



## Photoelectric Smoke Detectors

System Sensor *i*<sup>3</sup> series smoke detectors represent significant advancement in conventional detection. The *i*<sup>3</sup> family is founded on three principles: installation ease, intelligence, and instant inspection.



### Features

- Plug-in detector line, mounting base included
- Large wire entry port
- In-line terminals with SEMS screws
- Mounts to octagonal and single-gang back boxes, 4-square back boxes, or direct to ceiling
- Stop-Drop 'N Lock attachment to base
- Removable detector cover and chamber
- Built-in remote maintenance signaling
- Drift compensation and smoothing algorithms
- Simplified sensitivity measurement
- Wide-angle, dual-color LED indication
- Loop testing via EZ Walk feature
- Built-in test switch

**Installation ease.** The *i*<sup>3</sup> line redefines installation ease with its plug-in design. This allows an installer to pre-wire bases (included with heads). The large wire entry port and in-line terminals provide ample room for neatly routing the wiring inside the base. The base accommodates a variety of back box mounting methods as well as direct mounting with drywall anchors. To complete the installation, *i*<sup>3</sup> heads plug into the base with a simple Stop-Drop 'N Lock™ action.

**Intelligence.** *i*<sup>3</sup> detectors offer a number of intelligent features to simplify testing and maintenance. Drift compensation and smoothing algorithms are standard with the *i*<sup>3</sup> line to minimize nuisance alarms. 2-wire *i*<sup>3</sup> detectors can generate a remote LED-indicated maintenance signal when connected to the 2W-MOD2 loop test/maintenance module or a panel equipped with the *i*<sup>3</sup> protocol. The SENS-RDR, a wireless device, displays the sensitivity of *i*<sup>3</sup> detectors in terms of percent-per-foot obscuration.

**Instant inspection.** The *i*<sup>3</sup> series provides wide-angle red and green LED indicators for instant inspection of the detector's condition: normal standby, out-of-sensitivity, alarm, or freeze trouble. When connected to the 2W-MOD2 loop test/maintenance module or a panel with the *i*<sup>3</sup> protocol, the EZ Walk loop test feature is available on 2-wire *i*<sup>3</sup> detectors. This feature verifies the initiating loop wiring by providing LED status indication at each detector.

### Agency Listings



# Smoke Detector Specifications

## Architectural/Engineering Specifications

Smoke detector shall be a System Sensor i<sup>3</sup> Series model number \_\_\_\_\_, listed to Underwriters Laboratories UL 268 for Fire Protection Signaling Systems. The detector shall be a photoelectric type (Model 2W-B, 4W-B) or a combination photoelectric/thermal (Model 2WT-B, 4WT-B) with thermal sensor rated at 135°F (57.2°C). The detector shall include a mounting base for mounting to 3½-inch and 4-inch octagonal, single-gang, and 4-inch square back boxes with a plaster ring, or direct mount to the ceiling using drywall anchors. Wiring connections shall be made by means of SEMS screws. The detector shall allow pre-wiring of the base and the head shall be a plug-in type. The detector shall have a nominal sensitivity of 2.5 percent-per-foot nominal as measured in the UL smoke box. The detector shall be capable of automatically adjusting its sensitivity by means of drift compensation and smoothing algorithms. The detector shall provide dual-color LED indication that blinks to indicate power up, normal standby, out of sensitivity, alarm, and freeze trouble (Model 2WT-B, 4WT-B) conditions. When used in conjunction with the 2W-MOD2 module, 2-wire models shall include a maintenance signal to indicate the need for maintenance at the alarm control panel and shall provide a loop testing capability to verify the circuit without testing each detector individually.

## Electrical Specifications

<b>Operating Voltage</b>	Nominal: 12/24 V non-polarized Minimum: 8.5 V Maximum: 35 V
<b>Maximum Ripple Voltage</b>	30% peak to peak of applied voltage
<b>Standby Current</b>	2-wire: 50 µA maximum average; 4-wire: 50 µA maximum average
<b>Maximum Alarm Current</b>	2-wire: 130 mA limited by control panel; 4-wire: 20 mA @ 12 V, 23 mA @ 24 V
<b>Peak Standby Current</b>	2-wire: 100 µA; 4-wire: n/a
<b>Alarm Contact Ratings</b>	2-wire: n/a; 4-wire: 0.5 A @ 30 V AC/DC

## Physical Specifications

<b>Dimensions (including base)</b>	5.3 inches (127 mm) diameter; 2.0 inches (51 mm) height
<b>Weight</b>	6.3 oz (178 g)
<b>Operating Temperature Range</b>	2W-B and 4W-B: 32°F to 120°F (0°C to 49°C); 2WT-B and 4WT-B: 32°F to 100°F (0°C to 37.8°C)
<b>Operating Humidity Range</b>	0 to 95% RH non-condensing
<b>Thermal Sensor</b>	135°F (57.2°C) fixed
<b>Freeze Trouble</b>	2WT-B and 4WT-B only: 41°F (5°C)
<b>Sensitivity</b>	2.5%/ft nominal
<b>Input Terminals</b>	14 to 22 AWG
<b>Mounting</b>	3½-inch octagonal back box 4-inch octagonal back box Single-gang back box 4-inch square back box with a plaster ring Direct mount to ceiling

LED Modes			Power-Up Sequence for LED Indication	
LED Mode	Green LED	Red LED	Condition	Duration
Power up	Blink every 10 seconds	Blink every 10 seconds	Initial LED status indication	80 seconds
Normal (standby)	Blink every 5 seconds	off		
Out of sensitivity	off	Blink every 5 seconds		
Freeze trouble	off	Blink every 10 seconds		
Alarm	off	Solid		

## Ordering Information

Model	Thermal	Wiring	Alarm Current
2W-B	No	2-wire	130 mA max. limited by control panel
2WT-B	Yes	2-wire	130 mA max. limited by control panel
4W-B	No	4-wire	20 mA @ 12 V, 23 mA @ 24 V
4WT-B	Yes	4-wire	20 mA @ 12 V, 23 mA @ 24 V

## Accessories

2W-MOD2	2-wire loop test / maintenance module	RT	Removal / replacement tool
SENS-RDR	Sensitivity reader	A77-AB2	Retrofit adapter bracket, 6.6 inch (16.76 cm) diameter



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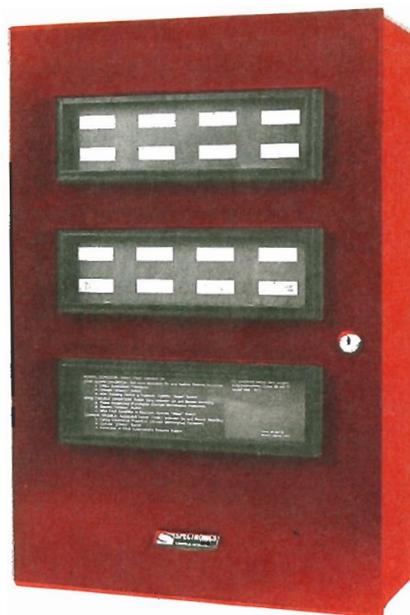


**SPECALARM**  
SYSTEMS-BY SPECTRONICS



# MODEL 640 SERIES

**FIRE ALARM  
CONTROL PANEL**



# INSTALLATION INSTRUCTION MANUAL

**SPECTRONICS CORPORATION**

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Phone (402) 467-3651

# 640 SYSTEM CONTROL UNIT INSTRUCTION MANUAL

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## GENERAL

The 640 Series is a multiple Circuit Modular non-coded Fire Alarm Control Panel operating at 24 volts DC. Applications of the 640 include systems requiring a Multiple Function Control Panel that complies with NFPA-72A for a local protective signaling system, NFPA-72B for an auxiliary protective signaling system, NFPA-72C for a remote station protected premise signaling system, or NFPA-72C for a remote station receiving Fire Alarm Control unit.

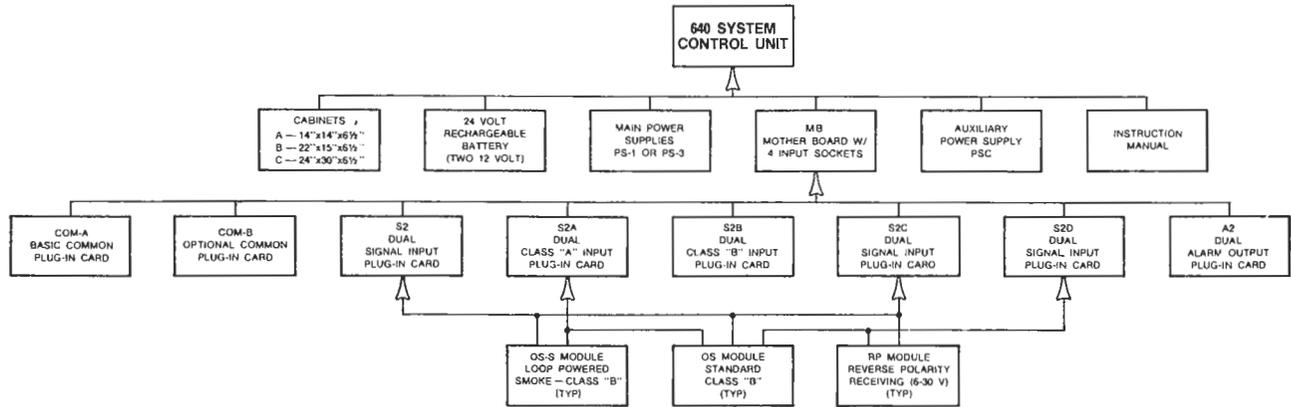
The 640 Series is available in three cabinet configurations--640 A, 640 B and 640 C. 640 A will accommodate up to six initiating circuits plus basic Common equipment; 640 B will accommodate up to fourteen initiating circuits plus basic Common equipment, and the 640 C will accommodate up to forty-six initiating circuits plus basic Common. In addition to the above capacities, all cabinets include a power supply/battery charger and space for sealed rechargeable batteries.

The 640 Series is compatible with PID Ionization detectors and two wire bases, the 3040RC series smoke detectors, manual fire alarm stations, automatic heat detectors, waterflow detectors, sprinkler supervisory initiating devices plus vibrating type alarm bells, alarm horns and strobe horns.

## 640 SERIES FEATURES

- Three cabinet configurations allow the control unit to be tailored to required application.
- Circuit and common identification may be chosen from individual engraved back lit windows or back lit screen and frame assembly for each group of eight.
- Power Supply/Battery Charger provides regulated voltage to system and emergency batteries.
- Auxiliary Power Supply provides additional power for system having unusually heavy external loads.
- Solid State Circuits allow for compact multi-function plug-in cards.
- Modular concept provides adaptability for various functions and system expansion.
- Two through Forty-six supervised initiating circuit capacity in increments of two.
- Class "A" and Class "B" initiating circuits plus reverse polarity receiving circuits.
- Two wire loop powered smoke detector circuits.
- Supervision of Remote Annunciator Alarm Lamps and field wiring.
- Individual trouble and alarm indicating lamps per circuit.
- Input circuit alarm signals lock to the reset switch for fire alarm and waterflow.
- Input circuit trouble and alarm are non-locking for sprinkler supervisory and local burglar alarm receiving.
- System provides for resounding feature on subsequent alarms and troubles.
- Polarized alarm output circuits are supervised for both open or shorted field wiring.
- Re-signal of reverse polarity alarm transmitter on subsequent alarm.
- Cross-zoning feature for alarm outputs.
- Lamp Test/Lamp Fail indicator circuits.
- Automatic ground detection circuit.
- Flashing of all trouble and alarm lamps until silenced.

# DESCRIPTION OF MAJOR SUB-ASSEMBLIES AND PLUG-IN CARDS



Equipment Block Diagram

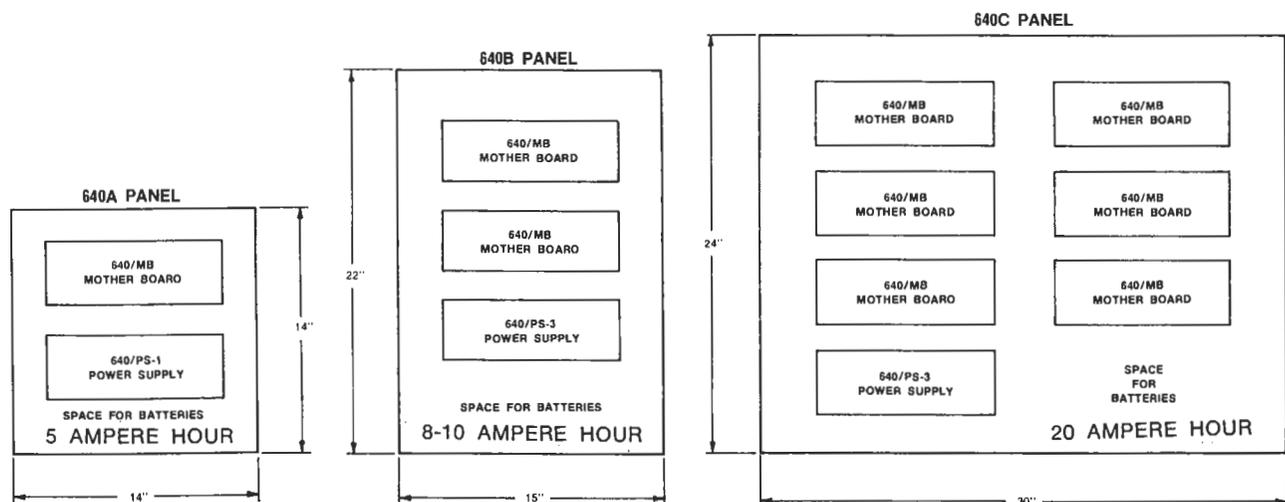
## CABINET ARRANGEMENTS

The 640 is offered in three surface mount cabinet sizes: (640A) 14 x 14 x 6.5, (640B) 22 x 15 x 6.5, (640C) 24 x 30 x 6.5.

