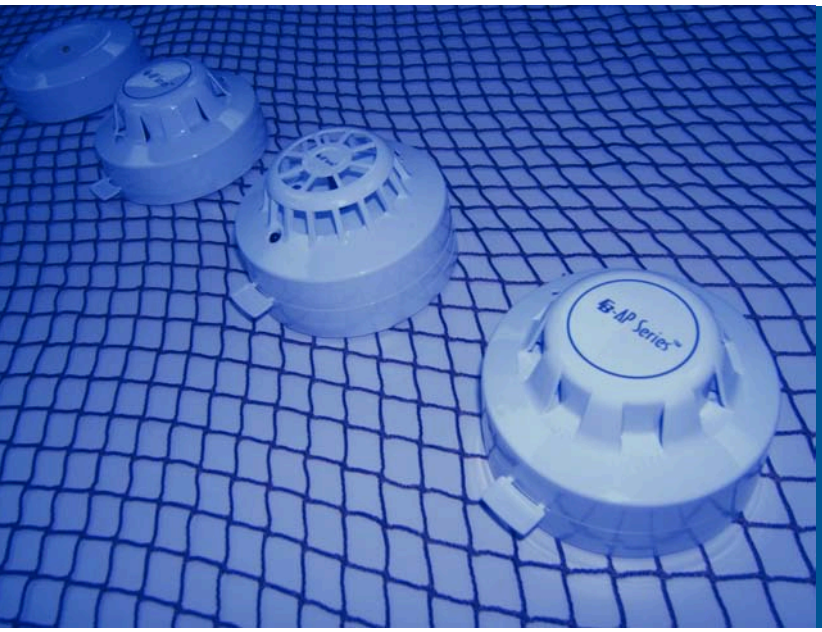

FireBus Systems, Inc.
FB-MESH/IP™ Series
Basic Module Installation Manual

Standard Display Module

FB-AP™ Series Loop Module

Virtual Panel Module

Power Supply

Literature No: 08-MIM001-A08

About FireBus™

FireBus Systems, Inc., located in Houston, TX, is focused on the engineering and development of managed IP-based life safety fire detectors and equipment and other enabling technologies to Fire & Gas System users and system integrators. These products broaden their field device choices while reducing restrictions on how they can be integrated in an approved manner

Notice

Although reasonable effort is made to ensure that the information in this document is complete and accurate at the time of release, FireBus Systems, Inc., cannot assume responsibility for any existing errors. Changes and/or corrections to the information contained in this document may be incorporated in future versions.

Your Responsibility for Your Systems Security

You are responsible for the security of your system. Product administration to prevent unauthorized use and access is your responsibility. Your system administrator should read all documents provided with this product to fully understand the architecture and features available in order to reduce your risk of incurring charges for unlicensed use of FireBus Systems products.

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08-MIM001-A08 (DRAFT)

Table of Contents

Introduction

1

About This Document and Fire Systems Limitations

Welcome to the FB-MESH/IP™ Series Basic Module Installation Guide, which provides detailed installation and configuration instructions for the essential modules needed to assemble a working Fire Alarm Control Panel (FACP).

This chapter has these sections:

Intended Audience

This guide is primarily intended for system installers and technicians who are responsible for the installation of FB-AP™ Series Fire Detectors control systems and FB-AP™ Series loop network devices. It assumes you have a basic understanding of the following:

- Basic fire alarm systems and their operation
- FB-AP™ Series I/O Devices
- Basic electrical and wiring diagram schematics
- Electrical characteristics and basic connectivity

For Programming questions and issues, refer to the FB-MESH/IP™ Series Basic Module Operation Manual.

Chapter Summaries

To help you locate information, this Installation manual begins with a Table of Contents and ends with an Index. The guide contains the following chapters and appendixes:

- Chapter 1, “Introduction,”, provides an overview of the guide, identifies the primary audience, introduces documentation conventions, and lists any reference information available at the time of writing.
- Chapter 2, “Physical Installation” on page 07, provides information regarding the physical installation housings, including the various panel configurations and their component makeup.
- Chapter 3, “Power Installation” on page 23, provides information about powering the various panels and modules, including wiring and support specifications.
- Chapter 4, “Module Installation” on page 27, provides information regarding the SDM, ALM, Processor Board and RTR-1 switch board layouts and connector assignments.
- Chapter 5, “Field Device Installation” on page 49 provides information about device installation in the field, including necessary wiring references and guidelines.
- Chapter-6, “Device Compatibility” on page 59 provides information about Notification Device compatibility.
- Appendix, “Device Interface Specification” on page 67 includes specific device specification information.

Document Conventions

This guide uses the following document conventions:

The version number appears on the inside front cover of this guide. Among other things, this number identifies the month, year and version of the guide you are currently reading. The version number looks like the following:

08-MIM001-A08 (DRAFT)

Bold type is generally used for emphasis, values of options, variables, the names of command objects and fields, and for the first use of a term being defined in the document.

Italic type is used for document titles and for words, letters and terms us in like manner.

Related Resources

Consult these additional resources as necessary:

FB-MESH/IP™ Series Basic Module Operation Manual, FireBus Systems, Inc., 2008. (08-MOM001-A08)

Fire Alarm System Limitations

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 72-2002 (NFPA 72-2002), manufacturers recommendations, State and local codes.

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 floor or level 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 due to one of the following reasons:

- Barriers such as closed or partially closed doors, walls, or chimneys that 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 the detectors, the detectors will not go into alarm.

Smoke detectors, even when working properly, have sensing limitations. Detectors that have photoelectric 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 the best, nor are they necessarily able to 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 NOTE: 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 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 the following:

Strobes can, under certain circumstances, cause seizures in people with conditions such as epilepsy.

Studies have show 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 owners responsibility to conduct fire drills and other training exercises 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 period of 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 72-2002 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.

Installation Precautions

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 the unit until this manual has been reviewed and understood.

CAUTION: System Re-acceptance Test after Software Changes. To ensure proper system operation, this product must be listed in accordance with NFPA 72-2002 Chapter 7 after any programming operation or change in site-specific software occurs. Re-acceptance testing is required after any change, addition or deletion of system components or after any modification, repair or adjustment to system hardware or wiring occurs.

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

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

Verify that wire sizes are adequate for all initiating and indicating device loops. Most devices cannot tolerate more than a 10% I.R. drop from the specified 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 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, filling, reaming, or punching of the enclosure. When possible, make all cable entries from the sides or rear of the enclosure. Before making modifications, verify that the modifications will not interfere with the battery, transformer, and printed circuit board locations.

Do not tighten screw terminals more than 9 in-lbs. Over-tightening may damage threads, resulting in reduced terminal contact pressure and difficulty with terminal screw 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 and operating manuals. These instructions must be followed to avoid damage to the control panel and associated equipment. MESH/IP™ Series operation and reliability depend upon proper installation by authorized personnel.

Physical Installation

2

This chapter provides information about the physical installation of the various modules and components of the FB-AP™ network.

This chapter covers the following topics:

Overview

PART NUMBER	DESCRIPTION
VSDM	Standard Display Module
VALM-12	FB-AP™ Loop Module
PS-8	Power Supply (8 amp)
PSM	Power Supply Monitor
BC	Battery Charger
CCR	Common Control Relay Card
MBLR	Line Reversal/Masterbox Card
KBD	Keyboard
KP	Keypad
IPF-12	IPF Single Loop Panel
IPF -12-K	IPF Single Loop Panel with Keyboard
IPF -XL	IPF Multi-Loop Panel
IPF -XL-K	IPF Multi-Loop Panel with Keyboard
REM-1	Remote Module
REM-1P	Remote Module w/Power Supply, Battery Charger
REM-VSDM	Remote IPF Standard Display Module
REM-VSDM2	Remote IPF Standard Display Module w/VALM
REM-VSDM2C	Remote Module with Visual Display

Product Information

The fire panels offered by FireBus fall into one of 5 basic assemblies, each designed to meet different physical constraints of the intended installation site. The assemblies are summarized in the following table, Figure 2-1 MESH/IP™ Product Reference, which details the various components that comprise each product. Note that some panel assemblies are identical, other than for the inclusion of the QWERTY keyboard option. The larger cabinets are designed in such manner to house multiple VALM-12 assemblies (as opposed to the single board entries), along with the necessary power supplies and charges to support them.

Product Name	Backbox Dimensions	VSDM/ VPM	Module Slot[1]	PS-8	BC/ PSM	General Contact Slots[2]	Keyboard
IPF-12	14Wx23Hx4.5D	1	1	1	1	2	-
IPF-12-K	14Wx23Hx4.5D	1	1	1	1	2	1
IPF-XL	22Wx30Hx5.5D	1	5	2	2	2	-
IPF-XL-K	22Wx30Hx5.5D	1	5	2	2	2	1
REM-1	9Wx12Hx3D	-	1	-	-	-	-
REM-1P	14Wx23Hx4.5D	-	1	1	1	-	-
REM-VSDM	14Wx10.5Hx4.5D	1	-	-	-	-	-
REM-VSDM2	14Wx10.5Hx4.5D	1	2	-	-	-	-
REM-VSDM2C	14Wx10.5Hx4.5D	1	1	-	-	2	-

[1] May contain VALM **or** RTR-1 **or** RTR-2 (in applicable configurations)
[2] General Contact Slots may hold any combination of Common Control Relay (CCR) boards and/or Line Reversal/Masterbox (MBLR)

Figure 2-1 – MESH/IP™ Product Reference

IPF-12 - Single Loop Panel

Backbox Dimensions	14W x 23H x 4.5D
VDM	IPF Display Module
(1) Module Slot - VALM-12	FB-AP™ Loop Module FB-AP™ Loops: 1 NAC Circuits: 2
PS-8	Power Supply (8 amp)
PSM	Power Supply Monitor
BC	Battery Charger
(2) General Contact Slots	Any combination of: Common Control Relay Card (CCR) Line Reversal/Masterbox Card (MBLR)

NOTE(s):

- All field wiring shall comply with Article 760 of the National Electric Code (NEC).

For general panel wiring diagrams, refer to the following IPF-12-K section.

IPF-12-K - Single Loop Panel w/keyboard

Backbox Dimensions	14W x 23H x 4.5D
VDM	IPF Display Module
(1) Module Slot - VALM-12	FB-AP™ Loop Module FB-AP™ Loops: 1 NAC Circuits: 2
PS-8	Power Supply (8 amp)
PSM	Power Supply Monitor
BC	Battery Charger
(2) General Contact Slots	Any combination of: Common Control Relay Card (CCR) Line Reversal/Masterbox Card (MBLR)
KBD	QWERTY Keypad

NOTE(s):

- Identical to the IPF-12 with QWERTY keyboard installation added.

All field wiring shall comply with Article 760 of the National Electric Code (NEC).

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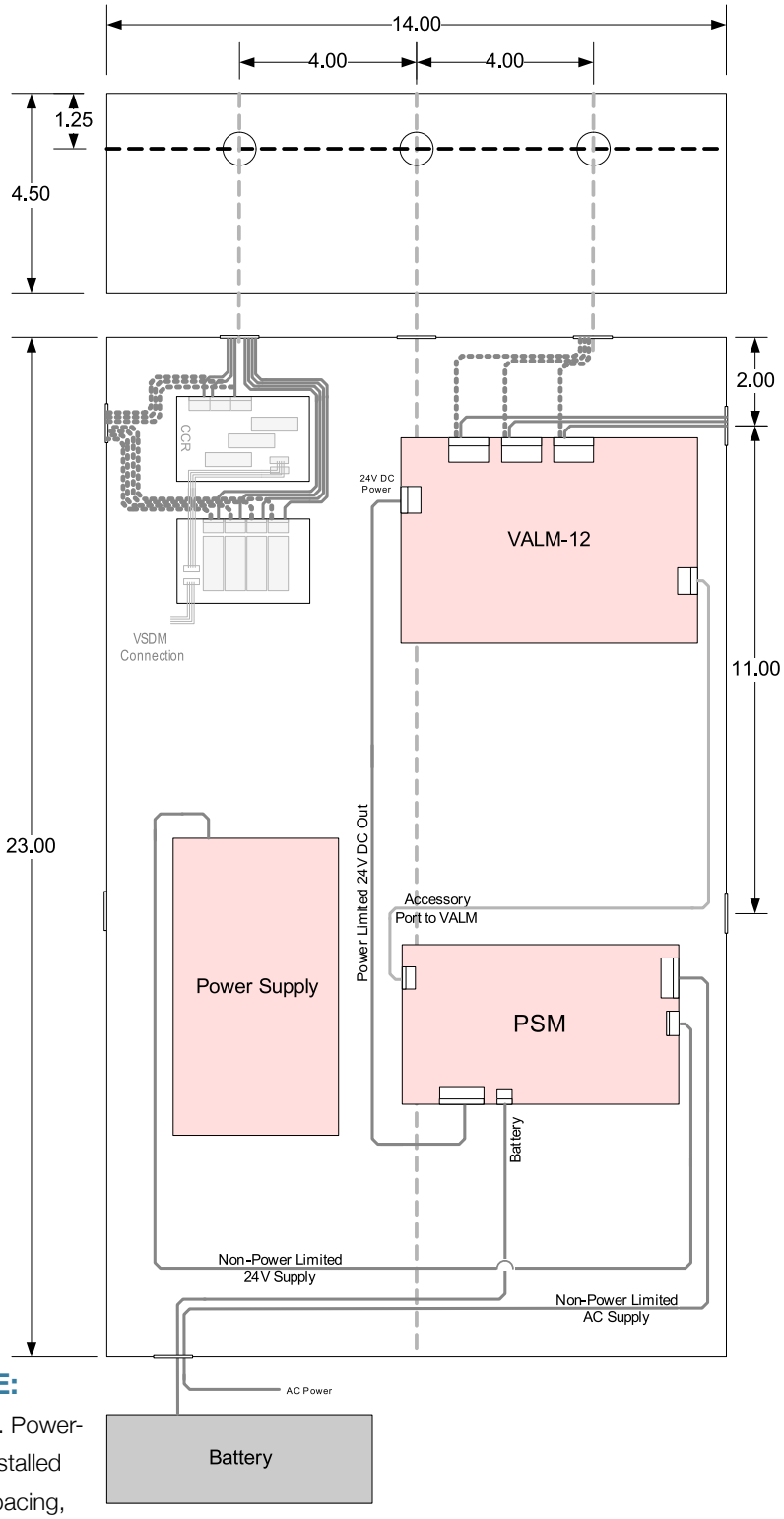
General Wiring Diagram: IPF-12 & IPF-12K (Single Loop Panels)



IMPORTANT NOTE:

All Non Power-limited vs. Power-limited wiring must be installed with a minimum of ¼" spacing, as per UL 864 12.3.1.

