EST2

FIRE ALARM CONTROL PANEL

INSTALLATION & PREVENTIVE MAINTENANCE

GUIDE

February, 1996
P/N 270268

FCC Information

1. The dialer complies with Part 68 of the FCC rules. The Dialer' FCC registration number and the Ringer Equivalence Number (REN) are on the back of the dialer. This information must be provided to the telephone company, if requested.
2. An FCC compliant telephone cord and modular plug cord is supplied with the dialer. The dialer is designed to be connected to the telephone network using the supplied cord and an RJ31X or RJ38X jack, which must also comply with FCC Part 68 rules.
3. The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed five (5). To be certain the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company.
4. If the dialer causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. If advance notice isn't practical, the telephone company will notify you as soon as possible. You will also be advised of your right to file a complaint with the FCC, if you believe it is necessary.
5. The telephone company may make changes in it's facilities, equipment, operations, or procedures that could affect the operation of the dialer. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.
6. If trouble is experienced with the dialer, for repair or warranty information, contact Edwards Systems Technology, 6411 Parkland Drive, Sarasota, Florida, USA 34243 Telephone: 1-800-655-4497. If the dialer is causing harm to the telephone network, the telephone company may request you disconnect the dialer until the problem is resolved.
7. No repairs may be performed on the dialer by the user.
8. The dialer cannot be used on public coin phone or party line service provided by the telephone company.

CANADA DOC Information

NOTICE: The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunicaions network protective, operational, and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate

NOTICE: The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirements that the sum of the Load Numbers of all the devices does not exceed 100.

EST2 Installation & Preventive Maintenance Manual P/N 270268 Revision Status			
Revision			
Firmware	Manual	Date	Reason for Change
	1.0	05-31-95	Initial Release.
	2.0	08/01/95	Revised: Figure 3.5; IOP-3 info; 2-MCM circuit resistance specs.; misc. editorial corrections. Added: Download ground fault note. DL2 Dialer
	3.0	12/95	Added CMDN, SAN, and APSB Power Supply information

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National Fire Protection Association (NFPA)
1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101

NFPA 70 National Electric Code
NFPA 72 National Fire Alarm Code

Underwriters Laboratories Inc. (ULI)
333 Pfingsten Road
Northbrook, IL 60062-2096

UL 38 Manually Actuated Signaling Boxes
UL217 Smoke Detectors, Single & Multiple Station
UL 228 Door Closers/Holders for Fire Protective Signaling Systems
UL 268 Smoke Detectors for Fire Protective Signaling Systems
UL 268A Smoke Detectors for Duct Applications
UL 346 Waterflow Indicators for Fire Protective Signaling Systems
UL 464 Audible Signaling Appliances
UL 521 Heat Detectors for Fire Protective Signaling Systems
UL 864 Standard for Control Units for Fire Protective Signaling Systems
UL 1481 Power Supplies for Fire Protective Signaling Systems
UL 1638 Visual Signaling Appliances
UL 1971 Visual Signaling Appliances

Underwriters Laboratories of Canada (ULC)
7 Crouse Road
Scarborough, Ontario M1R 3A9

ULC S527 Standard for Control Units for Fire Alarm Systems
ULC S524 Standard for the Installation of Fire Alarm Systems
ULC S536 Standard for the Inspection and Testing of Fire Alarm Systems
ULC S537 Standard for the Verification of Fire Alarm Systems

EST Technical Documents

P/N 270185 EST2 Applications Guide
P/N 270189 EST2 Service & Troubleshooting Guide
P/N 270187 EST2 Programming Guide
P/N 270188 EST2 Operations Guide
P/N 270145 Signature Series Intelligent Smoke & Heat Detectors Applications Bulletin

Other Requirements

Requirements of state and local building codes.
Requirements of the Authority Having Jurisdiction.

INTRODUCTION

The EST2 Fire Alarm Control Panel is a multiplexed fire alarm system which supports up to 96 Signature Series detectors and 94 Signature Series Modules on an addressable Signature Data Circuit. Two hard-wired Notification Appliance Circuits (NAC) are provided for audible and visual devices. An Expander Loop Module may be added to the panel, providing two more NACs and a second Signature Data Circuit (SDC) which supports an additional 96 Signature detectors and 94 Signature modules.

EST2 Features

- Autoprogramming
- Custom Programmable
- User-Friendly Front Panel
- Style D/B (Class A/B), Initiating Device Circuits (IDC)
- Monitor Mode
- Style Z/Y (Class A/B) Notification Appliance Circuits (NAC)
- Optional Expander Loop Module
- Class A/B RS-485 External Annunciator Port
- RS-232 External Peripheral Device Port
- Advanced Power Management
- Transient Protected Field Wiring
- Dead Front Construction
- Ground Fault Detection LED
- Switch Mode Power Supply
- Optional Supplementary Front Panel LED/Switch Modules
- March Time Module
- Off Premise: Reverse Polarity Module or Dialer (Digital Alarm Communicator Transmitter)
- Form C Alarm, & Trouble Contacts
- Form A Supervisory Contacts

Table 1.1 - Minimum EST2 System Requirements

NFPA 72 System Classification	Required Control Equipment
Protected Premise (Local) (Chapter 3)	2-CAB Enclosure 2-MCM Main Controller Module 2-PPS Primary Power Supply 2-LCD LCD Annunciator 5 AH Batteries, minimum (battery calculation required)
Auxiliary (Chapter 4-7)	Add RPM Module to Protected Premise System.
Remote Station (Chapter 4-5)	Add RPM or DL2 Module (Dialer) to Protected Premise System.
Proprietary Protected Premise (Chapter 4-4)	Connect to Protected Premise System. Connect a listed printer with 120 VAC uninterruptable power supply.

ENCLOSURE INSTALLATION

2.1 Power Limited & Non Power-Limited Wire Routing Requirements

Be sure to follow all Applicable Codes and Standards when installing this system. A list of standards is located immediately following the table of contents.

Mount the Backbox at the required location. A dedicated 120 VAC (model 2-PPS-120), or 220 VAC (model 2-PPS-220) 50/60 Hz circuit is required for power. Install all conduit and pull all wiring into the backbox before proceeding to the next step.

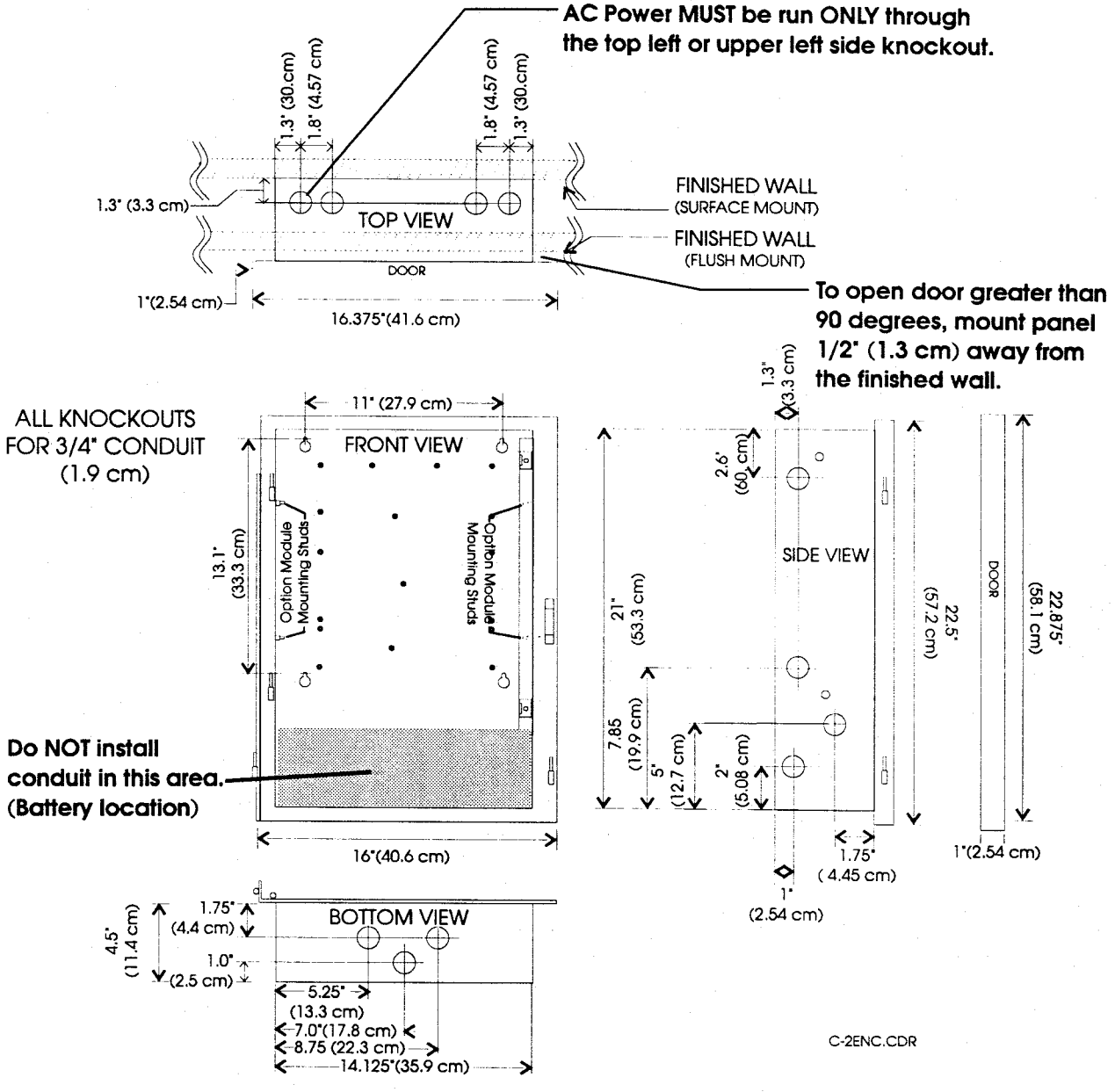


Figure 2.1 - 2-CAB Enclosure Installation

Fire Alarm System wiring is classified as either Power Limited or Non-Power Limited per NEC Article 760. **All power limited wiring must be separated from all non power limited wiring by a minimum distance of 1/4 in (6 mm).** Note in Figure 2.2 that AC power must enter the enclosure through the top left or upper left-hand knockouts in the enclosure.

If the relay contacts on the Main Controller Module are supplied by non-power limited sources, the wiring to these contacts must be routed through the lower left-hand knockouts in the enclosure. If a remote battery enclosure is used, route the battery wiring through the lower conduit knockouts to the protective channel leading to the battery terminals on the power supply.

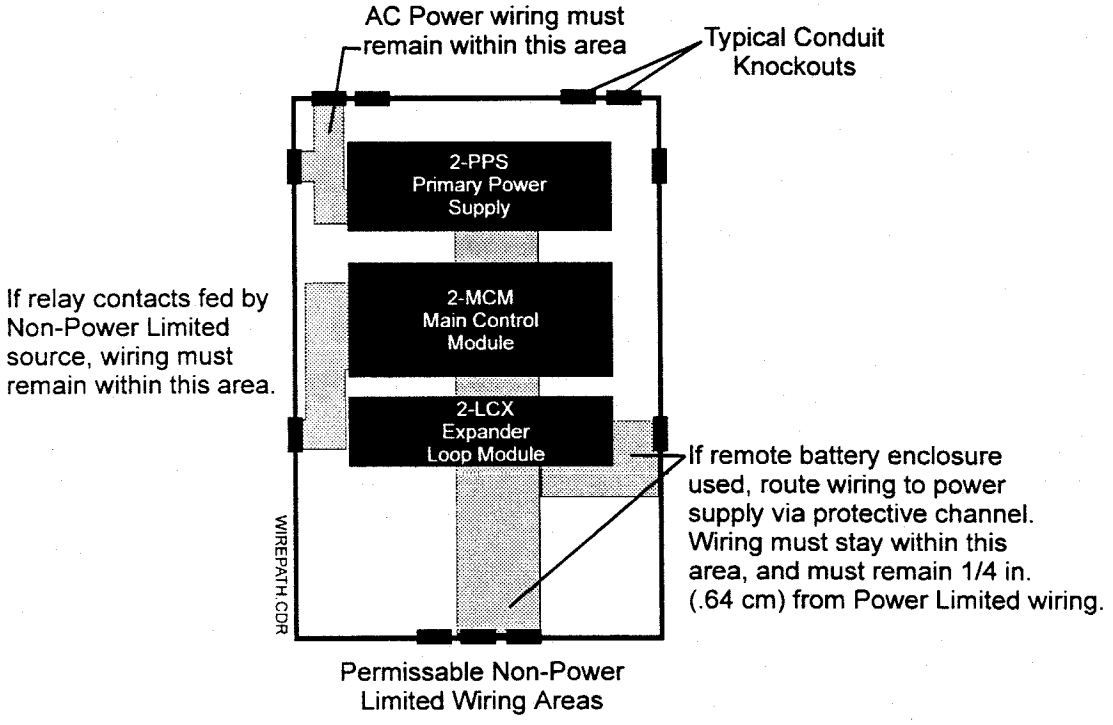


Figure 2.2 - Power Limited Versus Non-Power Limited Wiring Areas

Battery wiring is considered non-power limited, and must be routed to the Main Controller Module as shown in Figure 2.3.

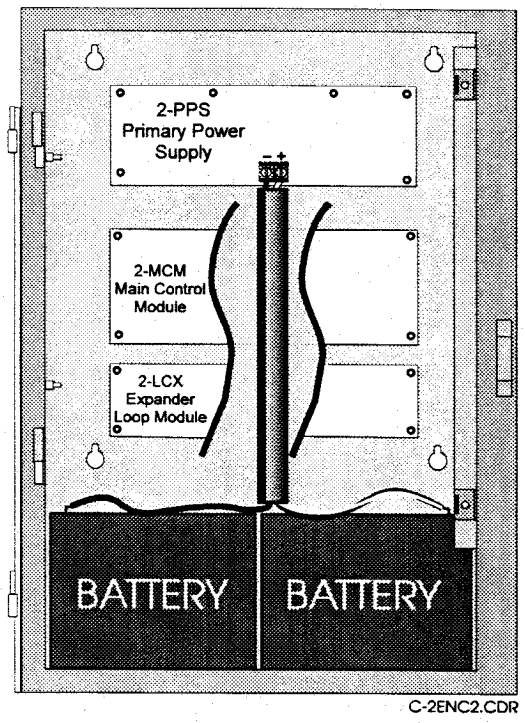


Figure 2.3 - Battery Wire (Non-Power Limited) Routing

If wiring is run horizontally in the space between the Primary Power Supply and the Main Controller Module, it must be **separated vertically by at least 1/4 inch (.6 cm)** from the ribbon cable between the Primary Power Supply and the Main Controller Module, as shown in Figure 2.4.

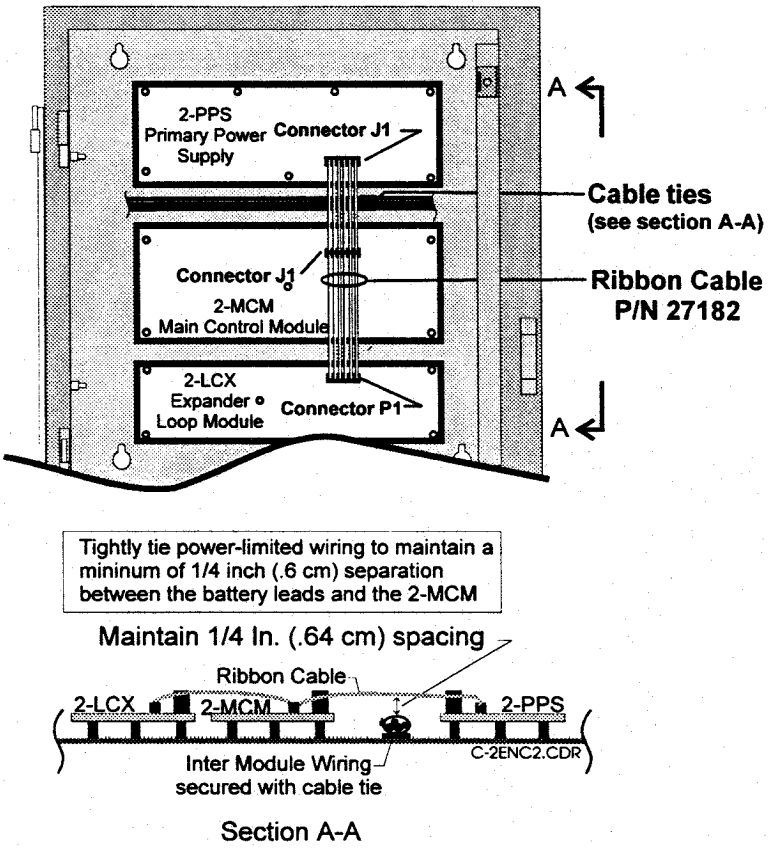


Figure 2.4 - Horizontal Wire Routing Between Modules

2.2 External Battery Cabinet Requirements

If batteries greater than 10AH are required, a BC-2 battery cabinet must be installed within 5 ft (1.5 m) of the control panel, as shown in Figure 2.5.

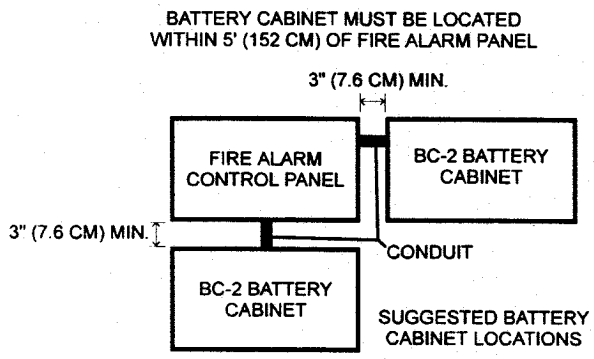


Figure 2.5 - Acceptable Battery Cabinet Locations

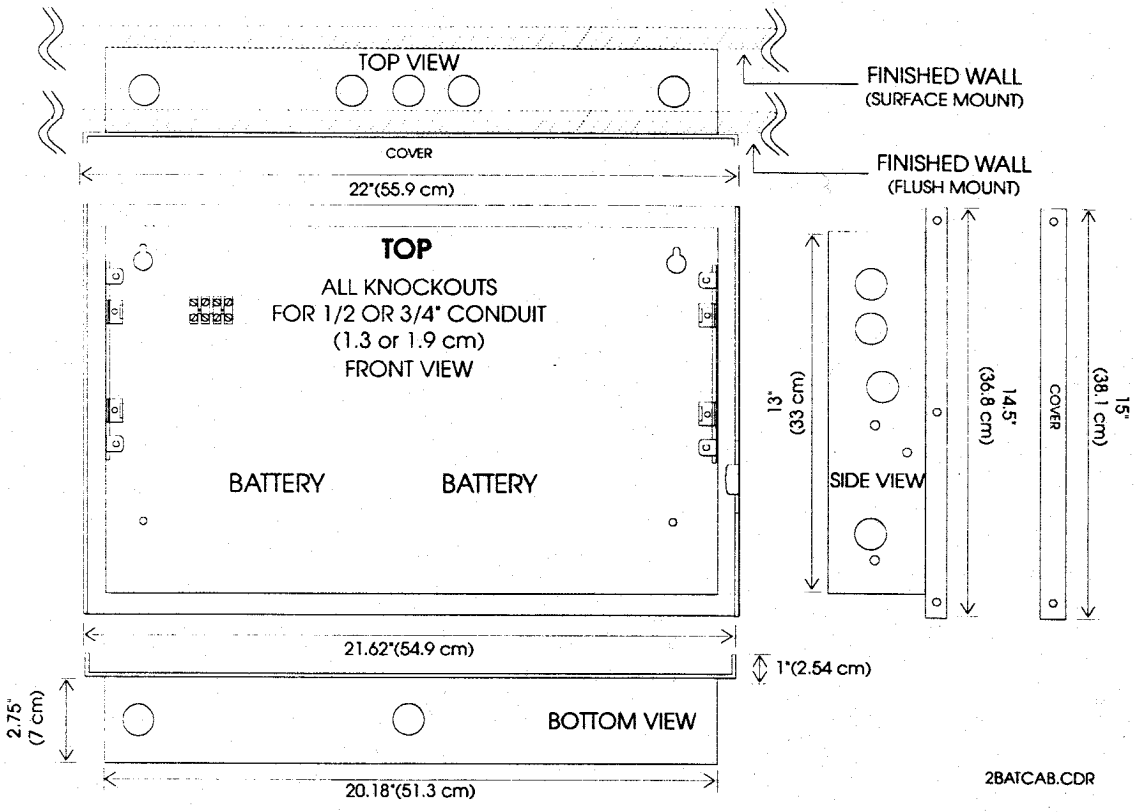


Figure 2.6 - BC-2 Battery Cabinet

2.3 2-CMDN and 2-CMDN-C Installation

The 2-CMDN and 2-CMDN-C mount in a stand-alone surface mount enclosure (P/N 200032).

1. Mount the enclosure in the required location.
2. Install conduit in the knockouts provided.
3. Wire per Annunciators Section of this manual.
4. Mount annunciator in enclosure with hardware provided. See Figure 2.7.

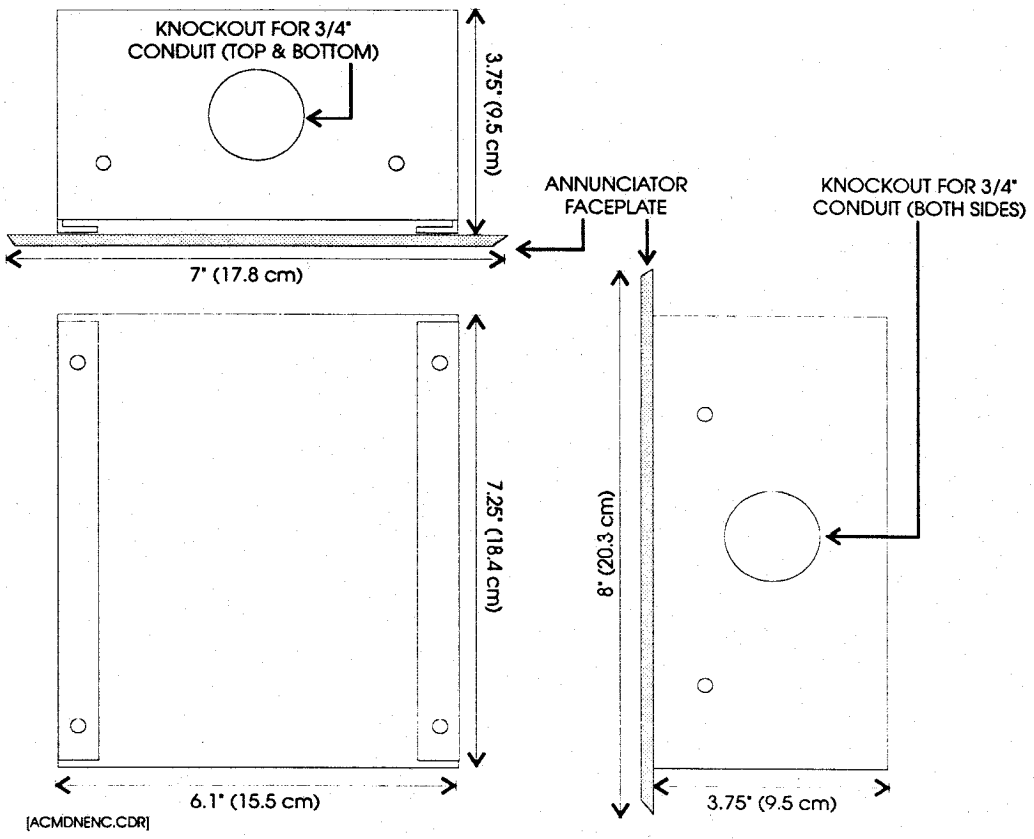


Figure 2.7 - 2-CMDN(-C) Flush Mount Enclosure

2.4 2-SMDN and 2-SMDN-C Installation

The 2-SMDN-C mounts in the SAN-4 or SAN-8 annunciator cabinets or in the RSAN-6 rack mount frame. The 2-SMDN or 2-SMDN-C Alpha-Numeric Display Annunciator requires two SAN module spaces. Install the annunciator in the SAN enclosure/frame with the hardware provided.

Wire the 2-SMDN(-C) per the Annunciator section in this manual.

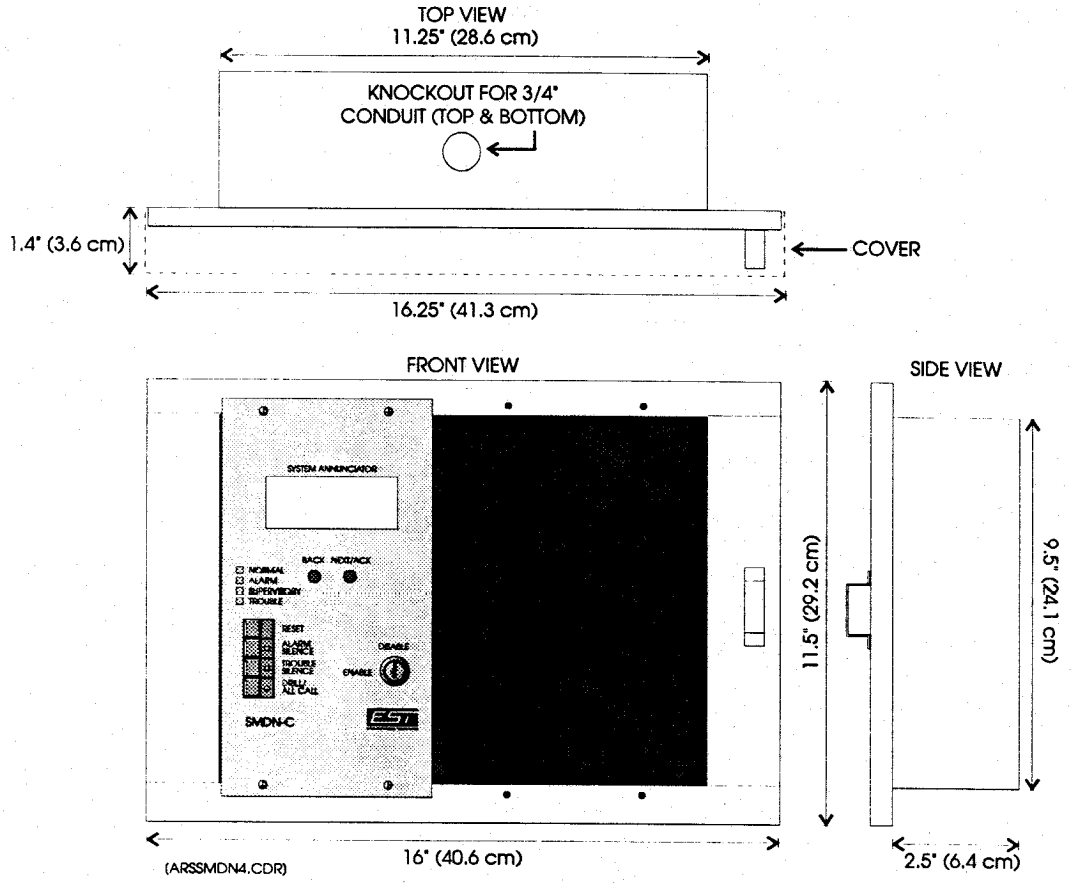


Figure 2.8 - 2-SMDN-C and SAN-4 Enclosure Installation

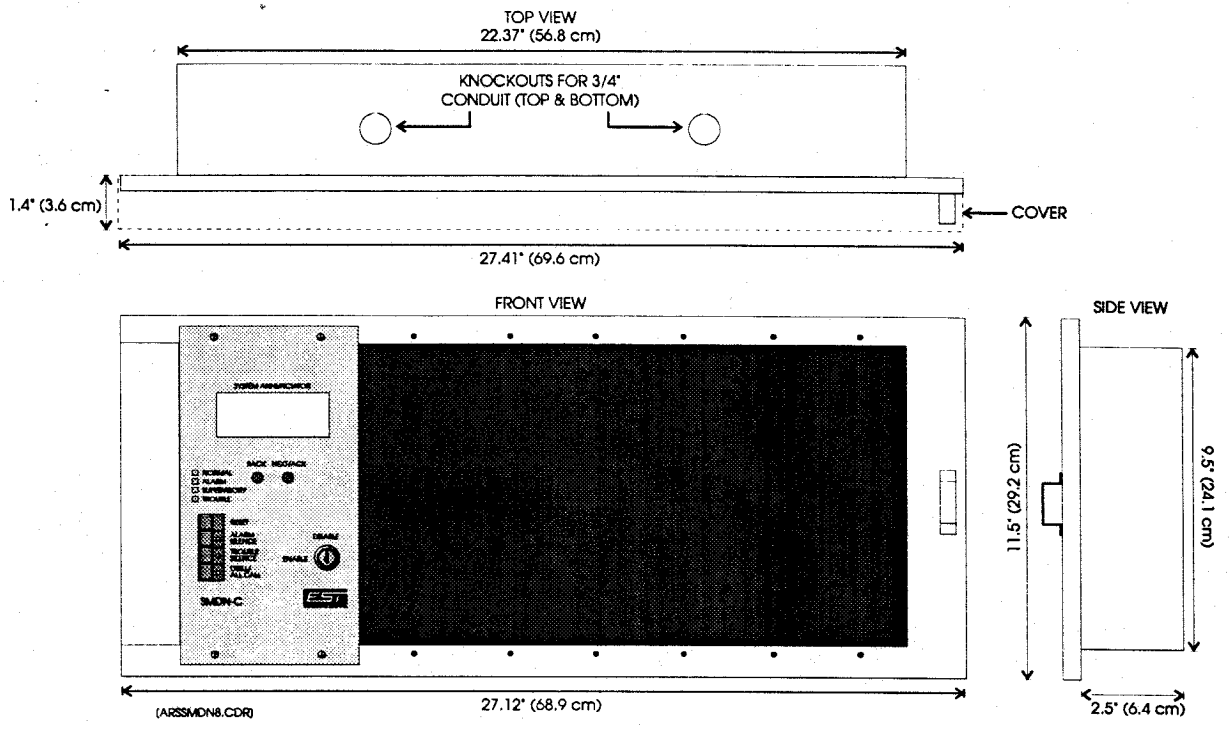


Figure 2.9 - 2-SMDN-C and SAN-8 Enclosure Installation

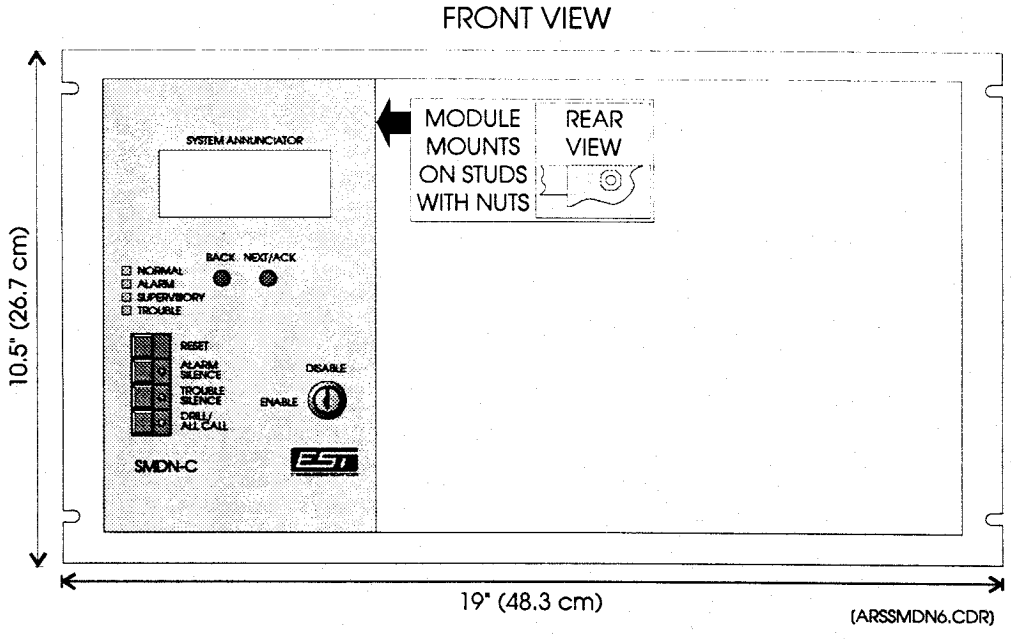


Figure 2.10 - 2-SMDN-C and RSAN-6 Mounting Frame Installation

2.5 SAN Annunciator Enclosure Installation

The SAN-4 and SAN-8 enclosures are semi-flush mounted cabinets for mounting SAN series annunciator modules. The SAN-4 accommodates four SAN modules and the SAN-CPU. The SAN-8 accommodates eight SAN modules and the SAN-CPU. Both the SAN-4 and SAN-8 are made from 16 gauge steel and are furnished with a key locking door with a Lexan viewing window. Backboxes are provided with conduit knockouts, module mounting studs, and a SAN-CPU mounting bracket.