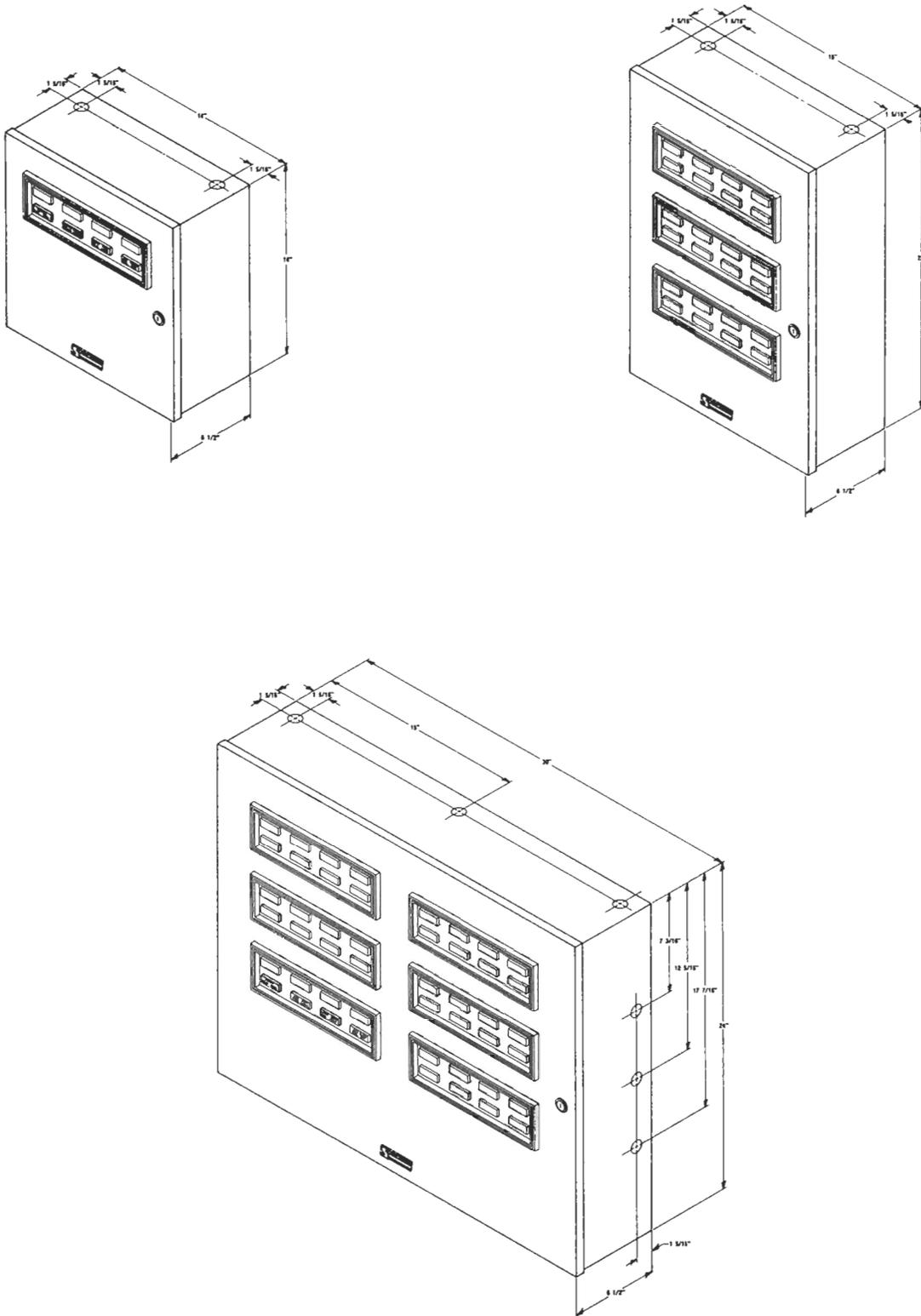
The 640 A Panel includes one four position mother board (MB) and either a 1.5 amp capacity (640/PS-1) or a 3.0 amp capacity (640/PS-3) power supply.

The 640 B Panel includes one four position mother board (MB) and one 640/PS-3 Power Supply. Space and hardware is provided for addition of a second MB mother board.

The 640 C Panel is equipped identical as 640 B, except space and hardware is provided for five (5) additional MB mother boards or four (4) MB mother boards and one (1) 640/PSC Auxiliary Power Supply.



Knockouts are provided in all cabinets for one-half inch conduit entry. The 640 A and 640 B cabinets have two knockouts on each the top and bottom. The 640 C cabinet has three knockouts on each of the sides, top and bottom.



## POWER SUPPLIES

There are three power supplies in the 640 Series of which two are main supplies and the third is for auxiliary applications. All have 120 VAC 60 HZ inputs and 24 volt D.C. outputs. The two main power supplies are Models 640/PS-1 and 640/PS-3. The auxiliary power supply is Model 640/PSC.

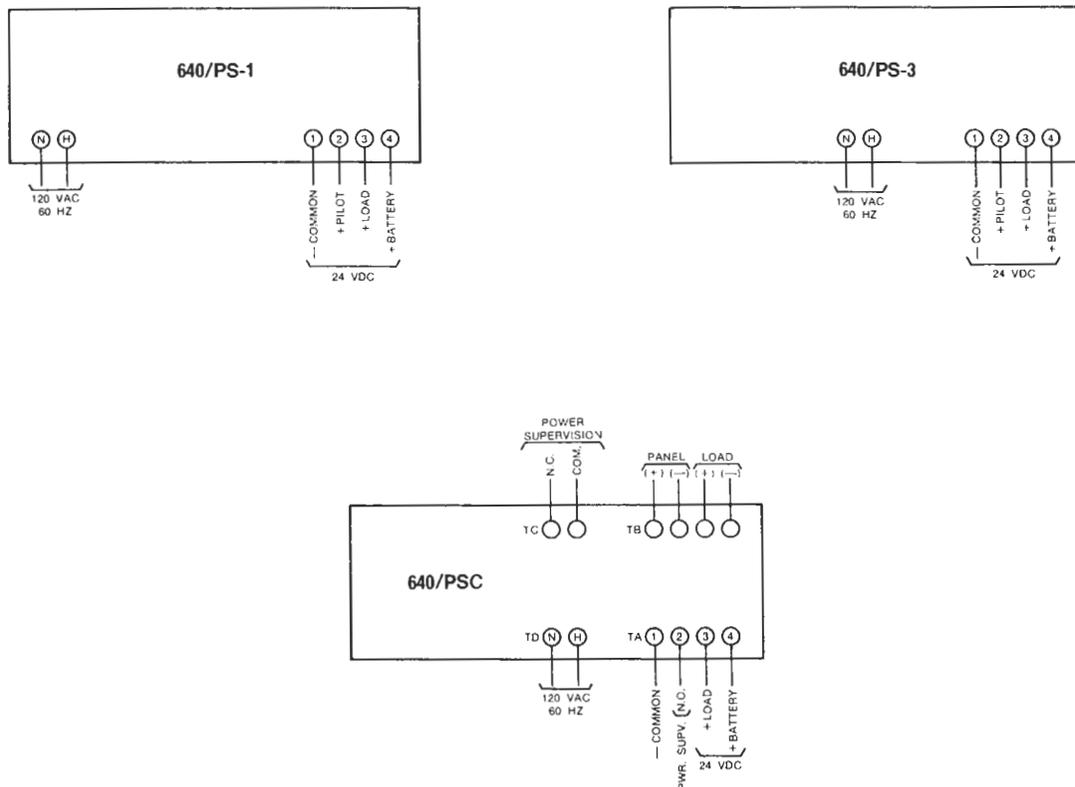
The 640/PS-1 is for use in systems having a limited power requirement of 1.5 Amps continuous--3.0 Amps surge. The 640/PS-3 is for use in systems having larger power requirements of 3.0 Amps continuous--5.0 Amps surge. Both the 640/PS-1 and 640/PS-3 are regulated supplies which operate the system plus maintain the emergency rechargeable batteries on a float charge.

Momentary surges of load current, in excess of power supply rating, are supplied by the floating emergency batteries. A circuit in the 640/PS-1 and 640/PS-3 supplies monitors the battery connection. Should a battery be disconnected, the pilot output will be turned off and indicate power failure.

The 640/PSC auxiliary supply (will not power panel circuits) delivers full wave rectified 24 volts at 3 amps and includes a power transfer relay which automatically changes over to emergency battery, extinguishes internal pilot indicator and operates terminal connected SPDT pilot contacts upon failure of the commercial power input. These pilot contacts are interconnected into the 640 to indicate power failure. A control relay is also included which is wired to accommodate either a non-supervised or a polarized supervision type alarm or auxiliary circuit. A 24 VFW--3 amp output is energized when there is an alarm input.

The auxiliary supply is intended for use when the external load exceeds the capacity of the main supply and is used in conjunction with a polarized alarm output circuit of COM-A, COM-B or A2 plug-in cards.

### TERMINAL CONNECTIONS



### Electrical Specifications

	640/PS-1	640/PS-3	640/PSC-3
Input	120 VAC, 60HZ @1.0 Amp Max.	120 VAC, 60HZ @1.5 Amp Max.	120 VAC, 60HZ @1.5 Amp Max.
Transformer Rating	50 V.A.	100 V.A.	100 V.A.
Rated Power Output	1.5 A @ 24VDC	3.0 A @ 24VDC	3.0 A @ 24VFW
D.C. Output Fuse	3 A	5 A	8 A
Battery AH Capacity	5.0 thru 20.0 A.H.	5.0 thru 20.0 A.H.	N/A
Battery Charge Current	20-100mA Normal Float	20-100mA Normal Float	N/A
Max. Ripple	.16%	.3%	.3%

#### BATTERY CAPACITIES

Battery Ampere-Hour Rating	Up to 1.0A Alarm Current for 5 Min at End of 24 hours	Up to 2.0 A Alarm Current for 5 Min at End of 24 Hours	
	24 Hours Maximum Standby Current	24 Hours Maximum Standby Current	60 Hours Maximum Standby Current
5.0 AH	190mA	173mA	86mA
8.0 AH	305mA	278mA	133mA
20.0 AH	764mA	695mA	366mA

A fully charged battery of specified AH (Ampere-hour) capacity will operate a system under standby conditions for the stated period when the current requirement does not exceed the values shown.

When selecting battery capacity for a given system, it first must be determined whether the system is to operate for 24 hours (NFPA-74A) or 60 hours (NFPA-72B and NFPA-72C). Next, it is necessary to determine the overall system load during power fail condition which includes all plug-in cards and mother boards within the central panel plus any field devices which normally consume power such as smoke detectors or D.C. voltage electro-magnetic door holder/releases.

#### STANDBY POWER REQUIREMENTS

640/MB Mother Board with Plug-in Card Supervision .....	10.5mA
640/COM-A Basic Common Plug-in Card, Non-silenced .....	20mA
Silenced.....	56mA
640/COM-B Optional Common Plug-in Card .....	26mA
640/S2 or S2C Dual Input Circuit Plug-in Card:	
with 640/OS Modules .....	11.5mA
with 640/OS-S Modules ...	17.5mA
with 640/RP Modules .....	11.0mA
640/S2A Dual Input Circuit Plug-in Card:	
with 640/OS Modules .....	11.5mA
with 640/OS-S Modules ...	17.5mA
640/S2B Dual Input Circuit Plug-in Card .....	11.5mA
640/A2 Dual Alarm Output Plug-in Card .....	4mA
PID-C/HAL 22 Ionization Detector and Base .....	.024mA
3040 RC-24 Photoelectric Smoke Detector .....	5mA
2040-24 End of Line Power Supervisory Relay .....	25mA

## 640/MB MOTHER BOARD ASSEMBLY

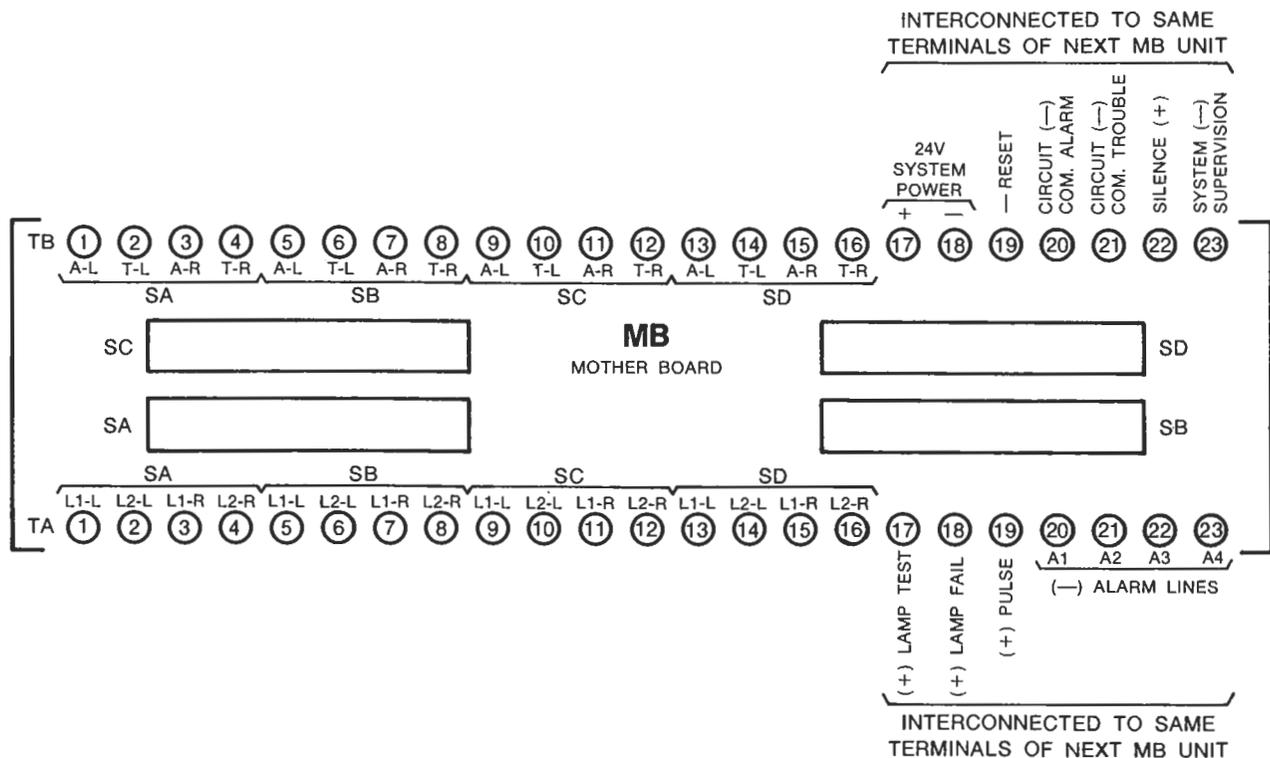
The primary module of the 640 Series Panel is the 640/MB Mother Board which has two 23 point terminal strips and four sockets in which plug-in cards are installed.