IPF-XL - Multi-loop Panel

Backbox Dimensions	22W x 30H x 5.5D
VDM	IPF Display Module
(5) Module Slots - VALM-12 - RTR-1 - RTR-2	FB-AP™ Loop Module FB-AP™ Loops: 1 NAC Circuits: 2
(2) PS-8	Power Supply (8 amp)
(1) PSM	Power Supply Monitor
(2) BC	Battery Charger
(2) General Contact Slots	Any combination of: Common Control Relay Card (CCR) Line Reversal/Masterbox Card (MBLR)
(2) General Contact Slots	Any combination of: Common Control Relay Card (CCR) Line Reversal/Masterbox Card (MBLR)

NOTE(s):

Product contents include 1 Circuit FB-AP™ Loop / 2 Circuit NAC Card for each VALM-12.

Listed for a maximum of 4 VALM-12 modules, with an option to place a Router in one of the five available mounting locations.

All field wiring shall comply with Article 760 of the National Electric Code (NEC).

For general panel wiring diagrams, refer to the following IPF-XL-K section.

IPF-XL-K - Multi-loop Panel w/keyboard

Backbox Dimensions	22W x 30H x 5.5D
VDM	IPF Display Module
(5) Module Slots - VALM-12 - RTR-1 - RTR-2	FB-AP™ Loop Module FB-AP™ Loops: 1 NAC Circuits: 2
(2) PS-8	Power Supply (8 amp)
(1) PSM	Power Supply Monitor
(2) BC	Battery Charger
(2) General Contact Slots	Any combination of: Common Control Relay Card (CCR) Line Reversal/Masterbox Card (MBLR)
(1) KBD	QWERTY Keyboard

NOTE(s):

Product contents include 1 Circuit FB-AP™ Loop / 2 Circuit NAC Card for each VALM-12.

Listed for a maximum of 4 VALM-12 modules, with an option to place a Router in one of the five available mounting locations.

All field wiring shall comply with Article 760 of the National Electric Code (NEC).

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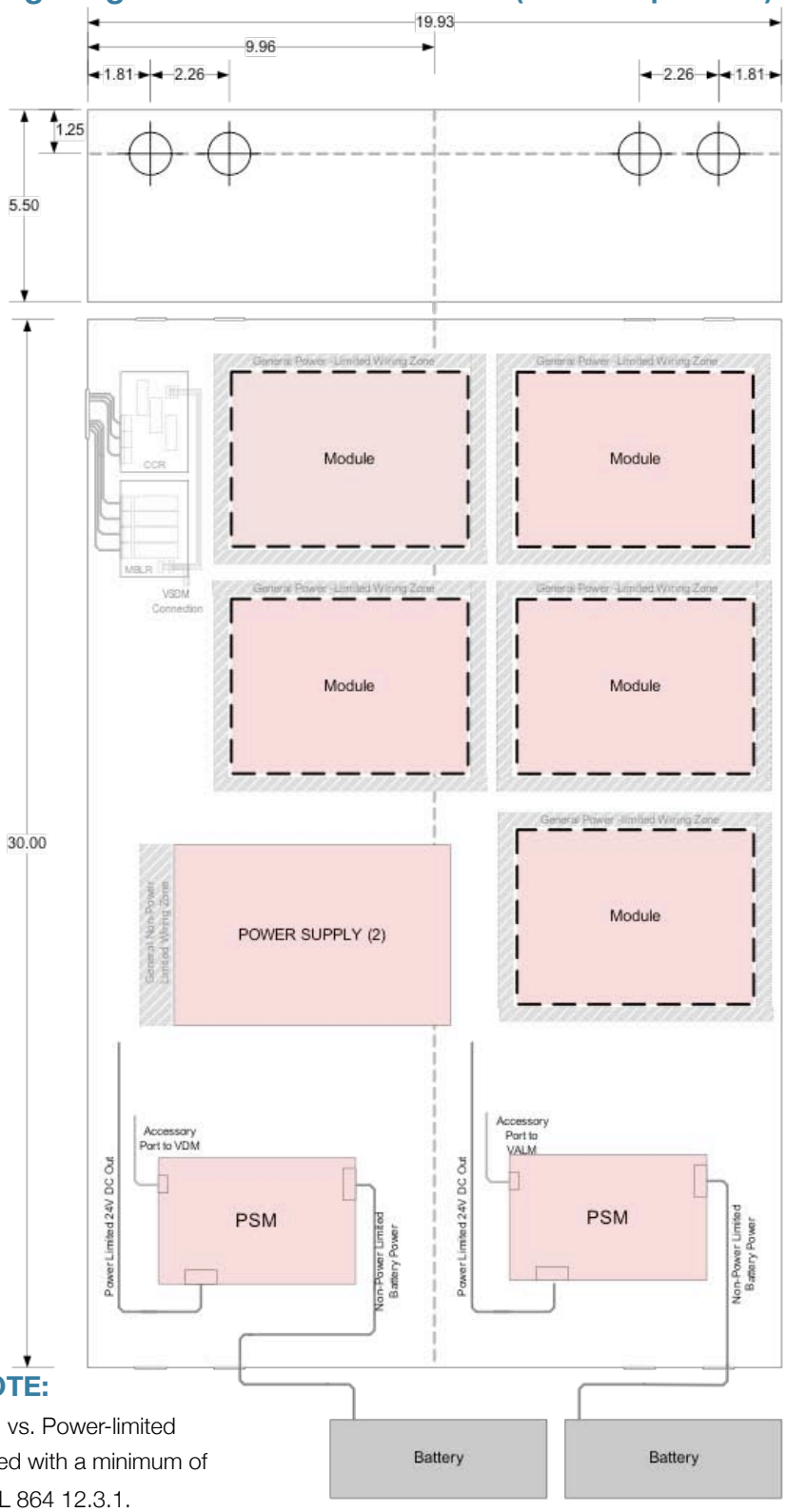
General Wiring Diagram: IPF-XL & IPF-XL-K (Multi-Loop Panels)



IMPORTANT NOTE:

All Non Power-limited vs. Power-limited wiring must be installed with a minimum of ¼" spacing, as per UL 864 12.3.1.

REM-1 - Remote Module

Backbox Dimensions	9Wx12Hx3D
(1) Module Slots - VALM-12 - RTR-1 - RTR-2	FB-AP™ Loop Module FB-AP™ Loops: 1 NAC Circuits: 2

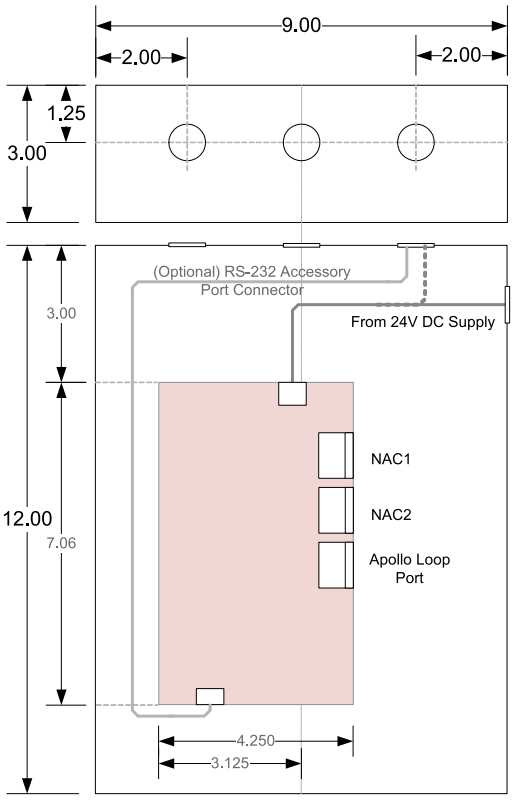
NOTE(s):

Remote module is powered using source external to cabinet.

All field wiring shall comply with Article 760 of the National Electric Code (NEC).

No non-power limited wiring is present within this cabinet assembly.

General assembly provides unrestricted cable routing to top and/or side knockouts as meeting local installation code.



REM-1P - Remote Module w/Power Supply & Battery Charger

Backbox Dimensions	14Wx23Hx4.5D
(1) Module Slots - VALM-12 - RTR-1 - RTR-2	FB-AP™ Loop Module FB-AP™ Loops: 1 NAC Circuits: 2
(1) PS-8	Power Supply (8 amp)
(1) PSM	Power Supply Monitor
(1) BC	Battery Charger

NOTE(s):

- Identical to the REM-1, except for internal power supply/charger addition
- All field wiring shall comply with Article 760 of the National Electric Code (NEC).

REM-VSDM - Remote IPF Standard Display Module

Backbox Dimensions	14Wx10.5Hx4.5D
VDM	IPF Display Module
(2) General Contact Slots	Any combination of: Common Control Relay Card (CCR) Line Reversal/Masterbox Card (MBLR)
(1) PSM	Power Supply Monitor
(1) BC	Battery Charger

NOTE(s):

All field wiring shall comply with Article 760 of the National Electric Code (NEC).

No non-power limited wiring is present within this cabinet assembly.

REM-VSDM2 - Remote IPF Standard Display Module w/VALM

Backbox Dimensions	14Wx10.5Hx4.5D
VDM	IPF Display Module
(2) Module Slots - VALM-12 - RTR-1 - RTR-2	FB-AP™ Loop Module FB-AP™ Loops: 1 NAC Circuits: 2
(2) General Contact Slots	Any combination of: Common Control Relay Card (CCR) Line Reversal/Masterbox Card (MBLR)

NOTE(s):

All field wiring shall comply with Article 760 of the National Electric Code (NEC).

No non-power limited wiring is present within this cabinet assembly.

Listed for a maximum of 2 modules, accepting any combination of VALM-12 and/or RTR-1/2 boards.

REM-VSDM2C - Remote Module w/Visual Display

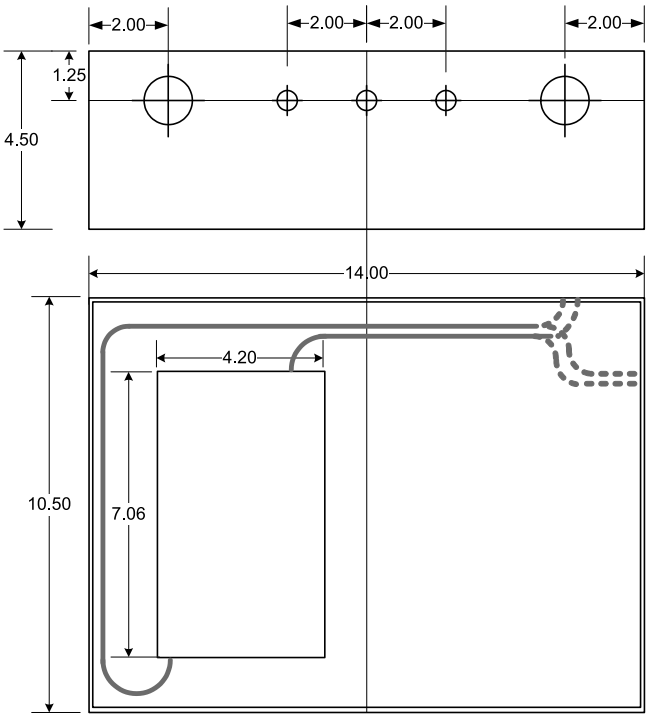
Backbox Dimensions	14Wx10.5Hx4.5D
VDM	IPF Display Module
(1) Module Slots - VALM-12 - RTR-1 - RTR-2	FB-AP™ Loop Module FB-AP™ Loops: 1 NAC Circuits: 2
(2) General Contact Slots	Any combination of: Common Control Relay Card (CCR) Line Reversal/Masterbox Card (MBLR)

NOTE(s):

Remote module is powered using source external to cabinet. All field wiring shall comply with Article 760 of the National Electric Code (NEC). No non-power limited wiring is present within this cabinet assembly. General assembly provides unrestricted cable routing to top and/or side knockouts as meeting local installation code.

General Wiring Diagram

REM-VSDM2C



Power Installation

3

This chapter provides information about the installation of power to the various modules. This chapter covers the following topics:

Overview

- The topic of AC power connections, battery installation and charger specifics, as well as monitoring layouts regarding power distribution requirements for a particular assembly, are detailed within this chapter.

AC Power Connections

All AC Power connections should terminate the earth ground, neutral and hot as per standard Article 760 of the National Electric Code (NEC). (Input voltage: 120 VAC 50/60 Hz 3 amps Max)

Battery Installation and Connections

All batteries used in IPF panel configurations should be 24V capable. Connections should comply per standard Article 760 of the National Electric Code (NEC).

Battery Charger Installation and Connections

The battery charger is a combination battery charger and supply monitor located underneath the PSM printed circuit board (PCB), and provides a 4.3 amp pulse battery charge.

Power Supply Monitor Connections

The PSM is a power monitor board that monitors and reports interruptions and/or other statuses regarding power to the network.