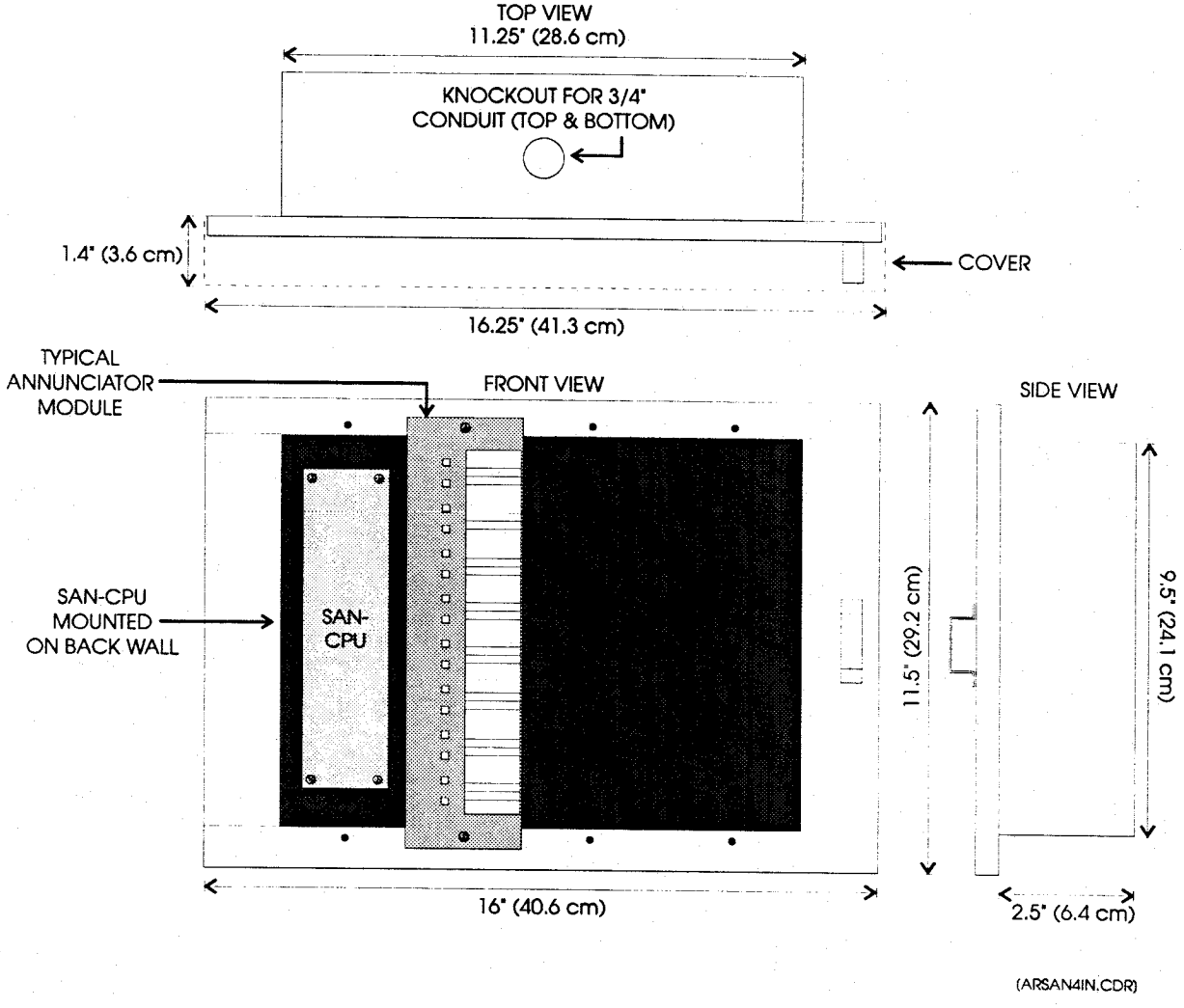


Figure 2.11 - SAN-4 Enclosure Installation with Typical Annunciator Module

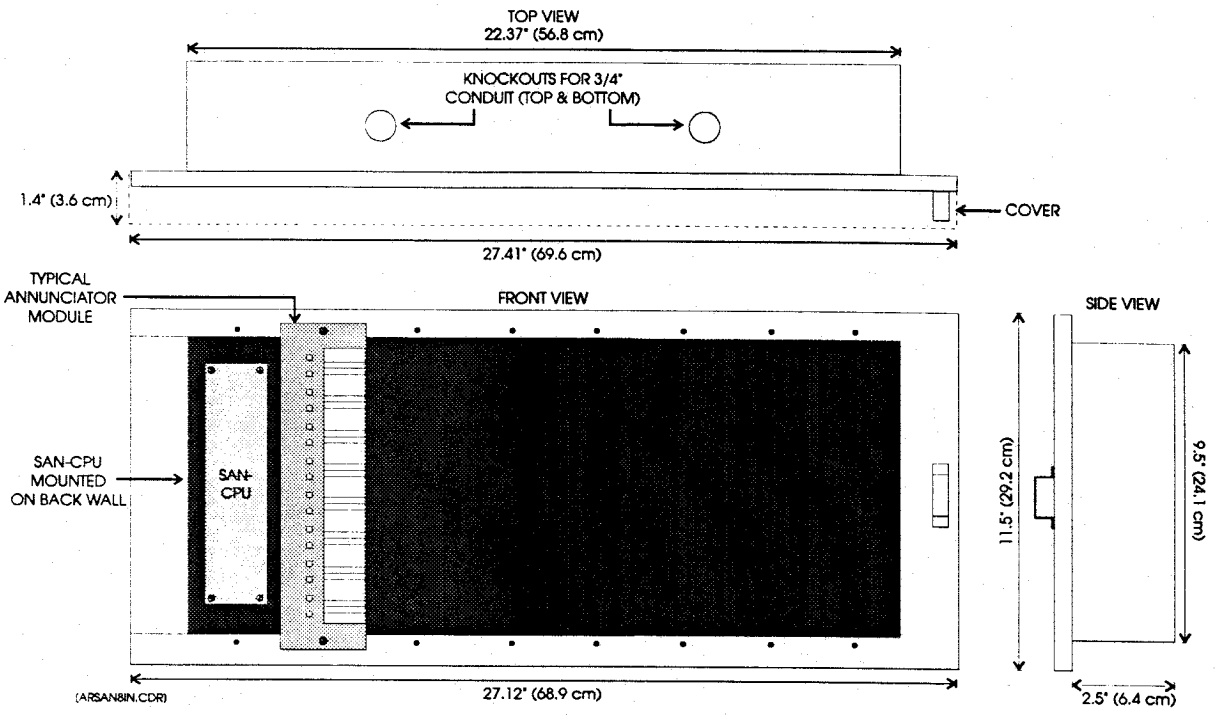


Figure 2.12 - SAN-8 Enclosure Installation with Typical Annunciator Module

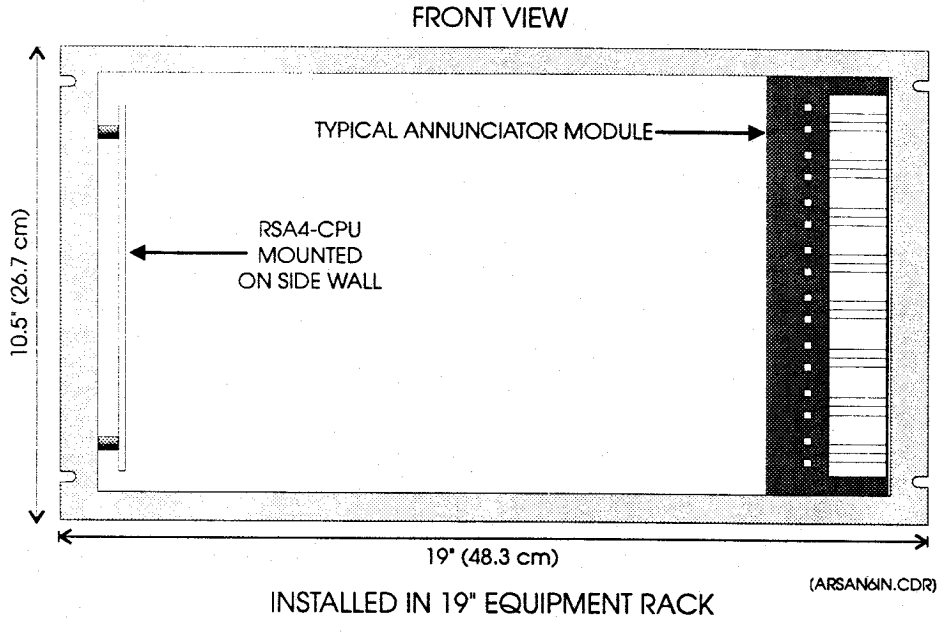


Figure 2.13 - RSAN-6 Enclosure Installation with Typical Annunciator Module

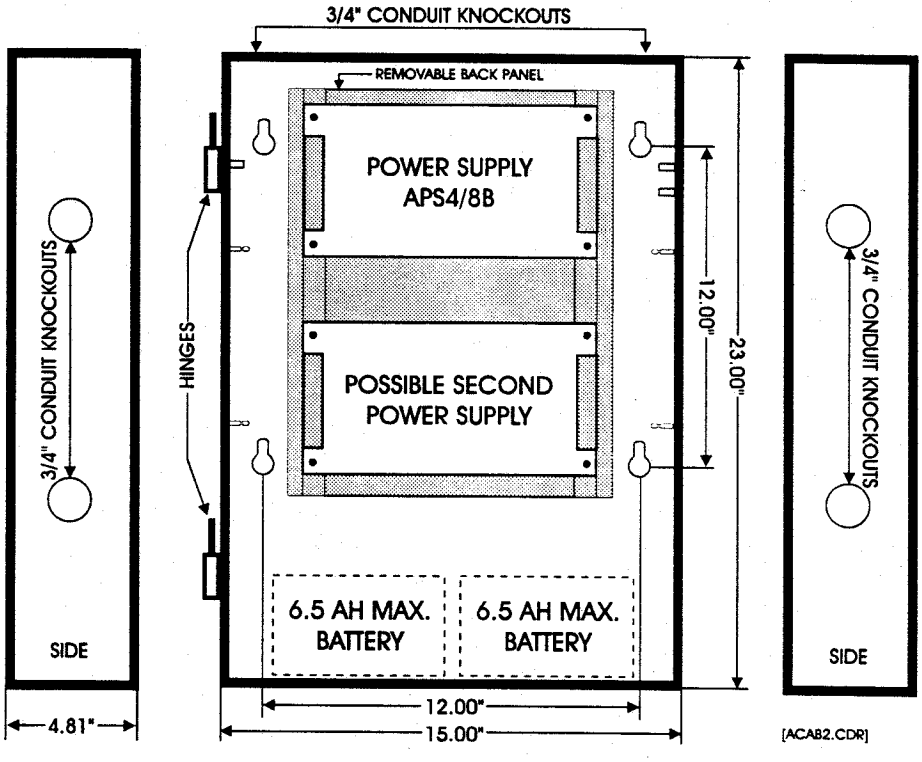
2.6 CAB-2 Enclosure Installation

The CAB-2 is a surface mounted enclosure. The cabinet is UL listed, constructed of 16 gauge welded steel, and features mounting rails with speed nuts for mounting the APSB series power supplies.

The surface mounted enclosure features a removable door which is hinged on the left side. The door on the semi-flush mounted enclosure are integral to the finished frame. The door is provided with a Lexan insert for viewing system indicators and are secured with a standard key lock assembly.

The enclosure features mounting studs for mounting a door tamper switch, which is required for security panel operations. Door assemblies and back boxes are painted white. Red enclosures may be specified by adding an "R" suffix to part and model numbers.

Electrical knockouts are provided on the top, bottom, and sides of the back box, and keyhole mounting slots are located on the back. The removable backplane permits mounting and wiring of the APSB series power supplies out of the back box for bench testing and facilitates easy installation. Space for batteries is provided at the bottom of the enclosure.



PANEL WIRING

3.1 Module Installation & Wiring

1. Mount the 2-PPS Primary Power Supply, the 2-MCM Main Control Module, and the 2-LCX Expander Loop Module (if used) on the back plane of the cabinet using the hardware supplied (Figure 3.1). **NOTE: If a DL2 Dialer Module is to be installed in the panel, install three metal spacers (P/N 362329) using 6-32 machine screws as shown in Figure 4-6, before mounting the 2-MCM in the enclosure.**

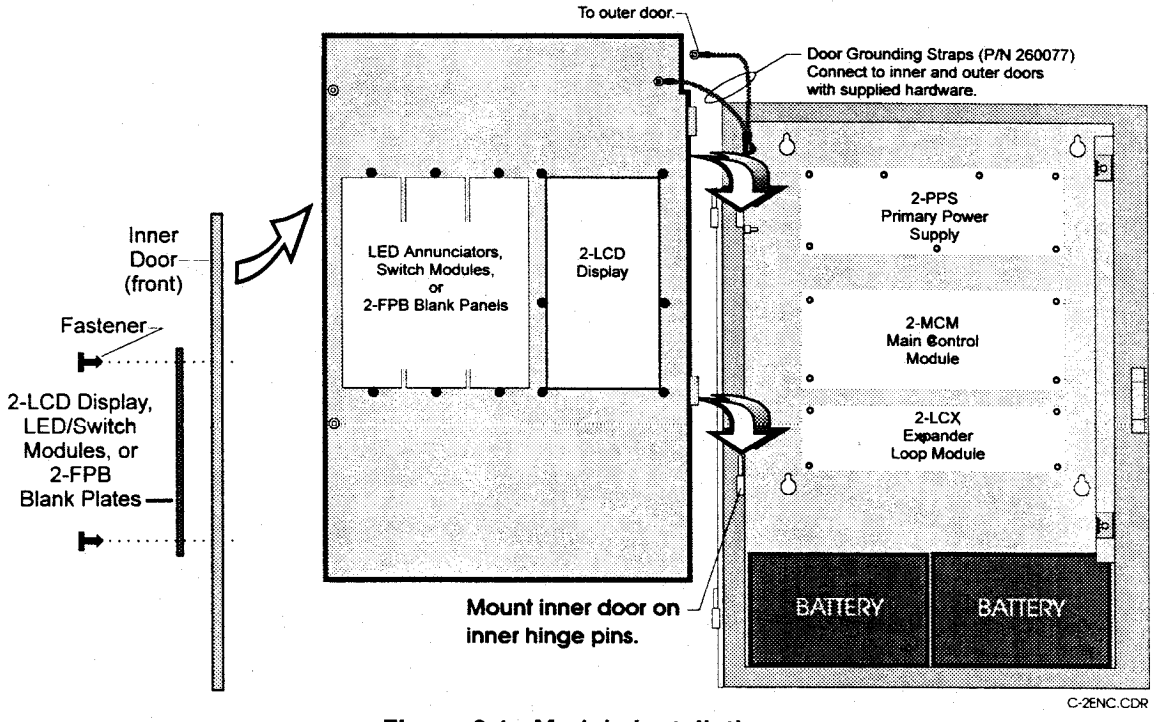


Figure 3.1 - Module Installation

2. Mount the 2-LCD Display Module on the left side (front view) of the inner door panel using the hardware supplied (Figure 3.1). If front panel Annunciator/Switch Modules are used, install them on the inner door next to the LCD Display Annunciator. Install 2-FPB blank plates in all unused spaces on the inner door.

3. Mount the inner door on the backbox inner hinge pins. Install **two (2)** grounding straps (P/N 260077) on the backbox stud with the hardware provided (Figure 3.1). Connect one strap to the inner door grounding stud. The second grounding strap is for the outer door and will be connected later.

4. Connect the power/data ribbon cable (P/N 250180) from connector J1 on the Power Supply Module to connector J1 on the Main Controller Module to connector P1 on the Expander Loop Module, if used. Refer to Figure 3.2.

5. Connect the power/data ribbon cable (P/N 250172) from connector J1 on the LCD Display to connector J2 on the Main Controller Module. Refer to Figure 3.2.

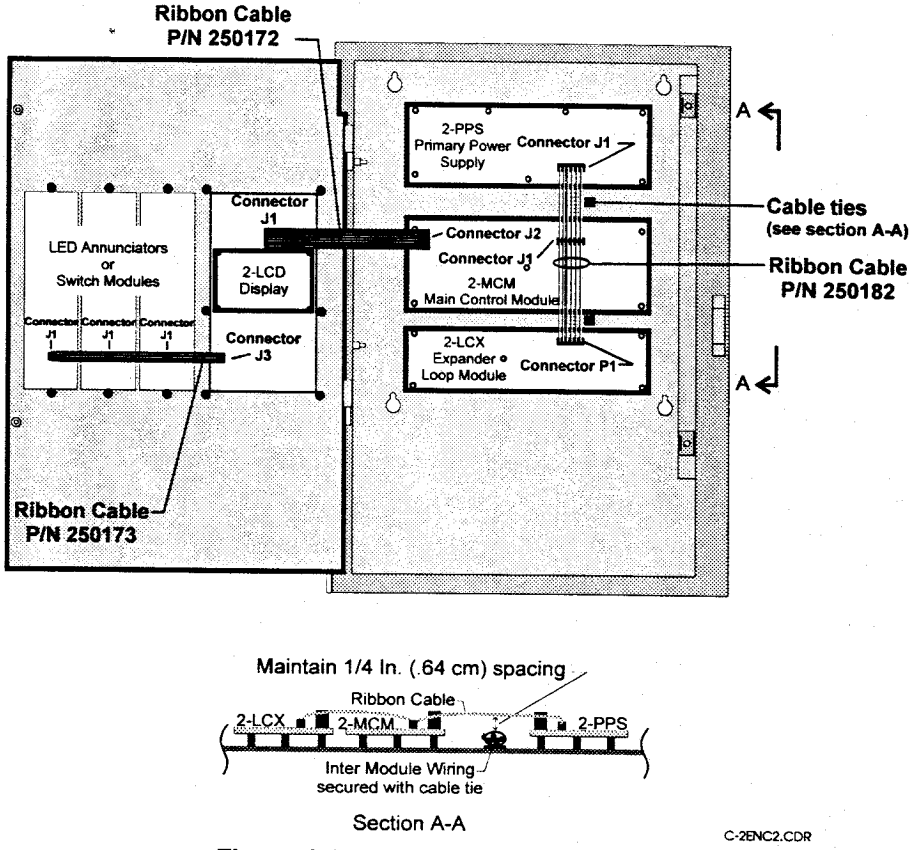


Figure 3.2 - Ribbon Cable Installation

6. If LED Annunciator/Switch Modules are used, install one connector of the multi-drop ribbon cable assembly (P/N 250173) in connector J1 of each of the annunciator modules, then install the remaining connector in connector J3 of the 2-LCD Display (Figure 3.2). Set the module numbers according to Figure 3.3. **NOTE:** Black indicates the switch position.

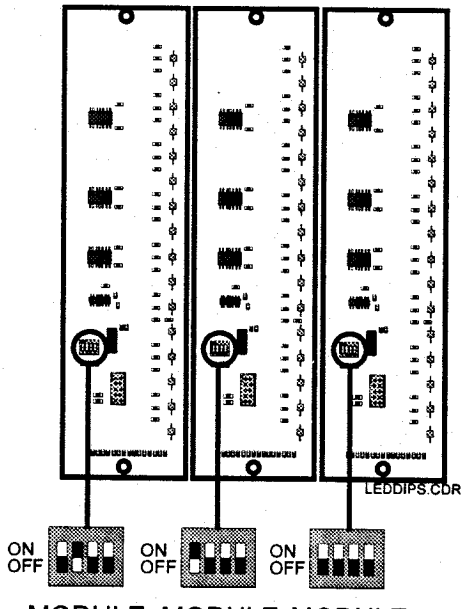


Figure 3.3 - LED/Switch Module Number Switch Settings

7. Install the outer door on the enclosure per Figure 3.4. Connect the grounding strap (P/N 260077) from the backbox to the grounding stud on the outer door using the supplied hardware. Install the instruction plate on the top of the inner door using the black fasteners.

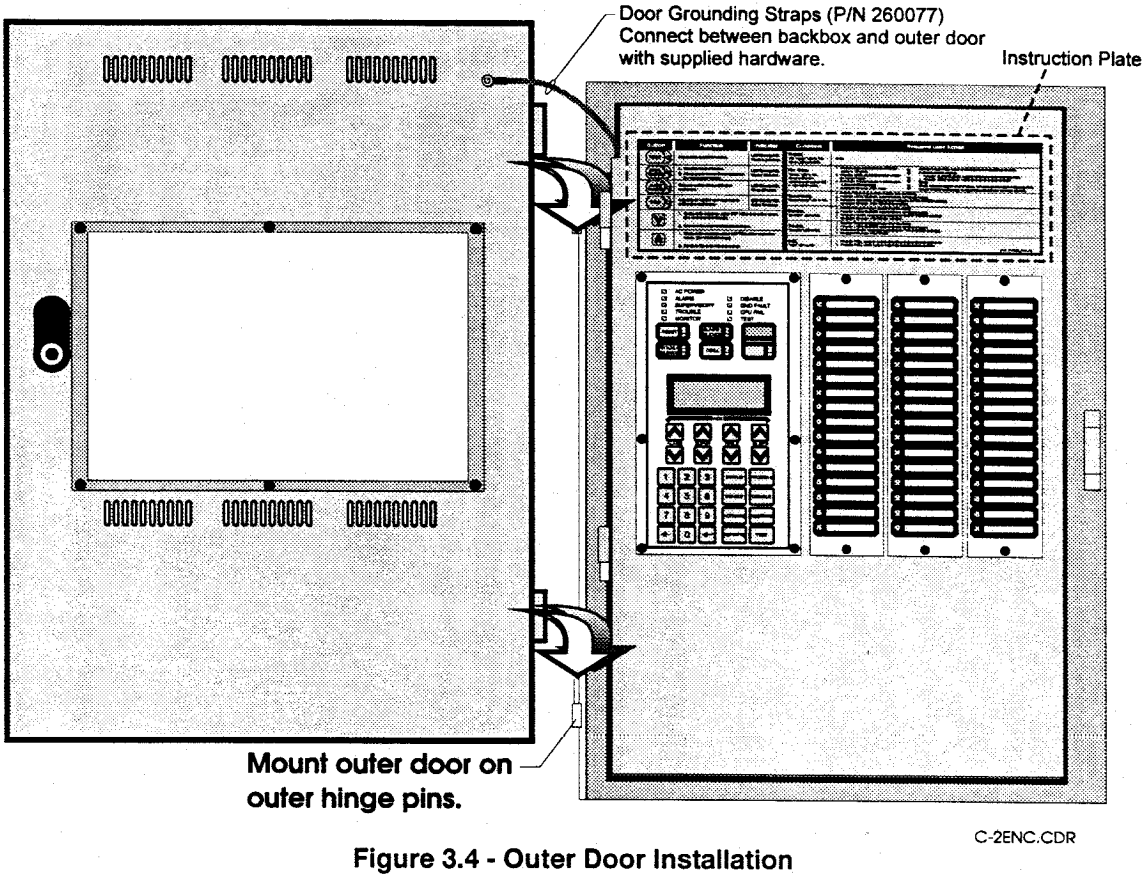


Figure 3.4 - Outer Door Installation

3.2 AC Power & Battery Wiring

WARNING

Do NOT energize power until instructed to do so!

1. Connect the AC power source to TB1 on the Primary Power Supply as shown in Figure 3.5. Route all AC power wiring in non-power limited areas (Figure 2.2).

2. If 2-wire or 4-wire smoke detectors are used, their power is derived from TB3 of the Primary Power Supply. Install JP4 when using 4-wire smoke detectors. Remove JP4 when using 2-wire smoke detectors on SIGA-UM Modules.

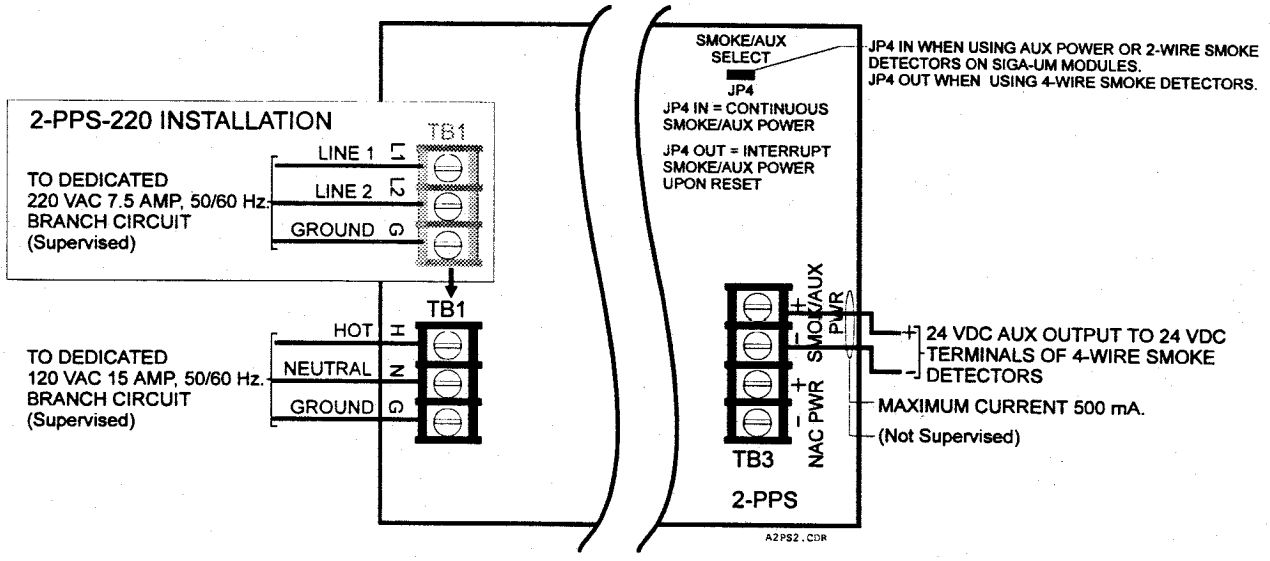


Figure 3.5 Primary Power Supply Connections

3. Route the battery wiring from the power supply to the batteries. This wiring must be run in the protective channel beneath the Main Controller Module and the Expander Loop Module. Refer to Figure 3.6 or Figure 3.7.