The terminal strips provide for termination of external circuit wiring (Eight terminal points for each socket) as well as interconnections between mother boards.

The four sockets accept the various 640 system plug-in cards. Any plug-in card may be located in any socket with external circuit wiring being the determining factor, however, factory interconnections will locate the 640/COM-A in lower left position (socket SA) and the optional 640/COM-B in lower right position (socket SB).

640/MB Mother Boards, for adding capacity to basic panels, are supplied with an interconnect cable harness.

The 640/MB has provision for plug-in card supervision which cause a continuous sounding of the buzzer on 640/COM-A whenever any other plug-in card is removed.



## FIELD CONNECTIONS

Refer to plug-in card data sheets and field wiring diagrams for details.

<b>Socket</b>	<b>Associated Terminals</b>
SA	TA 1, 2, 3 & 4 and TB 1, 2, 3 & 4
SB	TA 5, 6, 7 & 8 and TB 5, 6, 7 & 8
SC	TA 9, 10, 11 & 12 and TB 9, 10, 11 & 12
SD	TA 13, 14, 15 & 16 and TB 13, 14, 15 & 16

Designations L1L, L2L, L1R and L2R may be interchanged for a terminal group on TA; i.e., TA5 may be represented as L1L which indicates Line one of the left circuit. L and R suffixes represent left circuit and right circuit of a dual input or output plug-in card.

Designations AL, TL, AR and TR may be interchanged for a terminal group on TB in a fashion similar to the above. The A and T designation represent remote annunciator alarm and trouble outputs from a dual input circuit plug with the exception of the S2A which uses these terminals for the return loop of the Class A field wiring.

### **PROGRAMMING**

Plug-in card supervision is activated by removing the jumper(s) adjacent to a socket. Once a jumper is removed, a plug-in card must be installed to silence the trouble buzzer of 640/COM-A. Jumpers are removed by simply bending the wire back and forth until it breaks from mother board. Repeat procedure on other end and completely remove jumper from panel.

### **ELECTRICAL RATING**

Power requirements @ 24 VDC

Under all conditions with either jumpers in place or plug-in cards installed, each 640/MB consumes 10.5 mA.

## 640/COM-A BASIC COMMON PLUG-IN CARD

The COM-A plug-in card assembly includes the basic common and control functions for the 640 System Control Unit. One is required in each system.

### Visual Indicators:

1. Power Pilot
2. Power Trouble
3. Audible Circuit Trouble
4. Audible Alarm Output

### Control Switches:

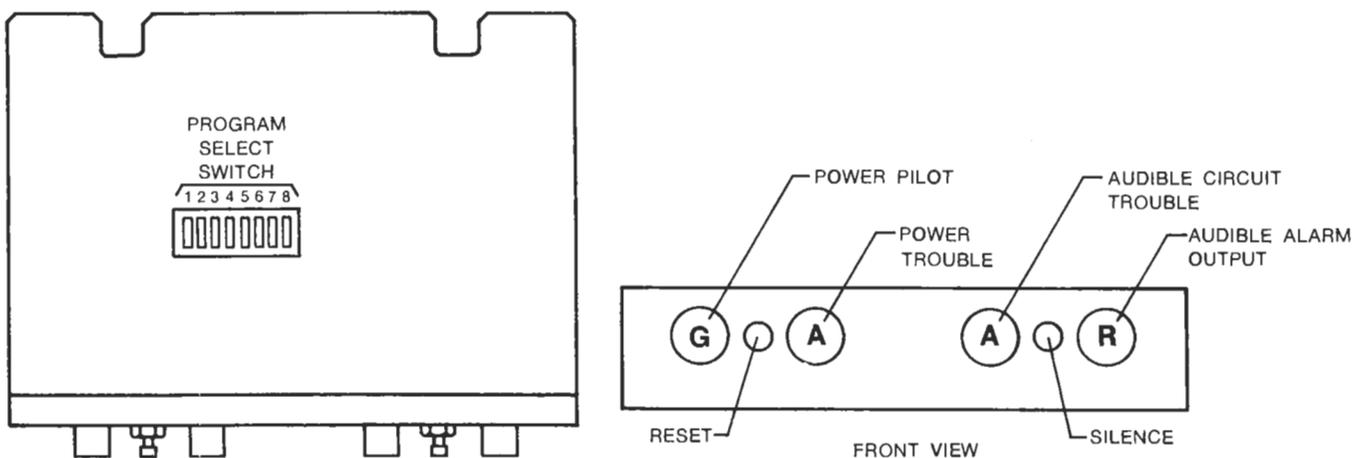
1. Reset (Momentary)
2. Silence (Momentary)

### Audible Indicator:

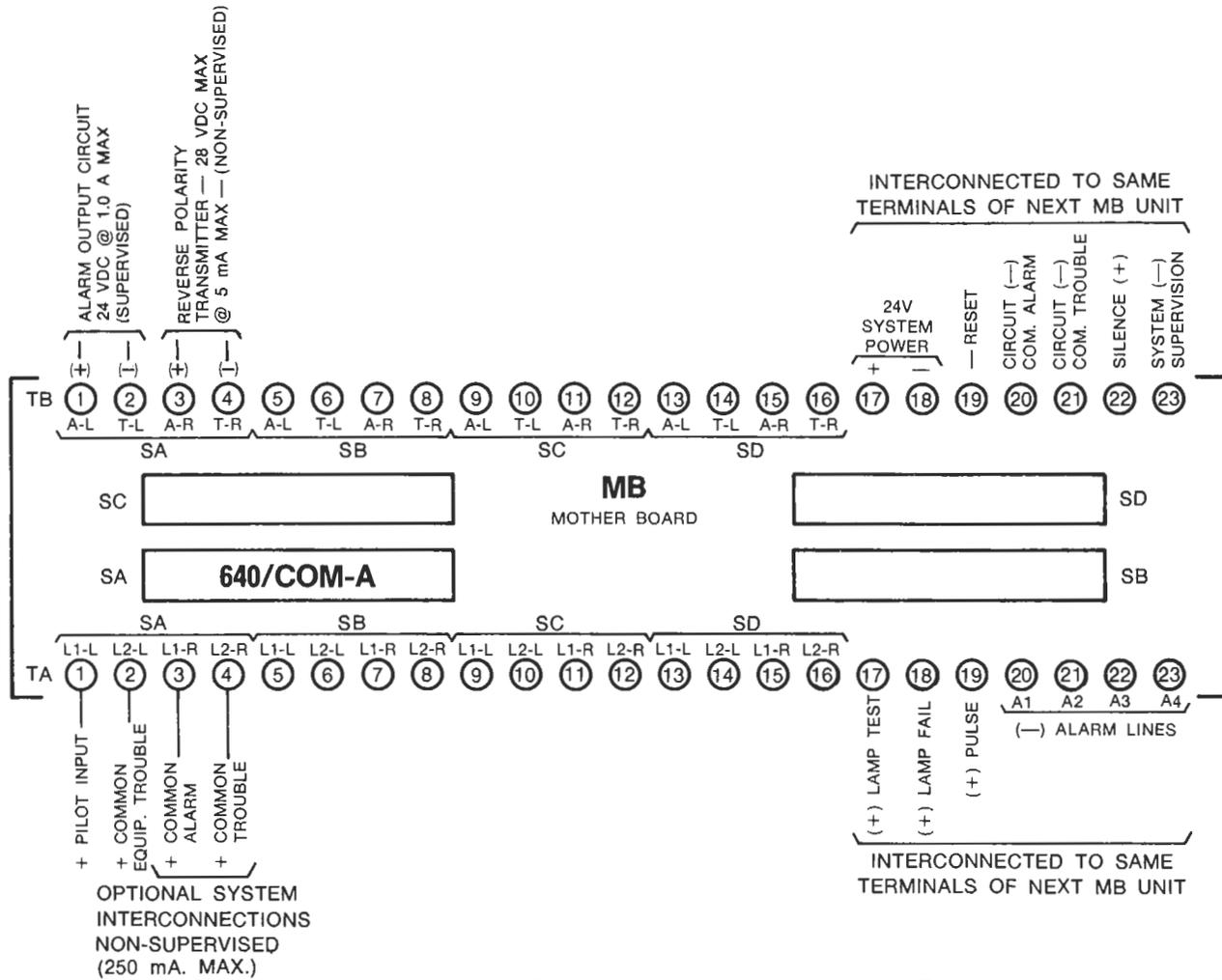
Built-in trouble buzzer with resound feature.

### Operating Functions:

1. Power Supervision
  - a. Commercial AC Input
  - b. Power Supply Circuit & Fuses
  - c. Battery Connection
2. Silence
  - a. System Trouble
  - b. COM-A Alarm Output
3. System Reset
4. Audible Alarm Output Circuit, Polarized Supervision
  - a. Supervised for both opens and shorts--disables output on fault condition.
  - b. Programmable for Non-Silence Operation, selectable for any or all circuits with waterflow applications.
  - c. Capability of resounding the audible alarm for each new incoming alarm signal or being maintained until reset for waterflow applications.
5. Remote Station Transmitter, Reverse Polarity
  - a. Trouble Signal Transmission removes normal signal.
  - b. Alarm Signal Transmission has priority over trouble.
  - c. Capability of retransmitting an alarm on subsequent incoming alarm signals or being maintained until reset.

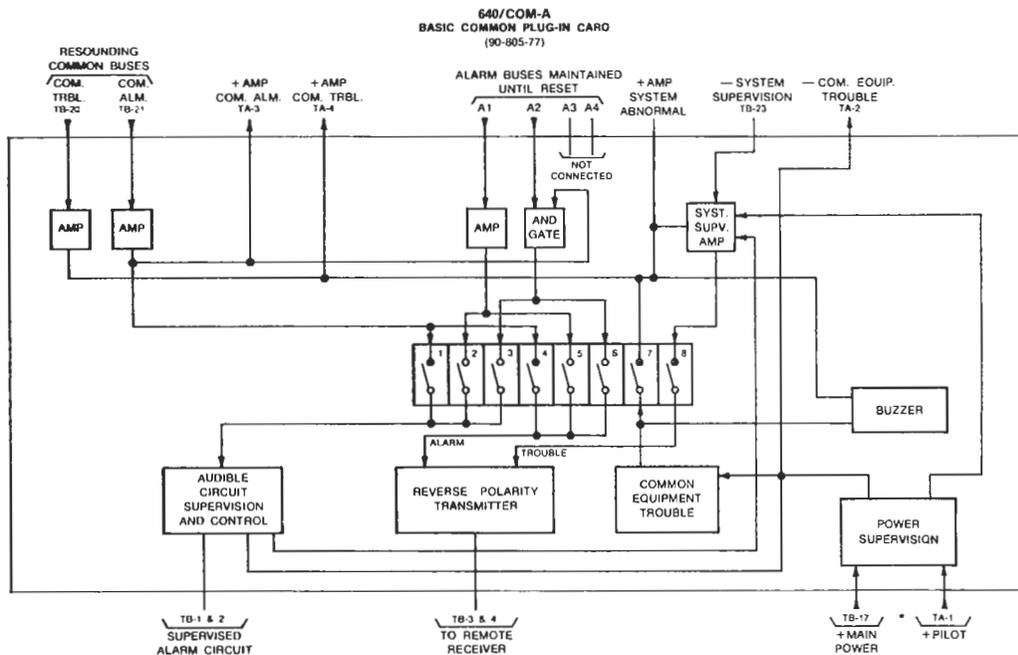


# FIELD CONNECTION



Field wiring shown is associated with 640/COM-A installed in Socket "A." Refer to alarm circuit field wiring diagram for additional details.

# FUNCTIONAL BLOCK



**PROGRAMMING**

Eight programming switches control the outputs from various inputs. BASIC SYSTEM OPERATION is provided by switch numbers 1, 4, 7 and 8 being turned ON and the balance being left OFF. Alternate system operations may be obtained by referring to the Programming Table and selecting desired functions.

OUTPUT FUNCTIONS \ INPUTS	CKT. COM. ALM.	A1 LINE	A2 LINE	COM. EQUIP. TRBL.	SYST. ABNORMAL
AUDIBLE OUTPUT (SILENCEABLE)	1	—	3	—	—
AUDIBLE OUTPUT (NON-SILENCE)	—	2	—	—	—
RP ALARM OUTPUT (RE-SIGNALS)	4	—	6	—	—
RP ALARM OUTPUT (MAINTAINED)	—	5	—	—	—
RP TROUBLE OUTPUT (MAINTAINED)	—	—	—	—	8
AMPLIFIED COM. TRBL. — TO COM.-B CARD	—	—	—	7	—

PROGRAM SWITCH NUMBERS

Programming switches when in the ON position will select the desired output function from an active input. All waterflow audible alarm signals must be connected to COM-A and programmed for non-silence operation.