The following schematic details the layout and wiring definitions for the XP-PM.100 board.

Jumper/Switch	Description
J1	Battery Wiring
J2	AC Power Connectors
J3	RS232 Serial Port (Accessory Port)
J4	24V Non-Resettable System Supply Out Dual Connection
J7	24V Supply Connector
F3	Fuse (10-15 amp standard)
JP1	Disable Charger Monitoring PINs

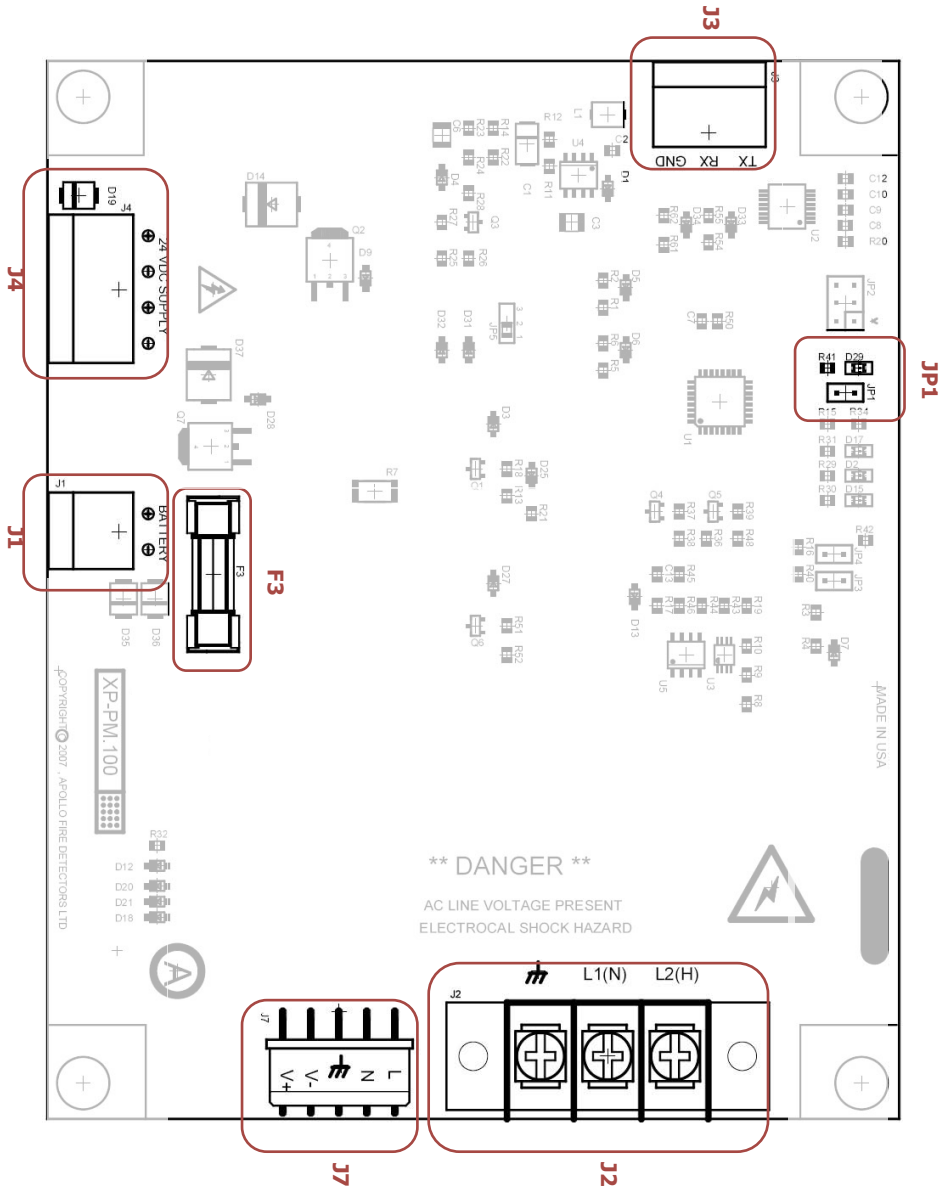


Figure 3.1 - Power Supply Monitor Board Layout (Top)

The bottom side of the card contains 2 connectors, as depicted and labeled below:

Jumper/Switch	Description
J5	DC Return Supply (from Battery Charger)
J6	AC Supply Out (to Battery Charger)
(2) General Contact Slots	Any combination of: Common Control Relay Card (CCR) Line Reversal/Masterbox Card (MBLR)

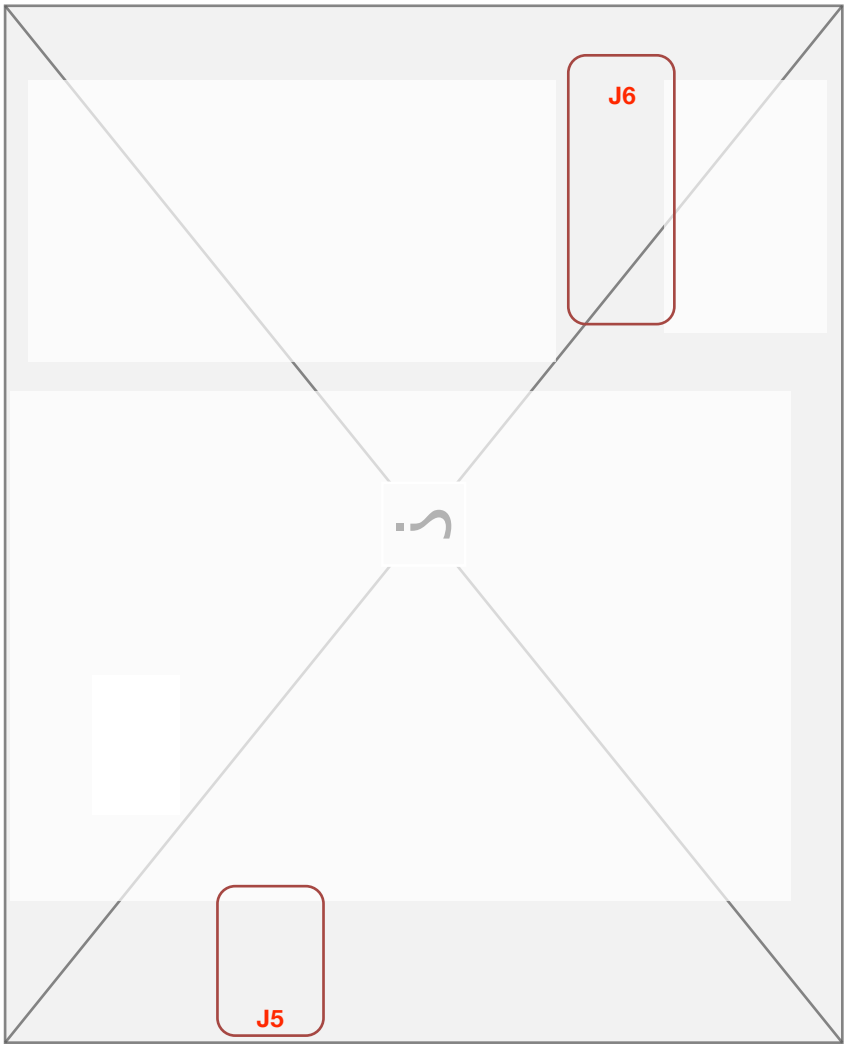


Figure 3.2 - Power Monitor Board Layout (Bottom)

Module Installation

4

This chapter provides information about installing VSDM modules, VALM modules and RTR Hubs in the network. This chapter covers the following topics:

Overview

This chapter includes both installation information and diagrams for a variety of IP Fire Series modules and components. Both VSDM and VALM modules are pre-assembled prior to delivery, permitting their installation to be placed in tandem within their enclosures and the desired physical network for which they serve.

General Information

All powered modules and components are connected to the Power Supply Module (PSM), and accept 24V Non-Resettable System Supply. To conduct repairs or replace modules, be sure to disconnect all power connections prior to performing work on the given equipment.

Ethernet Protection Boards

The Ethernet Protection Boards are two accessory boards designed to protect the RTR switches and VSDM/VALM modules from electrical overloads that can occur from external surges on the Ethernet network when used as field wiring connections. There are two separate boards, the EPROT1 board used to protect the module connections, and the EPROT7, designed to protect the RTR switches.

In addition to standard Ethernet field wiring protection, the EPROT7 will provide ground fault supervision on the field wiring, and thus require an additional 24V Non-Resettable System Supply connection. It should be noted, however, that only the negative contacts are utilized or required.

The following layouts describe the two boards as utilized within the architecture. See enclosed materials for details regarding physical installation of the boards with respect for their intended modules or routers.

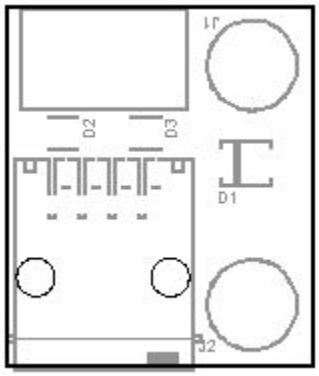
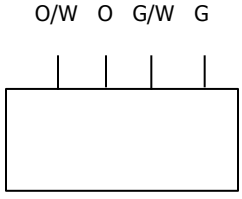


Figure 4.1 – EPROT1 Board Layout

Jumper/Switch	Description
J1	Field Wiring Connector1
J2	RJ45 Ethernet Connector

[1]Note the field wiring connector utilizes the following wire/pin specification:



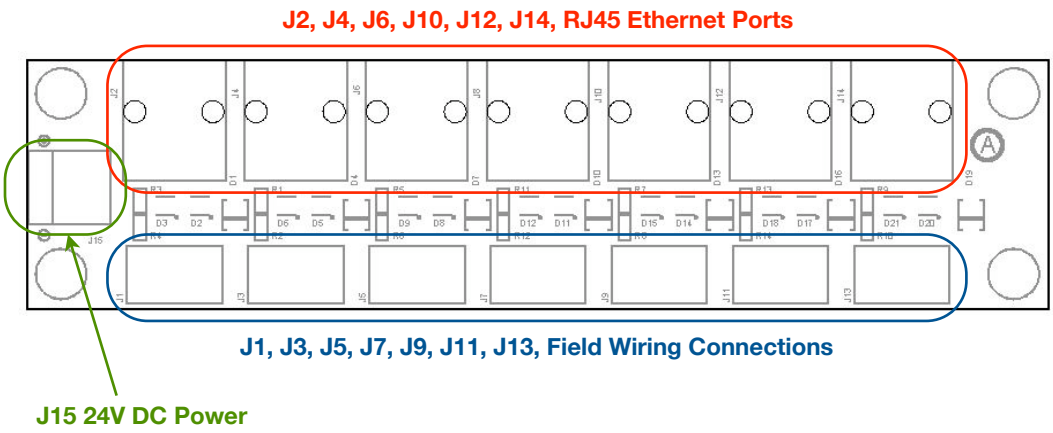
O/W – Orange/White

O – Orange

G/W – Green/White

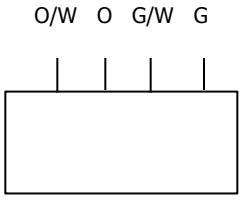
G - Green

EPROT7 - Ethernet Protection Board



Jumper/Switch	Description
J1, J3, J5, J7, J9, J11, J13	Field Wiring Connector1
J2, J4, J6, J8, J10, J12, J14	RJ45 Ethernet Connector
J15	Power Connector (24V DC Non-Resettable System Supply)

[1]Note the field wiring connector utilizes the following wire/pin specification:



O/W – Orange/White

O – Orange

G/W – Green/White

G - Green

VSDM Board Layouts

The VSDM modules are comprised of two physical boards, one being the processor board which is standard for all module assemblies. The second board is the VSDM itself, which is dual-sided to both allow mounting and interfacing as needed to other system components. For information regarding the processor board, please see the section Processor Board Layout

The top of the VSDM board layout is depicted in Figure 4.3 below. Note that the top is readily identifiable by the LCD screen, used to provide the visual user interface for which interaction with the network panel, modules and devices is designed.

Jumper/Switch	Description
J1	LCD Connector

LCD Connector

The LCD connector connects the VSDM to the physical chassis LCD display.

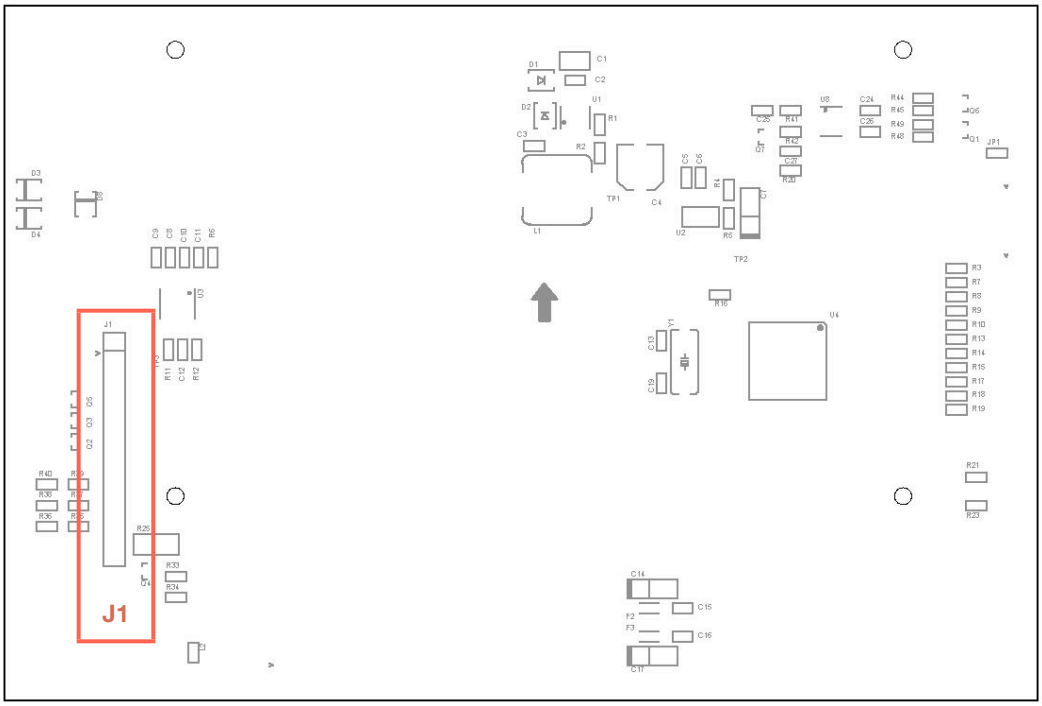


Figure 4.3 – VSDM Board Layout - Top

The bottom of the VSDM board layout is depicted in Figure 4.4, and is the side in which connectivity to the UPE200 processor board is designed to be attached.