WARNING

Do NOT connect batteries until instructed to do so!

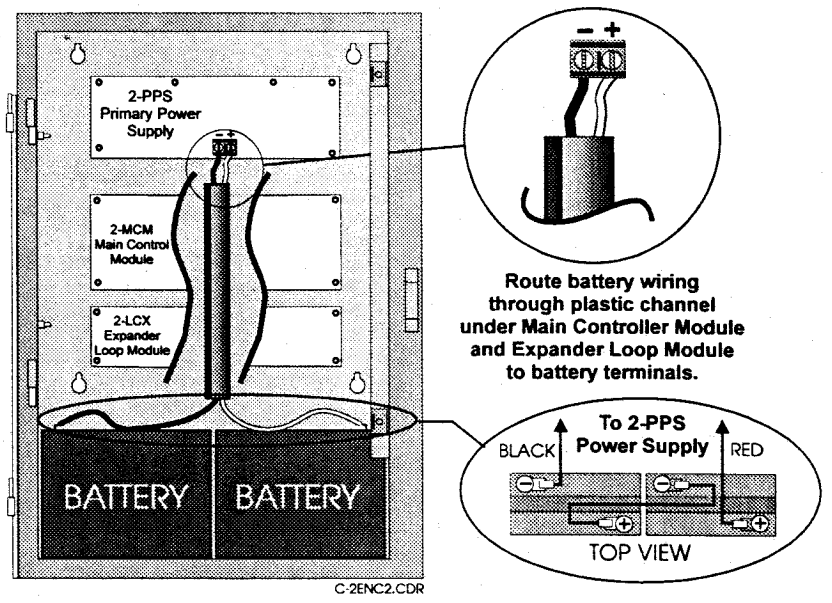


Figure 3.6 - Optional Battery Cable Wiring

The batteries in the external battery cabinet are connected to the battery terminals of the 2-PPS Power Supply in accordance with Figure 3.7.

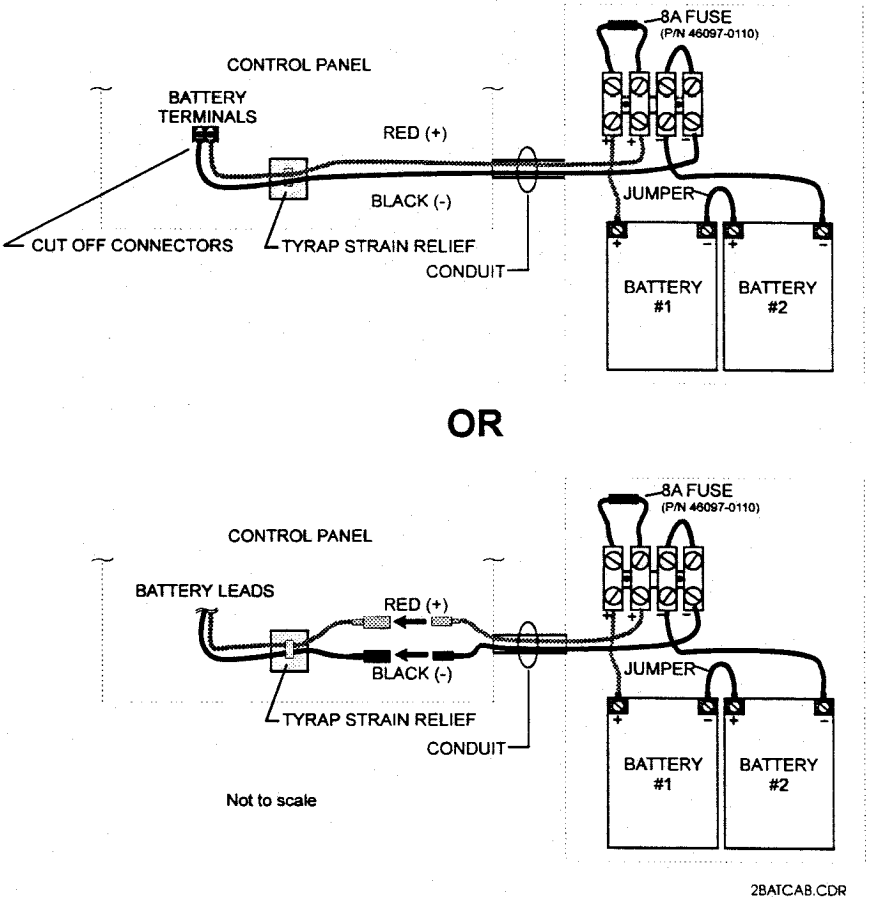


Figure 3.7 - Battery Cabinet Wiring

3.3 Notification Appliance Circuit (NAC) Wiring

Power for the Notification Appliance Circuits (NACs) must be connected from the 2-PPS NAC Power terminals to the source terminals of the Main Controller Module and the Expander Loop Module, as shown in Figure 3.8.

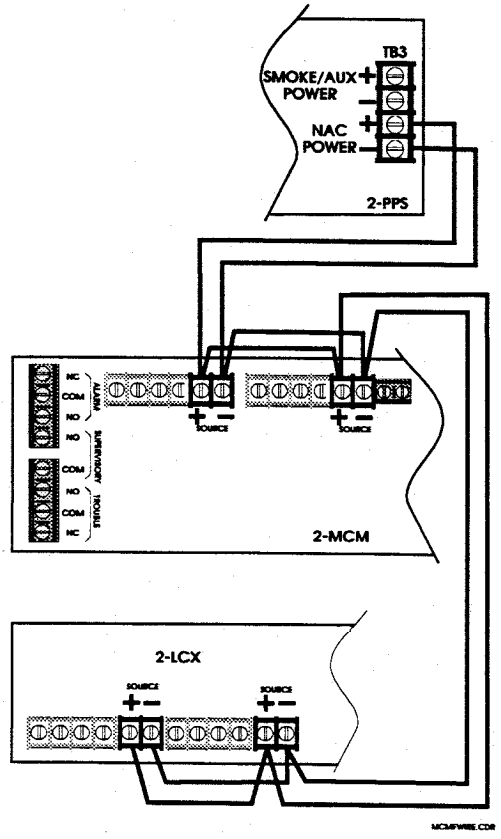


Figure 3.8 - NAC Input Wiring

If march time coding is required, wire a March Time Module (MTM-1) to the NAC source terminals circuit as shown in Figure 3.9.

NOTE

If strobe lights are used on a circuit, do NOT wire the circuit's NAC input through an MTM-1 March Time Module. Refer to Figure 3.8.

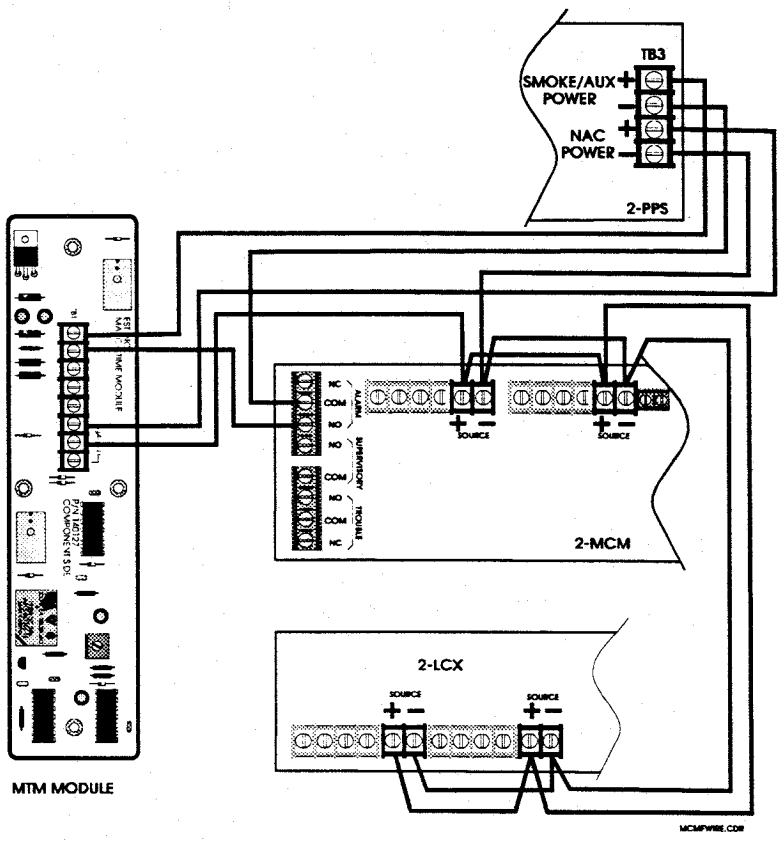


Figure 3.9 - March Time NAC Wiring

Before connecting the Notification Appliance Circuits, make the following circuit checks:

- Measure the resistance of the circuit. If no devices are installed on the circuit, the resistance should be infinite. The circuit resistance should be approximately 15KΩ when the polarized notification appliances are correctly installed.

- Reversing the meter leads, the circuit resistance should read approximately 10Ω to 20Ω. If the resistance reading is approximately the same value when the meter leads are reversed, one or more polarized devices is installed incorrectly.

- There should be infinite resistance between each conductor and earth ground.

When the circuit checks out properly, connect it to the appropriate NAC terminals on the Main Controller Module or the Expansion Loop Module, as shown in Figures 3.11 or 3.12. Polarity is indicated for normal monitoring of the circuit's electrical integrity. Route the power limited NAC cables away from the 120/240 VAC power wiring as shown in Figure 2.2.

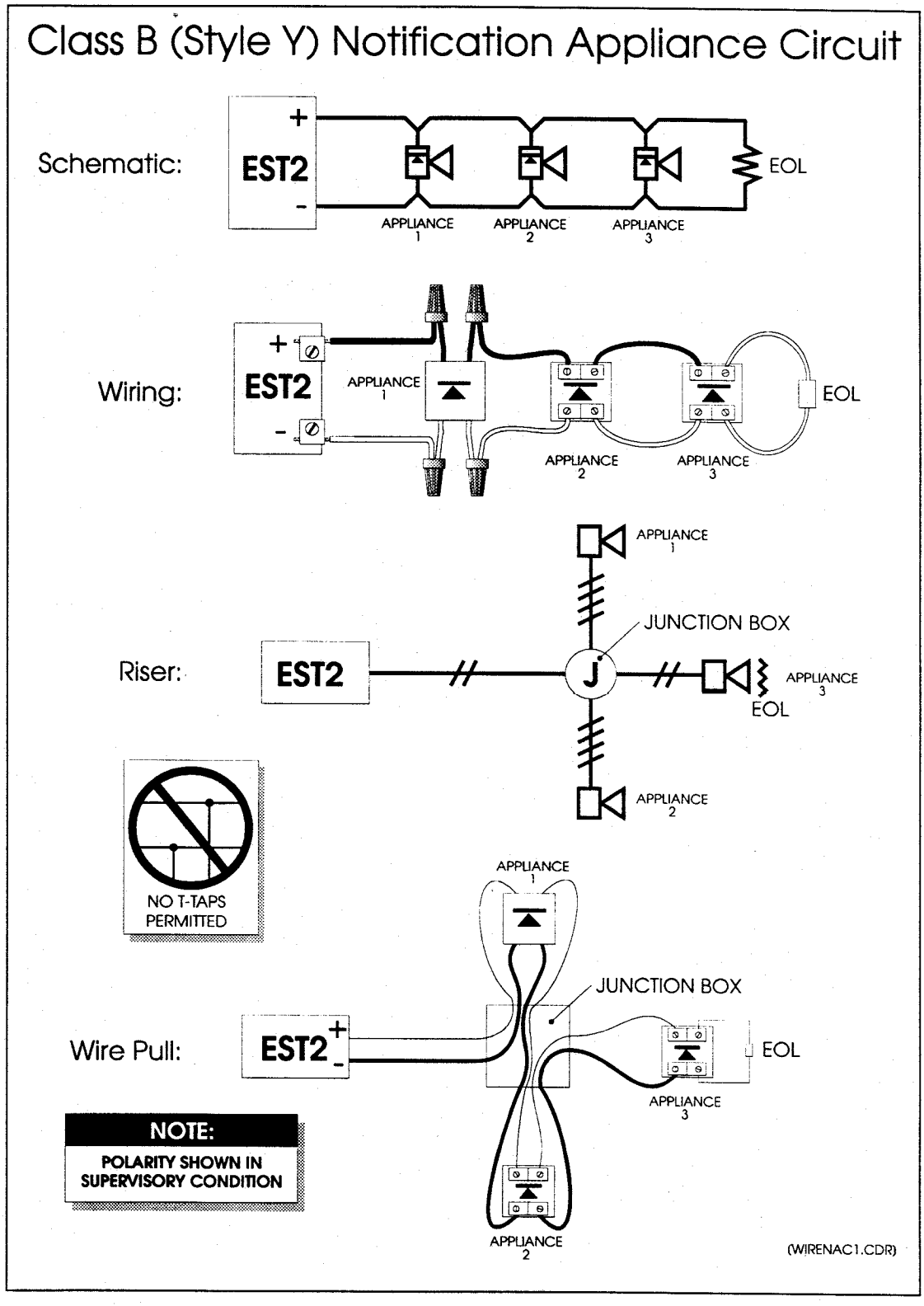


Figure 3.10 - Class B NAC Wiring Pictorial

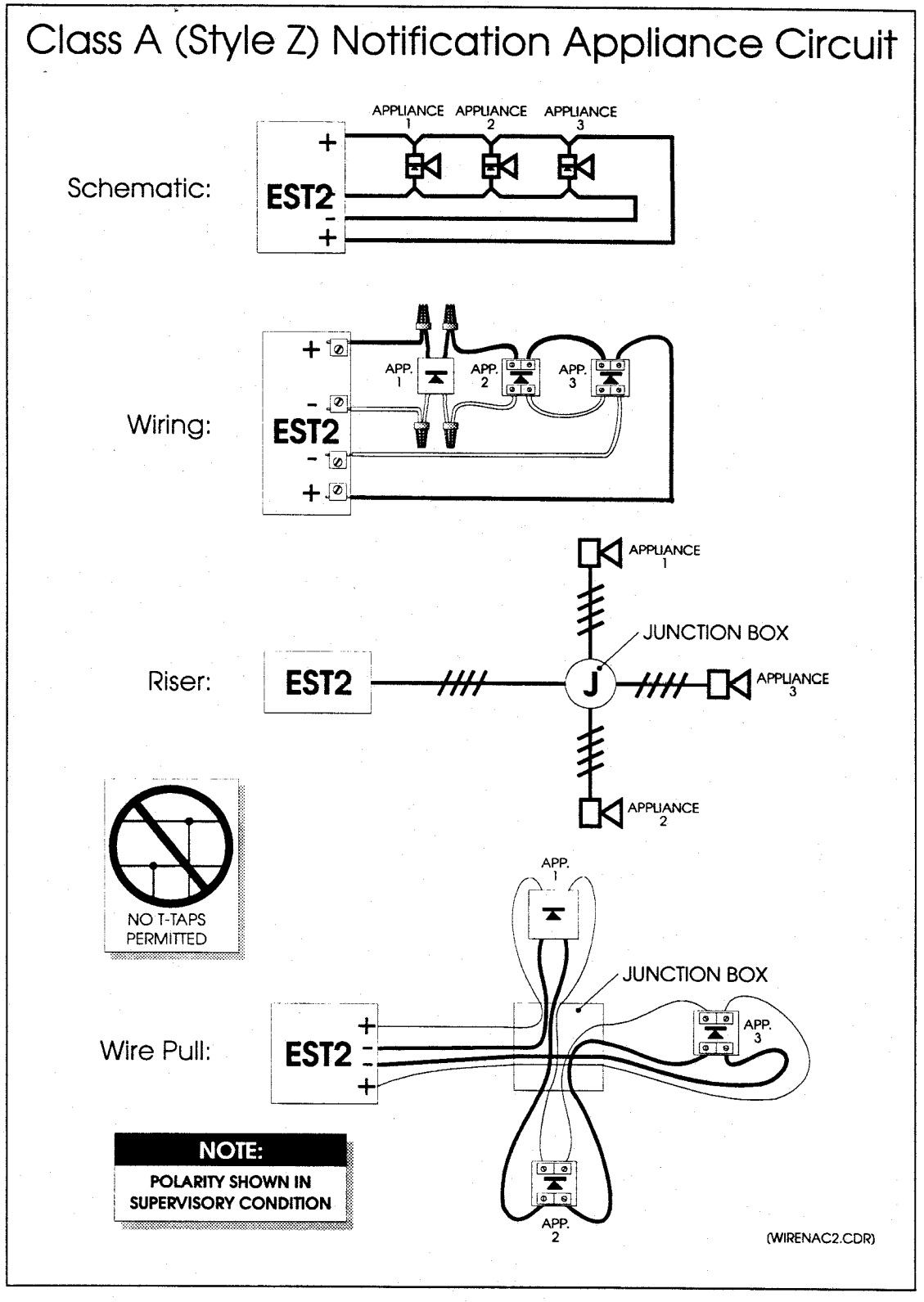
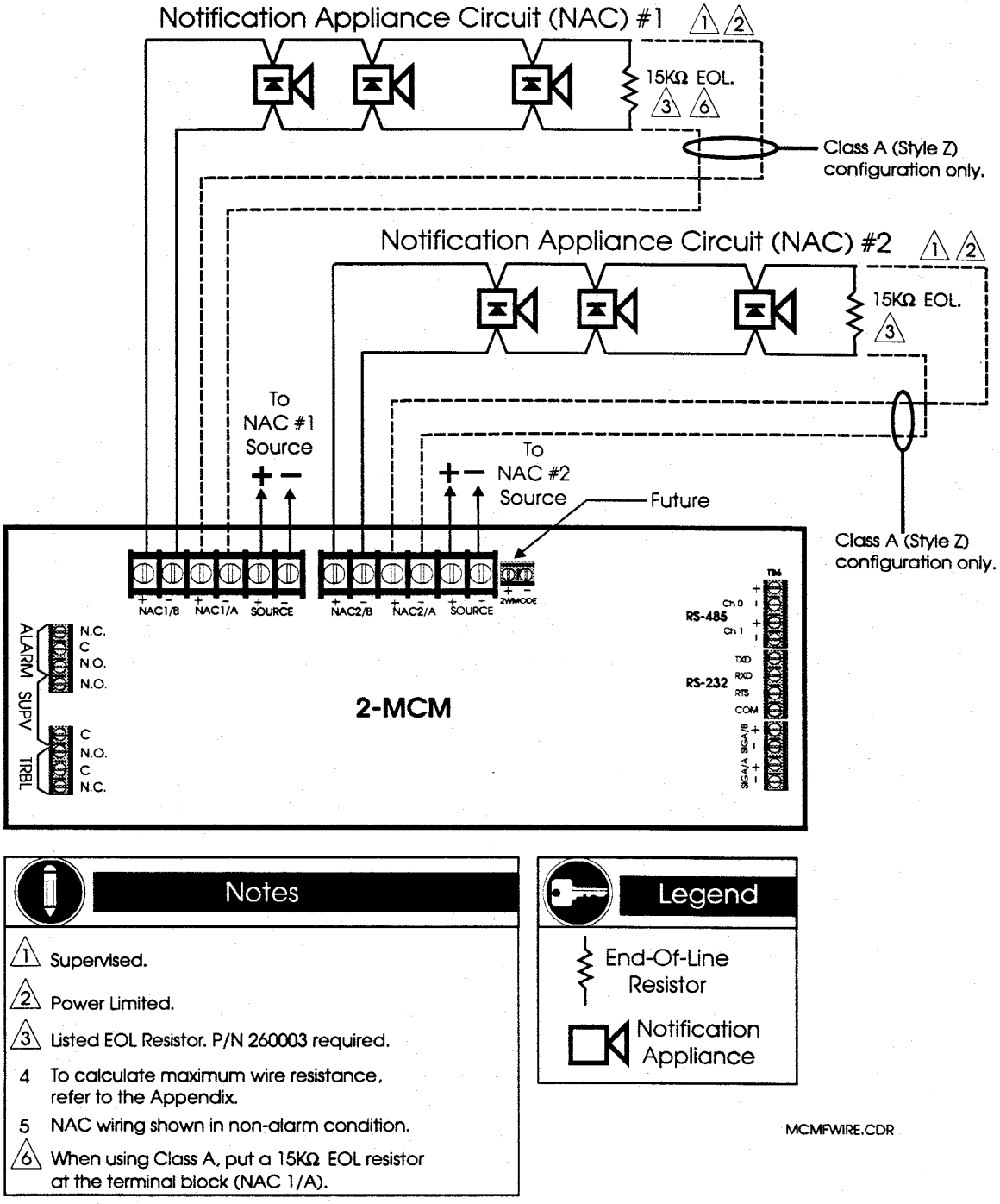


Figure 3.11 - Class A NAC Wiring Pictorial

NAC Wiring



Notes

1. Supervised.
2. Power Limited.
3. Listed EOL Resistor. P/N 260003 required.
4. To calculate maximum wire resistance, refer to the Appendix.
5. NAC wiring shown in non-alarm condition.
6. When using Class A, put a 15KΩ EOL resistor at the terminal block (NAC 1/A).

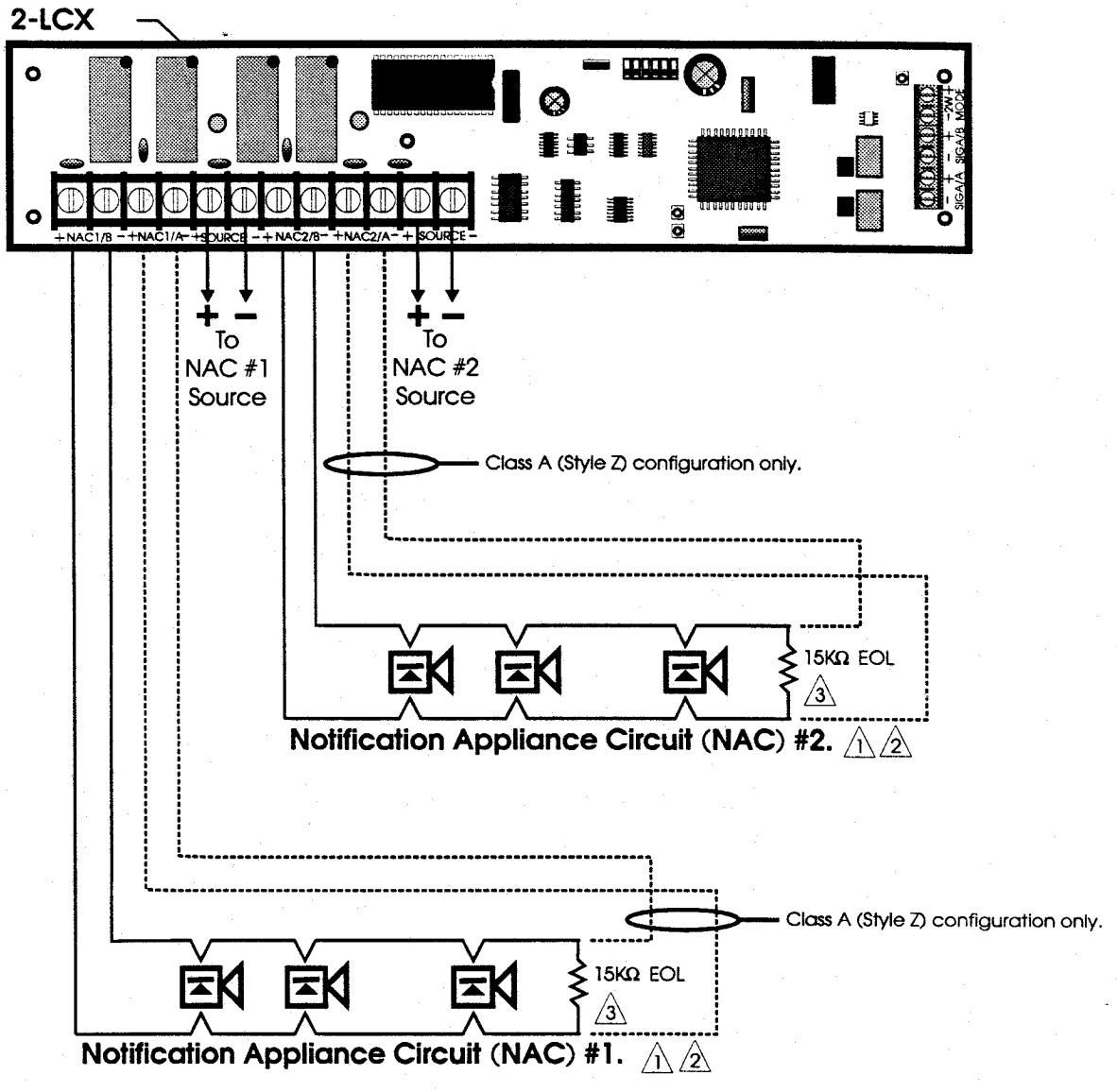
Legend

End-Of-Line Resistor

Notification Appliance

MCMFWIRE.CDR

Figure 3.12 - NAC Wiring, 2-MCM



Notes

1. Supervised.
2. Power Limited.
3. Listed EOL Resistor. P/N 260003 required.
4. To calculate maximum wire resistance, refer to the Appendix.
5. NAC wiring shown in non-alarm condition.

Legend

- End-Of-Line Resistor
- Notification Appliance

LCXFWIRE.CDR

Figure 3.13 - NAC Wiring, 2-LCX

3.4 Signature Data Circuits

Before connecting the Signature Data Circuits, make the following circuit checks:

- Measure the resistance of the circuit. If no devices are installed on the circuit, the resistance should be infinite. The circuit resistance should be greater than 10KΩ with devices installed, but not connected to the module.
- There should be infinite resistance between each conductor and earth ground.

When the circuit checks out properly, connect it to the appropriate SIGA terminals on the Main Controller Module or the Expansion Loop Module. Route the Signature data cables away from the 120 VAC power wiring.

