belowTable 3.1 for appropriate codes.

Address Point Group[1]	Point Type	Module Type	NFS-3030		VeriFire for NFS-3030 and NFS-640		Label examples
			Type Code Label[4]	FlashScan Type[4]	Type Code Label[4]	FlashScan Type[4]	
B	Base Address Monitor Module	Monitor	AUDIO SYSTEM	XPIQ GEN MON	AUDIO SYSTEM	XPIQ TROUBLE	XPIQ SYSTEM TROUBLE
G	Optional separate troubles for AC fail, battery fail and earth fault (required in Canada)	Monitor	AUDIO SYSTEM	XPIQ AC MON XPIQ BATT MON XPIQ EF MON	AUDIO SYSTEM	XPIQ AC XPIQ BATTERY XPIQ GND FLT	XPIQ AC FAIL XPIQ BAT FAIL XPIQ E FAULT
S	Speaker/channel control points	Control	SPEAKER	XPIQ SPKR	SPEAKER	XPIQ SPEAKER	Note 2 PAGE FLOOR1 PAGE FLOOR 2 EVAC FLOOR 1 EVAC FLOOR 2 ALERT FLOOR 1, ALERT FLOOR 2.
F	Firefighter telephone points or strobe (NAC) circuits	Control	TELEPHONE CONTROL	XPIQ TELE XPIQ NAC	TELEPHONE CONTROL	XPIQ TELEPHONE XPIQ STROBE	Note 3 TELEPHONE FLOOR 1 STROBES FLOOR 1
M	Optional background music control point	Control	AUDIBLE CKT	XPIQ BGND	AUDIBLE CKT	XPIQ MUSIC	BACKGROUND MUSIC

Notes:
1. Refer to the addressing chapter in the addressing section of the XPIQ manual for more information on these groups.
2. The label should describe audio content and speaker zone. The example shown in the table is for a three-channel (channel 1 = PAGE, channel 2 = EVACUATE, channel 3 = ALERT), two-zone (speaker zone 1 = FLOOR 1, speaker zone 2 = FLOOR 2) system.
3. Short trouble on telephone zones may be indicated as TROUBLE OPEN.
4. Autoprogramming assigns these values with the following exception: for the strobe (NAC) circuits in Address Point Group F, the NFS-640 assigns the Panel Type ID “CONTROL”, then presents choices from which the programmer should select one of these four: STROBE CKT, HORN CIRCUIT, BELL CIRCUIT, AUDIBLE.

Table 3.1 Table 1 FACP Software Type IDs and Label Information, Part 1

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Address Point Group[1]	Point Type	NFS-640	AM2020/ AFP1010	AFP-300/400, AFC-600	Label examples
B	Base Address Monitor Module	POWER_MONITR	MTRB	TROUBLE MON	XPIQ SYSTEM TROUBLE
G	Optional separate troubles for AC fail, battery fail and earth fault (required in Canada)	TROUBLE_MON TROUBLE_MON TROUBLE_MON	MTRB MTRB MTRB	TROUBLE MON	XPIQ AC FAIL XPIQ BAT FAIL XPIQ E FAULT
S	Speaker/channel control points	SPEAKER	SPKR	SPEAKER	Note 2 PAGE FLOOR1 PAGE FLOOR 2 EVAC FLOOR 1 EVAC FLOOR 2 ALERT FLOOR 1, ALERT FLOOR 2.
F	Firefighter telephone points or strobe (NAC) circuits	TELEPHONE CONTROL	TELE CON	TELEPHONE STROBE CKT HORN CIRCUIT BELL CIRCUIT AUDIBLE CIRCUIT	Note 3 TELEPHONE FLOOR 1 STROBES FLOOR 1
M	Optional background music control point	CONTROL	CON	CONTROL	BACKGROUND MUSIC

Notes:
1. Refer to the addressing chapter in the addressing section of the XPIQ manual for more information on these groups.
2. The label should describe audio content and speaker zone. The example shown in the table is for a three-channel (channel 1 = PAGE, channel 2 = EVACUATE, channel 3 = ALERT), two-zone (speaker zone 1 = FLOOR 1, speaker zone 2 = FLOOR 2) system.
3. Short trouble on telephone zones may be indicated as TROUBLE OPEN.