Jumper/Switch	Description
J2	KBD QWERTY Keyboard Connector
J4	USB 2.0 Type A Connector
J5	Accessory Port (RS232 Serial Connector)
J7	Power Connector (24V DC Non-Resettable System Supply)
J9	Event Port
J10 Pin	Keyboard Enable/Disable Pin (Enable = Closed, Int. Use Only)
J11	Common Outputs (Line Reversal/Masterbox Connector (MBLR) and/or Common Control Relay (CCR) Card)
J10 Connector	Keypad Connector
S1	Configuration Switch Pin
D5	Supervisory LED
D6	Alarm LED
D7	Trouble LED
R32	Screen Contrast Adjustment

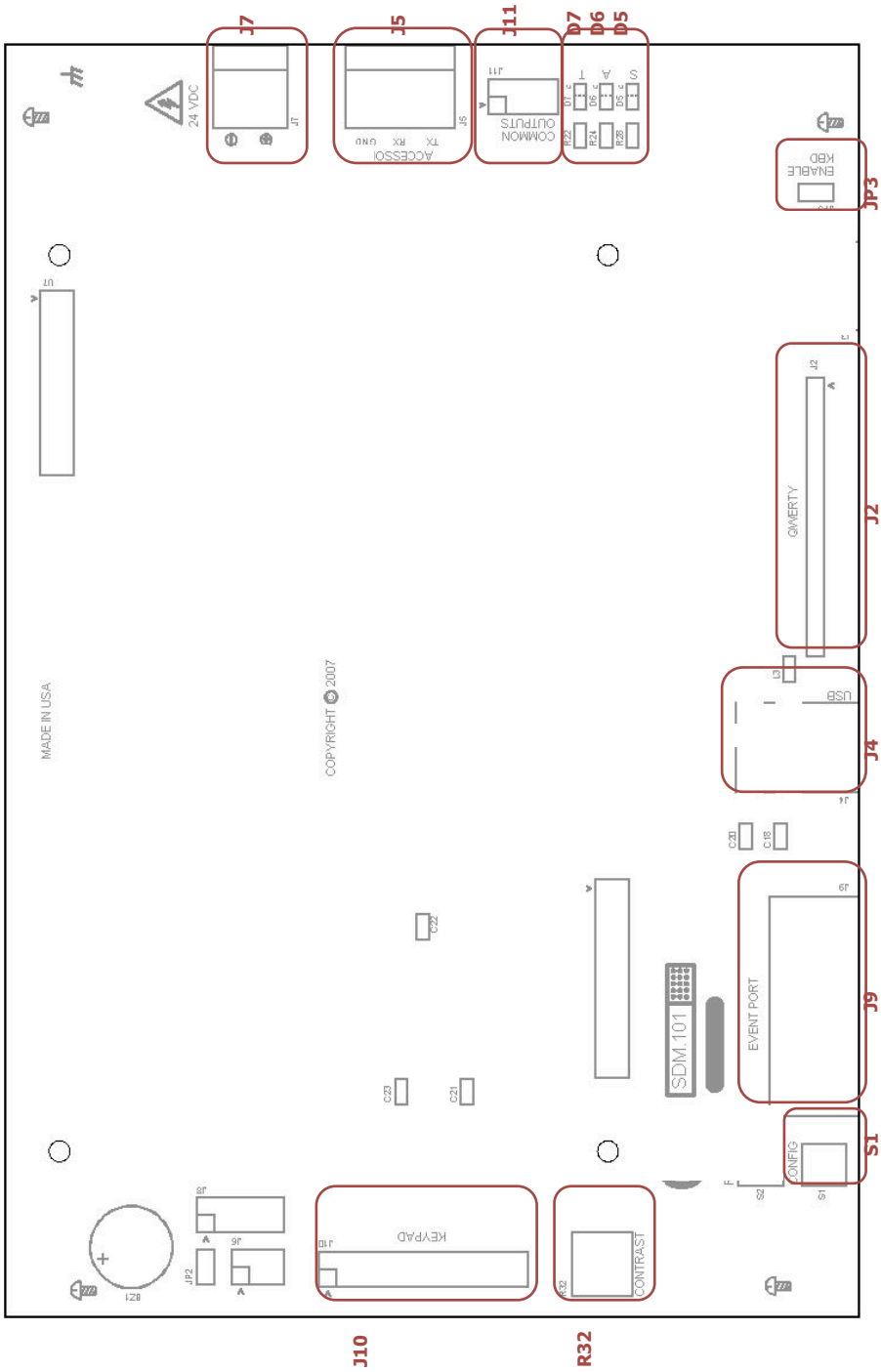


Figure 4.4 – VSDM Board Layout – Bottom

Power Connection

The Power Connection input is a standard 24V DC Non-Resettable System Supply, delivered from the system PSM.

Keyboard Enable/Disable Pin Switch

The enable/disable pins are for internal use only, providing a means to disable external keyboard interaction when the pins are in an open state.

Screen Contrast Adjustment

The Screen Contrast Adjustment is a pin-rotary adjustment that allows adjusting the LCD display contrast to optimal display in the installation environment.

JP9 Keypad Connector

The JP9 Keypad Connector is used to connect the VSDM to the physical panel's keypad display.

Configuration PIN

The Configuration PIN is used when commissioning (i.e. adding) the VSDM to the network. The pin should only be depressed when requested to do so by the panel software.

Reset PIN

The Reset PIN is used to reset the secondary processor.

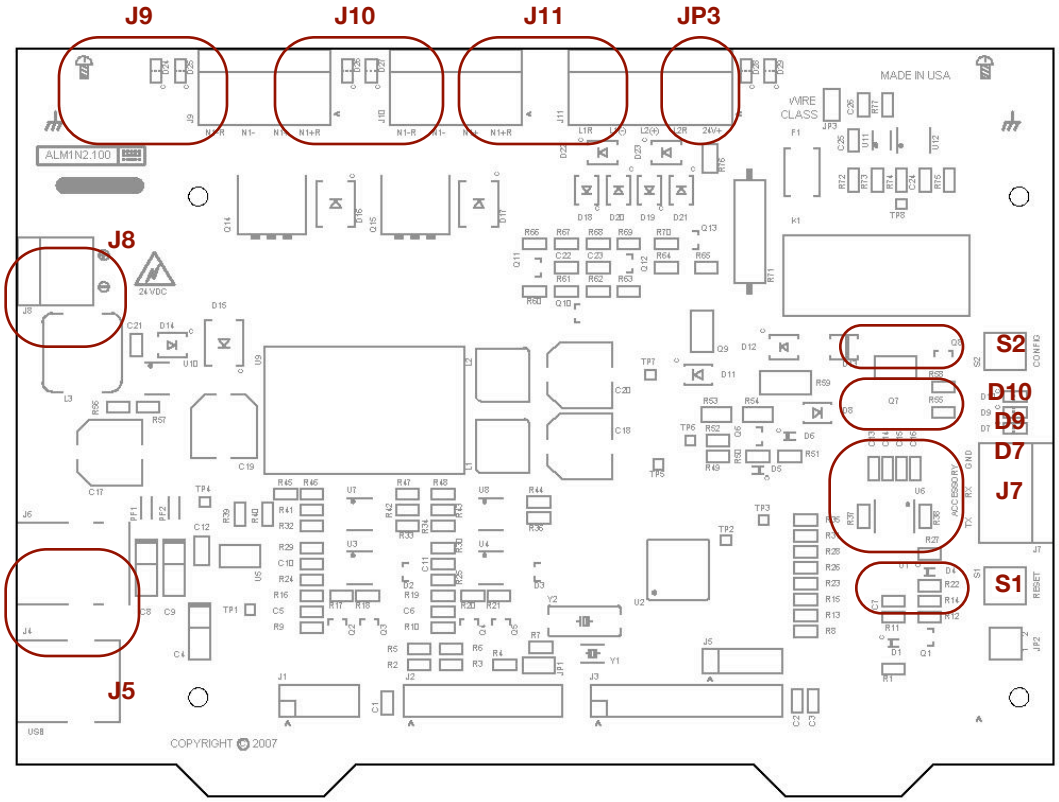
IMPORTANT NOTE:

The reset only resets the secondary processor, not the VSDM module itself! Only cycling power to the module by unplugging/plugging the power connection will reset the VSDM module.

VALM Board Layouts

Similar to the VSDM modules previously described, the VALM-12 modules are comprised of two physical boards, one being the processor board which is standard for all module assemblies. The second board is the VALM itself, which is dual-sided to allow mounting and interfacing as needed to other system components. It is designed to provide a single interface to a limited circuit of 126 FB-AP™ detectors and devices. For information regarding the UPE200 processor board, please see the section Processor Board Layout.

The top of the VALM-12 board layout is depicted in Figure 4.5 below.



4.5 - VALM-12 Board Layout - Top

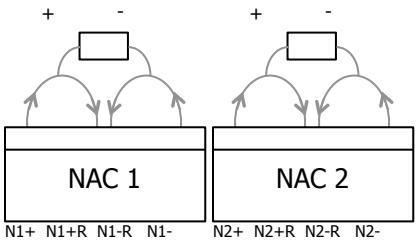
Jumper/Switch	Description
D7, D9, D10	Onboard LED Indicators
J5	USB 2.0 Type A Connector
J7	Accessory Port (RS-232 Serial Port)
J8	Power Connector (24V DC Non-Resettable System Supply)
J9	NAC1 – Notification Appliance Circuit 1
J10	NAC2 – Notification Appliance Circuit 2
J11	Apollo Loop Port
JP3	Wire Class Selector (Open: Class A Closed: Class B)
S1	Reset Switch Pin
S2	Configuration Switch Pin

Power Connection

The Power Connection input is standard 24V DC Non-Resettable System Supply, delivered from the system PSM.

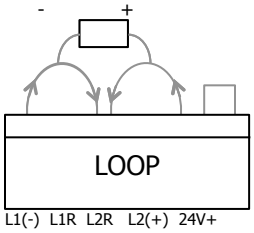
NAC1 and NAC2 Connectors

Notification Appliance Circuits are identical in wiring, providing power to 3.0 amp maximum powered devices, wired similarly as show in the following.



FB-AP™ Loop Connector

The FB-AP™ Loop Connector will support up to 126 devices, wired as depicted in the following.
Note: The 24V power is resettable.



Configuration PIN

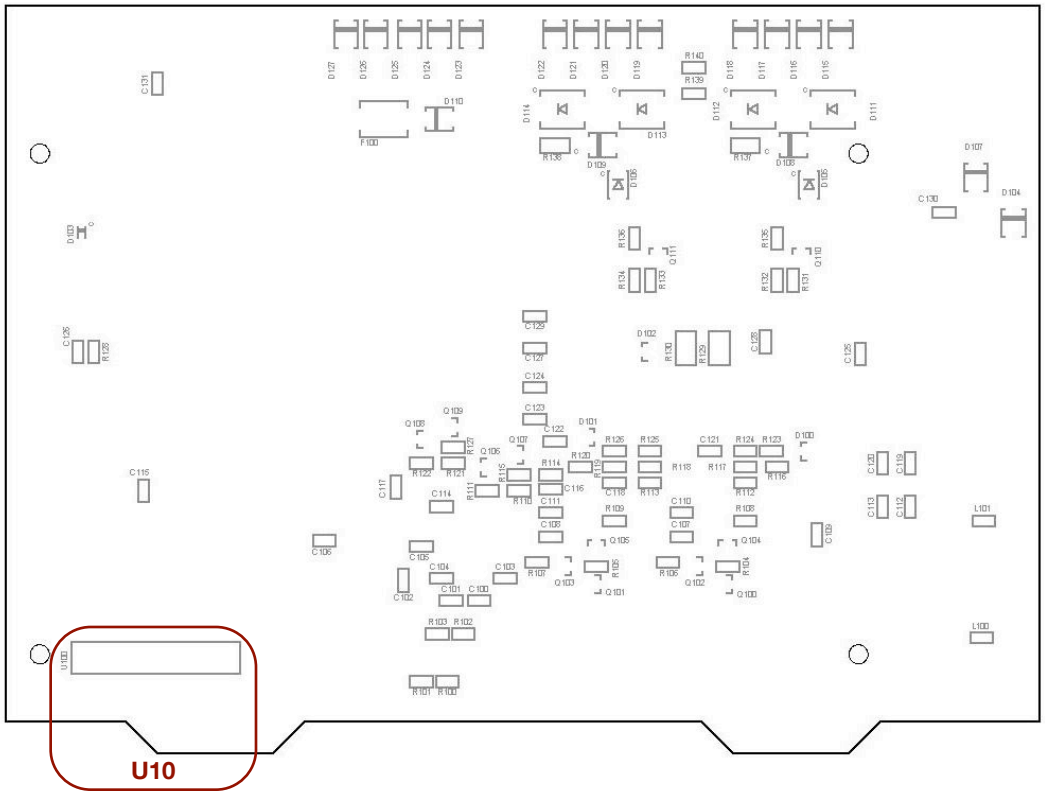
The configuration PIN is used when commissioning (i.e. adding) the VALM to the network. The pin should only be depressed when requested to do so by the panel software when adding the VALM module to the network.