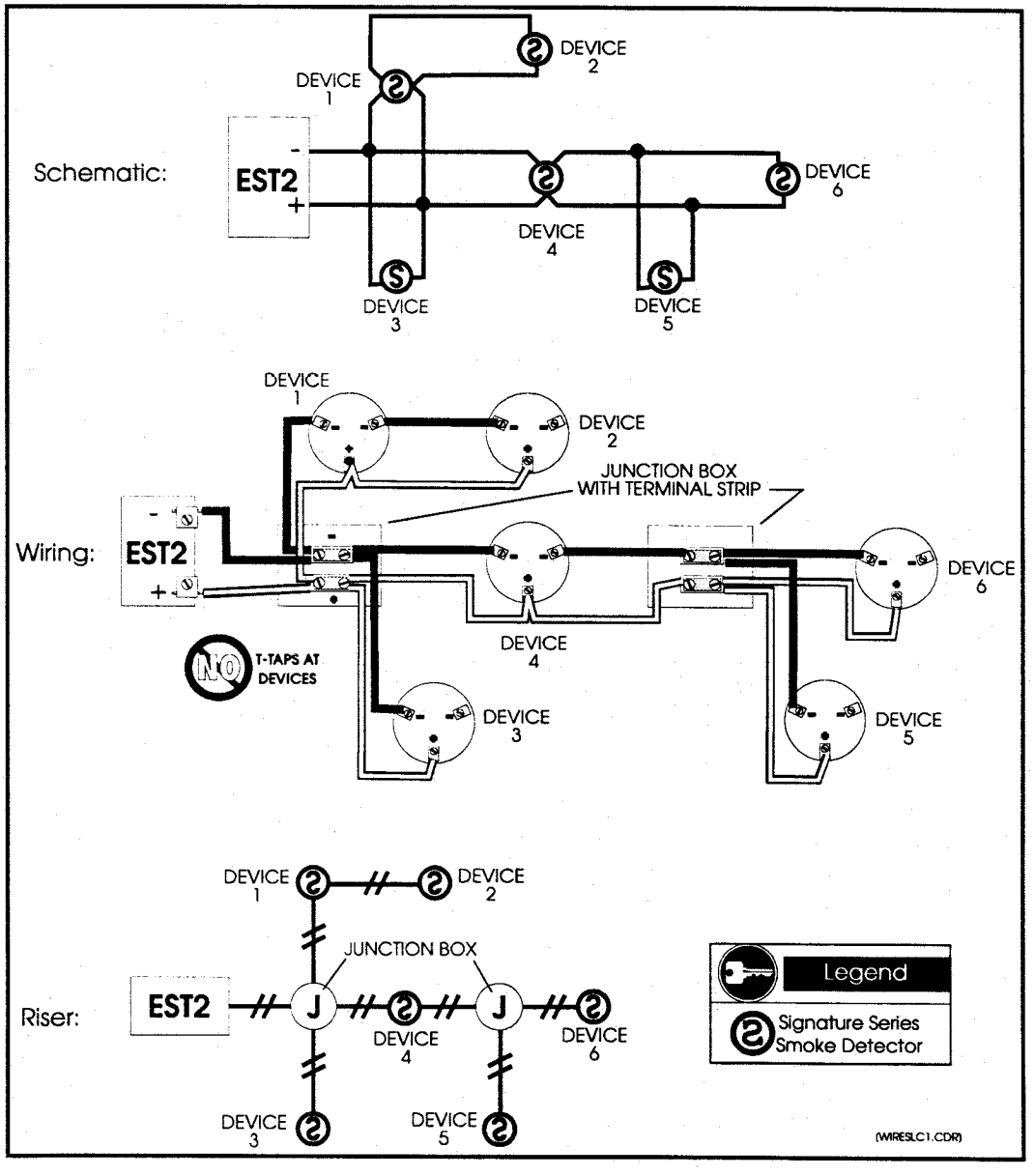


Figure 3.14 - Class B Signature Data Circuit Wiring Pictorial

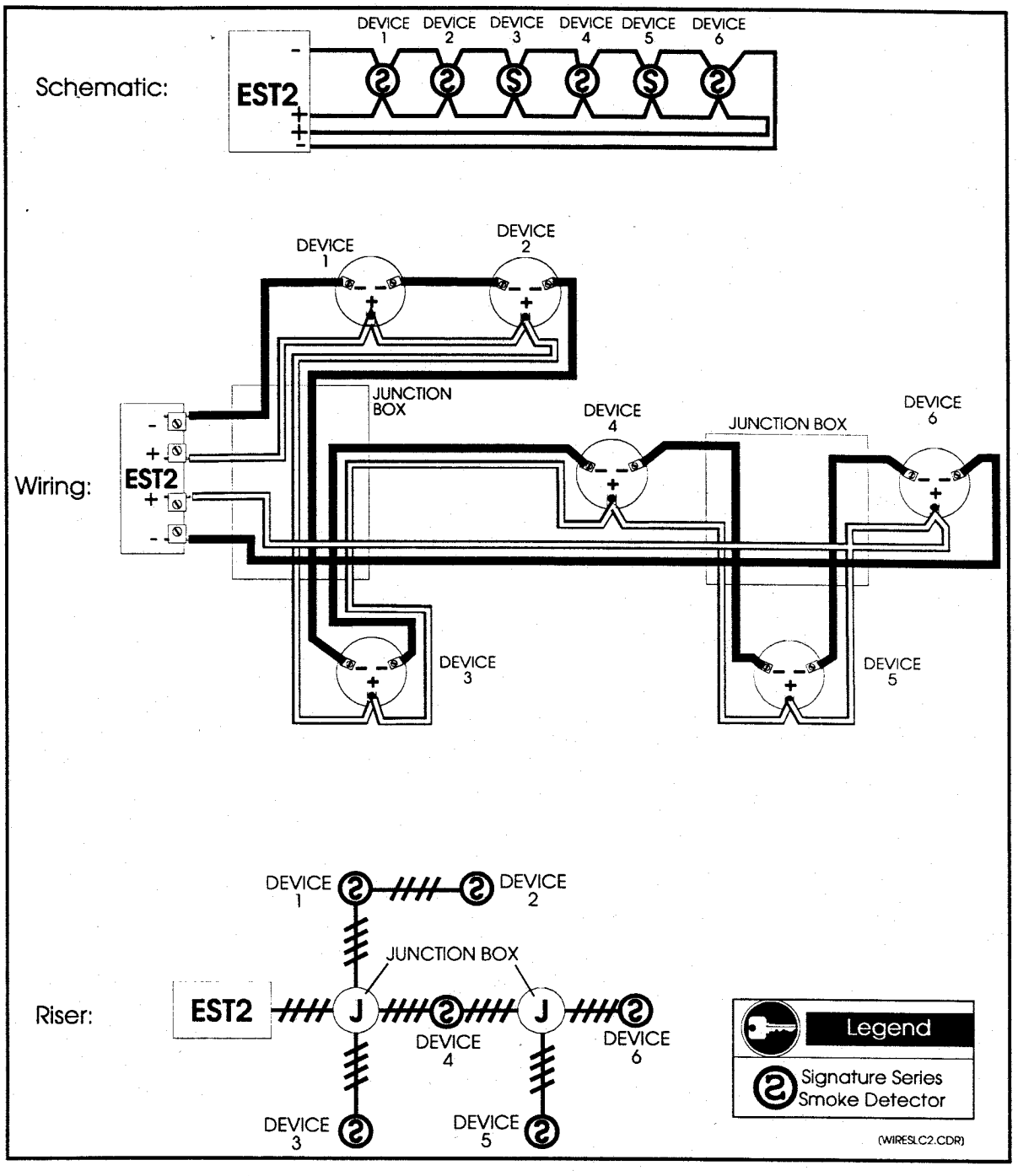


Figure 3.15 - Class A Signature Data Circuit Wiring Pictorial

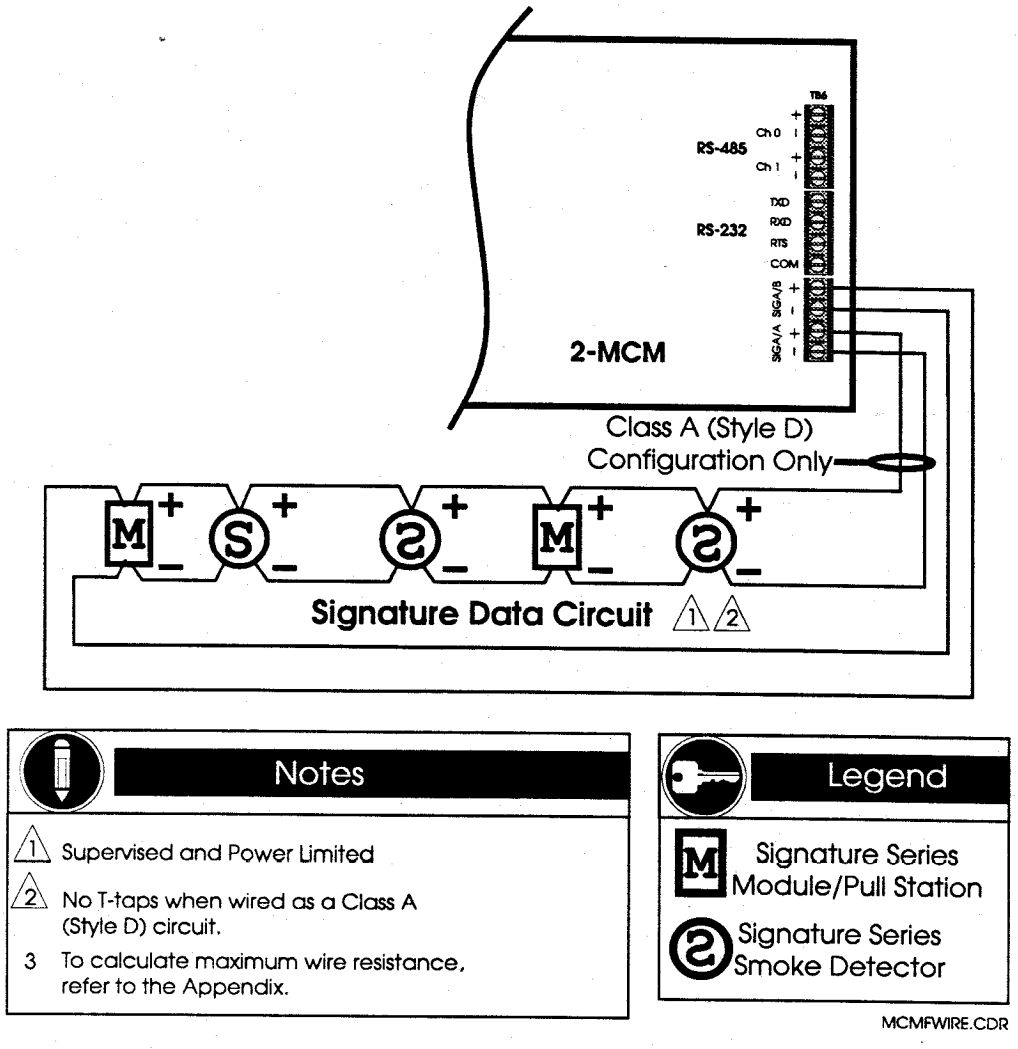


Figure 3.16 - Signature Data Circuit Wiring, 2-MCM

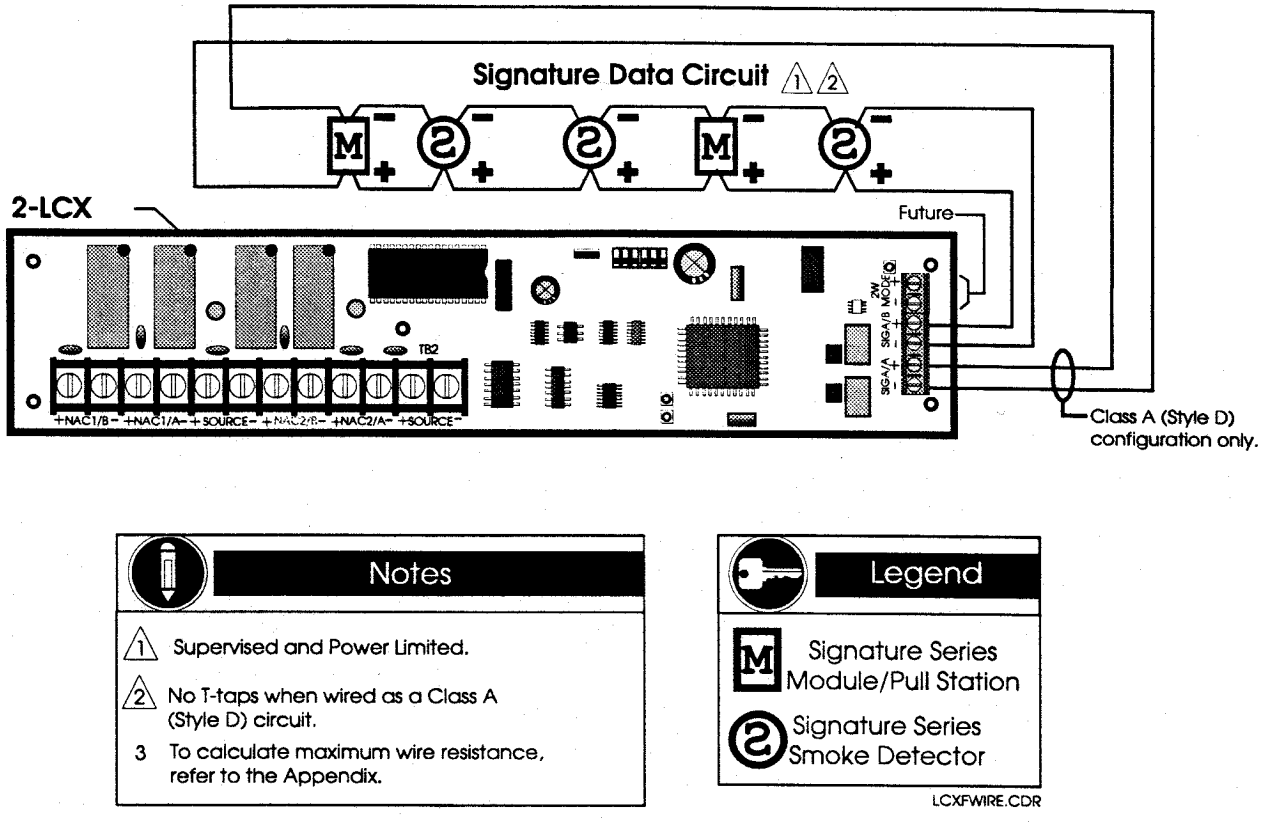


Figure 3.17 - Signature Data Circuit Wiring, 2-LCX

MAIN CONTROLLER MODULE SUPPLEMENTARY CIRCUITS

4.1 RS-232 Port - Printer Wiring

The RS-232 port is always active as a printer port except when downloading, or when configured as an external command port. Wire the printer port per Figure 4.1. Refer to connected device's manual for additional information. The RS-232 is not isolated from the power supply. Refer to RS-232 / IOP-3 Wiring when an isolated port is required. An isolated port is required if the printer causes a permanent ground fault on the panel. An IOP-3 is *not* required when downloading, if the download computer causes a temporary ground fault condition. Typical printer baud rate is 2400.

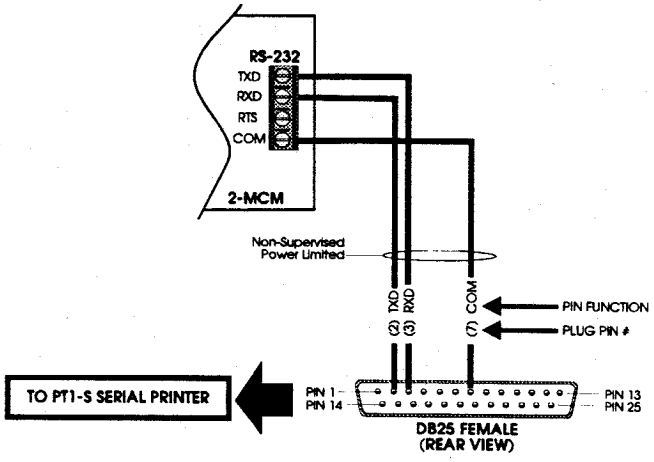
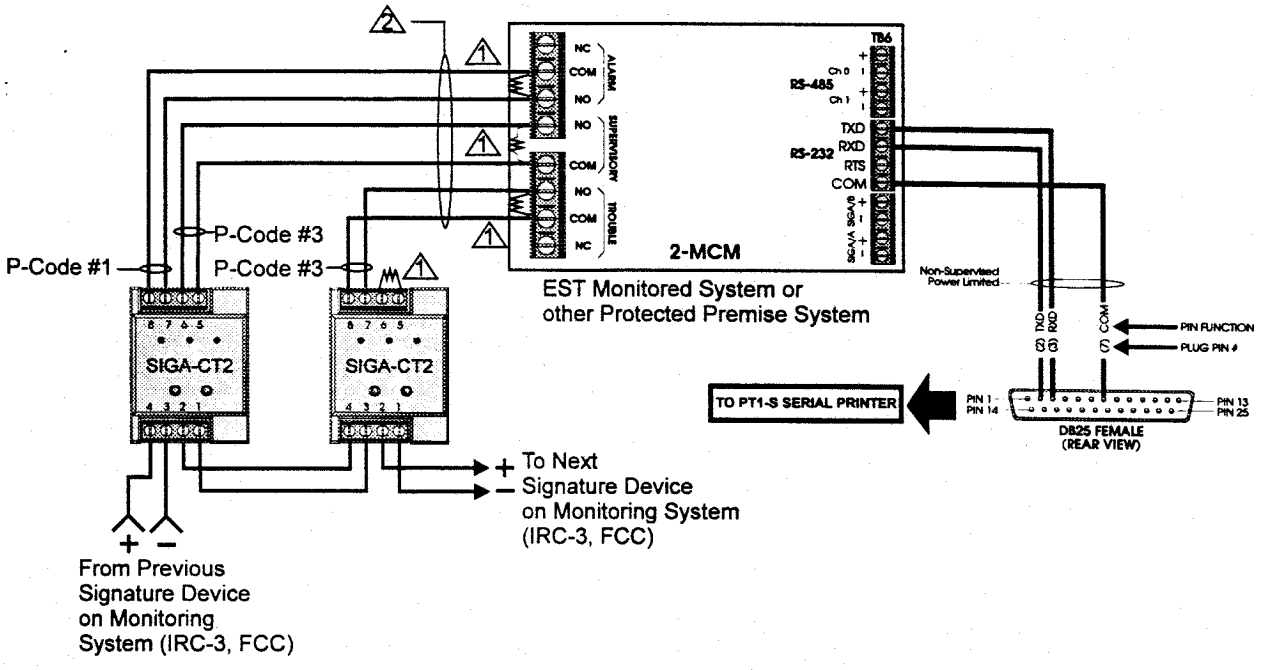


Figure 4.1- RS-232 Port Wiring

4.2 Proprietary Protected Premise Wiring

Wire per Figure 4.2. Refer to the *EST2 Programming Manual* (P/N270187) for additional details.



NOTES

1. Listed 47KΩ EOL (P/N 260072)
2. Supervised and Power Limited
3. Install Signature Modules in the same room and within 20 ft. (6 m) of the control panel.
4. SIGA-CT1 Modules may also be used.

MCMPWIRE.CDR

Figure 4.2 - Proprietary Protected Premise Wiring

4.3 RS-232 Port, IOP-3 Wiring

The IOP-3 is used to isolate the RS-232 port from ground, and is required if the RS-232 peripheral device causes a permanent ground fault on the panel. An IOP-3 is *not* required to remove temporary ground faults created during downloading. The port is always active as a printer port except when downloading, or when configured as an external command port. Wire per Figure 4.3. Refer to connected device's manual for additional information.

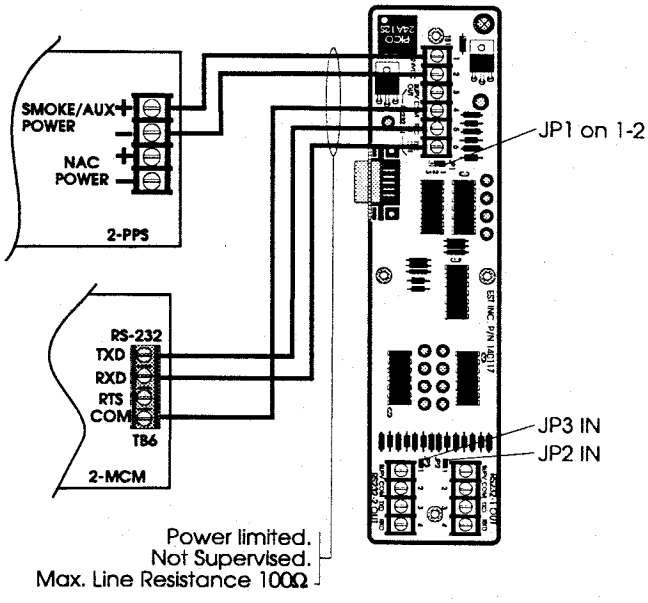


Figure 4.3 - IOP-3 Wiring

4.4 RS-485 Port

Wire the RS-485 port per Figure 4.4. Refer to connected device's manual for additional information. The RS-485 port is not isolated from the power supply.

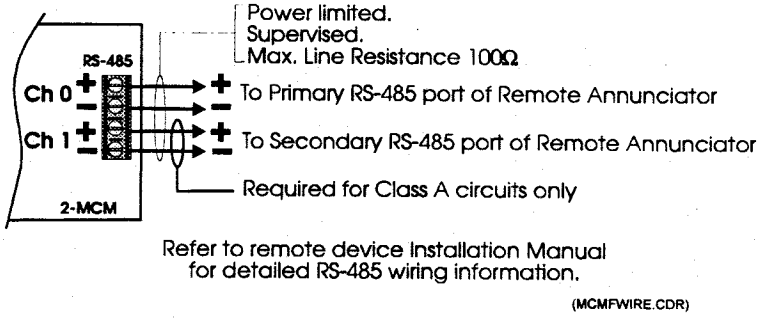
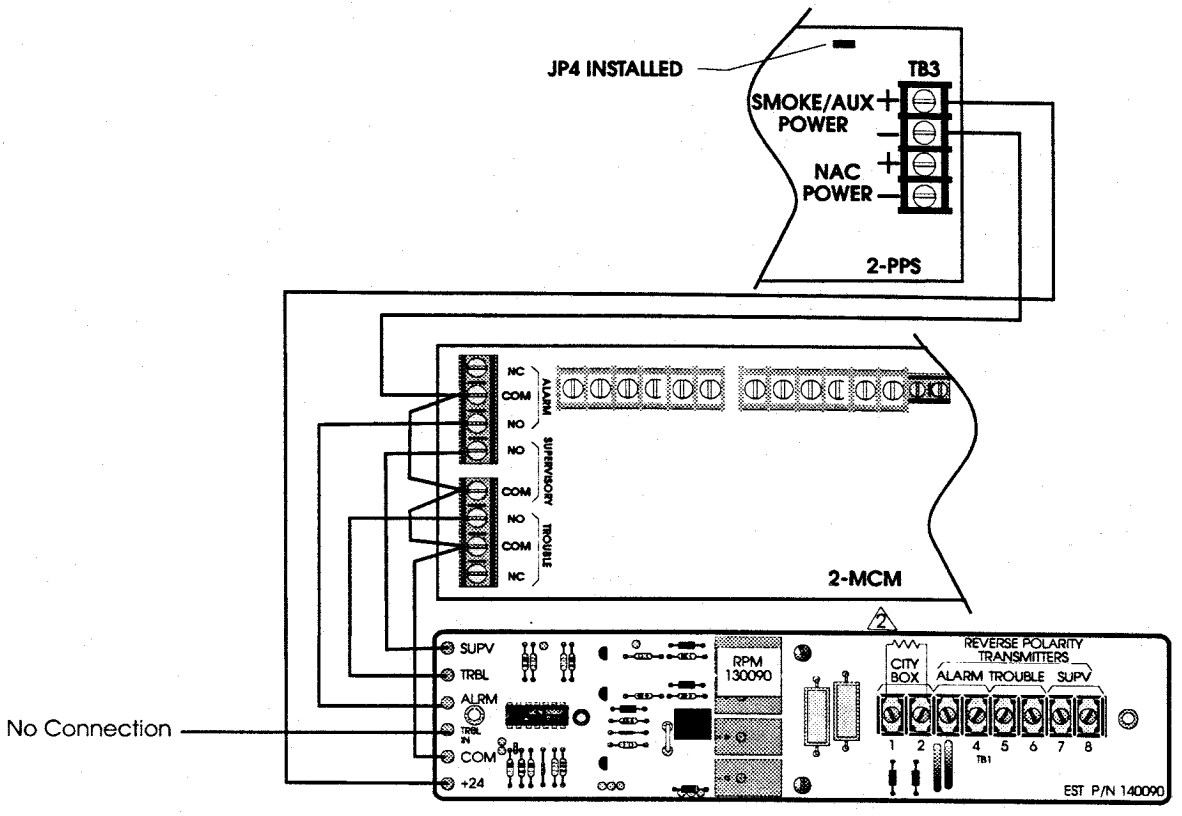


Figure 4.4 - RS-485 Port Wiring

4.5 RPM Reverse Polarity Module

Wire the RPM Module according to Figure 4.5. The RPM Module is designed to be connected to a receiving unit with compatible ratings. **NOTE: The local energy master box connection is not available for use with the EST2 panel.** Install a 3.9KΩ resistor across TB1-1 and TB1-2.



Notes

1 All field wiring is supervised.

2 Listed 3.9 KΩ EOL Resistor. P/N 260001 required. (circuit not used)

(MCMFWIRE.CDR)

Figure 4.5 - RPM Module Wiring

Table 4.1 - RPM Module Jumper Settings			
Jumper	**Alarm**	**Supervisory**	**Trouble**
JP1 IN **(Separate Alarm, Supervisory, & Trouble Circuits)**	Reverse Polarity on Terminals TB1-3 & TB1-4	Reverse Polarity on Terminals TB1-7 & TB1-8	Reverse Polarity on Terminals TB1-5 & TB1-6
JP1 OUT **(Single Alarm, Supervisory, & Trouble Circuit)**	Reverse Polarity on Terminals TB1-3 & TB1-4	0.0 VDC on Terminals TB1-3 & TB1-4 (Alarm overrides supv & trouble)	0.0 VDC on Terminals TB1-3 & TB1-4 (Alarm overrides supv & trouble)

Table 4.2 - RPM Module Field Wiring	
Terminal	**Function**
TB1-1 & TB1-2	Install listed 3.9KΩ EOL resistor. (P/N 260001) (circuit is not used.)
TB1-3 & TB1-4	To reverse polarity **alarm** receiver. (Supervisory & trouble signals also sent if JP1 removed)
TB1-5 & TB1-6	To reverse polarity **trouble** receiver.
TB1-7 & TB1-8	To reverse polarity **supervisory** receiver.

4.6 DL2 Dialer (Digital Alarm Communicator Transmitter) Module

To eliminate excessive calls to the Central Monitoring Station, the Dialer Module installation, field wiring, and programming should be performed after the balance of the panel has been tested and verified operational.

Install the DL2 Module according to Figure 4.6. The DL2 dialer module or is a Digital Alarm Communicator Transmitter (DACT) for transmitting alarm, supervisory and trouble information to a compatible Digital Alarm Communicator Receiver (DACR) via two dial-up telephone lines.

1. Verify the Central Monitoring Station (CMS) is properly programmed and ready for connection.
2. Mount the dialer module to the 2-MCM with the standoffs provided, taking care to insure the connector on the bottom of the module mates with the connector on the 2-MCM board. Refer to Figure 4.6

CAUTION

The telephone jacks must be installed by an authorized representative of the telephone company. Phone lines must be loop start on the public switched network.
PBX and party lines are not acceptable

3. Using the supplied 7Ft. (2.13 M) phone jack extension cables, connect J1 & J2 to the RJ31X, or RJ38X (CA31A or CA38A in Canada) telephone jacks as shown in Figure 4.7. A protective grommet is supplied for the enclosure knockout. The telephone jacks must be installed by an authorized representative of the telephone company. The phone lines must be loop start on the public switched network. PBX and party lines are not acceptable.

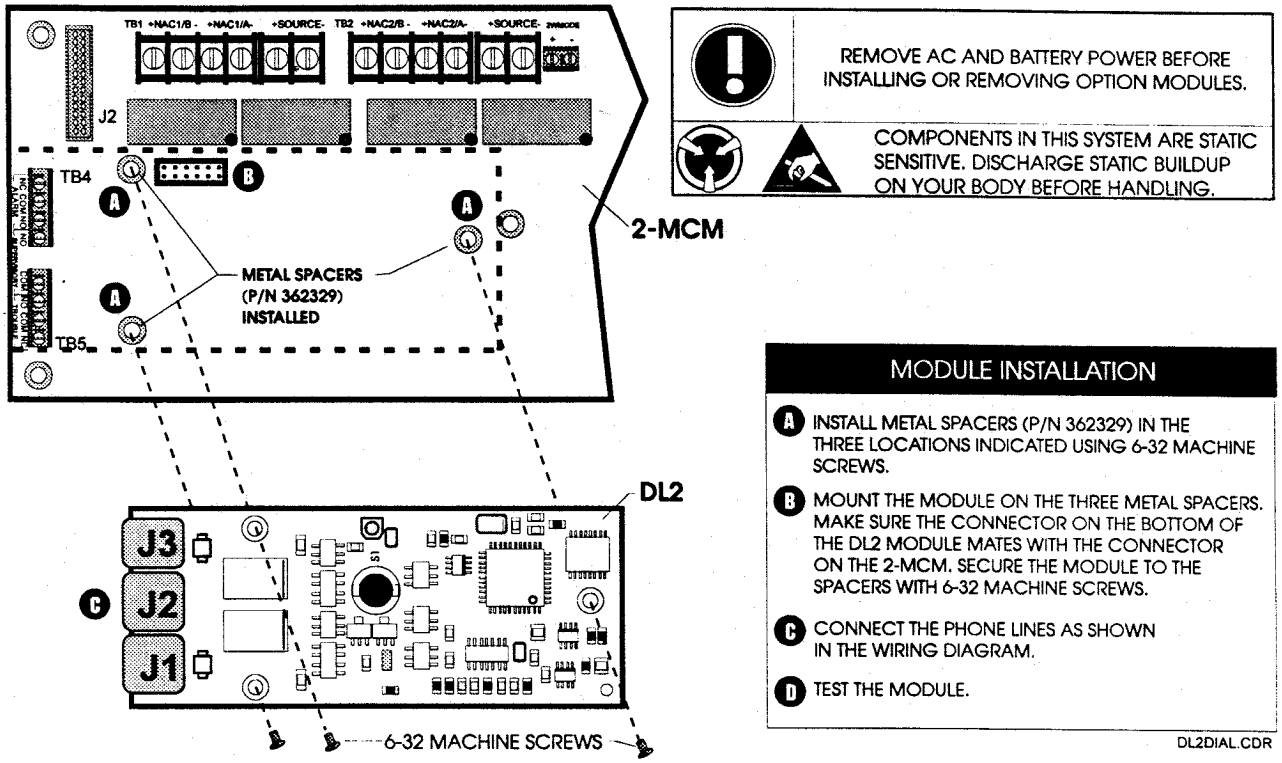


Figure 4-6 - DL2 Dialer Installation

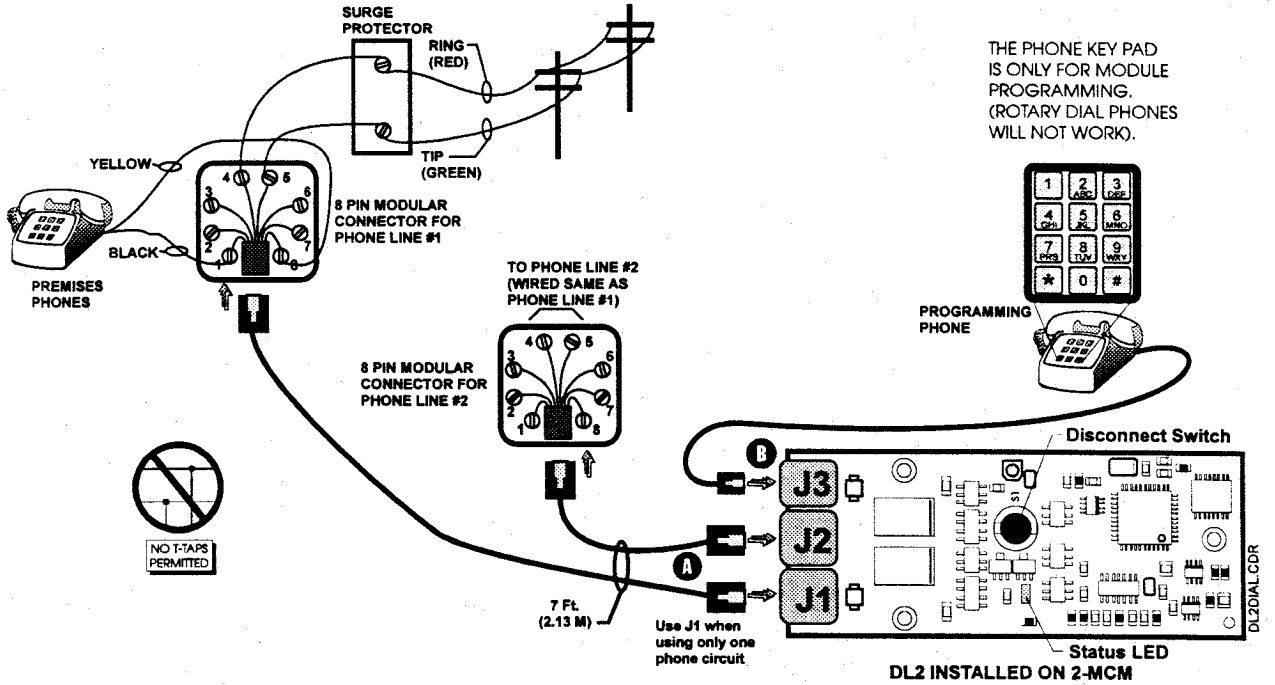


Figure 4.7 - DL2 Wiring

4. With system powered up, program the dialer as detailed in the EST2 Programming manual. **A new dialer module will remain in trouble until completely programmed.** Use the TROUBLE SILENCE switch to silence the Trouble signal.