**ELECTRICAL RATINGS**

Audible Output Circuit, Terminals TB-1 and TB12  
 24 VDC @ 1.0 Amp Max.-- Supervised, 27K ELR P/N 90-641-78

Reverse Polarity Transmitter, Terminals TB-3 and TB-4  
 28 VDC Max. and 5mA Max. -- Non-Supervised

**Power Requirements @ 24 VDC**

Normal Condition .....	54mA
Power Fail, Non-Silenced .....	20mA
Power Fail, Silenced .....	56mA
Common Circuit Trouble, Non-Silenced .....	59mA
Common Circuit Trouble, Silenced .....	54mA
Common Equipment Trouble, Non-Silenced .....	100mA
Common Equipment Trouble, Silenced .....	95mA
Alarm Condition (less external load), Non-Silenced .....	157mA
Alarm Condition, Silenced .....	54mA

## 640/COM-B OPTIONAL COMMON PLUG-IN CARD

The COM-B Plug-in Card Assembly includes additional common and control functions for the 640 System Control Unit. Optional--one per system.

### Visual Indicators:

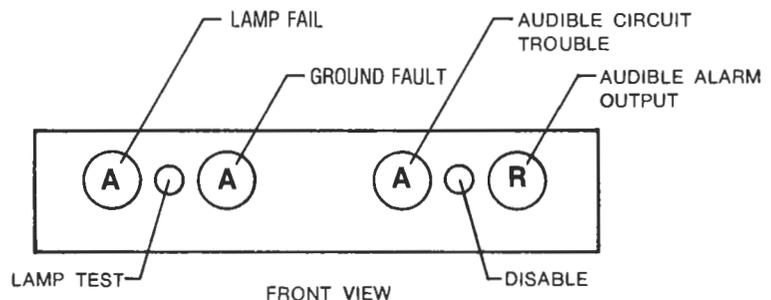
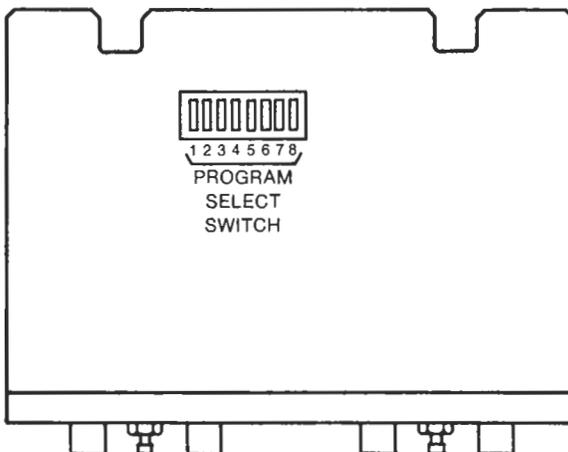
1. Lamp Fail
2. Ground Fault
3. Auxiliary Alarm Trouble
4. Auxiliary Alarm Output

### Control Switches:

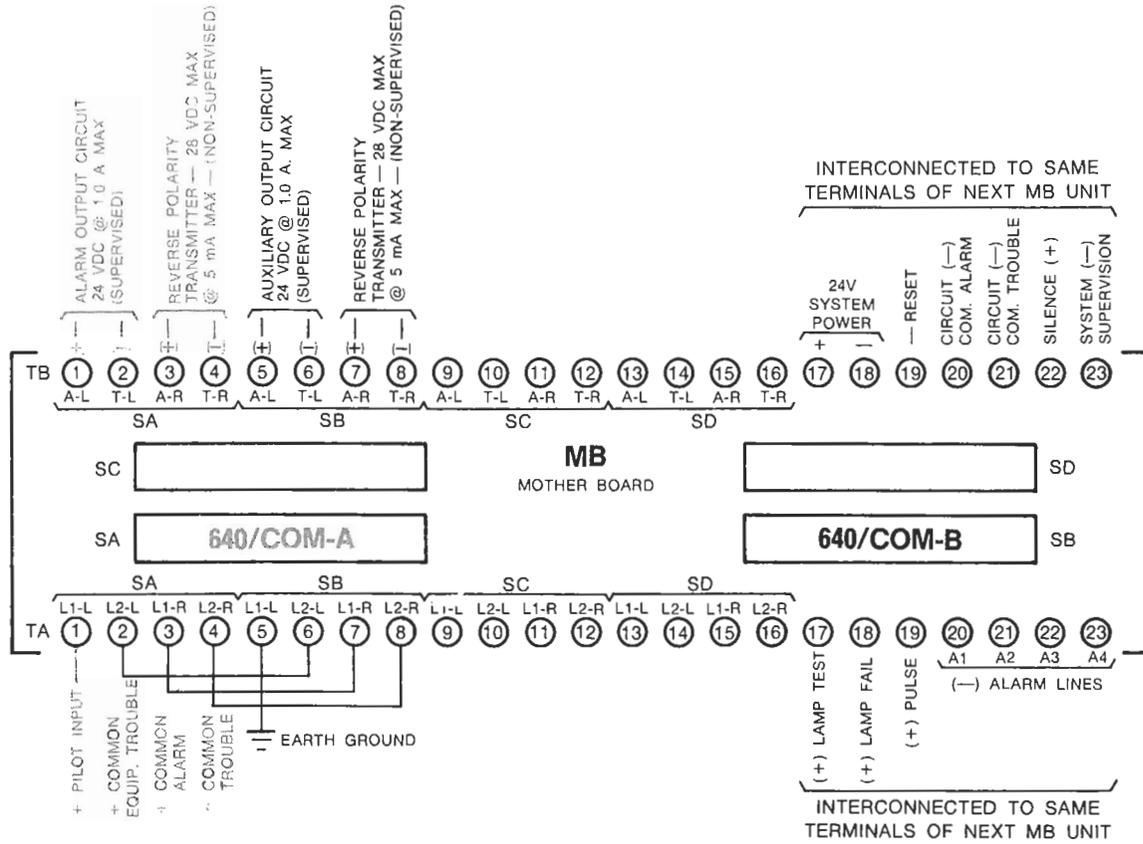
1. Lamp Test
2. Auxiliary Output Disable (Disconnect or Silence)

### Operating Functions:

1. Flashing of circuit trouble and alarm lamps upon initiation until silenced at which time they remain on steady.
2. Lamp Test/Lamp Fail Circuits for all circuit (zone) lamps.
  - a. Burned out lamp(s) will cause visual and audible fault indication.
  - b. Lamp test will light all circuit alarm and trouble lamps within panel while depressed (exception S2C).
3. Automatic Ground Detection
  - a. Senses positive ground on field wiring.
  - b. Causes visual and audible fault indication.
4. Auxiliary Alarm Output Circuit, Polarized Supervision
  - a. Supervised for both opens & shorts--disables output on fault condition.
  - b. Programmable for output upon presence of any one or combinations of the following:
    - (1) Common Alarm (Silenceable)
    - (2) Circuit Common Trouble (Silenceable)
    - (3) A2 Alarm Line (Non-Silenceable)
    - (4) A3 and A4 Alarm Lines Simultaneously (Non-Silenceable)
  - c. Capability of resounding audible
  - d. Suitable for:
    - (1) Master Box Connection (Local Energy)
    - (2) Audible or Visual Alarm Devices
  - e. Controlled with Push-On/Push-Off Disable/Silence Switch
5. Auxiliary Remote Station Transmitter, Reverse Polarity
  - a. Trouble signal transmission removes normal signal upon any system abnormal condition.
  - b. Alarm signal transmission has priority over trouble.
  - c. Programmable for alarm transmission upon presence of any one or combinations of the following:
    - (1) Resounding Common Alarm
    - (2) Resounding Common Circuit Trouble
    - (3) A2 Alarm Line--Constant Until Reset

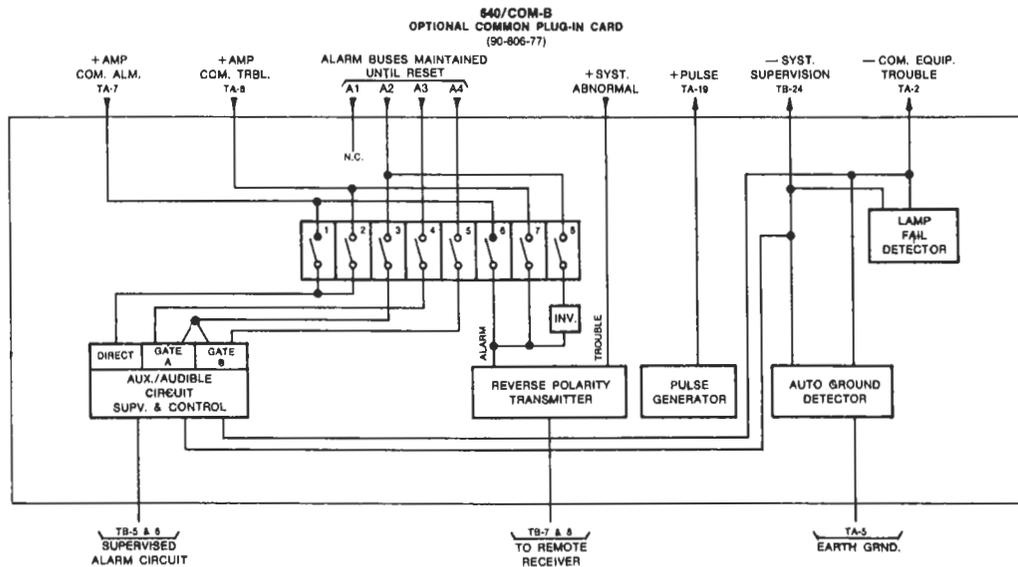


# FIELD CONNECTION



Field wiring shown is associated with 640/COM-B installed in Socket "SB." (640/COM-A would be in Socket "SA.") Refer to alarm circuit or master box field wiring diagrams for additional details.

# FUNCTIONAL BLOCK



**PROGRAMMING**

Eight programming switches control the outputs from various inputs. To duplicate the BASIC SYSTEM OPERATION of 640/COM-A, switch numbers 1 and 6 are turned on and the balance are left off. Alternate system operations may be obtained by referring to the programming table and selecting desired functions.

OUTPUT FUNCTIONS \ INPUTS		+CKT COMMON ALARM	+CKT COMMON TROUBLE	- A2 LINE	- A3 LINE	- A4 LINE
SILENCEABLE AUX. ALARM OUTPUT	GATE A	1	2	—	—	—
	GATE B			—	—	—
NON-SILENCE AUX. ALARM OUTPUT	GATE A	—	—	3	4	—
	GATE B	—	—		—	5
AUX. RP ALARM OUTPUT — RE-SIGNALS		6	7	—	—	—
AUX. RP ALARM OUTPUT — MAINTAINED		—	—	8	—	—

PROGRAM SWITCH NUMBERS

**NOTES:**

1. GATES A & B MUST BOTH BE ACTIVATED FOR AN AUXILIARY ALARM OUTPUT.
2. AUX. RP ALWAYS TRANSMITS A TROUBLE DURING A SYSTEM ABNORMAL CONDITION UNLESS AN ALARM IS PRESENT WHICH HAS PRIORITY.
3. AUX. ALARM OUTPUT MAY BE DISABLED/DISCONNECTED BY OPERATING PUSH-OFF/PUSH-ON SWITCH.

Programming switches when in the ON position will select the desired output function from an active input.

**ELECTRICAL RATINGS**

Auxiliary Output Circuit, Terminals TB-5 and TB-6  
 24 VDC @ 1.0 Amp Max -- Supervised, 27K ELR P/N 90-641-78

Reverse Polarity Transmitter, Terminals TB-7 and TB-8  
 28 VDC Max. and 5mA Max. -- Non-Supervised

**Power Requirements @ 24 VDC**

Normal Condition .....	23mA
Power Fail .....	23mA
Audible Circuit Trouble, Non-Silenced .....	70mA
Audible Circuit Trouble, Silenced .....	95mA
Alarm Condition (less external load), Non-Silenced .....	115mA
Alarm Condition, Silenced .....	50mA

## 640/S2 DUAL INPUT CIRCUIT PLUG-IN CARD

The S2 plug-in card assembly includes all necessary circuits and visual indicators for two input circuits (zones). Two 16 point DIP sockets are mounted on the plug-in card and will accept any of three programming modules.

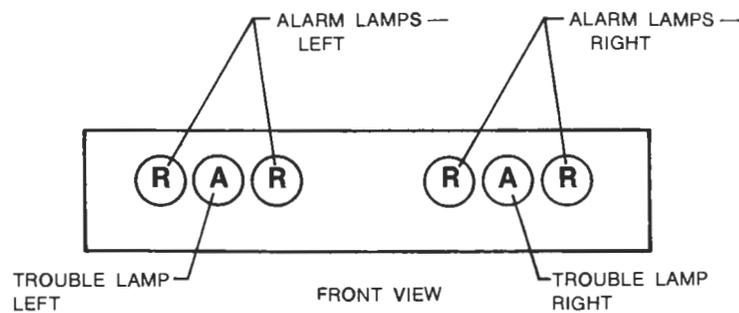
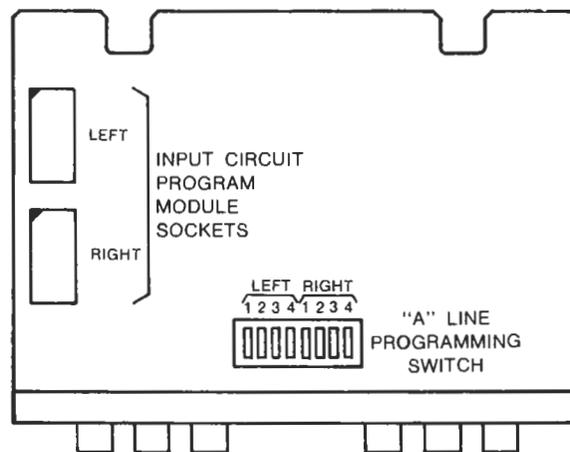
Programming modules include:

1. 640/OS for Standard Class "B" Input Circuits, requires 15K ohm ELR P/N 90-640-78
2. 640/OSS for Class "B" Input Circuits on which are connected loop powered smoke detectors as well as non-powered devices, requires 15K ohm ELR P/N 90-640-78.
3. 640/RP for reverse polarity receiving, accepts a 6-30 volt D.C. input.