LED Indicators

The onboard LED indicators are helpful when observing module behavior, especially in use for troubleshooting or general diagnostics. The red, yellow and green LEDs are used based on normal operation.

During normal operation, the LEDs are used to display the status of the module as it boots up, as described in the following:

Color	Description
Red	The module is initializing and obtaining it's default IP network address.
Yellow	(Solid) The module has obtained its IP address, and is now accessing/loading its configuration information prior to normal execution.
	(Blinking) The module has not obtained its IP address, and is therefore in a decommissioned mode (but running normally). The module must be commissioned to run normally within the network.
Green	The module has loaded and successfully initialized, and is running normally on the network.



The bottom of the VALM-12 board layout is depicted in Figure 4.6, and is the side in which connectivity to the UPE200 processor board is designed to be attached.

Jumper/Switch	Description
U100	Processor Board Connector

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Processor Board Layout

The UPE200 processor board is used with all modules, providing the processing capability that is interfaced with the modules to operate over the network.

Jumper/Switch	Description
J1	LCD Connector
J3	RJ45 Ethernet Connector
J5	RS232 Connector
S1	Reset Switch PIN
S2	Programming Switch PIN[1]

[1] *This PIN is for factory use only, and should never be used in the field.*

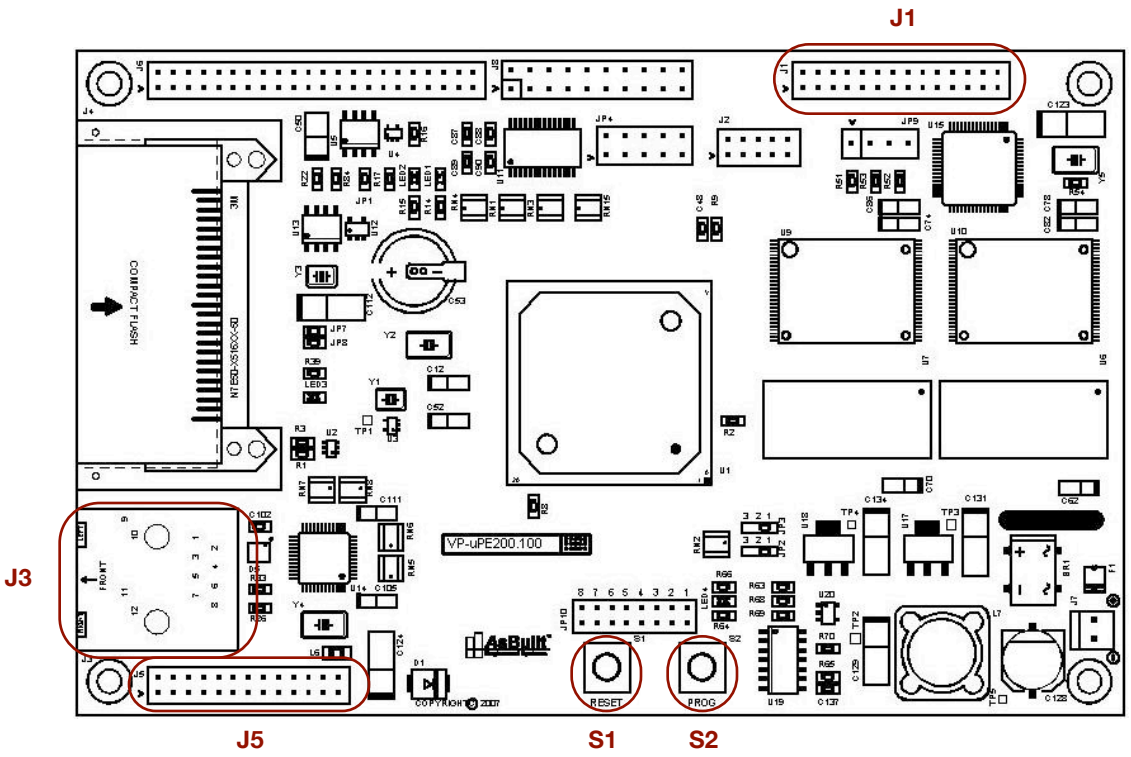

Figure 4.7 - UPE200 Processor Board Layout

Reset Switch PIN

The Reset Switch PIN is used to reset the processor board.

IMPORTANT NOTE:

Unlike other architectural module boards, such as the VALM or VSDM, this reset switch resets the processor board, but not the module itself. Only cycling power to the module by unplugging/plugging the power connection will reset the modules.

RTR-1, RTR-2 Router Board Layout

The RTR-1 and RTR-2 router boards are used to provide Ethernet connectivity between the various modules and the panel within the network. Basically identical in layout and design, the only distinguishing characteristic is that the RTR-1 is a "lightly managed" connectivity switch, whereas the RTR-2 is a managed switch, both providing network connectivity between the various network boards, etc.

Jumper/Switch	Description
J4	Power Connector (24V DC Non-Resettable System Supply)
J1, J2	RJ45 Ethernet Connector Ports
S1	Reset Switch

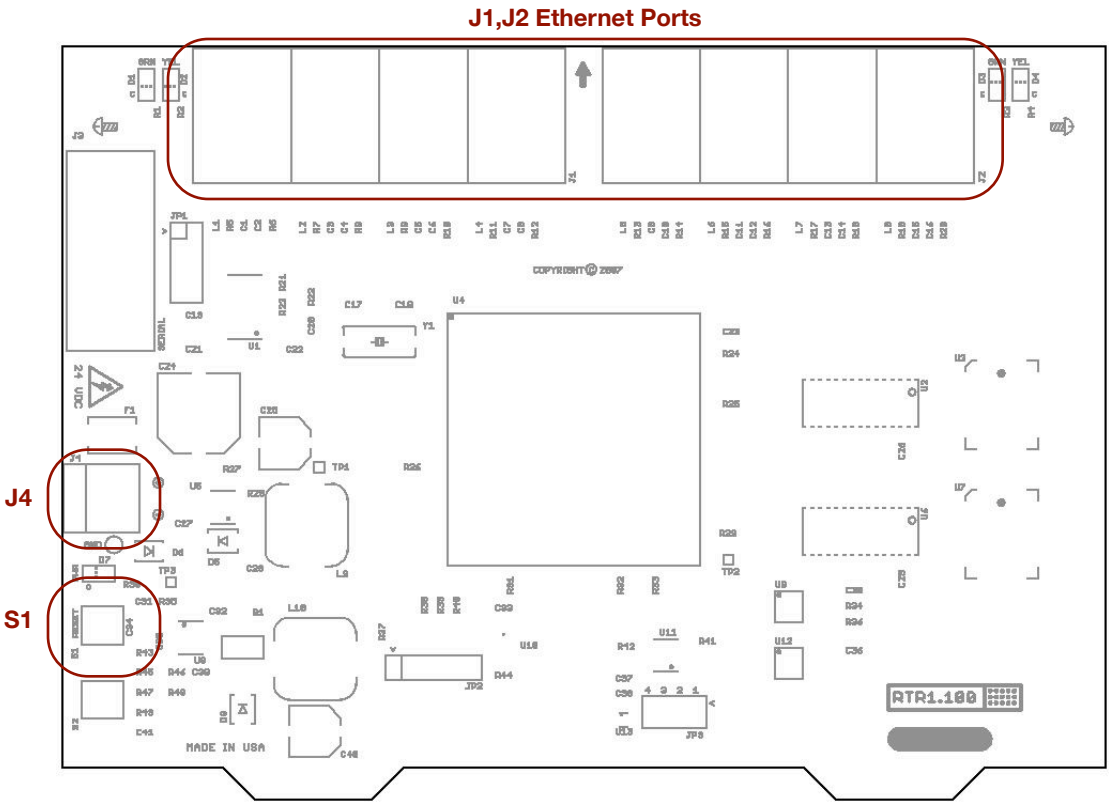

Figure 4.8 - RTR-1 Board Layout

Jumper/Switch	Description
J2, J3	RJ45 Ethernet Connector Ports
J4	Power Connector (24V DC Non-Resettable System Supply)
S1	Reset Switch

J2, J3 Ethernet Ports

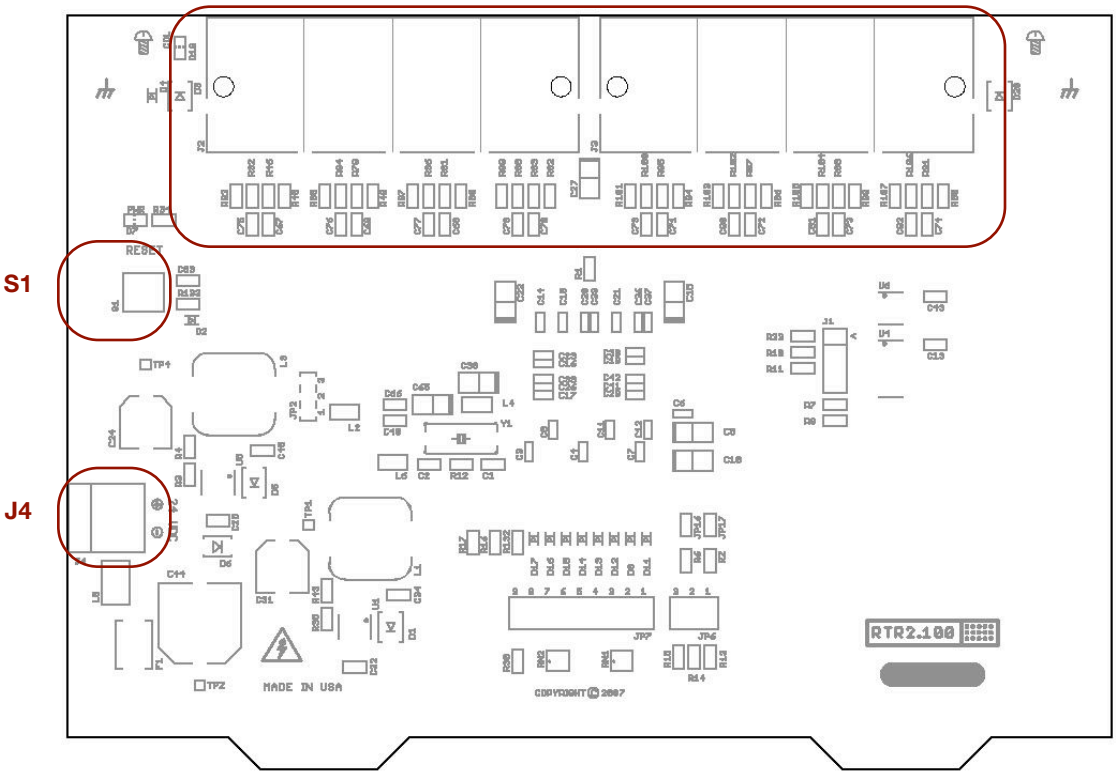

Figure 4.9 - RTR-2 Board Layout

RTR Connections

Each switch connects to the network via an Ethernet Switch Protection Board, mounted on the standard sheet metal casing using 4 standoffs, as detailed below:

(TBD – Schematic showing location of EPROT7?)

Each switch provides 8 ports, of which port 1 is used internally, and the remaining 7 allow connection to various modules and network elements that support the architecture. In addition, the EPROT7 reports ground faults when they occur and as such, provide an additional 24V connector – although only the negative connection is monitored for that purpose.

Power Connection

Power input is standard 24V DC Non-Resettable System Supply, delivered from the system PSM.

RJ45 Ethernet Connection Details

RJ45 Ethernet Connectors may accept either standard Ethernet or cross-over cables, to connect to system modules, panels, etc.

The following figure details the Ethernet wiring cable standards:

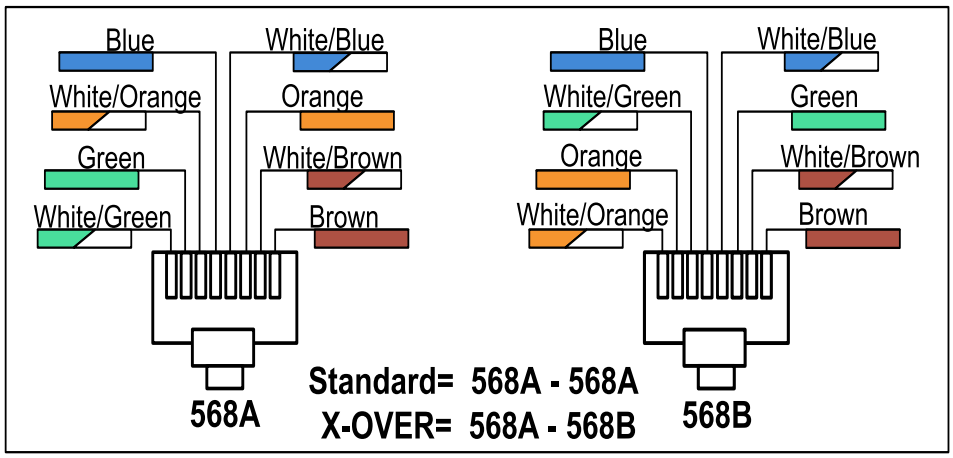

Figure 4.10 - Ethernet Wiring Cable Standards

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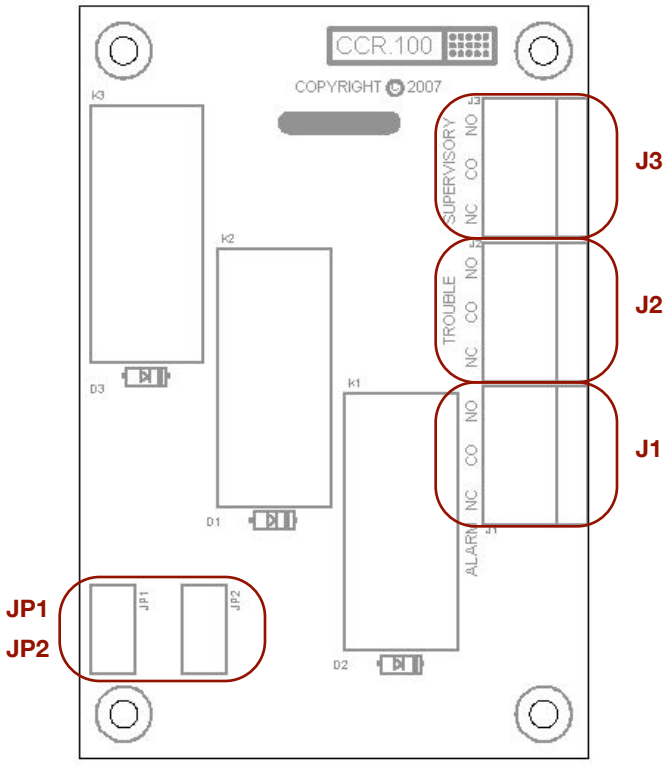
Common Control Relay Board (CCR)

The following schematic details the layout and wiring definitions for the Common Control Relay Board, used in conjunction with VALM module installations.