NOTE

If a DL2 Dialer Module is installed, it will introduce a panel trouble until programmed.

5. If the telephone lines are wired properly and the panel is programmed correctly, the trouble condition will clear (panel and module trouble LEDs turn off).
6. Activate an initiating device and verify the proper signal is received at the CMS.
7. Open a NAC circuit, generating a system trouble, and verify the proper signal is received at the CMS.
8. Activate a supervisory device and verify the proper signal is received at the CMS.
9. Verify that failure of the primary signal path (phone line connected to J1) results in a trouble signal being transmitted via the secondary signal path (phone line connected to J2) within 4 minutes.
10. Verify that failure of the secondary signal path (phone line connected to J2) results in a trouble signal being transmitted via the primary signal path (phone line connected to J1) within 4 minutes.

WARNING

The DL2 Dialer Module requires programming in order to operate.
Refer to the **EST2 PROGRAMMING MANUAL.**

4.7 APSB Series Power Supplies

APS4B / APS4B-220 Power Supply

The APS4B and APS4B-220 may occupy any space in an enclosure, providing there is no interference with panel mounted components. Remove the controller and trouble monitor cards before installing power supply. Verify there is no interference with other panel mounted components. Mount the APS4B or APS4B-220 chassis to the back panel with four #6 screws. Mount the protective module cover with the captive screws. All screws MUST be installed.

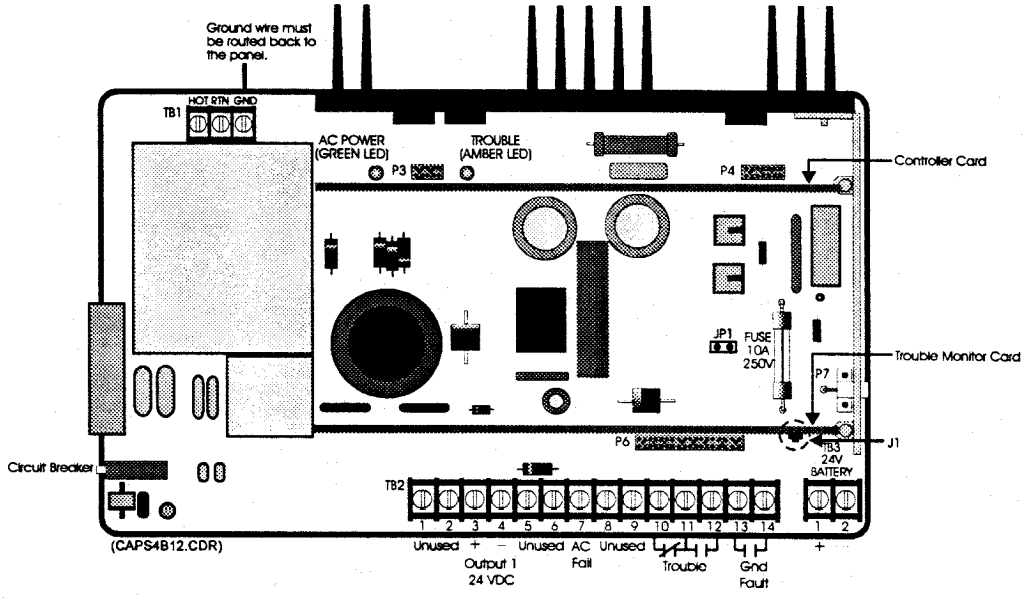


Figure 4.8 - APS4B

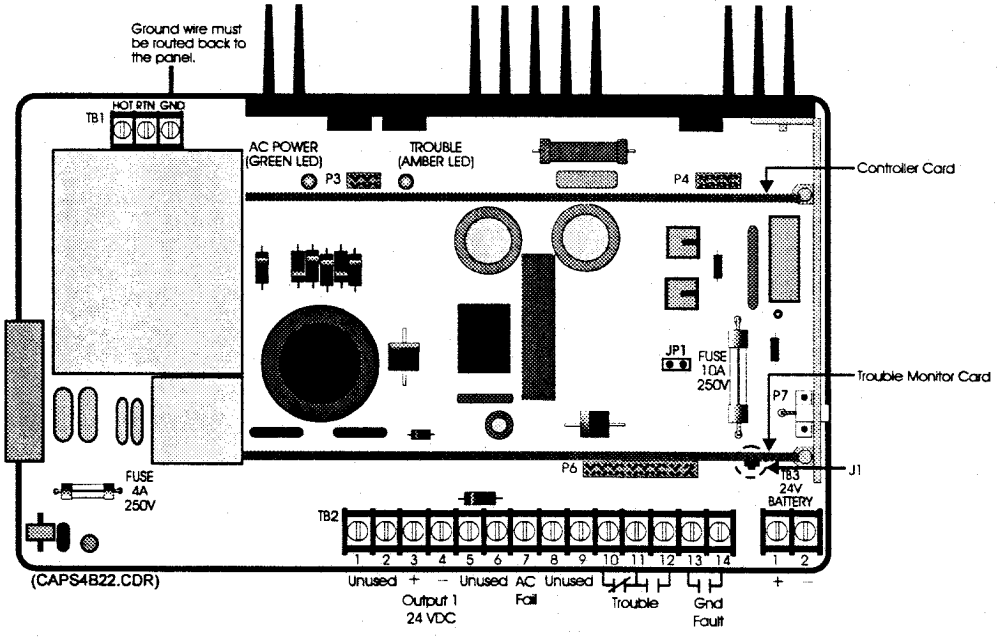


Figure 4.8 - APS4B-220

Field Wiring

TB1	Connect a 120 VAC, 15A, 50/60 Hz (220 VAC, 7A, 50/60 Hz) dedicated power circuit.
TB2-1 & 2	No connection.
TB2-3 & 4	24 VDC @ 3.5 A for notification, supplementary, or ancillary devices.
TB2-5 & 6	No Connection.
TB2-7	AC power fail. Connect to terminal 7 of another APS4B when using multiple power supplies.
TB2-8 & 9	No connection.
TB2-10 & 11 &12	Power supply trouble relay. (Relay shown in trouble condition.)
TB2-13 & 14	Ground fault relay. Contact closes when a ground fault exists on **ANY** wiring to this power supply.
TB3-1 & 2	Battery connection. Run wires through plastic tubing to meet non power limited requirements. Battery wiring MUST remain 1/4" from any power limited wiring.

NOTE: ALL APS4B-220'S MUST HAVE THEIR OWN BATTERIES. NO BATTERY SHARING IS ALLOWED.

Jumper Setup

TROUBLE MONITOR CARD		
JUMPER NAME	**JUMPER STATE** (BOLD INDICATES NORMAL CONDITION)	**CONDITION**
J1	**IN**	Ground Fault Detection Enabled
J1	OUT	Ground Fault Detection Disabled

MOTHERBOARD		
JUMPER NAME	**JUMPER STATE** (BOLD INDICATES NORMAL CONDITION)	**CONDITION**
JP1	**IN**	Battery Charger Enabled
JP1	OUT	Battery Charger Disabled (sharing common battery with another supply)

APS8B Power Supply

The APS8B may occupy any space in an enclosure, providing there is no interference with panel mounted components. Remove the controller and trouble monitor cards before installing power supply. Verify there is no interference with other panel mounted components. Mount the APS8B chassis to the back panel with four #6 screws. Mount the protective module cover with the captive screws. All screws MUST be installed.

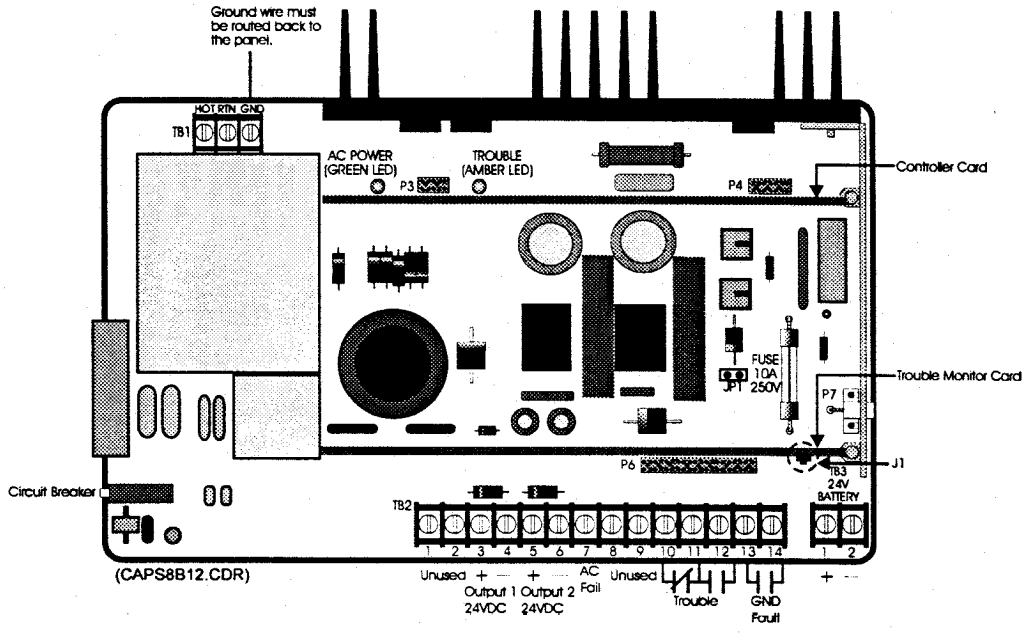


Figure 4.10 - APS8B

Field Wiring

TB1	Connect a 120 VAC, 15A, 50/60 Hz dedicated power circuit.
TB2-1 & 2	No connection.
TB2-3 & 4	24 VDC @ 3.5 A for notification, supplementary, or ancillary devices.
TB2-5 & 6	24 VDC @ 3.5 A for notification, supplementary, or ancillary devices.
TB2-7	AC power fail. Connect to terminal 7 of another APS8B when using multiple power supplies.
TB2-8 & 9	No connection.
TB2-10 & 11 &12	Power supply trouble relay. (Relay shown in trouble condition.)
TB2-13 & 14	Ground fault relay. Contact closes when a ground fault exists on **ANY** wiring to this power supply.
TB3-1 & 2	Battery connection. Run wires through plastic tubing to meet non power limited requirements. Battery wiring MUST remain 1/4" from any power limited wiring.

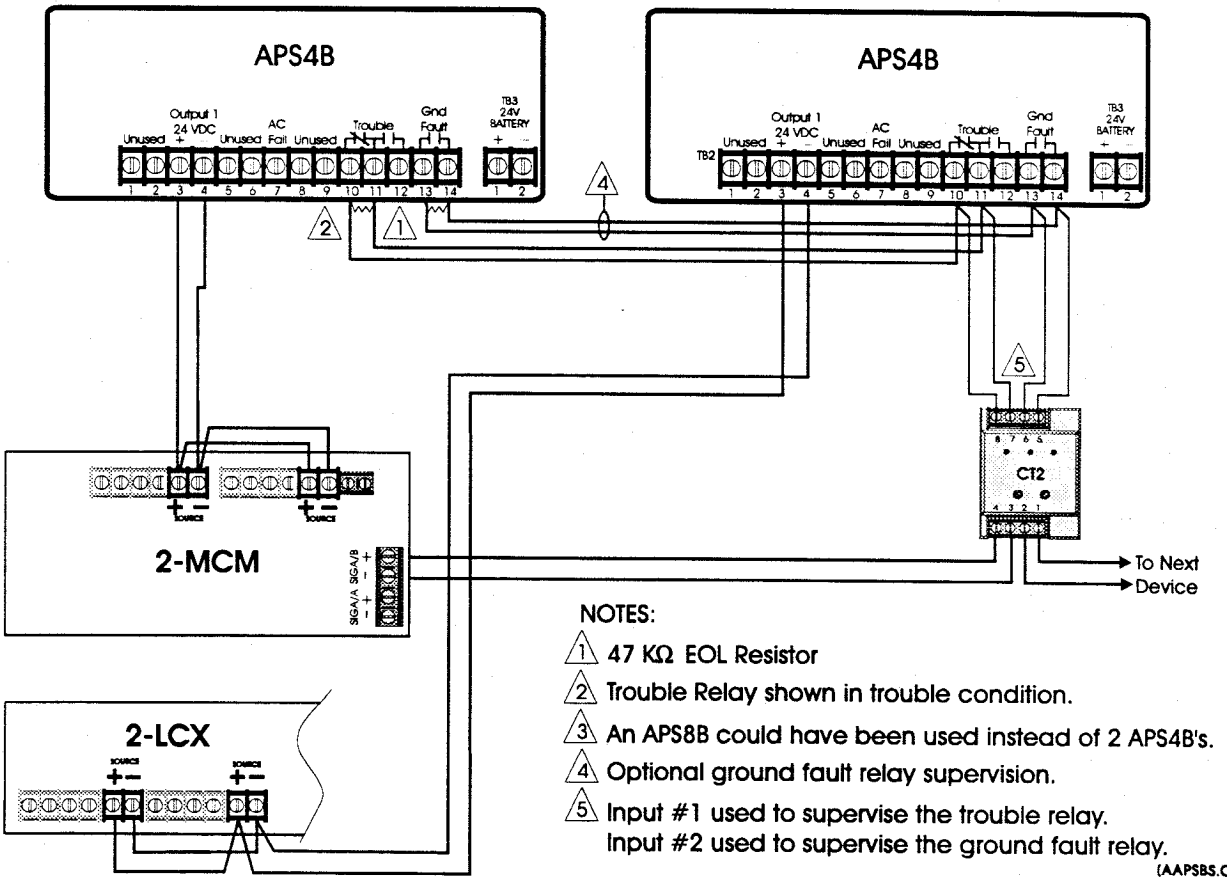
Jumper Setup

TROUBLE MONITOR CARD		
JUMPER NAME	**JUMPER STATE** (BOLD INDICATES NORMAL CONDITION)	**CONDITION**
J1	**IN**	Ground Fault Detection Enabled
J1	OUT	Ground Fault Detection Disabled

MOTHERBOARD		
JUMPER NAME	**JUMPER STATE** (BOLD INDICATES NORMAL CONDITION)	**CONDITION**
JP1	**IN**	Battery Charger Enabled
JP1	OUT	Battery Charger Disabled (sharing common battery with another supply)

Application Drawing for APSB Series Power Supplies

The following diagram represents one way of applying the APSB Series power supplies with the EST2 System. There are numerous other ways to incorporate the APSB power supplies with the EST2 System. The diagram shows an APS4B supplying power to the 2-MCM and another supplying power to the 2-LCX Expander Module. Also, a SIGA-CT2 is providing supervision for the trouble relay and ground fault relay.



ANNUNCIATORS

5.1 2-CMDN(-C) / 2-SMDN(-C)

The 2-CMDN(-C) mounts in a stand-alone surface mount enclosure. The 2-SMDN(-C) mounts in the SAN-4 or SAN-8 annunciator cabinets on in the RSAN-6 rack mount frame. Refer to the Enclosure Installation section of this manual for information on how to install the enclosures.

Field Wiring

The total length of the RS-485 communications loop used to connect multiple annunciators cannot exceed 7,700 feet (2348 m) in total.

Wire the annunciators per Figure 5.1. The table below lists the terminal connections.

Annunciator Terminal Connections	
Terminal	**Function**
1	+24 VDC
2	24 VDC Common
3	Earth Ground
4	RS-232, Rx IN
5	RS-232, Tx OUT
6	RS-232, Common
7	RS-485, Ch. 0 (+)
8	RS-485, Ch. 0 (-)
9	RS-485, Ch. 1 (+)
10	RS-485, Ch. 1 (-)

NOTE: For Style 4 (Class B) wiring, use only RS-485 Channel 0. For Style 7 (Class A) wiring, use both RS-485 channels.

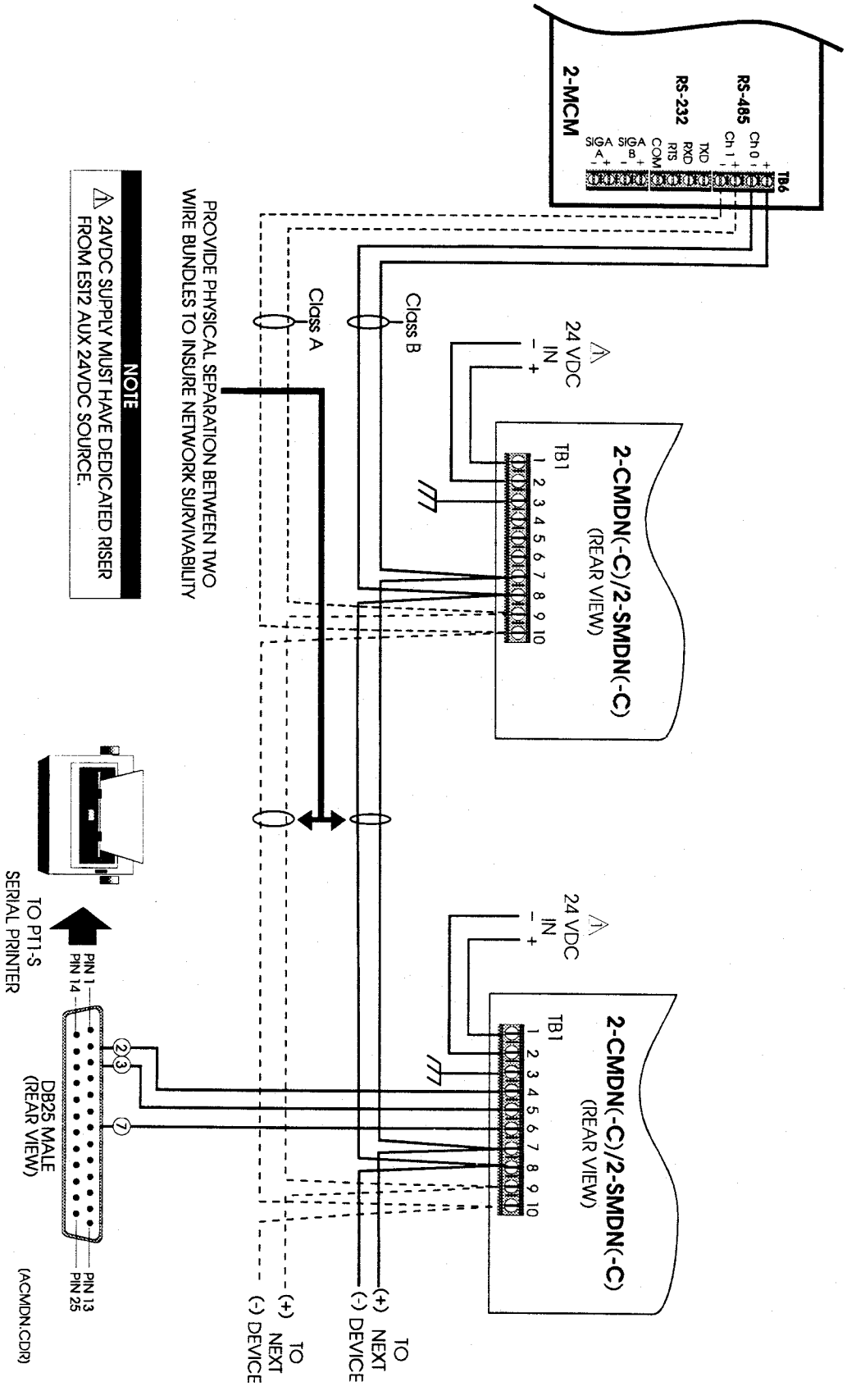


Figure 5.1 - RS-485 Data Line Wiring

Jumper Setup

Jumpers JP1 and JP2 on the annunciator are RS-485 terminating jumpers. The RS-485 terminating jumpers should be installed ONLY at the first and last physical connection locations on the data line.

Jumper Setup		
Function	JP1	JP2
Class B (Channel 0)	IN	**
Class A (Channel 1)	**	IN

**IN or OUT = No effect

Switch Setup

All DIP switches should be set in the OFF position. SW1-4 clears the database and loads the default parameters.

SWITCH POSITIONS				
DESCRIPTION	SWITCH S1-1	SWITCH S1-2	SWITCH S1-3	SWITCH S1-4
Buzzer Enabled & Auto-Acknowledge Disabled	OFF	OFF	OFF	OFF
Buzzer Disabled & Auto-Acknowledge Disabled	OFF	ON	OFF	OFF
Buzzer Enabled & Auto-Acknowledge Enabled	ON	OFF	OFF	OFF
Buzzer Disabled & Auto-Acknowledge Enabled	ON	ON	OFF	OFF
Programming	OFF	OFF	OFF	ON

Factory Default Setting:

1. Power down 2-CMDN
2. Turn ON DIP switch SW1-4
3. Power up 2-CMDN
4. System will default and clear, turn DIP switch SW1-4 OFF

5.2 SAN-CPU Annunciator Controller

The SAN-CPU requires 1/2 module footprint. The SAN-CPU is mounted on the back plane of the SAN-4 and SAN-8 enclosures. When using an RSAN-6, the SAN-CPU mounts on a special "L-SHAPED" bracket, perpendicular to the other SAN option modules installed in the rack.

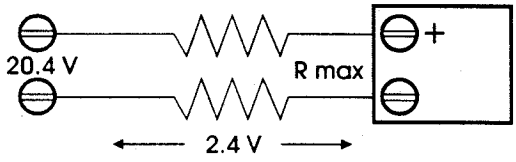
Power Calculations

The SAN-CPU requires 24 VDC power. The following areas must be addressed:

1. A minimum of 18.0 V is required at the SAN-CPU.
2. Minimum supply voltage available is 20.4 VDC.
3. The standby and alarm current requirements of the SAN-CPU and the option modules to which it is connected must be known.

A power consumption/wire sizing calculation must be performed to determine the wire size for a given load and wire length. Refer to the worksheet section, the SAN-CPU Current Worksheet, to determine SAN-CPU loading.

The schematic below shows the SAN-CPU circuit.



SAN-CPU POWER FEEDER

The value of R_{MAX} is determined using Ohm's Law for current values from 0.25 to 3.5 amps:

$$R_{MAX} = \frac{2.4}{I_{MAX}}$$

Where:
R_{MAX} = Maximum allowable wire resistance
I_{MAX} = Wire resistance per 1000' pair.
2.4 = Maximum allowable voltage drop.

Using wire resistance Table 1, the maximum SAN-CPU distance from the power supply using any listed wire gauge may be determined as follows below. Table 2 was derived using this method.

$$D = \frac{R_{MAX}}{R_{/1000'PAIR}} \times 1000$$

Where:
D= Distance in feet.
R_{MAX} = Maximum allowable wire resistance.
$R_{/1000'\ PAIR}$ = Wire resistance per 1000' pair.

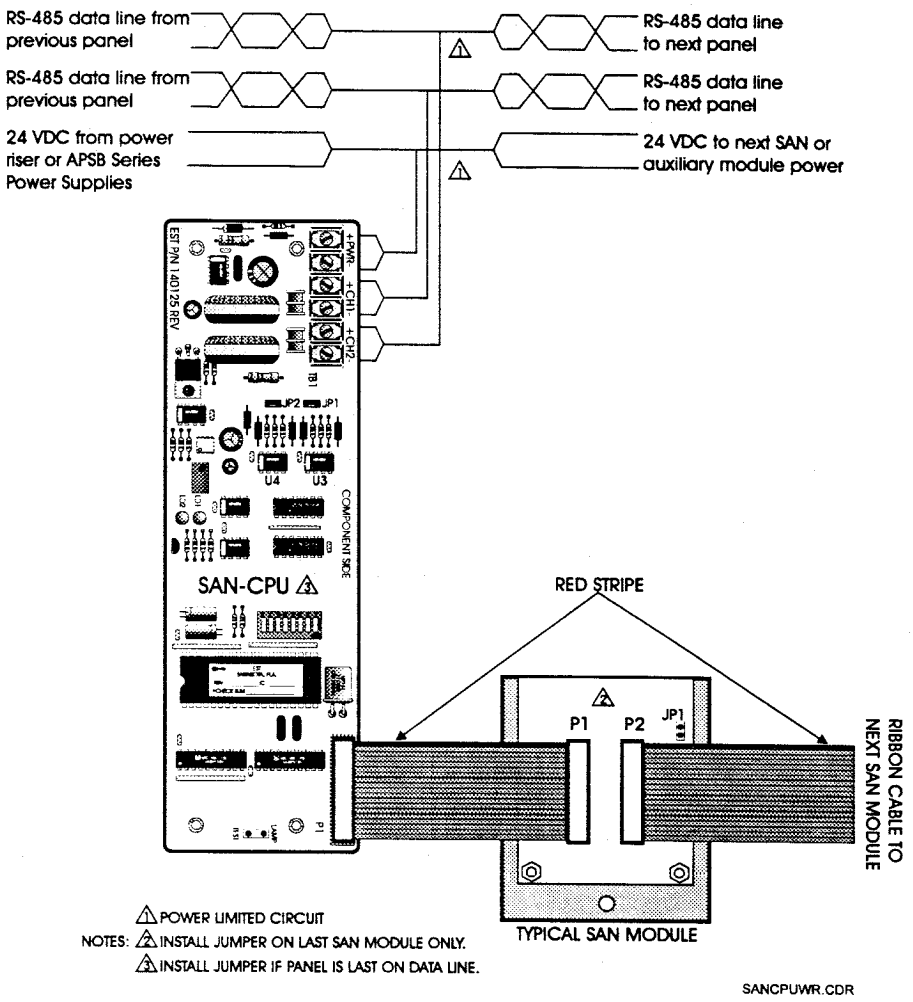
Wire Resistance	
WIRE SIZE	RESISTANCE PER 1000' PAIR $R_{/1000' PAIR}$
#18	13.0 Ω
#16	8.0 Ω
#14	5.2 Ω
#12	3.2 Ω

LOAD vs. DISTANCE IN FEET SAN-CPU POWER FEED CIRCUIT (2.4 VOLT DROP)			
CURRENT (AMPS)	#18 AWG	#16 AWG	#14 AWG
.25	738	1200	1846
.50	369	600	923
.75	246	400	615
1.00	184	300	462
1.25	148	240	369
1.5	123	200	308
1.75	105	171	263
2.00	92	150	231
2.25	82	134	206
2.50	74	120	185
2.75	67	109	167
3.00	62	100	154
3.25	57	93	142
3.50	53	86	133

Field Wiring

TB1-1 = +24 VDC
TB1-2 = 24 VDC Common
P1 = Ribbon Cable to SAN Option Modules

SAN-CPU Data Line Wiring			
Communications Format	Style 4 (Class B)	Style 7 (Class A)	Notes
RS-485	TB1-3 +RS-485 TB1-4 -RS-485	TB1-3 +RS-485, Ch. #1 TB1-4 -RS-485, Ch. #1 TB1-5 +RS-485, Ch. #2 TB1-6 -RS-485, Ch. #2	Install JP1/JP2 if SAN-CPU is last device on RS-485 data line.



Jumper Setup

JP1 Install when using Style 4 (Class B) or Style 7 (Class A) RS-485 communications format, AND the SAN-CPU is the last device on the data line.

JP2 Install when using Style 7 (Class A) RS-485 communications format, AND the SAN-CPU is the last device on the data line.