Table 3.2 Table 2 FACP Software Type IDs and Label Information

SECTION 4 Power Supply Calculations

This section contains instructions and tables for calculating power supply currents in alarm and standby conditions. Power supply and battery calculations require a four-step process which consists of the following steps:

1. Calculating the total amount of AC branch circuit current required to operate the system
2. Calculating the power supply load current for non-fire and fire alarm conditions and calculating the secondary (battery) load
3. Calculating the size (Ampere hour) of batteries required to support the system if an AC power loss occurs
4. Selecting the proper size batteries for the system

AC Branch Circuit Calculation

The XPIQ transponder requires connection to a separate, dedicated AC branch circuit (120 VAC or 240 VAC), 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 nonfire alarm equipment may be powered from the fire alarm branch circuit. The branch circuit wire must run continuously, without any disconnect devices, from the power source to the fire alarm control panel. Overcurrent protection for this circuit must comply with Article 760 of the National Electrical Codes as well as local codes. Use 14 AWG wire with 600 volt insulation for this branch circuit.

The total amount of current, in AC amperes, that must be supplied to the system is as follows:

- XPIQ-PS 120 VAC branch circuit requirements: 3.0A
- XPIQ-PSE 240 VAC branch circuit requirements: 1.5A

Calculating the System Current Draw

The XPIQ transponder must be capable of powering all internal and external devices continuously during the nonfire alarm condition. To calculate the nonfire alarm load on the system power supply when primary power is applied, use Calculation Column 1 in Table 4.2. The control panel must support a larger load current during a fire alarm condition. To calculate the fire alarm load on the power supply, use Calculation Column 2 in Table 4.2. The secondary power source (batteries) must be able to power the system during a primary power loss. To calculate the nonfire alarm load on the secondary power source, use Calculation Column 3 in Table 4.2.

When calculating current draw and the battery size, note the following:

- ‘Primary’ refers to the main power source for the XPIQ transponder
- ‘Secondary’ refers to the XPIQ transponder’s backup batteries
- All currents are given in amperes. Table 4.1 shows how to convert milliamperes and microamperes to full amperes

To convert...	Multiply	Example
Milliamperes (mA) to amperes (A)	mA x 0.001	3 mA x 0.001 = 0.003 A
Microamperes (µA) to amperes (A)	µA x 0.000001	300 µA x 0.000001 = 0.0003 A

Table 4.1 Converting to Full Amperes

How to use Table 4.2 and Table 4.3 to calculate system current draws

1. Enter the quantity of devices in both tables
2. Enter into Table 4.2, where required, the standby current drawn from the batteries in a nonfire alarm condition during a loss of AC power. Refer to the Notifier Device Compatibility Document for compatible devices and their current draw
3. Enter into 3, where required, the alarm current drawn from the batteries in a fire alarm condition during a loss of AC power. Refer to the Notifier Device Compatibility Document for compatible devices and their current draw
4. Calculate the current draws for each device in each table
5. Sum the total current for each table
6. Copy the totals from Table 4.2 and Table 4.4 into Table 4.4

Table 4.2 is used for calculating the standby current draw. Calculate the current and enter the total (in amperes) in the bottom row. When finished, copy the totals from this table to Table 4.4.