Jumper/Switch	Description
J1	Alarm Input Wiring Location
J2	Trouble Input Wiring Location
J3	Supervisory Input Wiring Location
JP1	Inter-Board Connector 1 (In)
JP2	Inter-Board Connector 2 (Out)

Each of the input wiring connectors contains three contacts that can be wired according to their labeled designations:

Label	Description
NC	Normally Closed
CO	Common
NO	Normally Open

JP1 and JP2 – Chain connectors that allow connections to the ALM, and to either another General Relay Board (GRB), or to a Line Reversal / Masterbox Board (MBLR).

Line Reversal / Masterbox Board (MBLR)

The following schematic details the layout and wiring definitions for the Line Reversal / Masterbox Board, used in conjunction with VALM module installations.

Jumper/Switch	Description
J1-J3	Line Reversal Wire Connectors (Alarm, Trouble, Supervisory)
J4	Municipal Box
JP1-JP2	MBLR Configuration PINS1 (Apply to ALARM/TROUBLE Only)
JP3-JP4	Inter-Board Connector 1
JP5	Onboard Municipal Box Disable Pins 1-2: Enable Pins 2-3: Disable
S1	Municipal Box Disable Switch
D1	Municipal LED Status (On: Disabled, Off-Enabled)

[1] *JP1-JP2: PINS 1-2: Operate Normally*
PINS 2-3: Combines ALARM and TROUBLE conditions into one circuit.
Note: that when combined, only J1 (ALARM) is operational

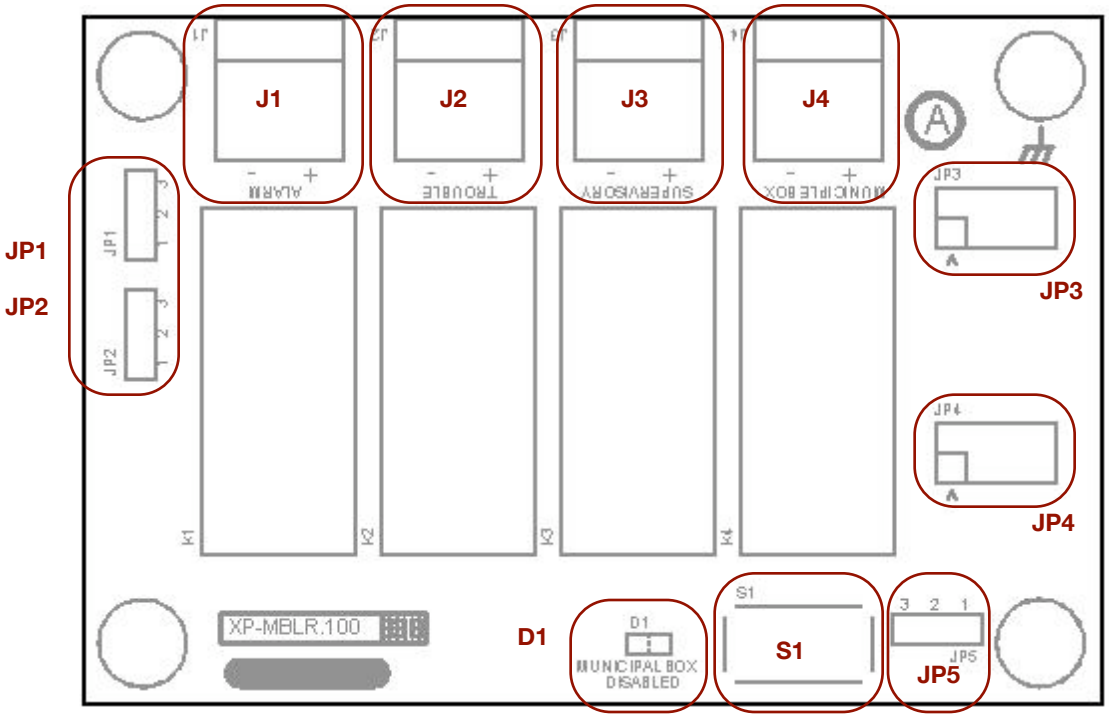


Figure 4.12 - Line Reversal / Masterbox Board Layout Details

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Field Device Installation

5

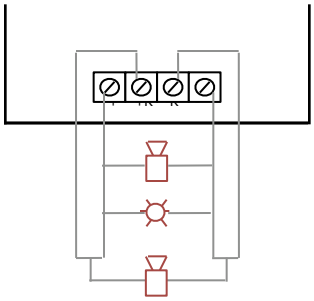
This chapter provides information about the installation of field devices. This chapter covers the following topics:

Overview

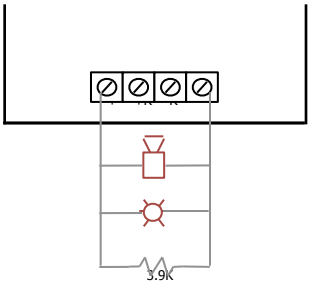
Installation of ALM (and other) modules consists of wiring notification appliance circuit (NAC) devices, as well as loop devices, into the network for monitoring and management by the panel.

General Wiring Diagrams

Installations of both initiating (i.e. pull stations, smoke detectors, etc.) and indicating (i.e. notification appliances such as horns, strobes, etc.) devices often fall into one of 2 categories of wiring: Class A or Class B. Each is illustrated in the following diagram:



General Class A Wiring Diagram



General Class B Wiring Diagram

Essentially Class A is a loop, much like a ring circuit, that is powered at both ends of the loop, allowing an open wire to not disable any of the devices serviced in the loop (although it will initiate a trouble).

The Class B is a straight run out to the last device. It is generally less expensive due to the loss of redundancy in the wiring hookup. If a line break occurs, the open wire would prevent any device located beyond the break to be inaccessible, and thus lost from the network. Devices still attached between the terminal and the break, however, would still be serviced as normal.

Wiring Guides

The following table provides general information regarding wiring practices used in the installation of IPF series panels and modules.

Signaling Circuit Wire Sizes – 24 Volt DC							
Wire Size and Resistance		Maximum Distance to Last Device					
AWG	Ω/1000 ft	Max. Load Current 0.5amp	Max. Load Current 1.0amp	Max. Load Current 1.5amp	Max. Load Current 2.0amp	Max. Load Current 2.5amp	Max. Load Current 3.0amp
18	6.5	400 ft	200 ft	130 ft	100 ft	80 ft	65 ft
16	4.1	620 ft	300 ft	210 ft	160 ft	125 ft	105 ft
14	2.6	1000 ft	500 ft	330 ft	250 ft	200 ft	165 ft
12	1.6	1600 ft	800 ft	520 ft	400 ft	325 ft	270 ft
10	1	2500 ft	1250 ft	840 ft	620 ft	520 ft	420 ft

To figure which wire size to utilize, multiply the number of devices by the maximum current draw for the devices. Take the total current draw and round it up to the nearest ½ amp. Next look at which wire size gives you the distance you need to reach the last device.

NAC Output Circuit Wiring

The VP-ALM Notification Appliance Circuit outputs can provide up to 3.0 Amps (power limited) of regulated 24 VDC each (total module output is limited to 7.5 Amps). The outputs can be wired as Class A or Class B circuits, as described in the previous section. The outputs can be arranged as 2 Style Y (Class B), or 2 Style Z (Class A) circuits. The EOL register value for Style Y wiring is 3.9K.

Initiating Devices

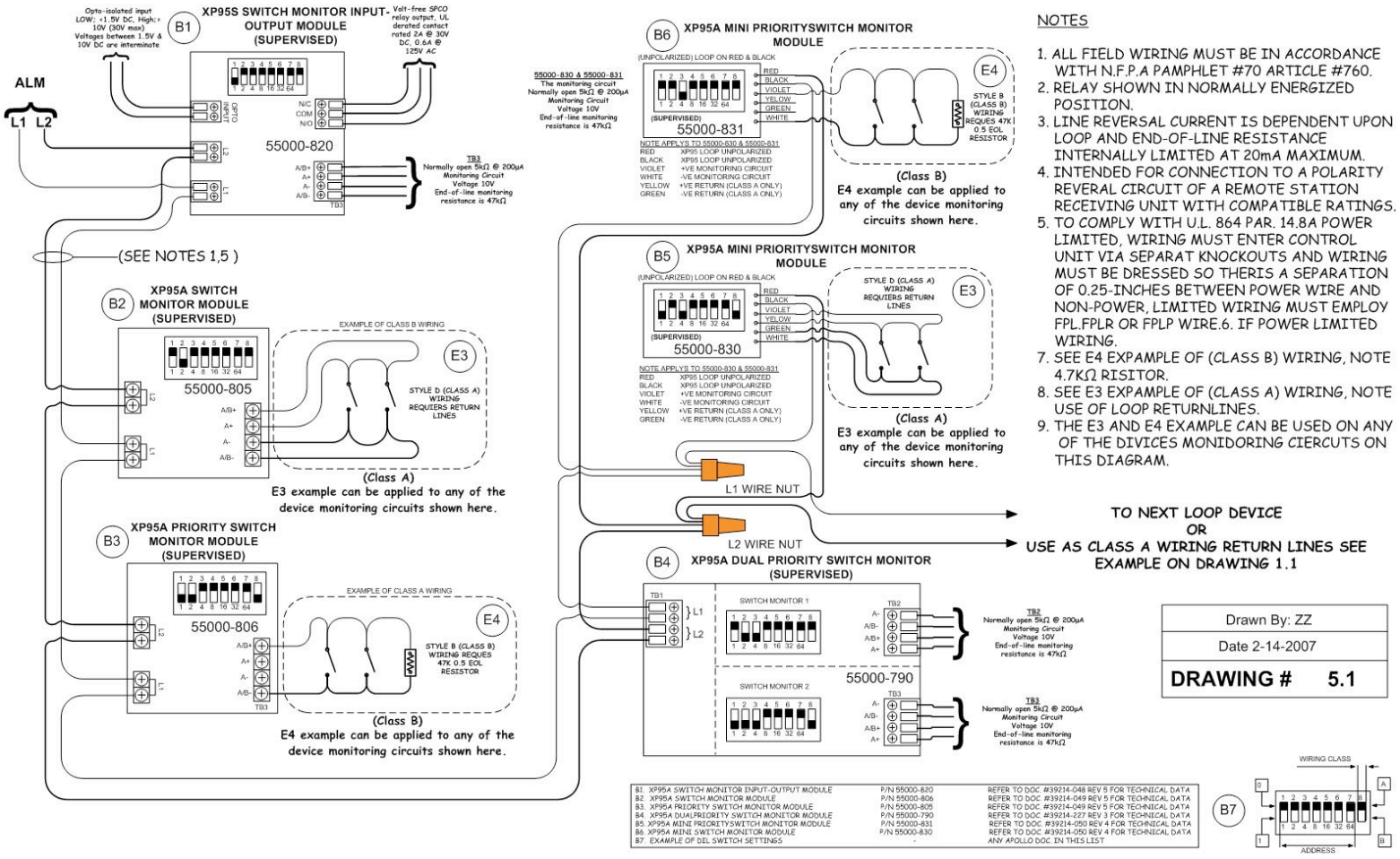
The following page depicts general wiring details for Discovery.

IP Fire Series Analog Addressable

XP-P
XP-I
XP-T
XP-M

IP Fire Series Intelligent

DISC-P
DISC-I
DISC-T
DISC-M



NOTES

1. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH N.F.P.A PAMPHLET #70 ARTICLE #760.
2. RELAY SHOWN IN NORMALLY ENERGIZED POSITION.
3. LINE REVERSAL CURRENT IS DEPENDENT UPON LOOP AND END-OF-LINE RESISTANCE INTERNALLY LIMITED AT 20mA MAXIMUM.
4. INTENDED FOR CONNECTION TO A POLARITY REVERAL CIRCUIT OF A REMOTE STATION RECEIVING UNIT WITH COMPATIBLE RATINGS.
5. TO COMPLY WITH U.L. 864 PAR. 14.8A POWER LIMITED, WIRING MUST ENTER CONTROL UNIT VIA SEPARAT KNOCKOUTS AND WIRING MUST BE DRESSED SO THERIS A SEPARATION OF 0.25-INCHES BETWEEN POWER WIRE AND NON-POWER, LIMITED WIRING MUST EMPLOY FPL.FPLR OR FPLP WIRE.6. IF POWER LIMITED WIRING.
7. SEE E4 EXPAMPLE OF (CLASS B) WIRING, NOTE 4.7KΩ RISITOR.
8. SEE E3 EXPAMPLE OF (CLASS A) WIRING, NOTE USE OF LOOP RETURNLINES.
9. THE E3 AND E4 EXAMPLE CAN BE USED ON ANY OF THE DIVICES MONIDORING CIERCUTS ON THIS DIAGRAM.