Switch Setup

SAN-CPU Addressing						
Switch	**SW1**	**SW2**	**SW3**	**SW4**	**SW5**	**SW6**
Address Weight	01	02	04	08	16	32

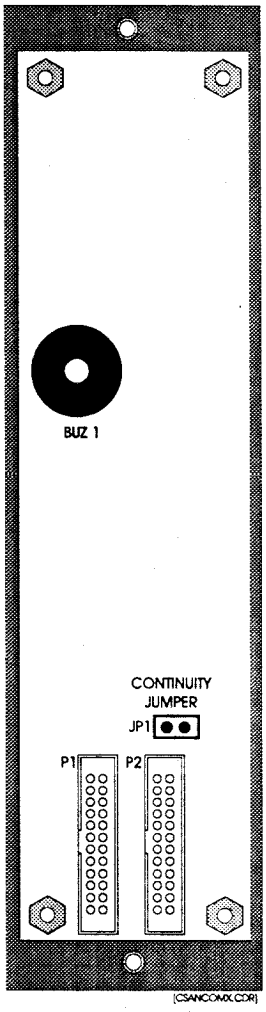
Baud Rate Selection		
SW7	**SW8**	**Rate**
OFF	OFF	9600
ON	OFF	4800
OFF	ON	2400
ON	ON	19200

5.3 2-SAN-COM Remote Network Control Module

The 2-SAN-COM may be installed in the SAN-4 or SAN-8 enclosure or the RSAN-6 19" rack mounting frame. When the 2-SAN-COM function is enabled in the data entry program, the 2-SAN-COM used the first input group and first output address group of the SAN-CPU to which it is connected, regardless of where it is physically located in the ribbon cable chain originating at the SAN-CPU.

Field Wiring

The only wiring required is to plug the ribbon cable assembly (P/N 250080) from the previous SAN series module into P2, and then plug the ribbon cable into P1 of the next SAN series module.



Jumper Setup

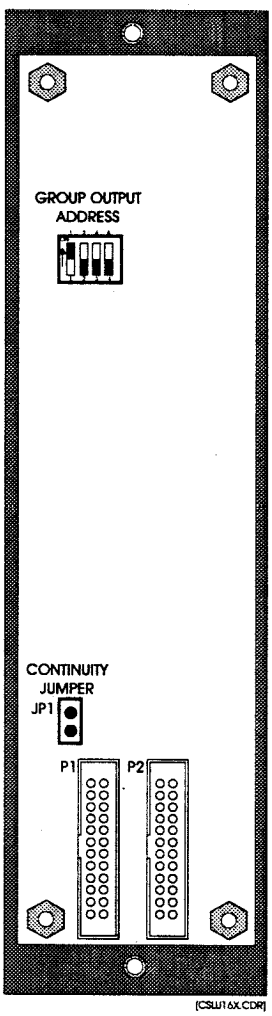
JP1 Install JP1 if the 2-SAN-COM module is the last module installed on the data line.

5.4 SLU-16R / SLU-16Y / SLU-16 R/Y Remote Annunciator Lamp Module

The SLU-16 may be installed in the SAN-4, SAN-8 or RSAN-6 enclosures. Enter the appropriate LED identification information on the LED label strip before installing the SLU-16. The SLU-16 requires two groups of 8 output addresses of the SAN-CPU to which it is connected.

Field Wiring

The only wiring required is to plug the ribbon cable assembly (P/N 250080) from the previous SAN series module into P2, and then plug the ribbon cable into P1 of the next SAN series module.



[CSLU16X.CDR]

Jumper Setup

JP1 Install JP1 if the SLU-16 is the last module installed on the ribbon cable chain.

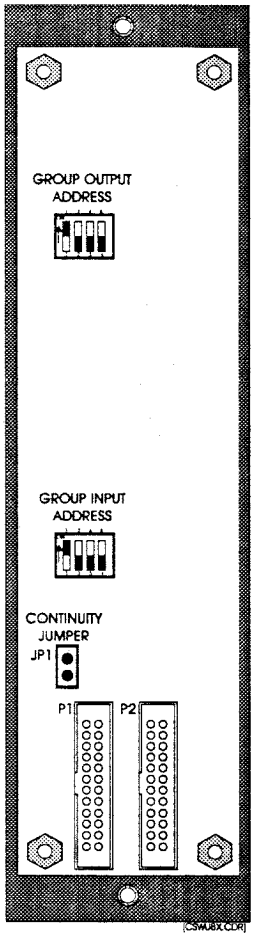
5.5 SWU-8 / SWU-8/3 Remote Annunciator Lamp and Switch Module

The SWU-8 and SWU-8/3 may be installed in the SAN-4, SAN-8, or RSAN-6 enclosures. Enter the appropriate switch and LED identification information on the label strip before installing it in the SWU-8 or SWU-8/3.

The SWU-8 requires one group of 8 input addresses and two groups of 8 output addresses of the SAN-CPU to which it is connected. The SWU-8/3 requires two groups of 8 input addresses and two groups of 8 output addresses of the SAN-CPU.

Field Wiring

The only wiring required is to plug the ribbon cable assembly (P/N 250080) from the previous SAN series module into P2, and then plug the ribbon cable into P1 of the next SAN series module.



Jumper Setup

JP1 Install JP1 if the SWU-8 or 8/3 is the last module installed on the ribbon cable chain.

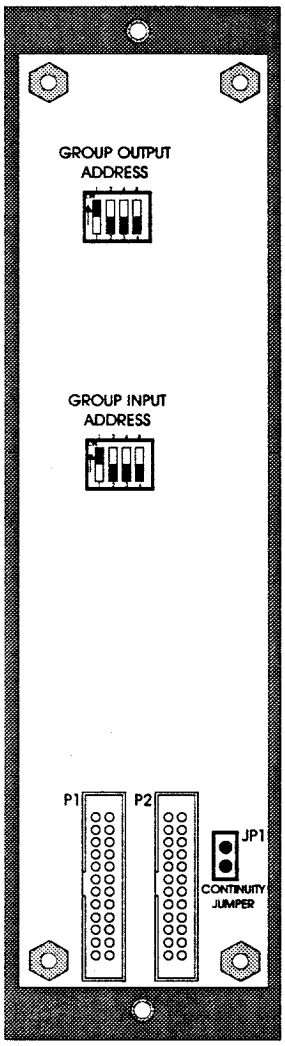
5.6 SHO-4 Remote Annunciator Lamp and Switch Module

The SHO-4 may be installed in the SAN-4, SAN-8, or RSAN-6 enclosure. Enter the appropriate switch and LED identification information on the label strip before installing it in the SHO-4.

The SHO-4 requires one group of 8 input addresses and one group of 8 output addresses of the SAN-CPU to which it is connected.

Field Wiring

The only wiring required is to plug the ribbon cable assembly (P/N 250080) from the previous SAN series module into P2, and then plug the ribbon cable into P1 of the next SAN series module.



Jumper Setup

JP1 Install JP1 if the SHO-4 is the last module installed on the ribbon cable chain.

5.7 SDR-32 / SDR-32K / SDR32-C Remote Annunciator Lamp Driver Module

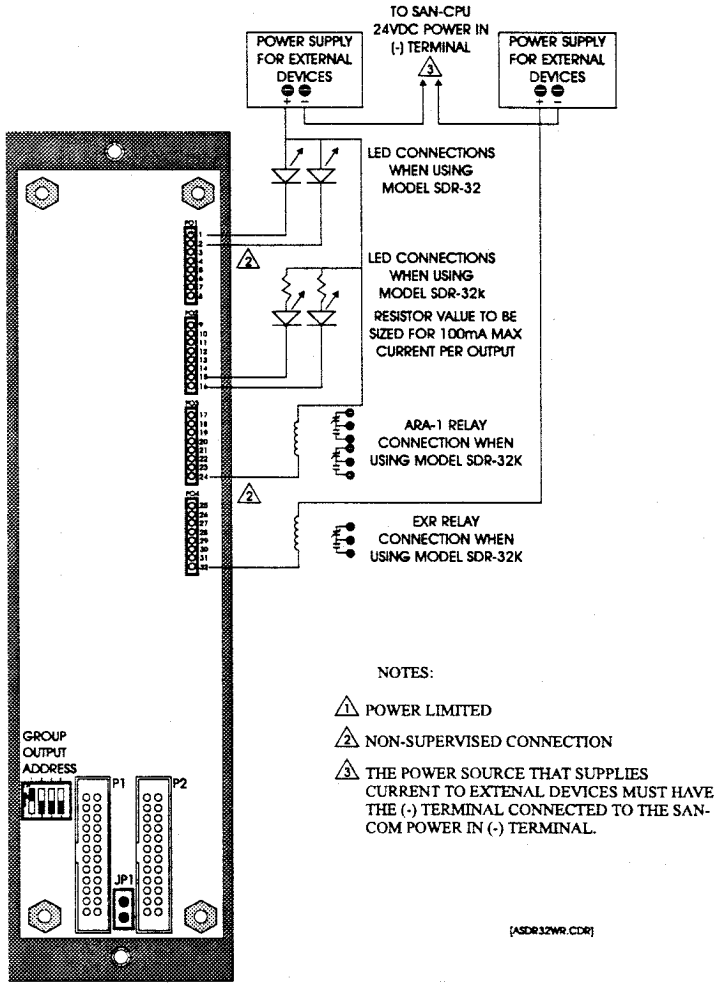
The SDR-32(K) may be installed in the SAN-4, SAN-8, or RSAN-6 enclosures. For integral mounting within a custom annunciator enclosure, the card only version (without mounting plate) may be ordered.

The SDR-32(K) module requires four groups of 8 output addresses of the SAN-CPU to which it is connected.

Field Wiring

Plug the ribbon cable assembly (P/N 250080) from the previous SAN series module into P2, and plug the ribbon cable into P1 on the next SAN series module. Connectors PO1 through PO4 mate with pigtail cables assemblies which connect to the individual lamps. The negative (-) side of the lamp power supply must be connected to the (-) SAN-CPU terminal.

CAUTION
When using incandescent lamps, some current limiting is advised as momentary current surges can exceed 100mA rating on the switching transistor causing permanent damage.



Jumper Setup

JP1 Install JP1 if the SDR-32 is the last module installed on the ribbon cable chain.

5.8 SIN-16 Remote Annunciator Input Receiver Module

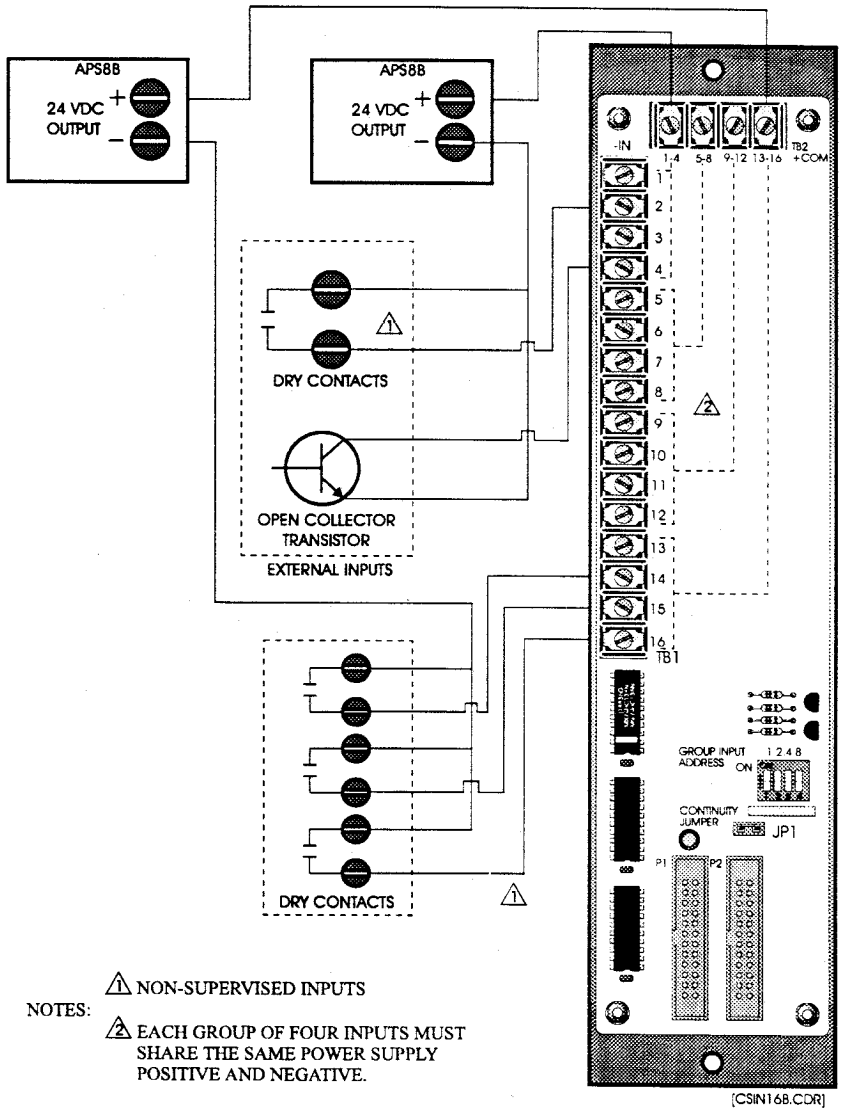
The SIN-16 may be installed in the SAN-4, SAN-8, or RSAN-6 enclosures. For integral mounting within a custom annunciator enclosure, the board only version (without mounting plate) may be ordered.

The SIN-16 requires two groups of 8 input addresses of the SAN-CPU to which it is connected.

Field Wiring

Plug the ribbon cable assembly (P/N 250080) from the previous SAN series module into P2, and plug the ribbon cable into P1 on the next SAN series module.

TB2-1 (+) common for SIN-16 inputs 1 to 4 (TB1-1 to TB1-4)
TB2-2 (+) common for SIN-16 inputs 5 to 8 (TB1-5 to TB1-8)
TB2-3 (+) common for SIN-16 inputs 9 to 12 (TB1-9 to TB1-12)
TB2-4 (+) common for SIN-16 inputs 13 to 16 (TB1-13 to TB1-16)



NOTES:
1. NON-SUPERVISED INPUTS
2. EACH GROUP OF FOUR INPUTS MUST SHARE THE SAME POWER SUPPLY POSITIVE AND NEGATIVE.

Jumper Setup

JP1 Install JP1 if the SIN-16 is the last module installed on the data line.

5.9 SRU-8 Remote Annunciator Relay Module

The SRU-8 may be installed in the SAN-4, SAN-8, or RSAN-6 enclosures.

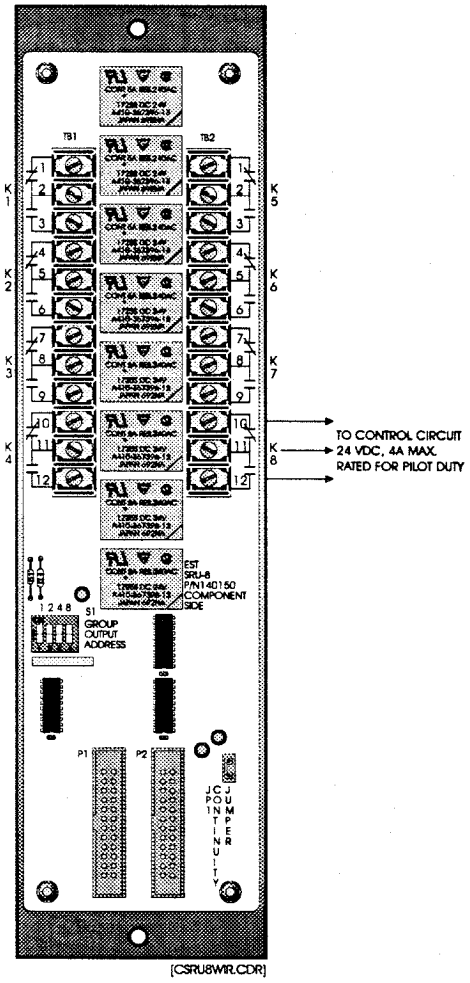
The SRU-8 module requires one group of 8 output addresses of the SAN-CPU to which it is connected.

Field Wiring

Plug the ribbon cable assembly (P/N 250080) from the previous SAN series module into P2, and plug the ribbon cable into P1 on the next SAN series module.

TB1-1: K1 NC
TB1-2: K1 COM
TB1-3: K1 NO
TB1-4: K2 NC
TB1-5: K2 COM
TB1-6: K2 NO
TB1-7: K3 NC
TB1-8: K3 COM
TB1-9: K3 NO
TB1-10: K4 NC
TB1-11: K4 COM
TB1-12: K4 NO

TB2-1: K1 NC
TB2-2: K1 COM
TB2-3: K1 NO
TB2-4: K2 NC
TB2-5: K2 COM
TB2-6: K2 NO
TB2-7: K3 NC
TB2-8: K3 COM
TB2-9: K3 NO
TB2-10: K4 NC
TB2-11: K4 COM
TB2-12: K4 NO



Jumper Setup

Install JP1 if the SRU-8 is the last module installed on the data line.

5.10 ISP-96-2 / ISP-96-3 Annunciator/Switch Panel

The ISP-96 requires 5 1/4" of vertical height and 2" of rear clearance in the enclosure.

Field Wiring

TB1-1 +24 VDC
TB1-2 24 VDC Common

ISP-96 Data Line Wiring			
Communications Format	**Style 4 (Class B)**	**Style 7 (Class A)**	**Notes**
RS-485	TB1-3 +RS-485 TB1-4 -RS-485	TB1-3 +RS-485, Ch. #1 TB1-4 -RS-485, Ch. #1 TB1-5 +RS-485, Ch. #2 TB1-6 -RS-485, Ch. #2	Install JP1/JP2 if SAN-CPU is last device on RS-485 data line.

Jumper Setup

SAN CPU

JP1 Install when using style 4 (Class B) or style 7 (Class A) RS-485 communications format, AND the ISP-96 is the last device on the data line.

JP2 Install when using style 7 (Class A) RS-485 communications format, AND the ISP-96 is the last device on the data line.

LED Switch Cards

JP1 One continuity jumper on each card. Jumpers are on inside of cards, facing back-side of metal face plate. The jumper at the middle of assembly should be removed, and jumper on the side of the assembly should be installed. **NOTE: If jumpers are NOT properly installed, an xx99 supervisory open will appear.**

SYSTEM POWER-UP

6.1 Power-Up Procedure

1. Energize AC power at 2-PPS Power Supply.

2. Connect batteries to the 2-PPS Power Supply terminals according to Figure 3.7.

3. The system will indicate mapping faults on the Signature Data Circuit(s) when initially powered up. If there are other trouble conditions, they will also be indicated on the panel's display. The quickest way to eliminate the mapping fault is to use the auto-programming feature. Any trouble conditions that remain after removing map faults are most likely installation and hardware problems. Detailed troubleshooting information on how to identify and correct these problems may be found in the *EST2 Service Manual*, P/N 270189.

6.2 Auto-Programming

The auto-programming feature of the EST2 panel is used to automatically identify all Signature Series devices that are properly connected to the EST2 panel, and to program the panel in the default configuration. The autoprogramming feature, referred to as "**Reconfigure**" on the panel program menu.

Refer to the EST2 Operations Guide P/N 270188 for more information on auto-programming.

6.3 System Testing

Once the system has been programmed, all devices should be tested to insure proper operation. Refer to the *EST2 Service & Troubleshooting Manual*, P/N 270189 for complete details.

6.4 Certificate of Completion

When the system has been tested and found to operate satisfactorily, make a copy and fill out the Certificate of Completion on the following pages, and give it to the building representative.

Fire Alarm System Certificate of Completion

Protected Property

Name: _____

Address: _____

_____

Representative: _____

Phone: _____

Authority Having Jurisdiction: _____

Address: _____

_____

Phone: _____

Certificate of System Installation

This system has been installed in accordance with the NFPA standards listed below, was inspected by _____ on _____, and includes the devices listed below, and has been in service since _____.

___ NFPA 72, Ch. 1 3 4 5 6 7 (circle all that apply)
___ NFPA 70, *National Electrical Code*, Article 760
___ Manufacturer's Instructions ___ Other (specify): _____

Certificate of System Operation

All operational features and functions of this system were tested by _____ on _____ and found to be operating properly and in accordance with the requirements of:

___ NFPA 72, Ch. 1 3 4 5 6 7 circle all that apply)
___ NFPA 70, *National Electrical Code*, Article 760
___ Manufacturer's Instructions ___ Other (specify): _____
Signed: _____ Dated: _____ Organization: _____

System Software

System Firmware
Installed Revision: _____ Checksum: _____ Date: _____

Application Programming
Initial Program Installation: _____ Date: _____
Revisions & Reasons: _____ Date: _____
_____ Date: _____
_____ Date: _____
Programmed by (name): _____
Date of Programmer's Latest Factory Certification: _____
Data Entry Program Revision Used _____

Maintenance

Frequency of routine tests and inspections, if other than in accordance with the referenced NFPA standards: _____
_____
_____

System deviations from the referenced standards are: _____
_____
_____

_____
(signed) for Central Station or Alarm Service Company (title) (date)

_____
(signed) for representative of the authority having jurisdiction (title) (date)

Certificate of Completion

Initiating Devices and Circuits

(indicate quantity)

____ Manual Stations

Automatic Devices

____ Smoke Detectors: ____ Ion ____ Photo

____ Duct Detectors: ____ Ion ____ Photo

____ Water flow Switches:

____ Other (list): _____

Combination Detectors (circle active sensors)

____ Ion/Photo/Heat

____ Ion/Photo/Heat

Supervisory Devices and Circuits

(indicate quantity)

____ Compulsary Guard's Tour comprised of _____ transmitter stations and _____ intermdediate stations.

Sprinkler System

____ Valve supervisory devices

____ Building temperature points

____ Site Water Temperature Points

____ Site water supply level points:

Engine Driven Fire Pump

____ Selector in auto position

____ Control panel trouble

____ Transfer switches

____ Engine running

Electric Fire Pump

____ Fire pump power

____ Fire pump running

____ Phase reversal

Other Supervisory Function(s)

(specify)

____ _____

_____

_____

Notification Appliances & Circuits

Notification Appliance Circuits _____

Type and quantity of installed Notification Appliances

____ Bells ____ inch

____ Speakers

____ Horns

____ Other: _____

____ Local Annunciator

____ Visual Signals Type: _____

____ with audible

____ without audible

Signaling Line Circuits

Quantity and Style of connected SLCs, per NFPA 72, Table 3-6.1

____ Quantity ____ Style

System & Service

____ **NFPA 72, Ch. 3 - Local**

If alarm transmitted off premise, location(s) received: _____

____ **NFPA 72, Ch. 3 - Emergency Voice Alarm Service**

voice/alarm channels: _____ single: _____ multiple: _____

installed speakers: _____ # speakers per zone: _____

telephones/jacks installed: _____

____ **NFPA 72, Ch. 4 - Auxiliary**

Type of connection:

Local Energy: _____ Shunt: _____ Parallel Telephone: _____

Location/Phone # for receipt of signals: _____

____ **NFPA 72, Ch. 4 - Remote Station**

Alarm: _____

Supervisory: _____

____ **NFPA 72, Ch. 4 - Proprietary**

If alarms retransmitted off premise, location & phone of receiving organization:

Method of alarm retransmission: _____

____ **NFPA 72, Ch. 4 - Central Station**

Prime Contractor: _____

Central Station Location: _____

Method of transmission of alarms to central station:

____ McCulloh ____ One-Way Radio ____ Digital Alarm Communicator

____ Multiplex ____ Two-Way Radio ____ Others: _____

Method of transmission of alarms to public fire service comunications center:

1. _____ 2. _____

Power Supplies

Primary (main)

Nominal Voltage: _____

Current Rating: _____

Overcurrent protection:

Type: _____

Current rating: _____

Location: _____

Secondary (standby)

____ Storage battery

Amp-Hour rating: _____

Calculated for ____ hours of system operation.

____ Dedicated generator

Location of fuel supply: _____

Emergency or standby system used to backup primary supply

____ Emergency system described in NFPA 70, Article 700

____ Legally required standby system described in NFPA 70, Article 701

____ Optional standby system described in NFPA 70, Article 702, meeting the performance requirements of Article 700 or 701

EDWARDS SYSTEMS TECHNOLOGY

EST2COC.CDR

APPENDICES

A1.0 Specifications

Table A1.1 - Specifications	
2-MCM Main Controller Module (P/N 130290)	
Input Power,	24 VDC, 150 mA - Standby, 275 mA - Active (current ratings include 2-LCD Module)
Smoke Power Max. Device Capacitance per Ckt.	24 VDC nominal @ 500 mA, filtered, reset programmable. Refer to Compatibility Section. 1000µF
Ground Fault Detection	10 KΩ to earth, all field wiring except AC input and common relay contacts.
Signature Data Circuits Class/Style Device Capacity/Ckt. Line Resistance Line Capacitance	 One Class B (Style B) or Class A (Style D) 96 Signature Series Detectors **AND** 94 Signature Series Modules. Additional devices with 2-LCX Expander Loop Module. Refer to the compatibility section. 65 Ω Max. under full load 0.33µF, Max.
Notification Appliance Circuit (NAC) Quantity Voltage Rating Current Rating per NAC Max. Line Resistance EOL Resistor	 Two, Class B (Style Y). or Class A (Style Z) 85 VAC, Max 3.5 A See power supply specs. for available NAC power. 50 Ω , Max. 15 KΩ , 1/2 Watt
RS-232 Port	Non-isolated. 50 Ft. (15.2 M) max Line Length.
RS-485 Port	Non-isolated, Class B or Class A 28 drops maximum
Maximum Wire Terminal Size Notification Appliance Circuits All other circuits	 12 AWG (3.09 mm^2) 14 AWG (1.5 mm^2)
System Alarm Relay	Form C, rated at 24 VDC @ 1A
System Trouble Relay	Form C, rated at 24 VDC @ 1A
System Supervisory Relay	Form A, rated at 24 VDC @ 1A
Max. Battery Charger Current	2.1 A.
Weight	12.3 oz. (344 g)

Table A1.2 - Specifications	
2-CAB Enclosure	
Dimensions (HWD) Back Box Rough-In Finished	 21.0 in x 14.125 in x 4.5 in (53.3 cm x 35.9 cm x 11.4 cm) 22 7/8 in x 16 3/8 in x 1.0 in (58.1 cm x 16.375 cm x 2.54 cm)
Option Module Mounts	Two ½ footprint & 3 optional front panel LED/Switch Modules
Batteries	Room for two 10 AH @ 12 VDC in enclosure
Finish	Red or Gray textured enamel
Weight	22.16 lbs. (9.9 Kg)

Table A1.3 - Specifications	
BC-2(R) Battery Cabinet	
Dimensions (HWD) Back Box Rough-In Finished	 13 in x 20.1 in x 2.75 in (33 cm x 51 cm x 7 cm) 15 in x 22 in x 1. in (38.1 cm x 55.9 cm x 2.5 cm)
Construction	18 Gauge CRS
Mounting	Surface or semi-flush
Finish	Textured enamel
Capacity	2 ea. 12 V, 24 AH Batteries
Internal Fuse	8 Amp
Weight	12.82 lbs. (5.5Kg)

Table A1.4 - Specifications		
EST2 Batteries		
Voltage	Two @ 12 VDC	
Installation	2-CAB Enclosure	External Battery Cabinet
Capacity	10 AH (P/N 12V10A)	24 AH (P/N 12V24A)
Weight	9.5 Lb (4.3 Kg) each	

Table A1.5 - Specifications	
2-PPS Primary Power Supply, 120 VAC Input (P/N 130339) **2-PPS-220 Primary Power Supply, 220 VAC Input (P/N 130360)**	
Input Power	120 VAC @ 300 W Max., 50-60 Hz. 220 VAC @ 300 W Max., 50-60 Hz.
Output Voltage	24 VDC, nominal @ 5.0 A
Battery Charging Capacity	24 AH Max.
Smoke Power Max. Device Capacitance per Ckt.	24 VDC nominal @ 500 mA, filtered, reset programmable. Refer to Compatibility Section. 1000 µF
Notification Appliance Circuit (NAC) Voltage Max. Available Current per power supply Max. Device Capacitance per Ckt.	 24 VDC, Nominal 3.5 A total, all circuits 5000 µF, Max.
Weight	23oz. (644g)

Table A1.6 - Specifications	
2-LCX Expander Loop Module (P/N 130313)	
Input Power	24 VDC, 20 mA - Standby, 130 mA - Active
Signature Data Circuit Class/Style Device Capacity/Ckt. Line Resistance Line Capacitance	 One Class B (Style B) or Class A (Style D) 96 Signature Series Detectors **AND** 94 Signature Series Modules. 65 Ω Max. under full load 0.33µF, Max.
Notification Appliance Circuit (NAC) Quantity Voltage Max. Current per power supply Max. Useable Current per NAC Max. Line Resistance EOL Resistor	 Two, Class B (Style Y). Optional Class A (Style Z) 24 VDC, Nominal 3.5 A total, all circuits 3.5 A 50 Ω, Max. 15 KΩ, 1/2 Watt
Maximum Wire Size Notification Appliance Circuits All other circuits	 12 AWG (3.09 mm^2) 14 AWG (1.5 mm^2)
Weight	7.2oz. (201g)

Table A1.7 - Specifications	
2-LCD Display/Control Panel (P/N 130274)	
Input Power	Included with 2-MCM Module
Display	4 lines, 20 Characters, back-lit alpha-numeric, Super-Twist Liquid Crystal
LED Indicators	AC Power, Alarm, Supervisory, Trouble, Monitor, Disable, Ground Fault, CPU Fail, Test, Reset, Local Silence, Alarm Silence, Drill, Option Module, and one custom programmable.
Front Panel Controls	Numeric keypad: 0-9, Enter & Delete Alarm, Supervisory, Trouble, & Monitor Scroll Keys Status, Reports, Enable, Disable, Activate, Restore, Program, Test, Option Switches, and one custom programmable.
Weight	6.2oz. (173g)