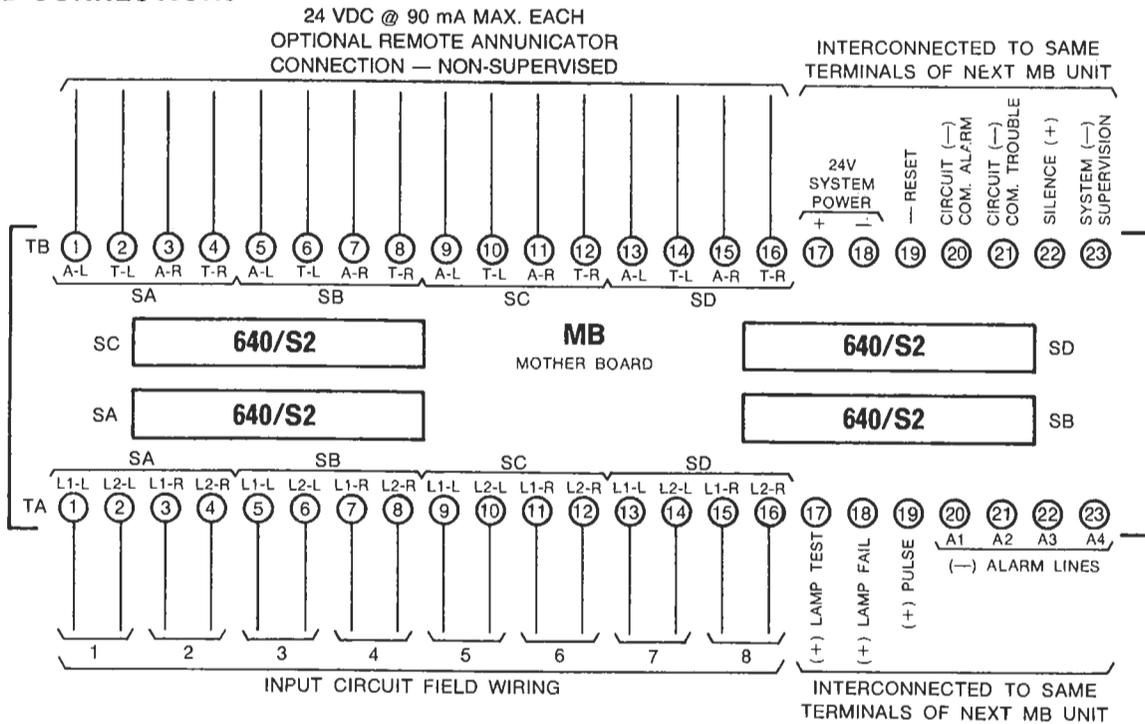
The visual indicators include one amber trouble lamp and two red alarm lamps per circuit (zone).

Operating Functions:

1. Lamp Test/Lamp Fail Circuits which become active when 640/COM-B is used within the system.
2. Resounding common trouble and common alarm buses.
3. Outputs for remote trouble and alarm annunciator lamps, non-supervised.
4. Locking circuits for alarm.
5. Programming switches allow any combination of alarm lines A1, A2, A3, and A4 to be selected for connection from each circuit (zone) into the alarm line buses.
6. Alarm line outputs are maintained until reset.

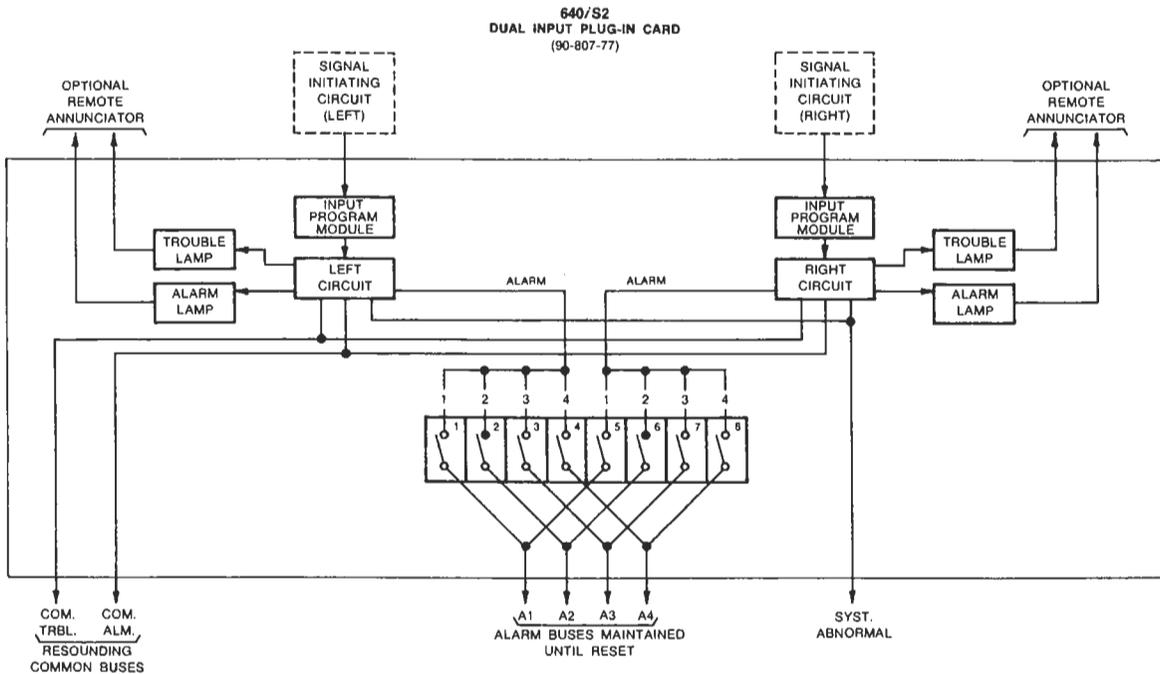


# FIELD CONNECTIONS



Refer to wiring diagrams 99-049-78 and 99-053-78 for manual and automatic detector with 640/OS Module, 99-051-78 for PID ionization detectors with 640/OS-S Module and 99-056-78 for remote receiving with 640/RP Module.

# FUNCTIONAL BLOCK



**PROGRAMMING**

There are eight program switches on each 640/S2 plug-in card, four for each circuit. BASIC SYSTEM OPERATION does not make use of these switches; however, they are necessary for many of the alternate functions such as non-silencing waterflow alarms, maintained reverse polarity alarm transmission, zoned alarm output circuits and similar situations.

Refer to the programming table and select the desired output lines per input circuit.

SWITCH NUMBER	CIRCUIT	ALARM BUSES			
		A1	A2	A3	A4
1	LEFT	X			
2	LEFT		X		
3	LEFT			X	
4	LEFT				X
5	RIGHT	X			
6	RIGHT		X		
7	RIGHT			X	
8	RIGHT				X

Program switches, when in the ON position, connect alarm outputs of input circuits into selected internal alarm bus, A1, A2, A3 and/or A4.

**ELECTRICAL RATINGS**

Power Requirements @ 24 VDC (per plug-in card)

With Program Modules	640/OS	640/OSS	640/RP
Normal & Standby Power Condition	11.5mA	17.5mA	11.0mA
One Circuit in TROUBLE	50mA	53mA	50mA
One Circuit in ALARM	85mA	88mA	136mA

## 640/S2A DUAL INPUT CIRCUIT PLUG-IN CARD

The S2A plug-in card assembly includes all necessary circuits and visual indicators for two Class "A" input circuits (zones). Two 16 point DIP sockets are mounted on the plug-in card and will accept either of two programming modules.

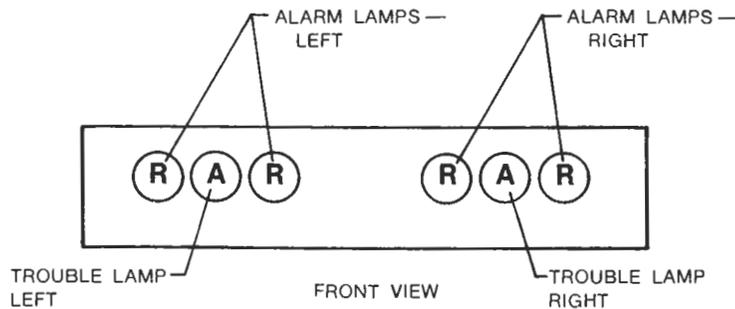
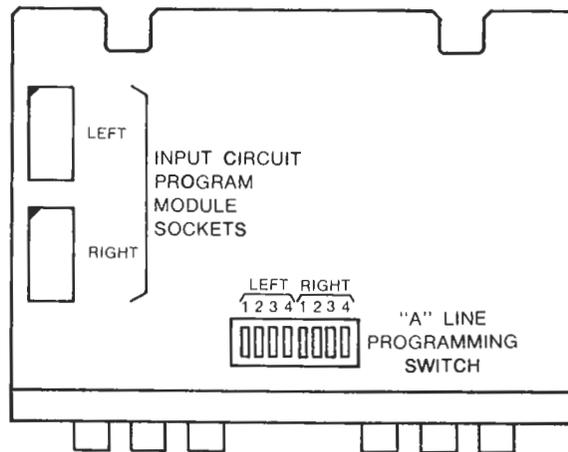
Programming modules include:

1. 640/OS for four wire Class "A" Input Circuits.
2. 640/OSS for Class "A" Input Circuits on which are connected loop powered smoke detectors as well as non-powered devices.

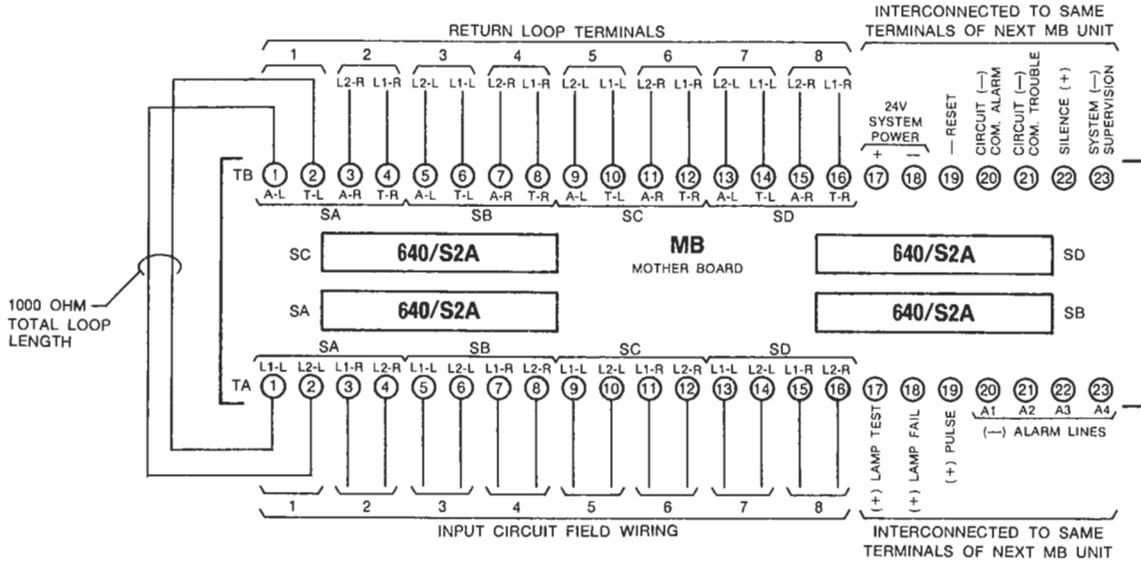
The visual indicators include one amber trouble lamp and two red alarm lamps per circuit (zone).

Operating Functions:

1. Lamp Test/Lamp Fail Circuits which become active when 640/COM-B is used within the system.
2. Resounding common trouble and common alarm buses.
3. Locking circuits for both trouble and alarm.
4. Programming switches allow any combination of alarm lines A1, A2, A3, and A4 to be selected for connection from each circuit (zone) into the alarm line buses.
5. Alarm line outputs are maintained until reset.