Drawn By: ZZ
Date 2-14-2007
DRAWING # 5.1

FB-AP™ Series Detector Wiring

The following page depicts the FB-AP™ detectors wiring diagram.

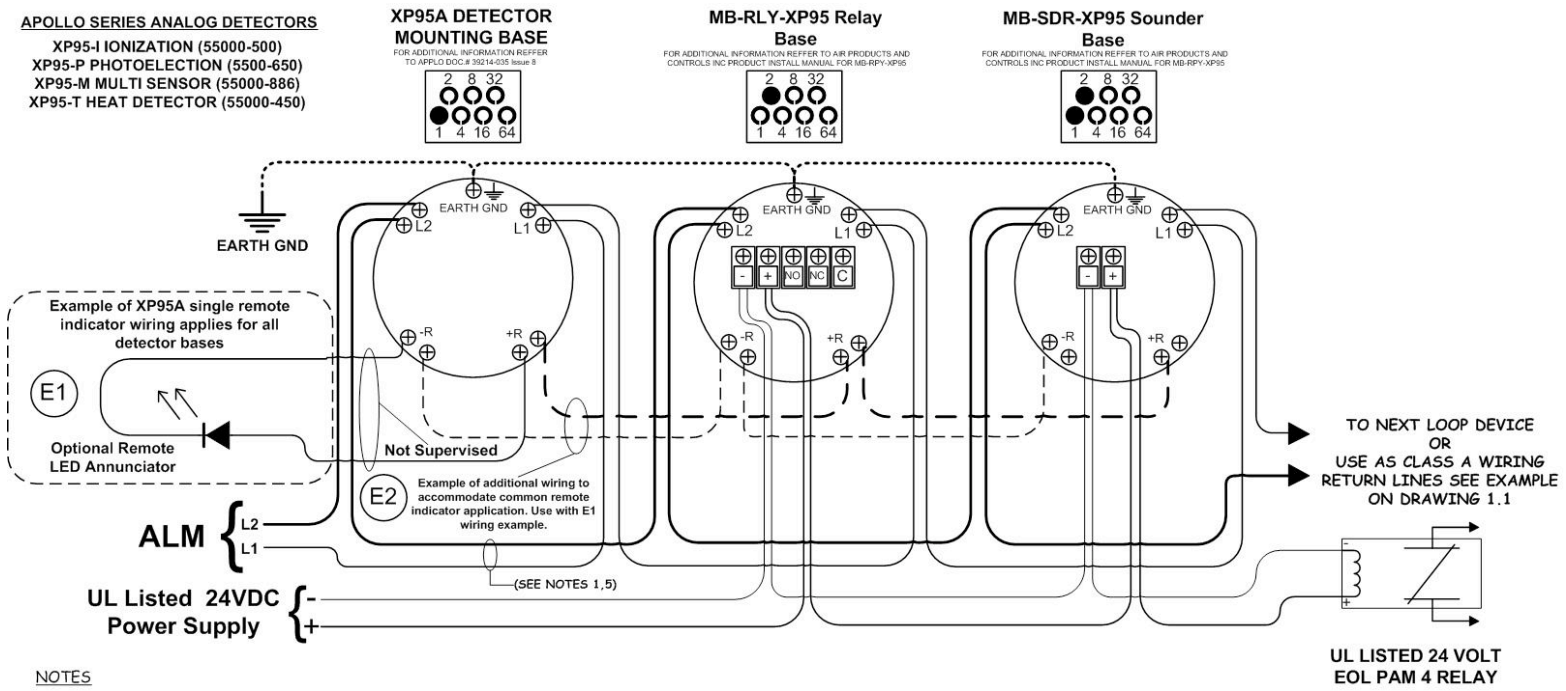
FB-AP™ detectors addressable

7254-FBD-5450A

7254-FBD-8550-A

7254-FBD-8750-A

7254-FBD-8650-A



NOTES

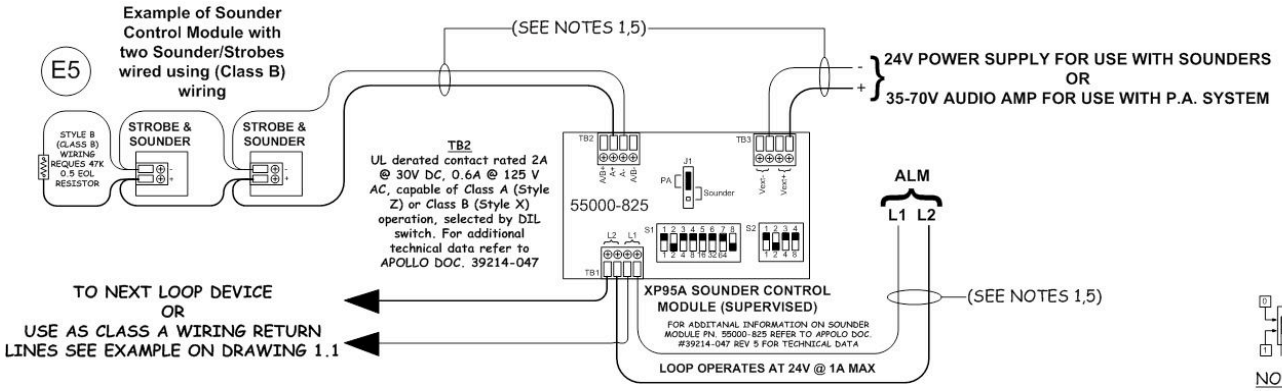
1. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH N.F.P.A PAMPHLET #70 ARTICLE #760.
2. RELAY SHOWN IN NORMALLY ENERGIZED POSITION.
3. LINE REVERSAL CURRENT IS DEPENDENT UPON LOOP AND END-OF-LINE RESISTANCE INTERNALLY LIMITED AT 20mA MAXIMUM.
4. INTENDED FOR CONNECTION TO A POLARITY REVERAL CIRCUIT OF A REMOTE STATION RECEIVING UNIT WITH COMPATIBLE RATINGS.
5. TO COMPLY WITH U.L. 864 PAR. 14.8A POWER LIMITED, WIRING MUST ENTER CONTROL UNIT VIA SEPARATE KNOCKOUTS AND WIRING MUST BE DRESSED SO THERIS A SEPARATION OF 0.25-INCHES BETWEEN POWER WIRE AND NON-POWER, LIMITED WIRING MUST EMPLOY FPL.FPLR OR FPLP WIRE.
6. E1 EXAMPLE USED ALOWNE REPRESENTS A SINGLE REMOTE INDICATOR. THE E2 EXMPLE IS IT BE USED WITH THE E1 EXAMPLE TO WIRE A COMMON REMOTE INDICATOR

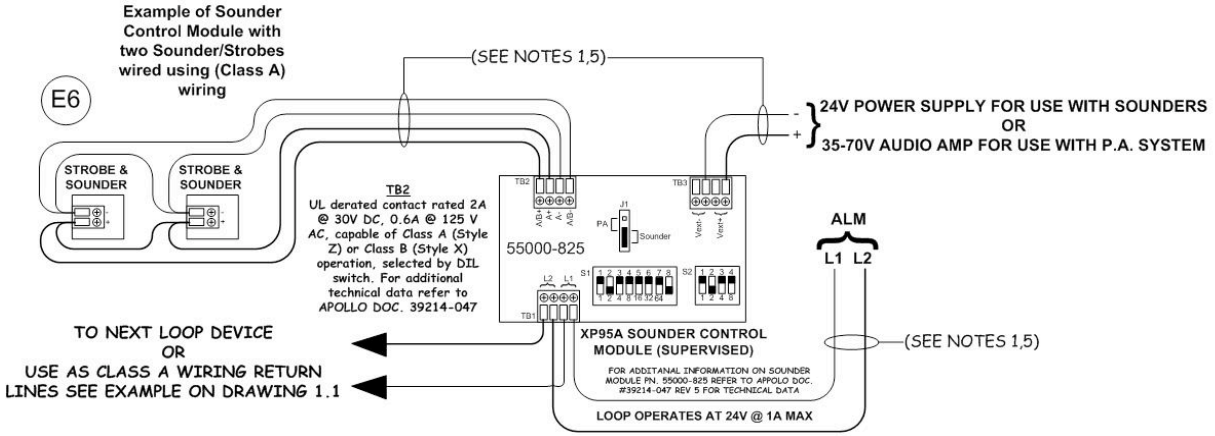
Notification Devices

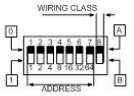
FB-AP™ Sounder Control Module Wiring

The following page depicts the FB-AP™ Sounder Control Module wiring diagram.

Drawn By: ZZ
Date 2-14-2007
DRAWING # 5.3







NOTES

1. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH N.F.P.A PAMPHLET #70 ARTICLE #760.
2. RELAY SHOWN IN NORMALLY ENERGIZED POSITION.
3. LINE REVERSAL CURRENT IS DEPENDENT UPON LOOP AND END-OF-LINE RESISTANCE INTERNALLY LIMITED AT 20mA MAXIMUM.
4. INTENDED FOR CONNECTION TO A POLARITY REVERAL CIRCUIT OF A REMOTE STATION RECEIVING UNIT WITH COMPATIBLE RATINGS.
5. TO COMPLY WITH U.L. 864 PAR. 14.8A POWER LIMITED, WIRING MUST ENTER CONTROL UNIT VIA SEPARATE KNOCKOUTS AND WIRING MUST BE DRESSED SO THERIS A SEPARATION OF 0.25-INCHES BETWEEN POWER WIRE AND NON-POWER, LIMITED WIRING MUST EMPLOY FPL.FPLR OR FPLP WIRE.
6. IF POWER LIMITED WIRING.
7. SEE EXPAMPLE OF CLASS B WIRING, NOTE 4.7KΩ RISITOR.
8. SEE EXPAMPLE OF CLASS A WIRING, NOTE USE OF LOOP RETURNLINES.

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Device Compatibility

6

This chapter provides information about compatibility of IP Fire Series devices. This chapter covers the following topics:

Overview

Cross compatibility is often an issue of note with installation, where devices and detectors must use components where applicable that meet functional requirements. This chapter details the cross compatibility for detectors and bases, and lists the general notification appliance circuit devices which are compatible with the applicable modules.

Detector vs. Base Compatibility

The following chart details detector and bases compatibility.

Detector	Bases			
	7254-FDB -4210-A 4”	7254-FBD -4250-A 6” E-Z Fit	7254-FBD -4225-A 6” Base	7254-FBD -4234-A 6” Low Profile
FB-AP™ Thermal Detector	X	X	X	X
FB-AP™ Ionization Detector	X	X	X	X
FB-AP™ Photoelectric Detector	X	X	X	X
FB-AP™ Multi-Detector	X	X	X	X

Appendix A- Device Interface Specification

A

This appendix includes sections for specific device interface specifications. It includes the following devices monitor and control modules:

Priority Switch Monitor Module(7254-FBD-5806)

Dual Priority Switch Monitor Module(7254-FBD-5790)

General

The unit incorporates the priority interrupt facility to give the fastest response to devices such as manual pull stations. A red indicator LED is visible through the fascia plate label. The product is mounted on a plastic fascia plate for use with a 4" junction box.

Mechanical

Dimensions:	4 ½" W x 4 ½"H x 1 ¾" D
Weight:	3 oz
Fixings:	Four #6-32 TAP machine screws. Centers to fit 4" Box, NEMA OS 1-1989 Figure 210 or equivalent.

Environmental

Temperature:	-4°F to +158°F
Humidity:	0% to 95% (no condensation or icing)
Shock:	To UL 864
Vibration:	To UL 864

Communication Protocol

The device uses FB-AP™ communication protocol. Analog levels and the function of input and output bits are given below.

Functional

Monitored Circuit:	Class A (Style D) or Class B (Style B) operation, selected by DIP switch.
	Switch type normally open, closure generates an alarm condition (contact resistance < 5kΩ @ 200μA)
	Monitoring circuit voltage 10V, End-of-line monitoring resistance is 47kΩ
Interrupt:	No
Internal Indicator:	Red LED, normally flashing in synchronization to any current pulse reply from the device. Operation of Output Bit 2 illuminates the LED continuously. Confirmation is returned by Input Bit 2.

Electrical Characteristics

Voltage:	16-28V DC 5-9V data pulses Data return: 20mA current pulses
Current Consumption:	Normal operation - 600µA typically. LED on: 4mA

DIP Switch Function

1-7	Address (ON = 0)
8	Selects wiring Class (ON = Class A)

Field Wiring Terminations

8 connections via right-angled terminal blocks enabling wire connections perpendicular to PCB with edge access securing screws. Terminals suitable for 14-26 AWG cables.

TB1	L1-FB-AP™ loop In/Out
TB5	L2-FB-AP™ loop In/Out L1 and L2 Unpolarized
TB3	Switch monitor circuit Class A or B

Mini Priority Switch Monitor Module (7254-FBD-5830)

General

The device is contained within a simple 2-piece plastic box, with 6 flyleads of 18AWG wire. Access is available through the plastic lid for the address DIL switch and a red indicating LED. The unit incorporates the FB-AP™ priority interrupt facility to give the fastest response to devices such as manual pull stations. This product is designed to fit in a single-gang junction box behind the pull station.