Table A1.8 - Specifications	
EST2 LED Annunciator Panels	
Input Power	24 VDC, 5 mA - Standby, 75 mA - Active
LEDs per Panel	16
LED Color P/N 2-8RY P/N 2-12R4Y P/N 2-16G P/N 2-16R P/N 2-16Y	 8 Red LEDs over 8 Yellow LEDs 12 Red LEDs over 4 Yellow LEDs 16 Green 16 Red 16 Yellow
Mounting	Internal door of Enclosure (3 max.)
Weight	1.8oz. (50g)

Table A1.9 - Specifications	
EST2 LED Annunciator & Switch Panels	
Input Power	24 VDC, 5 mA - Standby, 75 mA - Active
LED Configuration P/N 2-8RYS P/N 16R8S P/N 16Y8S	 8 Red LEDs over 8 Yellow LEDs & 8 Switches 16 Red LEDs & 8 Switches 16 Yellow LEDs & 8 Switches
Control Switches	8 momentary push button switches
Mounting	Internal door of Enclosure (3 max.)
Weight	1.9oz. (53g)

Table A1.10 - Specifications	
IOP-3 RS-232 Isolation Module (P/N 130117)	
Input Power Requirement	24 VDC @ 60 mA
Output Power	12 VDC @ 10 mA
Signal Format	RS-232
Baud Rate	300 to 9600
Integrity Monitoring	For Printers & peripherals
Mounting	Stud mount on side of enclosure

Table A1.11 - Specifications	
RPM Reverse Polarity Module (P/N 130090)	
Input Power	24 VDC, 20 mA - Standby, 20 mA - Active
Reverse Polarity Circuits Open Circuit Voltage Short Circuit Current	 24 VDC 7 mA. Max.
Mounting	Stud mount on side of enclosure

Table A1.12 - Specifications	
MTM-1 March Time Polarity Module (P/N 130127)	
Input Power	24 VDC, 0 mA - Standby, 30 mA - Active
Contact Rating	3.5A
Mounting	Stud mount on side of enclosure

Table A1.13 - Specifications	
DL2 Dialer (Digital Alarm Communicator Transmitter) Module (P/N 130318)	
Input Power	10 mA - Standby, 20 mA - Active
Mounting	Mounts on 2-MCM Board
Phone Line Wall Connector	Two Loop Start lines on Public switched telephone network, Pulse or DTMF dialing. Standard RJ-31X jack
Line Supervision	Trouble when line voltage < 10 V & line current < 5 mA.
Communications Protocol	Sescoa/ Franklin/ DCI/Vertex, 20 Pulse per Second; 3/2 or 4/2 Double Round.
Telephone Numbers	Two, 12 digit numbers
FCC Registration Number	To Be Issued
Dialing Retries	5 to 10
AC Power Failure Delay	0 to 30 hours
Clock Accuracy	Within one hour/year
Compliance	Communications Canada CS-03 FCC / CFR 47 Parts 15 & 68 NFPA 72; UL 864; ULC S527-M87
Programming Phone	Any Tone dial (DTMF) Phone with 6 position miniature jack

Table A1.14 - Specifications			
Remote Annunciator Enclosures			
Module	Overall Dimensions (HWD)	Rough-in Dimensions (HWD)	Module Spaces
SAN-4	11.5" x 16" x 4" 29.2 cm x 40.6 cm x 10.2 cm	9.5" x 11.25" x 2.5" 24.1 cm x 28.6 cm x 6.4 cm	4
SAN-8	11.5" x 27.5" x 4" 29.2 cm x 69.9 cm x 10.2 cm	9.5" x 23" x 2.5" 24.1 cm x 58.4 cm x 6.4 cm	8
RSAN-6	10.5" x 19.0" x 2.5" 26.7 cm x 48.3 cm x 6.4	N/A	6

Table A1.15 - Specifications	
SAN-CPU Annunciator Controller	
Module Power	24 VDC, 54 mA
Communications Formats	RS-485
Data Line Wiring	Style 7 (Class A) or Style 4 (Class B)
Mounting	1/2 Module Space

Table A1.16 - Specifications	
SAN-COM Remote Network Control Module	
Standby Current	22 mA
Alarm Current	7 mA
Trouble Current	15 mA

Table A1.17 - Specifications	
SLU-16R/SLU-16Y/SLU-16R/Y Remote Annunciator Lamp Module	
Power	From SAN-CPU
Standby Current	1 mA
Active LED Current	6 mA/LED, Full Load = 96 mA
Weight	3.3 oz.
Address Requirements: Inputs Outputs	 None 16 (2 groups of eight)

Table A1.18 - Specifications	
SWU-8/SWU-8/3 Remote Annunciator Lamp and Switch Module	
Power	From SAN-CPU
Standby Current	1 mA
Alarm Current	6 mA/LED
Weight	3.3 oz.
Address Requirements: SWU-8 Inputs Outputs SWU-8/3 Inputs Outputs	 8 (1 group of eight) 16 (2 groups of eight) 16 (2 groups of eight) 16 (2 groups of eight)

Table A1.19 - Specifications	
SHO-4 Remote Annunciator Lamp and Switch Module	
Power	From San-CPU
Standby Current	25 mA
Alarm Current	6 mA/LED
Weight	3.3 oz.
Address Requirements: Inputs Outputs	 8 (1 group of eight) 8 (1 group of eight)

Table A1.20 - Specifications	
SDR-32/SDR-32K/SDR-32C Remote Annunciator Lamp Driver Module	
Power	From SAN-CPU
Standby Current	1 mA
Current Sink	16 mA Max., SDR-32 100 mA Max., SDR-32K
Lamp Supply	24 VDC Max.
Weight	3.3 oz.
Address Requirements: Inputs Outputs	 None 32 (4 groups of eight)

Table A1.21 - Specifications	
SIN-16 Remote Annunciator Input Receiver Module	
Power	From SAN-CPU
Standby Current	1 mA
Input Current	7 mA/Ckt.
Input Voltage	24 VDC Max.
Weight	4.3 oz.
Address Requirements: Inputs Outputs	 16 (2 groups of eight) None

Table A1.22 - Specifications	
SRU-8 Remote Annunciator Relay Module	
Power	From SAN-CPU
Standby Current	1 mA
Relay Current	20 mA/Relay
Contacts	24 VDC, 4A Max.
Address Requirements: Inputs Outputs	 None 8 (1 group of eight)

Table A1.23 - Specifications	
ISP-96-2/ISP-96-3 Annunciator/Switch Panel	
Voltage	24 VDC
Standby Current	60 mA
Current per Active LED	6 mA, 268 mA Total Draw
Fully Loaded Current	680 mA
Temperature Range	0^0 - 49^0 C (32^0 - 120^0 F)
Humidity	85%, Non-condensing
Dimensions	5 1/4" x 19" x 2" (HWD) (13.3 cm x 48.3 cm x 5 cm) (HWD)

Table A1.24 - Specifications	
2-CMDN / 2-CMDN-C / 2-SMDN / 2-SMDN-C	
Voltage	18.4 - 24 VDC @ 80 mA
Host Quantity / Addressing	Up to 4 network addresses per annunciator.
Maximum Wire Length	7,700' (2348) #18 AWG Twisted Pair
Maximum Wire Size	Two #18 AWG per terminal
Printer Port Format	RS-232
Printer Baud Rate	2400, 4800, 9600
Message Capacity	88 Messages per panel address, 352 max. per annunciator
Dimensions (H, W, D) CMDN(-S) Faceplate CMDN(-S) Enclosure SMDN(-S)	 8" x 7" (20.3 cm x 17.8 cm) 7 1/4" x 6 1/8" x 3 3/4" (18.4 cm x 15.6 cm x 9.5 cm) 2 SAN Module Spaces

Table A1.25 - Specifications		
APS4B / APS4B-220 Power Supplies		
Specification	**APS4B**	**APS4B-220**
Input Voltage	120 VAC, 50/60Hz	220 VAC, 50/60 Hz
Input Current	2 A Max.	1 A Max.
24 VDC Alarm Current	7.5 A Max	4.0 A Max.
24 VDC Supervisory Current	2.25 A Max.	2.25 A Max
Battery Charger Voltage	26.8 VDC Max.	26.8 VDC Max.
Battery Charger Current	4.0 A Max.	4.0 A Max.
Trickle Charge Current	10 mA.	10 mA.
Maximum Battery Capacity	60 AH	60 AH
Battery Type	Sealed Gel Cell, Lead Acid	Sealed Gel Cell, Lead Acid
Ground Fault Detection	47 KΩ to 24 VDC or Common	47 KΩ to 24 VDC or Common
Brown Out Detection	≤96 VAC	≤192 VAC
Low Battery Detection	≤20.4 VDC	≤20.4 VDC
Low Battery Cut-Off	18.4 VDC	18.4 VDC
Temperature	0°C - 49°C (32°F-120°F)	0°C - 49°C (32°F-120°F)
Humidity	85% Non Condensing	85% Non Condensing
Mounting	1 standard module footprint	1 standard module footprint
TB1 Max. Wire Gauge	12 AWG (2.50 mm^2)	12 AWG (2.50 mm^2)
TB2 Max. Wire Gauge	14 AWG (1.50 mm^2)	14 AWG (1.50 mm^2)
TB3 Max. Wire Gauge	14 AWG (1.50 mm^2)	14 AWG (1.50 mm^2)

Table A1.26 - Specifications	
APS8B Power Supply	
Input Voltage	120 VAC, 50/60 Hz
Input Current	2 A Max.
24 VDC Alarm Current	7.5 A Max.
24 VDC Supervisory Current	2.25 A Max.
Battery Charger Voltage	26.8 VDC Max.
Battery Charger Current	4.0 A Max.
Trickle Charge Current	10 mA
Maximum Battery Capacity	60 AH
Battery Type	Sealed Gel Cell, Lead Acid
Ground Fault Detection	47 KΩ to 24 VDC or Common
Brown Out Detection	≤96 VAC
Low Battery Detection	≤20.4 VDC
Low Battery Cut-Off	18.4 VDC
Maximum Ripple	55 mVDC
Temperature	0°C - 49°C (32°F-120°F)
Humidity	85% Non Condensing
Mounting	1 standard module footprint
TB1 Max. Wire Gauge	12 AWG (2.50 mm^2)
TB2 Max. Wire Gauge	14 AWG (1.50 mm^2)
TB3 Max. Wire Gauge	14 AWG (1.50 mm^2)

DL2 Dialer Zones vs. Event Codes					
Dialer Zone		Event Code	Dialer		Event Code
Zone 1		11	Zone 50		50
		12			51
		13			52
		14			53
		15			54
		16			55
		17			56
		18			57
		19			58
Zone 2 0		20			59
		21	Zone 60		60
		22			61
		23			62
		24			63
		25			64
		26			
		27	Panel	24 Hr. Check in	90
		28		Alarm	91
		29		Supervisory Alarm	92
Zone 3 0		30		Trouble	93
		31		Restore	94
		32		Supervisory Restore	95
		33		AC Power Fail	96
		34		Telephone Line trbl	98
		35		Dialer Disabled	99
		36			
		32			
		37			
		38			
		39			
Zone 40		40			
		41			
		42			
		43			
		44			
		45			
		46			
		47			
		48			
		49			

A2.0 ULI Compatibility List

Compatible devices listed in this section are for use in the **USA ONLY**.

Table A2.1 - ULI Panel Compatibility
2-MCM, 2-LCX Loop Expander & Signature Series Devices

Cat. #	Description	Max. # Devices per SIGA Data Circuit
SIGA-IS	Ionization Smoke Detector	96
SIGA-PS	Photoelectric Smoke Detector	96
SIGA-PHS	Combination Photoelectric Smoke & 135º F (57ºC) Fixed Temperature Detector	96
SIGA-IPHS	Combination Ionization, Photoelectric Smoke, & 135º F (57ºC) Fixed Temperature Detector	96
SIGA-HFS	135º F (57ºC) Fixed Temperature Detector	96
SIGA-HRS	Combination 135º F (57ºC) Fixed Temperature & 15ºF /Minute Rate-of-Rise Heat Detector	96
SIGA-CC1	Single Input Signal Module	94
SIGA-CC2	Dual Input Signal Module	47
SIGA-CT1	Single Input Module	94
SIGA-CT2	Dual Input Module	47
SIGA-CR	Control Relay Module	94
SIGA-MM1	Monitor Module	94
SIGA-WTM	Waterflow/Tamper Module	47
SIGA-UM	Universal Module	47

Table A2.2 - ULI Compatibility - 4-Wire Initiating Devices
Refer to the SIGA-UM Installation Sheet, P/N 387024 for complete information.

Manufacturer	Cat. #	Description
Edwards	6250B	Ionization Smoke Detector with 6251B-003 relay base
Edwards	6270B	Photoelectric Smoke Detector with 6251B-003 relay base
Edwards	6264B-001	Ionization Duct Smoke Detector with 6251B-003 relay base & 6260A-100 housing
Edwards	6266B-001	Photoelectric Duct Smoke Detector with 6251B-003 relay base & 6260A-100 housing

Table A2.3 - ULI Compatible Notification Appliances

Cat.#	Description
202-3A-001	Strobe 24 VDC, 105 mA, UL 1971
202-3A-101	Strobe 24 VDC, 105 mA, UL 1971
202-5A-001	Strobe 24 VDC, 70 mA, UL 1971
202-5A-101	Strobe 24 VDC, 70 mA, UL 1971
202-6A-001	Strobe 24 VDC, 162 mA, UL 1971
202-6A-101	Strobe 24 VDC, 162 mA, UL 1971
202-7A-001	Strobe 24 VDC, 105 mA, UL 1971
202-7A-101	Strobe 24 VDC, 105 mA, UL 1971
202-8A-001	Strobe 24 VDC, 219 mA, UL 1971
202-8A-101	Strobe 24 VDC, 219 mA, UL 1971
323D-10AW	AdaptaBel 10" Single Stroke, 24 VDC
323D-10AW-R	AdaptaBel 10" Single Stroke, 24 VDC
329D-AW	Chime, 24 VDC w/diode, 0.3 Amps
403-3A-R	Bell/Strobe Plate, 24 VDC, 105 mA
403-5A-R	Bell/Strobe Plate, 24 VDC, 70 mA
403-7A-R	Bell/Strobe Plate, 24 VDC, 105 mA
403-8A-R	Bell/Strobe Plate, 24 VDC, 219 mA
405-3A-B	Strobe, 24VDC, 105 mA, UL 1971
405-3A-R	Strobe, 24VDC, 105 mA, UL 1971
405-5A-B	Strobe, 24VDC, 70 mA, UL 1971
405-5A-R	Strobe, 24VDC, 70 mA, UL 1971
405-6A-B	Strobe, 24VDC, 162 mA, UL 1971
405-6A-R	Strobe, 24VDC, 162 mA, UL 1971
405-7A-B	Strobe, 24VDC, 105 mA, UL 1971
405-7A-R	Strobe, 24VDC, 105 mA, UL 1971
405-8A-B	Strobe, 24VDC, 219 mA, UL 1971
405-8A-R	Strobe, 24VDC, 219 mA, UL 1971
439D-6AW	6" Vibrating Bell, Gray
439D-6AW-R	6" Vibrating Bell, Red
439D-8AW	8" Vibrating Bell, Gray
439D-8AW-R	8" Vibrating Bell, Red
439D-10AW	10" Vibrating Bell, Gray
439D-10AW-R	10" Vibrating Bell, Red
439DEX-6AW	6" Explosion Proof Bell
439DEX-8AW	8" Explosion Proof Bell
439DEX-10AW	10" Explosion Proof Bell
5520D-AW	Duotronic Horn/Siren, Diode Polarized

Cat.#	Description
692-7A-003	75cd Strobe/Horn, Red
692-7A-103	75cd Strobe/Horn, Beige
692-8A-003	110cd Strobe/Horn, Red
692-8A-103	110cd Strobe/Horn, Beige
732-5A-006	Chime/Strobe, 24VDC, 82 mA
732-5A-106	Chime/Strobe, 24VDC, 82 mA
732-7A-006	Chime/Strobe, 24VDC, 118 mA
732-7A-106	Chime/Strobe, 24VDC, 118 mA
732-8A-106	Chime/Strobe, 24VDC, 231 mA
767-5A-006	Speaker/Strobe, 4" Cone Type
767-5A-106	Speaker/Strobe, 4" Cone Type
767-7A-006	Speaker/Strobe, 4" Cone Type
767-7A-106	Speaker/Strobe, 4" Cone Type
767-8A-006	Speaker/Strobe, 4" Cone Type
767-8A-106	Speaker/Strobe, 4" Cone Type
792-5A-006	Horn/Strobe, 24VDC, 93 mA
792-5A-106	Horn/Strobe, 24VDC, 93 mA
792-7A-006	Horn/Strobe, 24VDC, 129 mA
792-7A-106	Horn/Strobe, 24VDC, 129 mA
792-8A-006	Horn/Strobe, 24VDC, 242 mA
792-8A-106	Horn/Strobe, 24VDC, 242 mA
822-1B-002	Wall Mounted Electronic Chine, 24 VDC
822-1B-102	Wall Mounted Electronic Chine, 24 VDC
822-1B-222	Ceiling Mounted Chime, 24 VDC, 12 mA
882-2B-001	Electronic Horn, 24VDC, 90 dBA
882-2B-002	Electronic Horn, 24VDC, 90 dBA
882-2B-101	Electronic Horn, 24VDC, 90 dBA
882-2B-102	Electronic Horn, 24VDC, 90 dBA
889D-AW	Explosion proof Horn
890RDA	Lamp Station, Integrity Monitored
890RDB-G5	Lamp Station, Integrity Monitored
890WDA-G5	Lamp Station, Integrity Monitored
890WDB-G5	Lamp Station, Integrity Monitored
97DEXR-G1	Explosion proof Strobe

(*Table A2.5 continued on next page*)

5522D-AW	Explosion proof Duotronic Horn
5523D-AW	Explosion proof Duotronic Siren
5524D-AW	Explosion proof Duotronic Horn
5525D-AW	Explosion proof Duotronic Siren
5530D-AW	Adaptatone Signal
5533D-AW	Explosion proof Adaptatone Signal
5534D-AW	Explosion proof Adaptatone Signal
682-1B-002	Mini-Horn, 24 VDC, 10 mA, 91 dBA Peak
682-1B-102	Mini-Horn, 24 VDC, 10 mA, 91 dBA Peak
682-1B-012	Mini-Horn, w/LED,24 VDC, 20 mA
682-1B-112	Mini-Horn, w/LED,24 VDC, 20 mA
692-5A-003	Mini-Horn/Strobe, 24 VDC, 80 mA
692-5A-103	Mini-Horn/Strobe, 24 VDC, 80 mA
692-7A-003	Mini-Horn/Strobe, 24 VDC, 115 mA
692-7A-103	Mini-Horn/Strobe, 24 VDC, 115 mA
692-8A-003	Mini-Horn/Strobe, 24 VDC, 229 mA

Table A2.4 - ULI Compatible Accessories

Cat. Number	Description
*MR-101/C	1-SPDT Relay w/LED
*MR-101/T	1-SPDT Relay w/LED
*MR-104/C	4-SPDT Relay w/LEDs
*MR-104/T	4-SPDT Relay w/LEDs
*MR-201/C	1-DPDT Relay w/LED
*MR-201/T	1-DPDT Relay w/LED
*MR-204/C	4-DPDT Relay w/LEDs
*MR-204/T	4-DPDT Relay w/LEDs
*PAM-1	1-SPDT w/LED, Adhesive Mt.
6254A-003	Fire Alarm/Power integrity monitoring Relay
CMDN	Alpha-Numeric Annunciator

* = Manufactured by Air Products & Control, Ltd.

Table A2.5 - ULI Compatible Receivers for the DL2 Dialer Module

Model	Manufacturer	Location
685	Alarm Device Manufacturing Co., Div. of Pittway Corp.	Syosset, NY 11791
CP220	Fire Burglary Instruments, Div. of Pittway Corp.	Syosset, NY 11791
Quick Alert II	Osborne - Hoffman Inc.	Point Pleasant Beach, NJ 08742
D6500	Radionics Inc.	Salinas, CA 93912
9000	Silent Knight Security Systems, Div. of Willknight Inc.	Maple Grove, MN 55369

A3.0 ULC Compatibility Listings

Compatible devices listed in this section are for use in **CANADA ONLY**.

Table A3.1 - ULC Panel Compatibility
2-MCM Panel, 2-LCX Loop Expander & Signature Series Devices

Cat. #	Description	Max. # Devices per SIGA Data Ckt.
SIGA-IS	Ionization Smoke Detector	96
SIGA-PS	Photoelectric Smoke Detector	96
SIGA-PHS	Combination Photoelectric Smoke & 135º F (57ºC) Fixed Temperature Detector	96
SIGA-IPHS	Combination Ionization, Photoelectric Smoke, & 135º F (57ºC) Fixed Temperature Detector	96
SIGA-HFS	135º F (57ºC) Fixed Temperature Detector	96
SIGA-HRS	Combination 135º F (57ºC) Fixed Temperature & 15ºF /Minute Rate-of-Rise Heat Detector	96
SIGA-CC1	Single Input Signal Module	94
SIGA-CC2	Dual Input Signal Module	47
SIGA-CT1	Single Input Module	94
SIGA-CT2	Dual Input Module	47
SIGA-MM1	Monitor Module	94
SIGA-WTM	Waterflow/Tamper Module	47
SIGA-CR	Control Relay Module	94
SIGA-UM	Universal Module	47

Table A3.2 - ULC Compatibility - 4-Wire Initiating Devices
Refer to the SIGA-UM Installation Sheet, P/N 387024 for complete information.

Manufacturer	Cat. #	Description
Edwards	6250C	Ionization Smoke Detector with 6251C-003 relay base
Edwards	6270C	Photoelectric Smoke Detector with 6251C-003 relay base
Edwards	6264C-001	Ionization Duct Smoke Detector with 6251C-003 relay base & 6260A-100 housing
Edwards	6266C-001	Photoelectric Duct Smoke Detector with 6251C-003 relay base & 6260A-100 housing

Table A3.3 - ULC Compatible Signaling Appliances

Cat.#	Description
128D-AWC	Mini-Horn, 15 mA.
128D-AWCR	Mini-Horn, 15 mA.
200E-CULC-24	Strobe, Clear
200E-RULC-24	Strobe, Red
200E1-CULC-24	Strobe, Clear
200E1-RULC-24	Strobe, Red
202-7A-001	75cd Strobe, Red
202-7A-101	75cd Strobe, Beige
202-8A-001	120cd Strobe, Red
202-8A-101	120cd Strobe, Beige
333D-4G1	AdaptaBel, Single Stroke Bell, 4"
333D-6G1	AdaptaBel, Single Stroke Bell, 6"
333D-10G1	AdaptaBel, Single Stroke Bell, 10"
339D-G1	Chime, 24VDC, 330 mA
439D-6AWC	6" Vibrating Bell, 24 VDC, Gray
439D-10AWC	10" Vibrating Bell, 24 VDC, Gray
439DEX-6AWC	6" Explosion proof Bell
439DEX-10AWC	10" Explosion proof Bell
5520D-G1	Duotronic Horn/Siren, Diode Polarized
5524D-G1	Explosion proof Duotronic Horn
5525D-G1	Explosion proof Duotronic Siren
5530D-AWC	Adaptatone Electronic Signal

Cat.#	Description
692-7A-003	75cd Strobe/Horn, Red
692-7A-103	75cd Strobe/Horn, Beige
692-8A-003	120cd Strobe/Horn, Red
692-8A-103	120cd Strobe/Horn, Beige
732-7A-006	75cd Strobe/Chime, Red
732-7A-106	75cd Strobe/Chime, Beige
732-8A-006	120cd Strobe/Chime, Red
732-8A-106	120cd Strobe/Chime, Beige
792-7A-006	75cd Strobe/Horn, Red
792-7A-106	75cd Strobe/Horn, Beige
792-8A-006	120cd Strobe/Horn, Red
792-8A-106	120cd Strobe/Horn, Beige
882-2C-001	Electronic Horn, 24VDC, 90 dBA
889D-AWC	Explosion proof Horn
892E-3001	4.7cd Strobe/Horn w/Leads, Red
MBG6-24-R-ULC*	Bell, Motor, 6"
MBG10-24-R-ULC*	Bell, Motor, 10"
MBSG6-24-WHFR-ULC*	3cd Strobe/Bell, Motor, 6"
MBSG10-24-WHFR-ULC*	3cd Strobe/Bell, Motor, 10"

Table A3.4 - ULC Compatible Accessories

Cat. Number	Description
MR-101/C	1-SPDT Relay w/LED
MR-101/T	1-SPDT Relay w/LED
MR-104/C	4-SPDT Relay w/LEDs
MR-104/T	4-SPDT Relay w/LEDs
MR-201/C	1-DPDT Relay w/LED
MR-201/T	1-DPDT Relay w/LED
MR-204/C	4-DPDT Relay w/LEDs
MR-204/T	4-DPDT Relay w/LEDs
PAM-1	1-SPDT w/LED, Adhesive Mt.
CMDN	Alpha-Numeric Annunciator
6254A-003	Fire Alarm/Power integrity monitoring Relay
1598D-1FG1	1 Face English Fire Sign
1598D-F1FG1	1 Face French Fire Sign
1598D-2FG1	2 Face English Fire Sign
1598D-F2FG1	2 Face French Fire Sign
7651-9	Corridor Lamp, Red
7651-AQ	Corridor Lamp, Red

(C) = English/French bilingual version.

Table A3.5 - ULC Compatible Receivers for the DL2 Dialer Module		
Model	**Manufacturer**	**Location**
685	Alarm Device Manufacturing Co., Div. of Pittway Corp.	Syosset, NY 11791
CP220	Fire Burglary Instruments, Div. of Pittway Corp.	Syosset, NY 11791
Quick Alert II	Osborne - Hoffman Inc.	Point Pleasant Beach, NJ 08742
D6500	Radionics Inc.	Salinas, CA 93912
9000	Silent Knight Security Systems, Div. of Willknight Inc.	Maple Grove, MN 55369

A4.0 Battery Calculations

Battery Calculation Worksheets

1. Enter the quantity of each module installed in the "Quantity" column, next to the appropriate module description.
2. For each quantity entry, multiply the value in the "Quantity" column by the value in the "Standby" column, and enter the value in the "Total Standby" column.
3. For each quantity entry, multiply the value in the "Quantity" column by the value in the "Alarm" column, and enter the value in the "Total Alarm" column.
4. Add all values in the "Total Standby" column and put the answer in the Total Standby box "*A*".
5. Add all values in the "Total Alarm" column and put the answer in the Total Alarm box "*B*".
6. Enter the required standby time (hours) in box "*C*", and the total alarm time (minutes) in the alarm time box "*D*".
7. Substitute the values from boxes "*A*" through "*D*" in the battery calculation formula, and calculate the minimum battery capacity.

Description	Quantity		Standby (mA)	Total Standby (mA)	Alarm (mA)	Total Alarm
2-MCM Main Controller Module w/ LCD display & Primary Power Supply	1	x	150	150	275	275
Expander Loop Module		x	20		130	
Front Panel LED Modules		x	5		75	
Front Panel LED/Switch Modules		x	5		75	
RPM Module			20		21	
DL2 Module		x	10		20	
Device current from worksheet on next page						
Smoke power, 4-wire detectors		x				
Smoke power if SIGA-UMs with P-Codes 13, 14, 20, or 21 (2-wire smoke detectors) on *Main Controller* Module Signature Data Circuit.				N/A	34.0	
Smoke power if SIGA-UMs with P-Codes 13, 14, 20, or 21 (2-wire smoke detectors) on *Expander Loop* Module Signature Data Circuit.				N/A	34.0	
Total # SIGA-UMs with P-Codes 13, 14, 20, or 21 (2-wire smoke detectors)		x	2.0		2.0	
Audible Notification Appl. (mA)		x				
Visual Notification Appl. (mA)		x				
			TOTAL	(*A*)		(*B*)
Battery Calculation						
Supervisory Hours	(*C*)					
Alarm Minutes	(*D*)					

$$\text{Battery Capacity (A.H.)} = 1.2 \times \left[\frac{(A \times C) + (0.0167 \times B \times D)}{1000}\right]$$

Minimum battery capacity, 5.0 Amp-Hours.
Maximum battery capacity can NOT exceed 24 Amp-Hours!