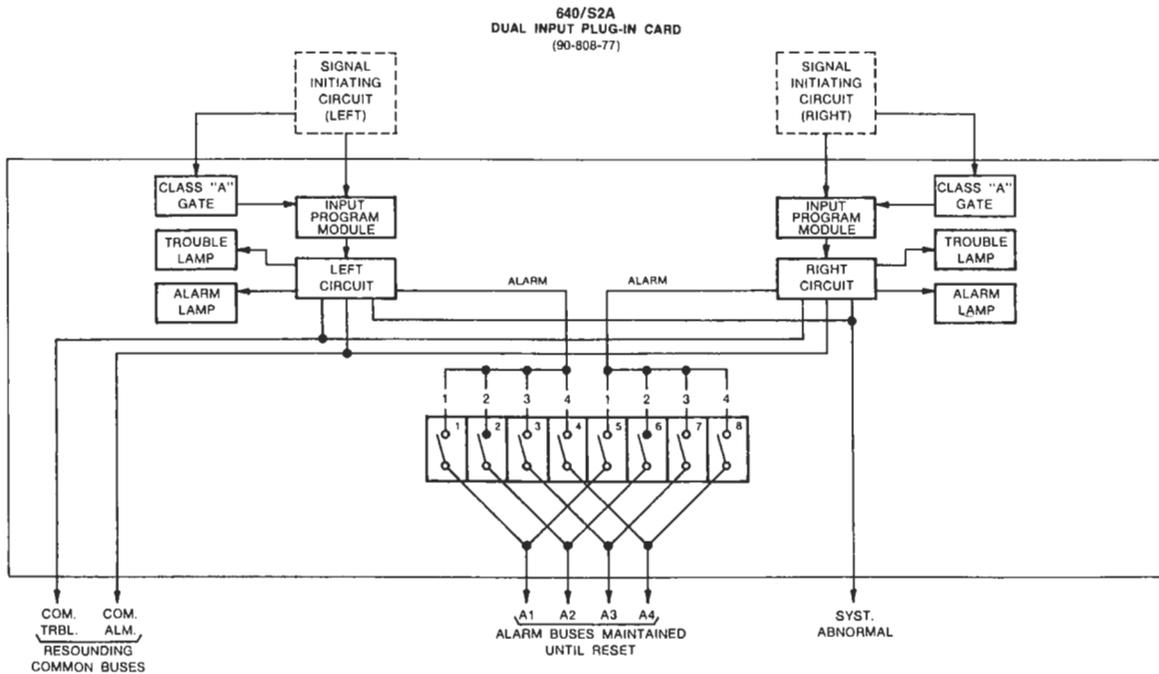


# FIELD CONNECTIONS



Refer to wiring diagrams 99-050-78 and 99-054-78 for manual and automatic detector with 640/OS Module and 99-052-78 for PID ionization detectors with 640/OS-S Module.

# FUNCTIONAL BLOCK



## PROGRAMMING

There are eight program switches on each 640/S2A plug-in card, four for each circuit. BASIC SYSTEM OPERATION does not make use of these switches; however, they are necessary for many of the alternate functions such as non-silencing waterflow alarms, maintained reverse polarity alarm transmission, zoned alarm output circuits and similar situations.

Refer to the programming table and select the desired output lines per input circuit.

SWITCH NUMBER	CIRCUIT	ALARM BUSES			
		A1	A2	A3	A4
1	LEFT	X			
2	LEFT		X		
3	LEFT			X	
4	LEFT				X
5	RIGHT	X			
6	RIGHT		X		
7	RIGHT			X	
8	RIGHT				X

Program switches, when in the ON position, connect alarm outputs of input circuits into selected internal alarm bus, A1, A2, A3 and/or A4.

## ELECTRICAL RATINGS

Power Requirements @ 24 VDC (per plug-in card)

With Program Modules	640/OS	640/OSS
Normal & Standby Power Condition	11.5mA	17.5mA
One Circuit in TROUBLE	54mA	57mA
One Circuit in ALARM	90mA	93mA

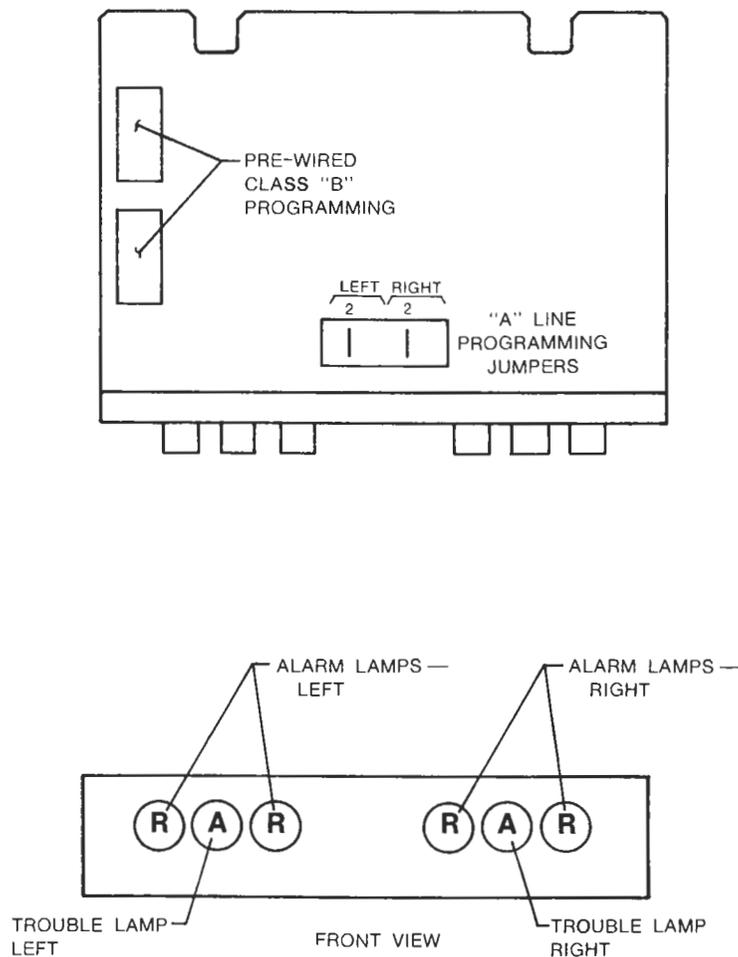
## 640/S2B DUAL INPUT CIRCUIT PLUG-IN CARD

The S2B plug-in card assembly includes all necessary circuits and visual indicators for two standard Class "B" input circuits (zones) and requires 15K ohm ELR.

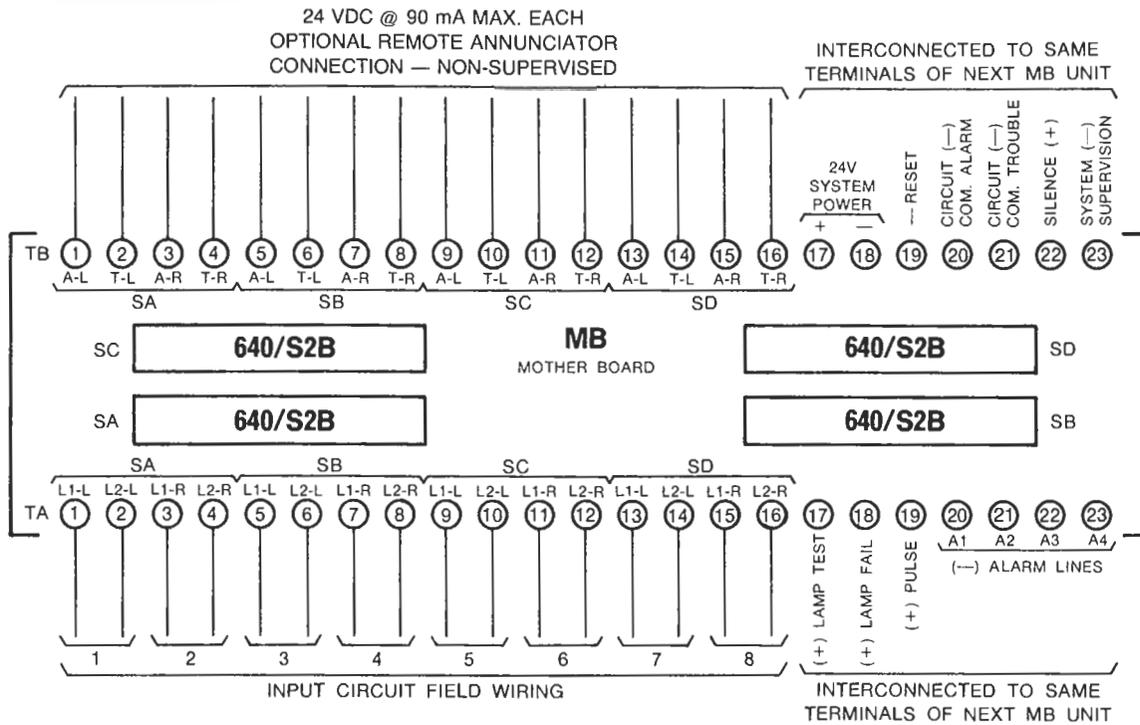
The visual indicators include one amber trouble lamp and two red alarm lamps per circuit (zone).

### Operating Functions:

1. Lamp Test/Lamp Fail Circuits which become active when 640/COM-B is used within the system.
2. Resounding common trouble and common alarm buses.
3. Outputs for remote trouble and alarm annunciator lamps, non-supervised.
4. Locking circuits for alarm.
5. Programming jumpers of alarm line A2 are connected from each circuit (zone) into the alarm line bus, A2.
6. Alarm line output is maintained until reset.

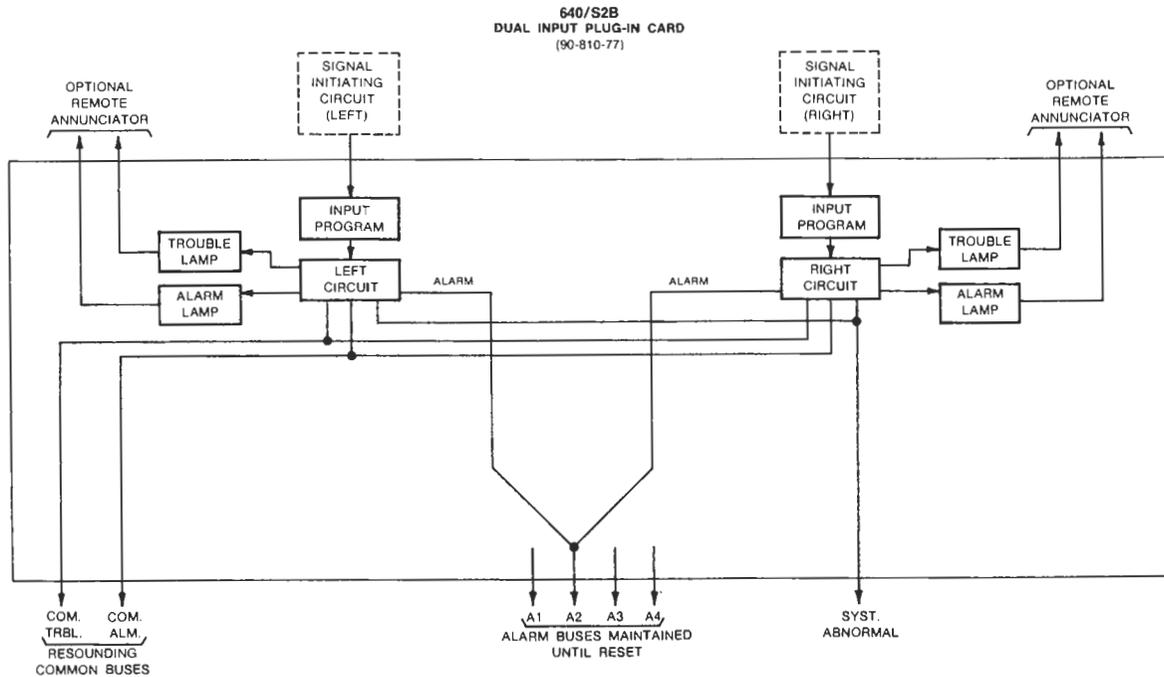


# FIELD CONNECTIONS



Refer to wiring diagrams 99-049-78 and 99-053-78 for manual and automatic detectors.

# FUNCTIONAL BLOCK



## **PROGRAMMING**

The S2B is factory programmed for alarm outputs on Alarm Line A2.

## **ELECTRICAL RATINGS**

Power Requirements @ 24 VDC (per plug-in card)

Normal & Standby Power Condition	11.5mA
One Circuit in TROUBLE	50mA
One Circuit in ALARM	85mA

## 640/S2C DUAL INPUT CIRCUIT PLUG-IN CARD

The S2C plug-in card assembly includes all necessary circuits and visual indicators for two input circuits (zones). Two 16 point DIP sockets are mounted on the plug-in card and will accept any of three programming modules. S2C provides supervision of remote alarm annunciator lamps and individual annunciator input wires. 640/COM-B common plug-in card must be employed to provide supervision.

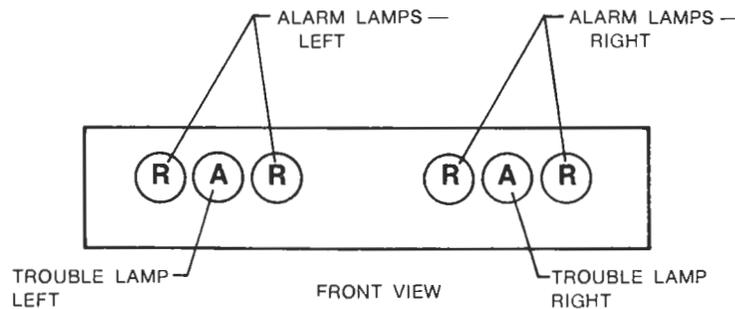
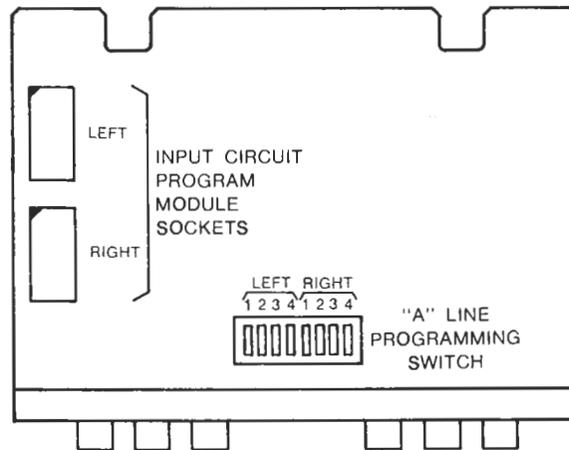
Programming modules include:

1. 640/OS for Standard Class "B" Input Circuits, requires 15K ohm ELR, P/N 90-640-78.
2. 640/OSS for Class "B" Input Circuits on which are connected loop powered smoke detectors as well as non-powered devices, requires 15K ohm ELR, P/N 90-640-78.
3. 640/RP for reverse polarity receiving, accepts a 6-30 volt D.C. input.