Mechanical

Dimensions:	3” W x 1¾” H x ¾” D
Weight:	1½ oz
Fixings:	None

Environmental

Temperature:	-4°F to +158°F
Humidity:	0% to 95% (no condensation or icing)
Shock:	To UL 864
Vibration:	To UL 864

Communication Protocol

The device uses FB-AP™ communication protocol. Analog levels and the function of input and output bits are given below.

Functional

Monitored Circuit:	Class A (Style D) or Class B (Style B) operation, selected by DIP switch. Switch type normally open, closure generates an alarm condition (contact resistance< 5kΩ @ 200µA)
	Monitoring circuit voltage 10V
	End-of-line monitoring resistance is 47kΩ
Interrupt:	Yes
Internal Indicator:	Red LED, normally flashing in synchronization to any current pulse reply from the device. Operation of Output Bit 2 illuminates the LED continuously. Confirmation is returned by Input Bit 2.

Electrical Characteristics

Voltage:	16-28V DC
	5-9V data pulses
	Data return: 20mA current pulses
Current Consumption:	Normal operation - 600µA typically. LED on: 4mA

DIP Switch Function

1-7	Address (ON = 0)
8	Selects wiring Class (ON = Class A)

Field Wiring Terminations

6 flying leads of 18AWG wire, 6” long approx.

RED	FB-AP™ Loop (Unpolarized)
BLACK	FB-AP™ Loop (Unpolarized)
VIOLET	+ve Monitored Circuit
WHITE	-ve Monitored Circuit
YELLOW	+ve return (used in Class A only)
GREEN	-ve return (used in Class A only)

Sounder Control Unit Module (7254-FBD-5825)

General

The sounder control module is intended to monitor and control one circuit of alarm sounders or PA speakers. The module incorporates a synchronization facility which allows the outputs of groups of modules to be synchronized by commands from the control panel. The unit is mounted on a plastic fascia plate suitable for fitting on a 4" square box. A red LED indicator, visible through the fascia, is provided.

Mechanical

Dimensions:	4 ½" W x 4 ½"H x 1 ¾" D
Weight:	3 oz
Fixings:	Four #6-32 TAP machine screws. Centers to fit 4" Box, NEMA OS 1-1989 Figure 210 or equivalent.

Environmental

Temperature:	-4°F to +158°F
Humidity:	0% to 95% (no condensation or icing)
Shock:	To UL 864
Vibration:	To UL 864

Communication Protocol

The device uses FB-AP™ communication protocol. Analog levels and the function of input and output bits are given below.

The unit additionally uses a subset of the protocol for the synchronized facility. The operation of this function is also detailed below.

Functional

Sounder Circuit:	Sounder relay output is 4PCO, UL derated contact rated 2A @ 30V DC, 0.6A @ 125V AC, capable of Class A (Style Z) or Class B (Style X) operation, selected by DIP switch.
	Normal monitoring circuit voltage 10V
	End-of-line monitoring resistance is 47kΩ
Speaker Supply:	Either external supply (24V) monitored by an opto-isolated input of 35 – 70V Audio Input, for use with PA speakers.
	To avoid fault conditions when issued in PA mode, jumper J1 should be moved to the PA position to disable the supply monitoring.

NOTE: The audio amplifier must have wire supervision capability as per NFPA. The sounder supply must be power limited as per NFPA.

Internal Indicator: Red LED, flashing in synchronization to any current pulse reply from the device.

Relay Functionality

Removal of supply voltage will not result in any change of state of the relay output.

When powered up, the relay state will initially be unchanged from the state that existed prior to power down occurring. Four seconds after application of valid DC supply the module will respond to Output Bit 0. If the module has not been addressed at this point, then a relay reset will automatically be applied.

When in normal operation, the output state will change within 0.1s of a valid change in the command bit.

NOTE: FB-AP™ *loop corruption may occur for duration of relay pulse.*

Electrical Characteristics

Voltage:	16-28V DC
	5-9V data pulses
	Data return: 20mA current pulses
Current Consumption:	Normal operation and Sounder drive active: 1mA typically relay activated 4mA typically pulsed for 150ms. Power up surge current 6mA max for 150ms

DIP Switch Function

S1	1-7	Address (ON = 0)
	8	Selects wiring Class (ON = Class A)
S2	Sets sounder group address for synchronization purposes	

Field Wiring Terminations

12 connections via right-angled terminal blocks enabling wire connections perpendicular to PCB with edge access securing screws. Terminals are suitable for 14-26 AWG cables.

TB1	L1 - FB-AP™ loop In/Out
	L2 - FB-AP™ loop In/Out
	L1 and L2 Unpolarized
TB3	External Supply +ve and
	–ve input and Output
TB2	Class A or B sounder circuit.

Mini Switch Monitor Module (7254-FBD-5831)

General

The device is contained within a simple 2-piece plastic box, with 6 flying leads of 18AWG wire. Access is available through the plastic lid for the address DIL switch and a red indicating LED. The product is designed to fit in a single-gang junction box.

Mechanical

Dimensions:	3” W x 1¾” H x ¾” D
Weight:	1½ oz
Fixings:	None

Environmental

Temperature:	-4°F to +158°F
Humidity:	0% to 95% (no condensation or icing)
Shock:	To UL 864
Vibration:	To UL 864

Communication Protocol

The device uses FB-AP™ communication protocol. Analog levels and the function of input and output bits are given below.

Functional

Monitored Circuit:	Class A (Style D) or Class B (Style B) operation, selected by DIP switch. Switch type normally open, closure generates an alarm condition (contact resistance < 5kΩ @ 200µA)
	Monitoring circuit voltage 10V
	End-of-line monitoring resistance is 47kΩ
Analog Levels:	16 – Normal condition
	4 – Open Circuit Fault
	64 – Alarm caused by switch closure
Interrupt:	No
Internal Indicator:	Red LED, normally flashing in synchronization to any current pulse reply from the device. Operation of Output Bit 2 illuminates the LED continuously. Confirmation is returned by Input Bit 2.

Electrical Characteristics

Voltage:	16-28V DC
	5-9V data pulses

Data return: 20mA current pulses

Current Consumption: Normal operation - 600µA typically. LED on: 4mA

DIP Switch Function

1-7	Address (ON = 0)
8	Selects wiring Class (ON = Class A)

Field Wiring Terminations

6 flying leads of 18AWG wire, 6” long approx.

RED	FB-AP™ Loop (Unpolarized)
BLACK	FB-AP™ Loop (Unpolarized)
VIOLET	+ve Monitored Circuit
WHITE	-ve Monitored Circuit
YELLOW	+ve return (used in Class A only)
GREEN	-ve return (used in Class A only)

Switch Monitor Module (7254-FBD-5805)

General

A red indicator LED is visible through the fascia plate label. The product is mounted on a plastic fascia plate for use with a 4" junction box.

Mechanical

Dimensions:	4 ½" W x 4 ½"H x 1 ¾" D
Weight:	3 oz
Fixings:	Four #6-32 TAP machine screws. Centers to fit 4" Box, NEMA OS 1-1989 Figure 210 or equivalent.

Environmental

Temperature:	-4°F to +158°F
Humidity:	0% to 95% (no condensation or icing)
Shock:	To UL 864
Vibration:	To UL 864

Communication Protocol

The device uses FB-AP™ communication protocol. Analog levels and the function of input and output bits are given below.

Functional

Monitored Circuit:	Class A (Style D) or Class B (Style B) operation, selected by DIP switch. Switch type normally open, closure generates an alarm condition (contact resistance < 5kΩ @ 200µA)
	Monitoring circuit voltage 10V
	End-of-line monitoring resistance is 47kΩ
Analog Levels:	16 – Normal condition
	4 – Open Circuit Fault
	64 – Alarm caused by switch closure
Interrupt:	No
Internal Indicator:	Red LED, normally flashing in synchronization to any current pulse reply from the device. Operation of Output Bit 2 illuminates the LED continuously. Confirmation is returned by Input Bit 2.

Electrical Characteristics

Voltage:	16-28V DC
	5-9V data pulses

Data return: 20mA current pulses

Current Consumption: Normal operation - 600µA typically. LED on: 4mA

DIP Switch Function

1-7	Address (ON = 0)
8	Selects wiring Class (ON = Class A)

Field Wiring Terminations

8 connections via right-angled terminal blocks enabling wire connections perpendicular to PCB with edge access securing screws. Terminals are suitable for 14-26 AWG cables.

TB1	L1 - FB-AP™ loop In/Out
TB5	L2 - FB-AP™ loop In/Out
	L1 and L2 Unpolarized
TB3	Switch monitor circuit Class A or B

Switch Monitor Input/Output Module (7254-FBD-5820)

General

A red indicator LED is visible through the fascia plate label. The product is mounted on a plastic fascia plate for use with a 4" junction box.

Mechanical

Dimensions:	4 ½" W x 4 ½"H x 1 ¾" D
Weight:	3 oz
Fixings:	Four #6-32 TAP machine screws. Centers to fit 4" Box, NEMA OS 1-1989 Figure 210 or equivalent.

Environmental

Temperature:	-4°F to +158°F
Humidity:	0% to 95% (no condensation or icing)
Shock:	To UL 864
Vibration:	To UL 864

Communication Protocol

The device uses FB-AP™ communication protocol. Analog levels and the function of input and output bits are given below.

Functional

Monitored Circuit:	Class A (Style D) or Class B (Style B) operation, selected by DIL switch. Switch type normally open, closure generates an alarm condition (contact resistance < 5kΩ @ 200µA)
	Monitoring circuit voltage 10V
	End-of-line monitoring resistance is 47kΩ
Unmonitored Input:	Opto-isolated input
	Low: <1.5V DC, High: >10V (30V max)
	Voltages between 1.5V and 10V DC are indeterminate
Output:	Volt-free SPCO relay output, UL derated contact 2A @
	30V DC, 0.6A @ 125V AC.
Analog Levels:	16 – Normal condition
	4 – Open Circuit Fault
	64 – Alarm caused by switch closure
Interrupt:	No

Internal Indicator:	Red LED, normally flashing in synchronization to any current pulse reply from the device. Operation of Output Bit 2 illuminates the LED continuously. Confirmation is returned by Input Bit 2.

Relay Functionality

Removal of supply voltage will not result in any change of state of the relay output.

When powered up, the Relay state will initially be unchanged from the state that existed prior to power down occurring. Four seconds after application of a valid DC supply the module will respond to Output Bit 0. If the module has not been addressed at this point, then a Relay reset will automatically be applied.

When in normal operation, the output state will change within 0.1s of a valid change in the command bit.

NOTE: FB-AP™ loop corruption may occur for duration of relay pulse.

Electrical Characteristics

Voltage:	16-28V DC
	5-9V data pulses
	Data return: 20mA current pulses
Current Consumption:	Normal operation - 600µA typically. LED on: 4mA
	Relay activated: 4mA pulsed for 80ms
	Switch on surge current: 3.5mA for 2s

DIP Switch Function

1-7	Address (ON = 0)
8	Selects wiring Class (ON = Class A)

Field Wiring Terminations

13 connections via right-angled terminal blocks enabling wire connections perpendicular to PCB with edge access securing screws. Terminals are suitable for 14-26 AWG cables.

TB1	L1-FB-AP™ loop In/Out
TB5	L2-FB-AP™ loop In/Out L1 and L2 Unpolarized
TB3	Switch monitor circuit Class A or B
TB4	Relay contacts: (N/C, COM, N/O)
TB2	Unpolarized Opto-Isolated input

Relay Output Module (7254-FBD-5863)

General

This is a loop-powered device which incorporates a dual-form C, volt-free relay output. The product is mounted on a plastic fascia plate for use with a 4" junction box.

Mechanical

Dimensions:	4 ½" W x 4 ½"H x 1" D
Weight:	3 oz
Fixings:	Four #6-32 TAP machine screws. Centers to fit 4" Box, NEMA OS 1-1989 Figure 210 or equivalent.

Environmental

Temperature:	-4°F to +158°F
Humidity:	0% to 95% (no condensation or icing)
Shock:	To UL 864
Vibration:	To UL 864

Communication Protocol

The device uses FB-AP™ communication protocol.

Functional

Analog Levels: 16 – Normal condition

Relay Functionality

Removal of supply voltage will not result in any change of state of the relay output.

When powered up, the Relay state will initially be unchanged from the state that existed prior to power down occurring. Four seconds after application of a valid DC supply the module will respond to Output Bit 0. If the module has not been addressed at this point, then a Relay reset will automatically be applied.

When in normal operation, the output state will change within 0.1s of a valid change in the command bit. **NOTE**: FB-AP™ loop corruption may occur for duration of relay pulse.

Electrical Characteristics

Voltage:	17-28V DC
	5-9V data pulses

DIP Switch Function

1-7	Address (ON = 0)
8	Selects wiring Class (ON = Class A)

Appendix B - Detector List and Part Number Cross Reference

Description	Air Products Number	FireBus Part Number
2-Wire Analog Ionization Duct Smoke Detectors	SL-DAA-N	
2-Wire Analog Photoelectric Duct Smoke Detectors	SL-DAA-P	
4-Wire Analog Ionization Duct Smoke Detectors	SL-DA4R-N	
4-Wire Analog Photoelectric Duct Smoke Detectors	SL-DA4R-P	
4-Wire Ionization Duct Smoke Detectors	SL-2000-N	
4-Wire Photoelectric Duct Smoke Detectors	SL-2000-P	
Analog Addressable Ionization Duct Smoke Detectors	RW-AR-N	
Analog Addressable Photoelectric Duct Smoke Detectors	RW-AR-P	
Analog Addressable Ionization Duct Smoke Detectors	RW-AA-N	
Analog Addressable Photoelectric Duct Smoke Detectors	RW-AA-P	

NOTE: Duct detectors are identified and installed in like manner to those of similar FB-AP™ Series devices.

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