EST2 Signature Series Device Battery Calculation Worksheet						
Device Type	**Device Quantity**		**Standby Current (mA)**	**Total Standby**	**Alarm Current (mA)**	**Total Alarm (mA)**
SIGA Series Detectors		X	0.045		0.045	
SIGA Single Stage Pull Stations		X	0.25		0.40	
SIGA Two Stage Pull Stations		X	0.396		0.68	
SIGA-CC1/2		X	0.223		0.10	
SIGA-CR		X	0.10		0.10	
SIGA-CT1		X	0.25		0.40	
SIGA-CT2		X	0.396		0.68	
SIGA-LED		X	0.0		2.0	
SIGA-MM1		X	0.25		0.40	
SIGA-UM, P-Codes 1, 2, 3, or 4		X	0.396		0.68	
SIGA-UM, P-Code 8		X	0.10		0.10	
SIGA-UM, P-Codes 9, 10 ,11, 12, 15, or 16		X	0.223		0.365	
SIGA-UM, P-Codes 13, 14, 20, or 21		X	0.10		0.10	
SIGA-WTM		X	0.396		0.68	
TOTALS (Enter in Battery Calculation Worksheet)						

A5.0 EST2 Wire Distance Calculations

Table A5.1 - Wire Resistance per 1000 ft (305 m) Pair	
Wire Size	**Resistance per 1000 ft (305 m) Pair ($R_{/1000' PAIR}$)**
18 AWG (0.963 mm^2)	13.0 Ω
16 AWG (1.23 mm^2)	8.0 Ω
14 AWG (1.95 mm^2)	5.2 Ω
12 AWG (3.09 mm^2)	3.2 Ω

Signature Data Circuits (SDC)

Table A5.2 shows the maximum wire distance limits under *worst case* (96 detectors & 46 SIGA-UMs configured for 2-wire smoke detectors) conditions, using the wire resistance's from Table A5.1 and a maximum of 0.33µF capacitance at the IDC terminals of the 2-MCM or 2-LCX.

Table A5.2 - Maximum Worst Case Signature Data Circuit Lengths		
18 AWG (0.963 mm^2)	**16 AWG (1.23 mm^2)**	**14 AWG (1.95 mm^2)**
1,738 Ft (530 M) **Cable capacitance must be ≤ 189 pf/Ft (623 pf/M)**	2,825 Ft (861 M) **Cable capacitance must be ≤ 117 pf/Ft (383 pf/M)**	4,346 Ft (1,325 M) **Cable capacitance must be ≤ 76 pf/Ft (249 pf/M)**

The maximum distance may be extended over the values shown in Table A4.2 by performing the required calculations using the exact circuit load and wire parameters for the 2-MCM and the 2-LCX.

To determine the maximum cable length as limited by conductor resistance, use the EST2 Signature Data Circuit Resistance Worksheets:

1. Enter the Signature device quantities on the Signature Data Circuit.
2. Multiply the device quantity by the current draw and enter the result in the Extended Current Draw column.
3. Total all the values in the Extended Current Draw column and put the result in the Grand Total box at the bottom of the Extended Total column.

Main Controller Module Signature Data Circuit Resistance Worksheet					
Device Type	**Quantity**		**Current Draw (mA)**		**Total Current Draw (mA)**
SIGA Series Detectors		X	0.045	=	
SIGA Single Stage Pull Stations		X	0.40	=	
SIGA Two Stage Pull Stations		X	0.68	=	
SIGA-CC1/2		X	0.223	=	
SIGA-CR		X	0.10	=	
SIGA-CT1		X	0.40	=	
SIGA-CT2		X	0.68	=	
SIGA-MM1		X	0.40	=	
SIGA-UM, P-Codes 1, 2, 3, or 4		X	0.68	=	
SIGA-UM, P-Code 8		X	0.20	=	
SIGA-UM, P-Codes 9, 10 ,11, 12, 15, or 16		X	0.465	=	
If SIGA-UMs with P-Codes 13, 14, 20, or 21(2-wire smoke detectors) on Signature Data Circuit.			34.0	=	
SIGA-UM, P-Codes 13, 14, 20, or 21		X	2.0	=	
SIGA-WTM		X	0.78	=	
Grand Total = I_T					

Expander Loop Module Signature Data Circuit Resistance Worksheet					
Device Type	**Quantity**		**Current Draw (mA)**		**Total Current Draw (mA)**
SIGA Series Detectors		X	0.045	=	
SIGA Single Stage Pull Stations		X	0.40	=	
SIGA Two Stage Pull Stations		X	0.68	=	
SIGA-CC1/2		X	0.223	=	
SIGA-CR		X	0.10	=	
SIGA-CT1		X	0.40	=	
SIGA-CT2		X	0.68	=	
SIGA-MM1		X	0.40	=	
SIGA-UM, P-Codes 1, 2, 3, or 4		X	0.68	=	
SIGA-UM, P-Code 8		X	0.20	=	
SIGA-UM, P-Codes 9, 10 ,11, 12, 15, or 16		X	0.465	=	
If SIGA-UMs with P-Codes 13, 14, 20, or 21(2-wire smoke detectors) on Signature Data Circuit.			34.0	=	
SIGA-UM, P-Codes 13, 14, 20, or 21		X	2.0	=	
SIGA-WTM		X	0.78	=	
Grand Total = I_T					

To determine the maximum allowable Signature Data circuit resistance, R_{MAX}

$$R_{Max} = \frac{3.0V}{I_T}$$

Where: I_T = Grand Total of all Signature Device currents

NOTE: I_T includes the current requirements of SIGA-UM modules supporting 2-wire smoke detectors supplied via the "third" conductor, as the Signature Data Circuit is used as the return current path.

Using wire resistance Table A5.1, the maximum allowable length (D) of any listed wire gauge pair may be determined as follows:

$$D_{Max} = \frac{R_{Max}}{R_{/1000'\,PAIR}}$$

Where:

D = Distance in thousands of feet.
R_{Max} = Maximum permissible wire resistance
$R_{/1000'\,PAIR}$ = Wire resistance per 1000' (305 M) pair

The second criteria in determining the maximum cable length is circuit capacitance. This value can not exceed 0.33µF total. To determine maximum cable distance as limited by cable capacitance, use the following formula:

$$L_{Max} = \frac{330{,}000}{C_{pf}}$$

Where: L_{Max} = Maximum Cable Length in feet, as limited by cable capacitance

C_{pf} = Cable capacitance in pico-farads per foot.

The maximum allowable Signature Data Circuit length is the lowest value of D_{Max}, L_{Max}, or 12,000 ft.

24 VDC Notification Appliance Circuits (NAC)

The Notification Appliance Circuits must be a minimum of 18 AWG (0.963 mm^2) pair. Circuit length limits are determined using the maximum allowable circuit resistance and cable manufacturer's specifications.

Table A5.3 shows selected NAC load currents Vs wire sizes. The procedure for calculating the maximum wire length for a given load appears after the table.

Table A5.3 - Load Vs Distance
Notification Appliance Circuit (3.4V drop)

LOAD CURRENT	Maximum Distance to Last Appliance in Feet (Meters)			
	12 AWG (3.09 mm^2)	14 AWG (1.95 mm^2)	16 AWG (1.23 mm^2)	18 AWG (0.963 mm^2)
0.1A	10,625 (3,239)	6,538 (1,993)	4,250 (1296)	2,615 (797)
0.25A	4,250 (1,296)	2,615 (797)	1,700 (518)	1,046 (319)
0.5A	2,125 (648)	1,308 (399)	850 (259)	523 (159)
0.75A	1,406 (429)	865 (264)	563 (172)	346 (105)
1.0A	1,062 (324)	654 (199)	425 (130)	262 (80)
2.0A	531 (162)	327 (100)	213 (65)	131 (40)
3.0A	353 (108)	217 (66)	141 (43)	87 (27)
3.5A	303 (92)	187 (57)	121 (37)	75 (23)

The following restrictions apply when calculating the wire size for 24 VDC Notification Appliance Circuits:

Minimum supply voltage available is 20.4 V.
Minimum required circuit voltage at any notification appliance is 17 V.

Using Ohm's Law, the NAC current requirement (total current of all installed notification appliances) and the allowable voltage drop of 3.4 volts (20.4 - 17); the maximum allowable NAC circuit resistance is determined as follows:

$$R_{Max} = \frac{V_{drop}}{I_{Max}}$$

Where:

R_{Max} = Maximum allowable Notification Appliance Circuit Resistance.

V_{drop} = Maximum allowable voltage drop from power supply to the last Notification Appliance.

I_{Max} = Maximum Notification Appliance Circuit current requirement.

Using this formula, the maximum permissible circuit resistance for a fully loaded (3.5 A) NAC using #14 AWG wire is determined to be 0.97Ω , as follows:

$$0.97\Omega = \frac{3.4V}{3.5A}$$

Using wire resistance Table A5.1, the maximum allowable length (D) of any listed wire gauge pair may be determined as follows:

$$D = \frac{R_{Max}}{R_{/1000'\,PAIR}} X1000$$

Where:

D = Distance in feet.
R_{Max} = Maximum permissible wire resistance
$R_{/1000'\,PAIR}$ = Wire resistance per 1000' (305 m) pair [Table A5.1]

Using this formula, the maximum length of a fully loaded (3.5 A) Notification Appliance Circuit using a pair of #14 AWG wires is:

$$187' = \frac{0.97}{5.2} \times 1000$$

186 feet (57 m) is the maximum length of a fully loaded (3.5 A) Notification Appliance Circuit using a pair of #14 wires. Other loads and wire sizes may be calculated in a similar manner. Table A5.3 lists allow distances for selected current draws and wire sizes.

Measurement Conventions

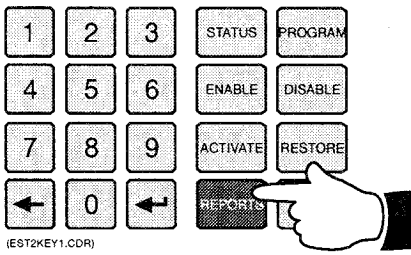
Use the methods shown in Table A5.4 when calculating EST2 system wire lengths.

Table A5.4 - Wiring Measurement Conventions

Signature Data Circuit Configuration	Resistance	Capacitance
Class A (Style D)	Calculate the resistance using the wire length from the *"last device" on the longest of the two paths* to the control panel.	Calculate the capacitance using total length of *all installed wiring.*
Class B (Style A)	Calculate the resistance using the wire length from the *last device on the furthest branch* to the control panel.	Calculate the capacitance using total length of *all installed wiring.*

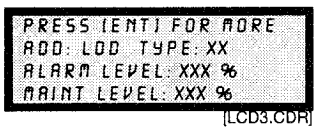
EST2 Detector Sensitivity Testing

The integral EST2 panel sensitivity test feature is listed by ULI and ULC, and is the only approved method of performing a detector sensitivity check. To test the sensitivity of the Signature Series detectors, press the "REPORTS" switch on the front panel.



(EST2KEY1.CDR)

1. Press the REPORTS switch to access the sensitivity function.
2. Press "1" to choose a sensitivity report.
3. Press "2" to send the sensitivity report to the printer. All detectors will be listed in the report.
4. Press "1" to send the report to the LCD display screen. Enter the address of the detector whose sensitivity is to be checked. The sensitivity report will be displayed as shown below. Sensitivity is shown in percent per foot obscuration. Table 1.2 relates the detector sensitivity settings to the nominal obscuration settings.



[LCD3.CDR]

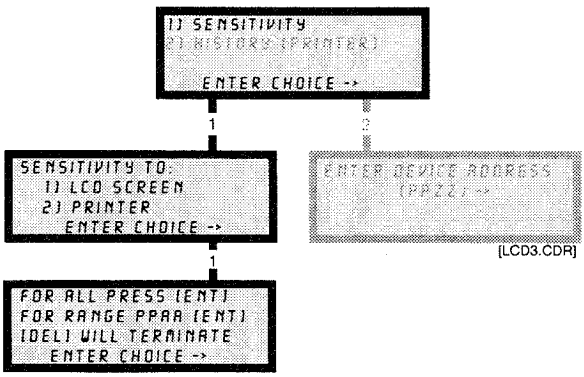
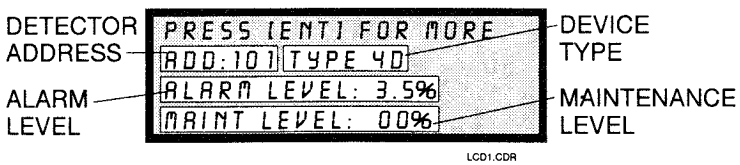


Table 1.2 - Detector Sensitivity Settings			
Sensitivity Level	Description	SIGA-IS % Obscuration per Foot	SIGA-PS, PHS, & IPHS % Obscuration per Foot
1	Most Sensitive	0.7	1.0
2	More Sensitive	1.0	2.0
3	Normal	1.2	2.5
4	Less Sensitive	1.4	3.0
5	Least Sensitive	1.6 (factory preset)	3.5 (factory preset)



LCD1.CDR

Panel Display Sensitivity Report Format

Table 1.3 - Sensitivity Report Device Type Chart	
Device Type Code	Device
4D	SIGA-IPHS: Ionization, Photoelectric, & Thermal
3D	SIGA-PHS: Photoelectric/Thermal
Ph	SIGA-PS: Photoelectric
Ion	SIGA-IS: Ionization

= = = = 4D Panel Sensitivity Report = = = =

Date: 11-03-94
Time: 01:10:15
Panel Address: 01

Alarm thresholds for 4D, 3D Ion, and Photo sensors are printed as a % obscuration per foot.

4D is a combination of Ion, Photo and Heat Detectors
3D is a combination of Photo and Heat Detectors

Current device levels :

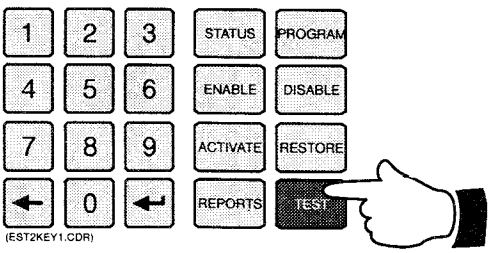
Device Address	Device Type	Alarm Threshold	Maintenance Indicator
01	4D Detector	2.5	21
02	4D Detector	2.5	15
03	4D Detector	2.5	12
04	4D Detector	2.5	34

Panel Test Mode

The panel is incapable of transmitting a signal to the fire department during testing.

The Test function is used to temporarily disable the normal response of the entire system while the panel, detectors, and modules are tested. The response of any device which has been activated or placed in trouble appears on the 2-LCD display and is sent to the printer.

The Test function is set for silent or audible operation by the system designer, using the panel editor. In the audible mode, the Notification Appliance circuits programmed to be activated by the device under test are activated for approximately 2 seconds. There are special "test only" functions which may be programmed by the system installer.



(EST2KEY1.CDR)

The Test function ends when: the test is manually exited or a 30 minute period goes by without a device being tested.

If the installer has customized the function of the test function, refer to the information below and the site specific information furnished with the panel.

EST2
Preventive Maintenance

Before commencing system testing, notify all areas where the alarm sounds (and all off-premise locations that receive alarm and trouble transmissions) that testing is in progress.

- Records of all testing and maintenance shall be kept on the protected premises for a period of at least five (5) years.

- Required Tools:
  - Slotted Screwdriver, Insulated
  - Digital Multimeter
  - 12" (30.5 cm) Jumper Lead with Alligator Clips
  - Panel Door Key
  - Personal Computer & EST2 Configuration Program

- A complete check of installed field wiring and devices should be made at regular intervals, in accordance with NFPA 72 and ULC 524 requirements. This includes testing all alarm and supervisory alarm initiating devices and circuits, and any off-premise connections.

- Panel operation should be verified in the alarm, supervisory, and trouble modes.

- To ensure that the panel can be powered when primary power is lost, the batteries should be periodically inspected, tested, and replaced (as a minimum) every four (4) years.

Refer to the other side of this sheet for a Preventive Maintenance Schedule. The preventive maintenance schedule lists each system component, the interval at which it must be tested, and the test procedure.

INSTALLATION SHEET:

EST2 FIRE ALARM CONTROL PANEL
PREVENTIVE MAINTENANCE

INSTALLATION SHEET P/N: 387133	FILE NAME: 387133.CDR
REVISION LEVEL: 1.0	APPROVED BY: R.W.
DATE: 7/31/95	CREATED BY: R².W./S.J.

A UNIT OF GENERAL SIGNAL

EDWARDS SYSTEMS TECHNOLOGY ESI

EDWARDS SYSTEMS TECHNOLOGY
SARASOTA, FL. 800-655-4497 Fax: 941-753-1806
FARMINGTON, CT. 203-678-0410 Fax: 203-677-1621
OWEN SOUND, CANADA 519-376-2430 Fax: 519-376-7258
INTERNATIONAL: CANADA 905-678-6767 Fax: 905-678-287

EST2 Preventive Maintenance Schedule

System Component	Testing Interval	Testing Procedure
Manual Pull-Stations	Semi-Annually	1. Visually inspect the manual pull-station. 2. Put the zone in TEST mode. 3. Activate the manual pull-station to be tested. 4. Verify proper system response.
Non-Restorable Heat Detectors	Semi-Annually	1. Visually inspect the heat detector. 2. Put the zone in TEST mode. 3. Test the detector mechanically and/or electrically. 4. Verify proper system response.
Restorable Heat Detectors	Semi-Annually	1. Visually inspect the heat detector. 2. Put the zone in TEST mode. 3. Activate at least one (1) detector on each IDC. Within five (5) years, all detectors on each IDC shall be tested.
Smoke Detectors	Annually	1. Visually inspect the smoke detector. 2. Put the zone in TEST mode. 3. Functional test to verify proper system response. 4. Check sensitivity using sensitivity feature. 5. Clean as required.
Waterflow Switches	Two (2) Months	1. Put the zone in TEST mode. 2. Activate the sprinkler test valve. Refer to sprinkler system test procedure. Wait 16 seconds for systems with retard to respond.
Supervisory Signal Initiating Devices	Semi-Annually	1. Put the zone in TEST mode. 2. Operate the valve. 3. Verify proper system response. NOTE: Test pressure, temperature, and water level sensors per the sprinkler system manufacturer's test procedure.
Remote Annunciators	Annually	1. Verify that all indicators are operating properly. 2. Verify annunciator integrity monitoring operating properly.
Signature Data Circuits	Annually	1. Open field wiring. Verify trouble annunciated. If class A, verify Class A circuit operation by activating a device on sides of the break. 2. Short field wiring. Verify trouble annunciated. 3. Ground one side of the dat circuit. The ground fault LED should light activate. Ground the other side of the circuit. The ground fault LED should light activate. 4. Reset and lock panel at conclusion of all testing.
Notification Appliance Circuits (NAC)	Annually	1. Open field wiring. Verify trouble annunciated. If class A, activate circuit (drill) and verify Class A circuit operation 2. Short field wiring. Verify trouble annunciated. 3. Ground one side of the NAC circuit. The ground fault LED should light activate. Ground the other side of the circuit. The ground fault LED should light activate. 4. Reset and lock panel at conclusion of all testing.
Alarm Notification Appliances	Annually	1. Visually inspect. 2. Put panel in alarm, drill, or test mode. Verify all notification appliances operating properly.

EST2 Preventive Maintenance Schedule

System Component	Testing Interval	Testing Procedure
Initialing Device Circuits (IDC)	Annually	1. Put panel in test mode. 2. Open field wiring. Verify trouble annunciated. If Class A, verify Class A circuit operation by activating a device on both sides of the break. 3. Short field wiring. Verify trouble annunciated. 4. Ground one side of the IDC circuit. The ground fault LED should light activate. Ground the other side of the IDC circuit. The ground fault LED should light activate. 5. Reset and lock panel at conclusion of all testing.
Panel LEDs and Trouble Buzzer	Annually	1. Illuminate all LEDs by simultaneously pressing the LOCAL SILENCE and ALARM SILENCE switches. 2. Reset and lock panel at conclusion of all testing.
Panel Primary Power	Acceptance and Re-Acceptance Tests	1. Remove primary AC power. 2. Verify that the panel operates from the battery. 3. Verify the panel goes into Trouble (6 second delay). 4. Restore AC power at the end of the test. 5. Reset and lock panel at conclusion of all testing.
Panel Secondary Power	Acceptance and Re-Acceptance Tests	1. Remove primary AC power. 2. Measure standby and alarm currents. Compare with battery calculations to verify adequate battery capacity. 3. Test under full load for five (5) minutes. 4. Measure battery voltage under full load (20.4 to 27.3 VDC). 5. Restore AC power at end of test. 6. Reset and lock panel at conclusion of all testing.
Panel Trouble Signals	Annually	1. Verify that the system Trouble LED and Trouble buzzer. 2. Reset and lock panel at conclusion of all testing.
Auxillary System Off-Premise Fire Alarm Signal Transmission	Monthly	1. Coordinate the test with the receiving location. 2. Verify receipt of all transmitted signals. 3. Reset and lock panel at conclusion of all testing. DL2 Module: 1. Verify dialer is connected to two separate phone lines. 2. Verify that failure of the primary signal path (phone line connected to J1) results in a truoble signal being transmitted via the secondary signal path (phone line connected to J2) within 4 minutes. 3. Verify that failure of the secondary signal path (phone line connected to J2) results in a trouble signal being transmitted via the primary signal path (phone line connected to J1) within 4 minutes.
Remote System Off-Premise Waterflow Signal Transmission	Two (2) Months	

GLOSSARY OF TERMS

A Device/Zone - An Alarm device/zone.

Action - A list of outputs to be activated or functions to be performed by the system as a result of an activation of an input, time control, sequence, etc. The entire list of outputs or functions (action) may be activated by any input activation. An action may also be referred to as a task made up of multiple output functions.

Activate - To turn on or energize. Outputs may be activated.

Address - A numbering system used to uniquely identify a device, output, panel, etc.

COMPLETE ADDRESS = PPZZ

PANEL ADDRESS PP		ZZ DEVICE ADDRESS
PRIMARY POWER SUPPLY	00	01-14 = SYSTEM FAULTS 15-19 = MAIN CONTROLLER MODULE FAULTS 20-24 = EXPANDER LOOP MODULE FAULTS
2-MCM	01	01-96 = DETECTORS
	02	01 & 02 = NACS, 03-96 = MODULES
2-LCX	03	01-96 = DETECTORS
	04	01 & 02 = NACS, 03-96 = MODULES
LED/ SWITCH MODULES	05	01 - 16 = 1ST LED/SWITCH MODULE (Switches 0501 to 0508) 17 - 32 = 2ND LED/SWITCH MODULE (Switches 0509 to 0516) 33 - 48 = 3RD LED/SWITCH MODULE (Switches 0517 to 0524)

[ADDFORMT.CDR]

Alarm - A condition or state of a Fire Alarm Initiating Device Circuit (IDC) caused when the effective internal resistance of an initiating device is approaching 0Ω.

Alarm Circuit - An input zone that reports a fire alarm condition when activated.

Alarm Silence/Reset Inhibit Timer - A panel option which prevents silencing Notification Appliance Circuits (NACs) or resetting the panel for a programmed period after the last alarm.

Alarm Silence Timer - A panel option which automatically silences the Notification Appliance Circuits (NACs) after a pre-programmed time limit after the last alarm.

AND Statement - A system input that will activate when ALL the input conditions as indicated in its AND statement list, are active.

Audible Circuit - A Notification Appliance Circuit that is turned OFF when the Alarm Silence switch is activated.

Byte - An 8-bit digital word.

Change of State - An input zone or device that has changed from a restored to an active condition or from the active condition back to the restored condition.

Class A NAC - An circuit connected directly to notification appliances, which signals a trouble condition upon an open or shorted condition on the circuit. All appliances wired on the circuit to continue to operate in the event of a single open. Similar to Style Z integrity monitoring.

Class A IDC - An circuit connected directly to initiating devices, which signals a trouble condition upon an open condition on the circuit. All devices wired on the circuit to continue to operate in the event of a single open. Similar to Style D & E integrity monitoring.

Class B NAC- An circuit connected directly to notification appliances, which signals a trouble condition upon an open or shorted condition on the circuit. All appliances wired on the circuit to continue to operate up to the location of a break. Similar to Styles W, X, & Y integrity monitoring.

Class B IDC - An circuit connected directly to initiating devices, which signals a trouble condition upon an open condition on the circuit. All devices wired on the circuit to continue to operate up to the location of a break. Similar to Styles A, B, C, & D integrity monitoring

Coder - A device that provides interruption of power to audible devices at a predetermined rate or sequence.

Compile - Assembling data entered during the data entry phase of programming into a format used by the fire alarm control panel.

Controller Module - Electronic components in the fire alarm control panel supporting Signature devices i.e. 2-MCM Main Controller Module and the 2-LCX Loop Expander Module

DACT- Digital Alarm Communicator Transmitter. A system component which transmits digital alarm, supervisory, and troublesignals to a Central Monitoring Station (CMS) over dial-up telephone lines.

Database - User-defined, permanently stored system parameters containing system zone definitions, device types, responses, messages, etc.

Device - Any Signature Series detector or module.

Device Address - A number which uniquely identifies a detector or module on a Signature data circuit.

Dialer- See DACT.

Disable - Prevent an input, output, or system feature from functioning

DOS Shell - A mode of operation that allows you to temporarily exit your current application in the PC computer to perform a DOS command, and then return to your previous application without any loss of data.

Download - Sending the compiled database from your PC to the fire alarm control panel.
EEPROM - Electrically Erasable Programmable Read-Only Memory. Non-volatile memory containing the system database.

Enable - Permit an input, output, or system feature to function.

EPROM - Erasable Programmable Read-Only Memory. Non-volatile memory containing the operating system. EPROM is erasable only by ultra-violet light.

External Command Port - An RS-232 connection which permits the EST2 to be connected to a remotely located control system such as the Color Graphics Package (CGP) or the Computerized Color Annunciator (CCA).

FasTest - A method of input zone or device testing that allows one (1) person to place an input device in the alarm condition and have that device report its activation without generating a building fire alarm.

Initiating Device Circuit - (IDC) An input circuit connected directly to any manual or automatic initiating device, whose normal operation results in an alarm or supervisory signal indication at the control panel. The electrical integrity of the circuit is monitored by the fire alarm system.

Input - A signal generated by a field device and sent to the control panel for evaluation and responses as determined by the system database. Inputs to the system are detectors, modules, and switches.

Listing - A readout of all system configuration data contained within the panel.

Logic Functions - AND and OR statements.

M Device/Zone - A Monitor device/zone

March Time - A 50% duty cycle, 120 beats per minute signal pattern.

Matrix - A correlation sheet that indicates the relationship between the activation of an input and the effect it will have upon all system outputs.

Non-Silenceable - A notification Appliance Circuit (NAC) which remains active after initiating, independent of the panel's alarm silence features. Non-silenceable NACs are typically used for visual devices.

Notification Appliance Circuit (NAC) A circuit connected directly to notification appliances. The electrical integrity of the circuit is monitored by the fire alarm system.

Output - A signal generated by the system, based upon responses defined in the system database, and sent to external field devices. Outputs are LEDs, and modules

Output Priority - A system of hierarchy that allows or prevents setting or resetting outputs. Output priorities range from 00 to 99.

P Code - See Personality Code

Panel - A unit of system addressing comprising 96 inputs and 94 outputs.

Personality Code- A numeric code number used to set the configuration and operation of a SIGA module. A personality code is either factory installed or must be downloaded into SIGA modules for proper operation.

Polling Address - A panel address that is polled by the control panel.

Power Limited - Wiring and equipment which conforms with, and is installed to, the *National Electrical Code®*, Article 760, power limited provisions.

Pseudo Point - An input or output point generated in or by the system that is not a physical device.

PSNI - Positive, Successive, Non-Interfering code.

RAM - Random Access Memory. Volatile memory containing the system on-line or active status.

Reset - An active condition or command used to force an output to its OFF condition. An output's OFF state may be in the restored condition (normal condition, not under the influence of a response) or the reset condition. An output reset state contains a priority level.

Retard - The delay of water flow signals to prevent false alarms due to fluctuations in water pressure.

Response - A list of outputs or functions that occur as a result of the change of state of an input.

Restore - Refers to a condition of an input, where the input is not active. It also refers to the condition of an output where the output is not in its SET or RESET condition and does not have a priority value associated with it.

Riser - An electrical path that contains power or signal that is used by multiple outputs, zones, or circuits.

RS-232 - A serial communications format normally used for serial peripheral devices (i.e., printers) from a computer. RS-232 cables have a maximum length of 50 ft.

RS-485 - A serial differential communications format used to communicate between the panel and some remote annunciators.

S Device/Zone - Supervisory device/zone.

SAN - Serial Annunciator.

Sensitivity - The relative % obscuration of a detector.

Sequence - A series of actions separated by time delays.

SIGA - An abbreviation for SIGnAture.

Signature Data Circuit - The wiring which connects Signature Series devices to the fire alarm panel

Silenceable - Notification Appliance Circuits which follow the action of the panel's alarm silence features, Silenceable NACs are used for audible devices only.

SPM - Abbreviation for Strokes Per Minute.

Start Action - An action that is activated upon power-up of the panel and remains active until manually reset.

Start Sequence - A sequence that is begun upon power up of the panel.

Supervisory Circuit - An IDC input circuit used to monitor the status of critical fire protection equipment, i.e. sprinkler valves, etc.

Supervisory Open (Trouble) - Condition generated when a supervisory zone is open, ground fault, or when a Signature Series device is not responding to a poll.

Supervisory Short - Condition generated when a supervisory zone or device is shorted.

Temporal Pattern- A universal "3 pulse" evacuation signal meeting the requirements of NFPA Standard 72, section A-2-4.10(a) and ULC 527.

Time Control - An input activated by the time of day or day of the month.

Verification Alarm - Upon receipt of an alarm by a smoke detector, verified detectors attempt to automatically reset. Receipt of a second alarm within the 60 second confirmation period after the automatic detector reset period is indicative of a verified alarm.

Waterflow Device - Devices/zones defined as waterflow devices are not permitted to silence their notification appliances while the alarm is active.

Zone - A grouping of Signature series detectors and modules which has a unique zone number and acts as a single entity for programming purposes, whenever any component of the zone is activated.