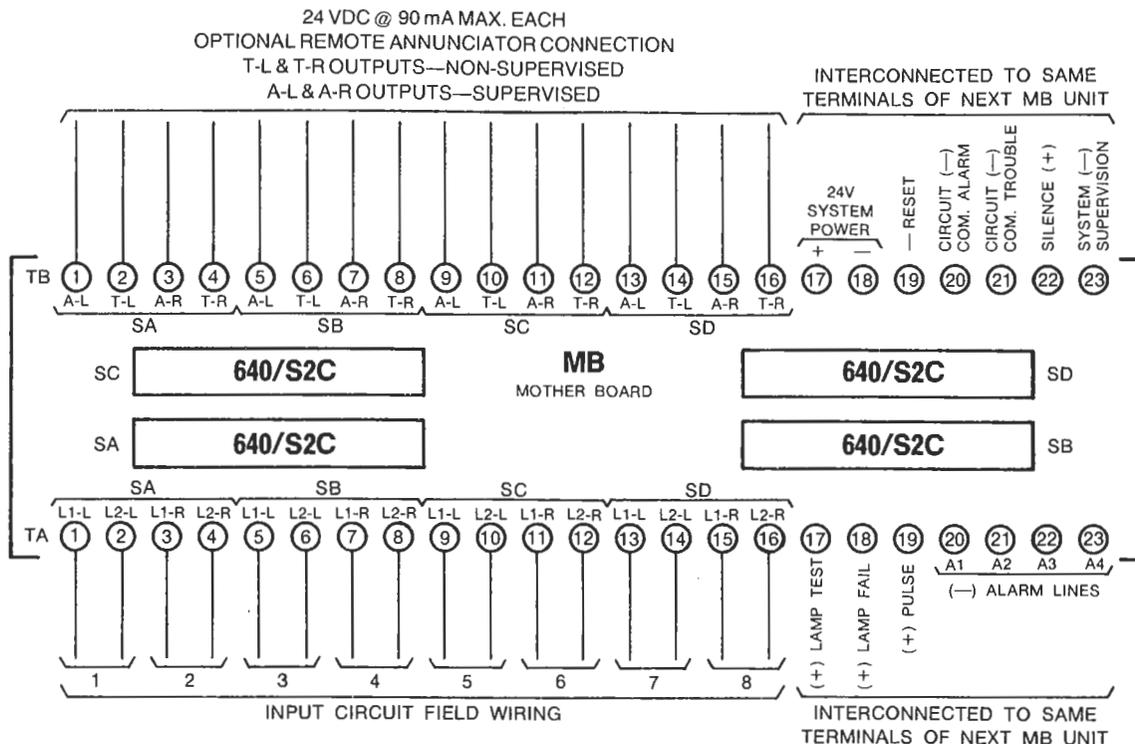
The visual indicators include one amber trouble lamp and two red alarm lamps per circuit (zone).

Operating Functions:

1. Lamp Test/Lamp Fail Circuits when 640/COM-B is used within the system.
2. Resounding common trouble and common alarm buses.
3. Alarm output terminals for interconnection to indirect inputs, non-supervised
4. Outputs for remote annunciator alarm lamps, supervised
5. Locking circuits for alarm.
6. Programming switches allow any combination of alarm lines A1, A2, A3 and A4 to be selected for connection from each circuit (zone) into the alarm line buses.
7. Alarm line outputs are maintained until reset.

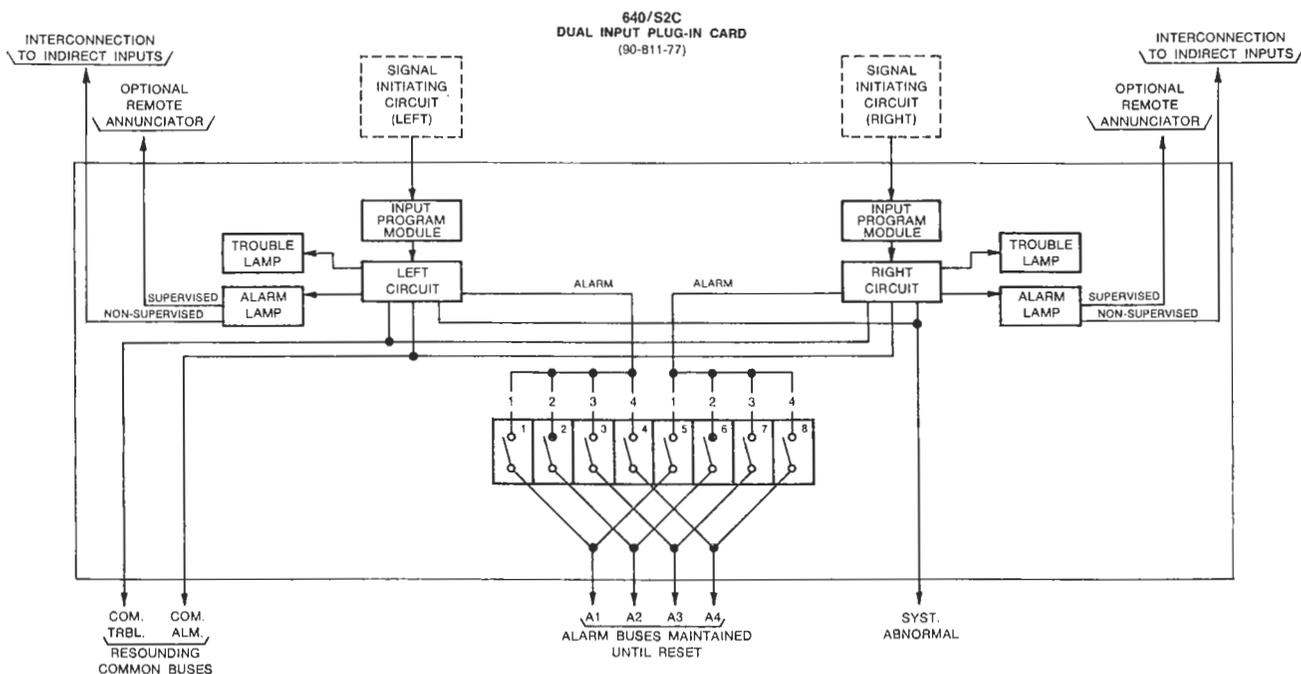


# FIELD CONNECTIONS



Refer to wiring diagrams 99-049-78 and 99-053-78 for manual and automatic detectors with 640/OS Module, 99-051-78 for PID ionization detectors with 640/OS-S Module and 99-056-78 for remote receiving with 640/RP Module.

# FUNCTIONAL BLOCK



**PROGRAMMING**

There are eight program switches on each 640/S2C plug-in card, four for each circuit. BASIC SYSTEM OPERATION does not make use of these switches; however, they are necessary for many of the alternate functions such as non-silencing waterflow alarms, maintained reverse polarity alarm transmission, zoned alarm output circuits and similar situations.

Refer to the programming table and select the desired output lines per input circuit.

SWITCH NUMBER	CIRCUIT	ALARM BUSES			
		A1	A2	A3	A4
1	LEFT	X			
2	LEFT		X		
3	LEFT			X	
4	LEFT				X
5	RIGHT	X			
6	RIGHT		X		
7	RIGHT			X	
8	RIGHT				X

Program switches, when in the ON position, connect alarm outputs of input circuits into selected internal alarm bus, A1, A2, A3 and/or A4.

**ELECTRICAL RATINGS**

Power Requirements @ 24 VDC (per plug-in card)

With Program Modules	640/OS	640/OSS	640/RP
Normal & Standby Power Condition	11.5mA	17.5mA	11.0mA
One Circuit in TROUBLE	50mA	53mA	50mA
One Circuit in ALARM	85mA	88mA	136mA

## 640/S2D DUAL INPUT CIRCUIT PLUG-IN CARD

The S2D plug-in card assembly includes all necessary circuits and visual indicators for two input circuits (zones). Two 16 point DIP sockets are mounted on the plug-in card and will accept either of two programming modules.

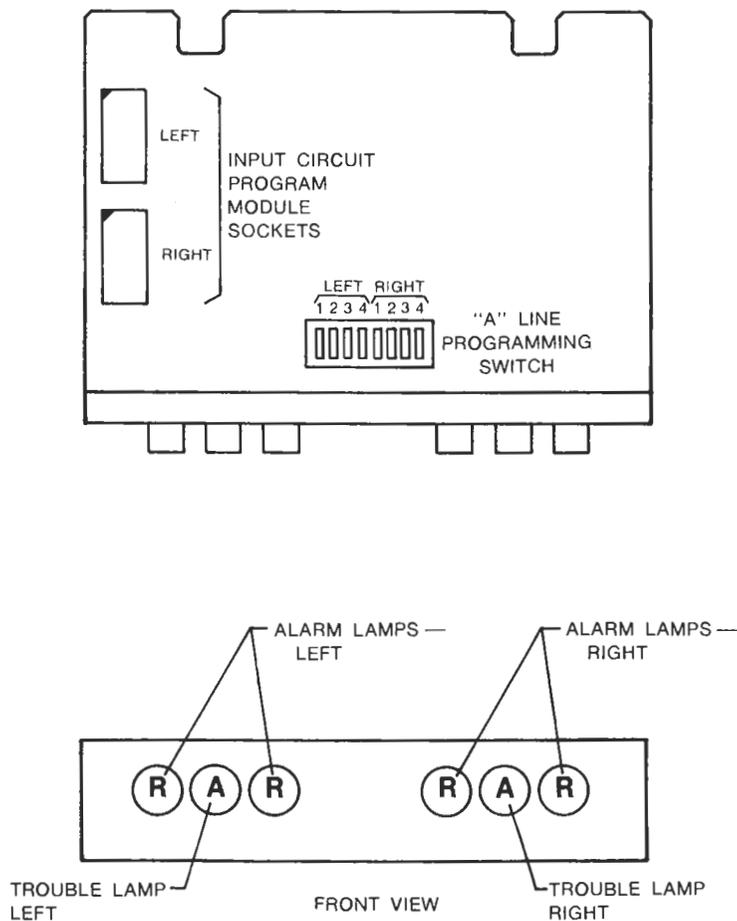
Programming modules include:

1. 640/OS for Standard Class "B" Input Circuits, (Non-Locking) requires 15K ohm ELR P/N90-640-78
2. 640/RP for reverse polarity receiving, accepts a 6-30 volt D.C. input (Non-Locking).

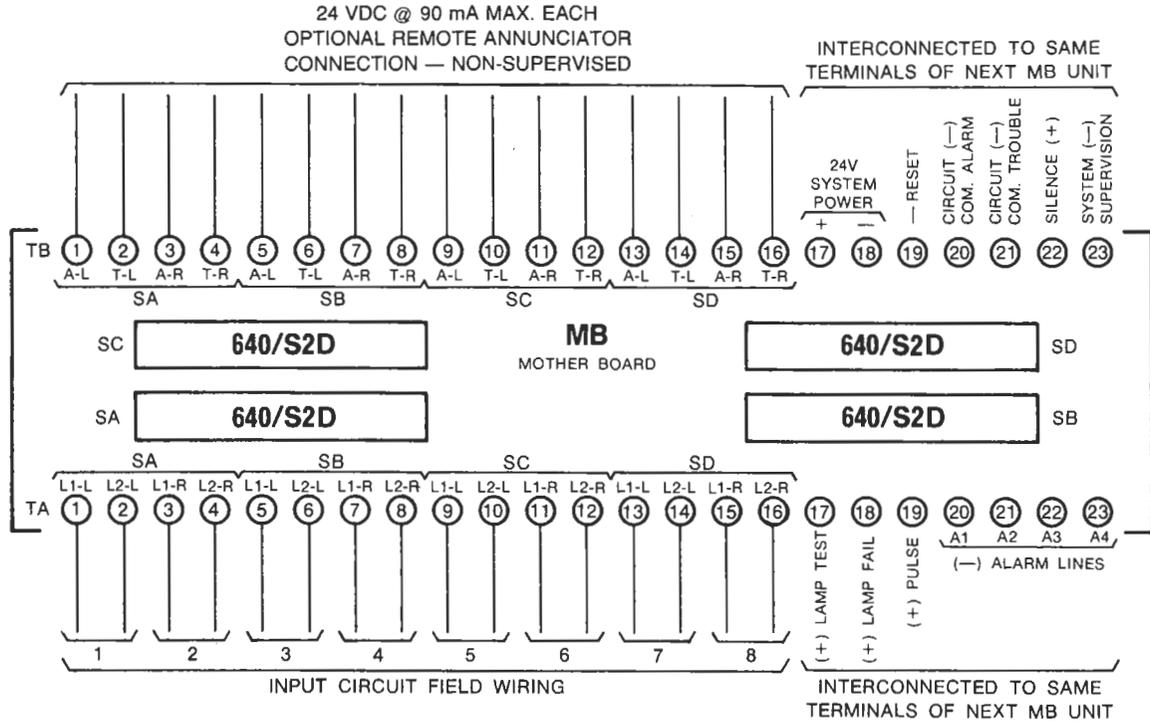
The visual indicators include one amber trouble lamp and two red alarm lamps per circuit (zone).

Operating Functions:

1. Lamp Test/Lamp Fail Circuits which become active when 640/COM-B is used within the system.
2. Resounding common trouble and common alarm buses.
3. Outputs for remote trouble and alarm annunciator lamps, non-supervised.
4. Non-Locking circuits for both trouble and alarm.
5. Programming switches allow any combination of alarm lines A1, A2, A3, and A4 to be selected for connection from each circuit (zone) into the alarm line buses.
6. Alarm line outputs are maintained until alarm condition is cleared.