Device Type	Secondary Standby Current in amperes				
	Qty	X	device current draw in amperes	=	total
XPIQ-PS(E) Power Supply	1	X	0.022	=	
XPIQ-MB Mother Board	1	X	0.075	=	
XPIQ-SLI Signaling Line Interface	1	X	0.023	=	
XPIQ-AA25 (primary and backup) Audio Amplifier	[ ]	X	0.020	=	
XPIQ-AA2270 (primary and backup) Audio Amplifier	[ ]	X	0.080	=	
XPIQ-AIB1 Audio Input Board	[ ]	X	0.011	=	
XPIQ-AIB4 Audio Input Board	[ ]	X	0.030	=	
XPIQ-CA Class A Converter Module	[ ]	X	0.005	=	
XPIQ-RMI Remote Microphone Interface	[ ]	X	0.009	=	
RM-1(SA) Remote Microphone	[ ]	X	0.020	=	
Standby current draw of other devices[1]	[ ]	X	_____	=	
Total Standby Current	sum of all current draws from right column			=	

Table 4.2 Standby Current Draw Calculations

Table Footnote

1. Other devices include devices separate from the XPIQ but backed-up by the same battery: for example, APS-6R used for NAC connected to the same battery as the XPIQ-PS(E)

Table 4.3 is used for calculating alarm current draw. Calculate the current and enter the total (in amperes) in the bottom row. When finished, copy the totals from this table to Table 4.4.

Device Type	Alarm Current in amperes				
	Qty	X	device current draw in amperes	=	total
XPIQ-PS(E) Power Supply	1	X	0.022	=	
XPIQ-MB Mother Board	1	X	0.075	=	
XPIQ-SLI Signaling Line Interface	1	X	0.023	=	
XPIQ-AA25 Primary Audio Amplifier	[ ]	X	2.125	=	
XPIQ-AA25 used as external backup[1]	1 or 0	X	2.125	=	
XPIQ-AA2270 Primary Audio Amplifier	[ ]	X	2.440	=	
XPIQ-AA2270 used as external backup[1]	1 or 0	X	2.440	=	
XPIQ-AIB1 Audio Input Board	[ ]	X	0.011	=	
XPIQ-AIB4 Audio Input Board	[ ]	X	0.030	=	
XPIQ-CA Class A Converter Module	[ ]	X	0.005	=	
XPIQ-RMI Remote Microphone Interface	[ ]	X	0.009	=	
RM-1(SA) Remote Microphone	[ ]	X	0.020	=	
Alarm current draw of other devices[2]	[ ]	X	_____	=	
Total Alarm Current	sum of all current draws from right column			=	

Table 4.3 Alarm Current Draw Calculations

Table Footnotes:

1. Include XPIQ-AA25/XPIQ-AA2270 backup amplifier when used as an external backup to XPIQs that have their own batteries. These applications are shown in Figure 2.15 on page 40 and Figure 2.17 on page 42.
2. Other devices include devices separate from the XPIQ but backed up by the same battery: for example, APS-6R used for NAC connected to the same battery as the XPIQ-PS(E).

Calculating the Required Battery Capacity

Use Table 4.4 to calculate the total Standby and Alarm load in Ampere hours (Ah). This total load determines the battery size in Ah, required to support the XPIQ transponder under the loss of AC power. Complete Table 4.4 as follows:

1. Enter the totals from Table 4.2 and Table 4.3 where shown
2. Enter the NFPA Standby and Alarm times (refer to 'NFPA Battery Requirements' below)
3. Calculate the Ampere hours for Standby and Alarm, then sum the Standby and Alarm Ampere hours
4. Multiply the sum by the derating factor of 1.2 (1.5 for ULC installations) to get the proper battery size in Ah
5. Write the Ampere hour requirements on the Protected Premises label located inside the cabinet door

Secondary Standby Load (total from Table 4.2) [ ]	Required Standby Time (24 or 60 hours) x [ ]	 = Ah
Secondary Alarm Load (total from Table 4.3) [ ]	Required Alarm Time (For 5 min., enter 0.084, for 10 min., enter 0.168 for 15 min. enter 0.25) x [ ]	 = Ah
Sum of Standby and Alarm Ampere hours		= Ah
Multiply by the Derating Factor		x 1.2 (1.5 for ULC installations)
Battery Size, Total Ampere hours Required		= Ah

Table 4.4 Total Secondary Power Requirements at 24 VDC

Notes

Numerics

A

B

C

D

E

F

G

I

L

M

P

R

S

T

W

X

Notes

Notes

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