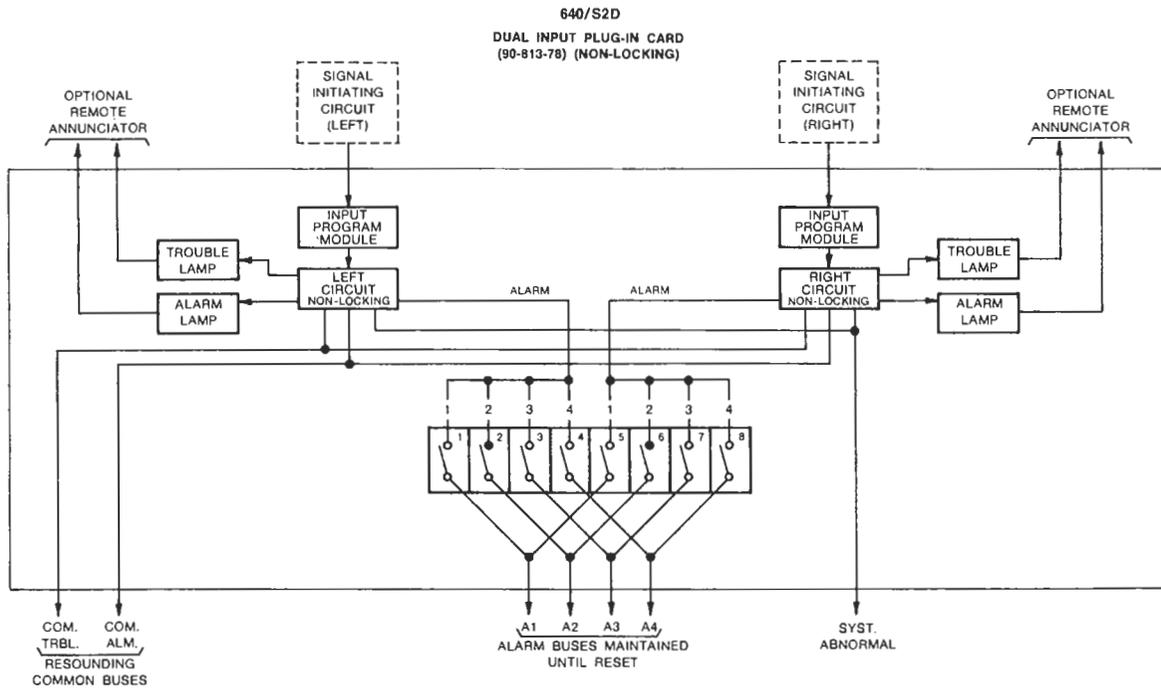


# FIELD CONNECTIONS



Refer to wiring diagrams 99-078-78 for sprinkler supervisory devices with 640/OS Module and 99-056-78 for remote receiving with 640/RP Module.

# FUNCTIONAL BLOCK



## PROGRAMMING

There are eight program switches on each 640/S2D plug-in card, four for each circuit. BASIC SYSTEM OPERATION does not make use of these switches; however, they are necessary for many of the alternate functions such as reverse polarity alarm transmission, zoned alarm output circuits and similar situations.

Refer to the programming table and select the desired output lines per input circuit.

SWITCH NUMBER	CIRCUIT	ALARM BUSES			
		A1	A2	A3	A4
1	LEFT	X			
2	LEFT		X		
3	LEFT			X	
4	LEFT				X
5	RIGHT	X			
6	RIGHT		X		
7	RIGHT			X	
8	RIGHT				X

Program switches, when in the ON position, connect alarm outputs of input circuits into selected internal alarm bus, A1, A2, A3 and/or A4.

## ELECTRICAL RATINGS

Power Requirements @ 24 VDC (per plug-in)

With Program Modules	640/OS	640/RP
Normal & Standby Power Condition	11.5mA	11.0mA
One Circuit in TROUBLE	50mA	50mA
One Circuit in ALARM	85mA	136mA

## 640/A2 DUAL ALARM OUTPUT CIRCUIT PLUG-IN CARD

The A2 plug-in card assembly includes all necessary circuits and visual indicators for two supervised output circuits.

### Visual Indicators:

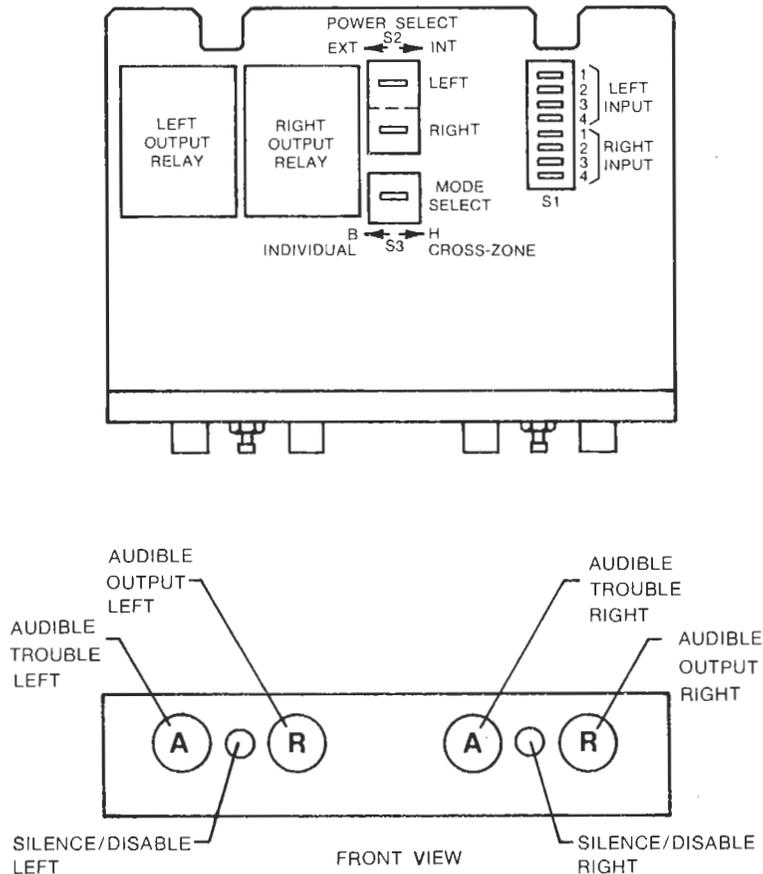
1. Output Lamp per Circuit
2. Trouble/Disabled Lamp per Circuit

### Control Switches:

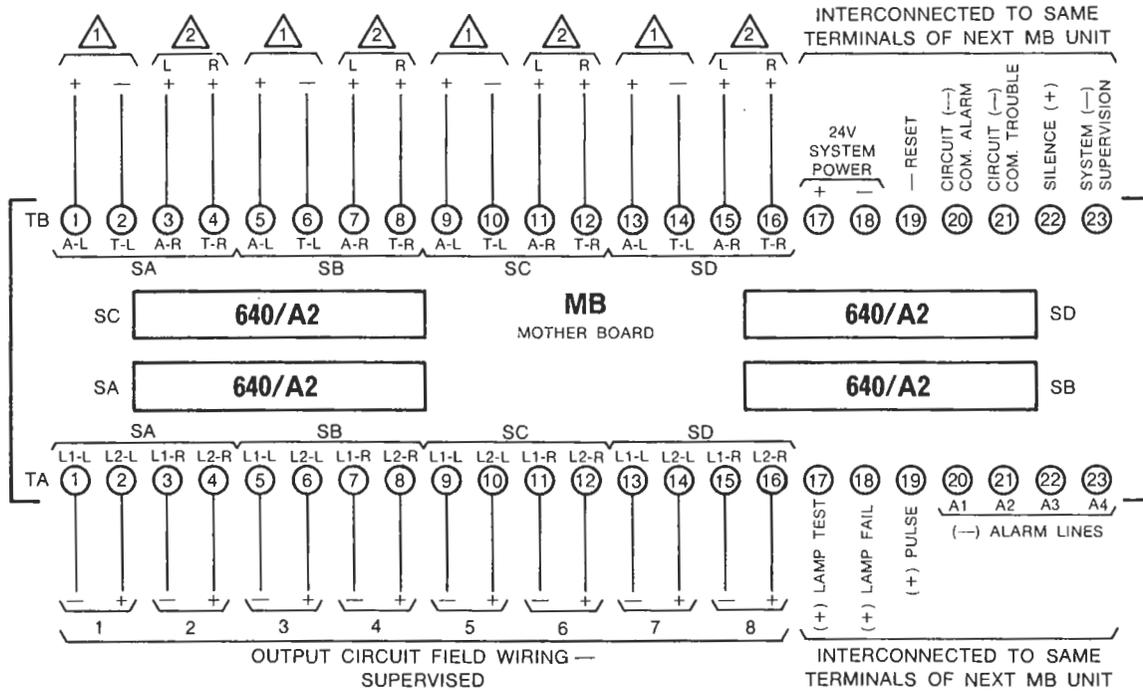
Disable/Silence Switch per Circuit

### Operating Functions:

1. Output field wiring supervised for opens and shorts--automatically disables output on fault condition, requires 27K ohm ELR, P/N 90-641-78.
2. Alternate action pushbutton disable switches.
3. Inputs from alarm lines A1, A2, A3 and A4 plus indirect input terminals.
4. Output circuit power is selectable from either system main operating power or auxiliary power via power input terminals per plug-in card--selectable by circuit.
5. Either circuit may be activated separately or together as determined by programming.
6. "AND" Gate may be selected into circuits causing an output on the "left" circuit (i.e., audible alarm) whenever either input is present. An output on the "right" circuit (i.e., halon control) is energized only when both the "left" and "right" inputs are simultaneously present.



# FIELD CONNECTION

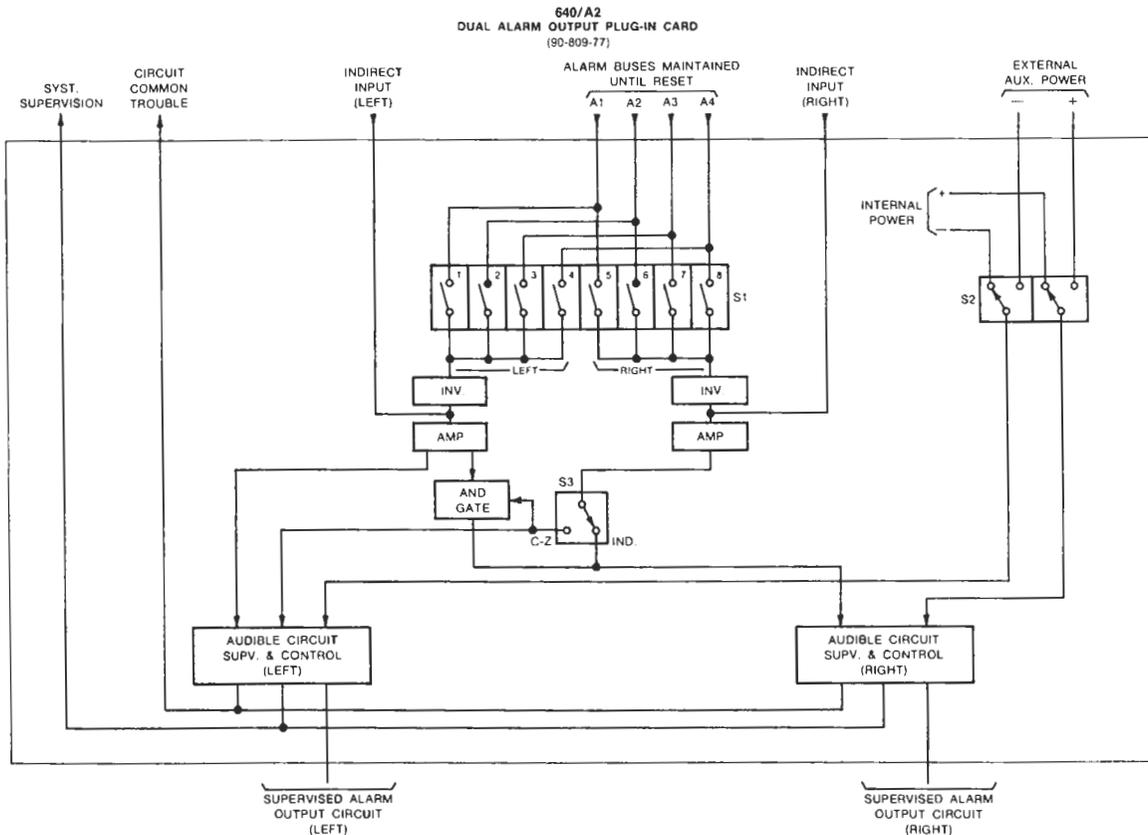


① OPTIONAL EXTERNAL POWER SOURCE — NON-SUPERVISED.

② OPTIONAL INDIRECT ALARM INPUTS — NON-SUPERVISED.

Refer to wiring diagrams 99-055-78 for connections and rating of alarm circuits.

# FUNCTIONAL BLOCK



**PROGRAMMING**

The eight switches of S1 provide programming of the left and right circuits. When in the ON position, they will select the desired alarm line A1, A2, A3 or A4 to control the respective output circuit.

Indirect input terminals may be jumper connected to annunciator output terminals associated with particular input circuits (zones), common alarm or common trouble. The indirect inputs may be used in lieu of or in addition to alarm lines A1 through A4.

Power select switches of S2 when in the "internal" position provide 24 VDC system power to the output circuits. When in the "external" position, an auxiliary power source is applied to the output circuits. Each circuit may be individually selected.

Mode Select Switch S3 has two positions--"Individual" or "Cross-zone". In the "Individual" position, a left input will result in a left output and a right input will result in a right output. When in the "Cross-zone" position, either a left or a right input will result in a left output. However, when both the left and right inputs are coincident, a right output will also result.

**ELECTRICAL RATINGS**

Alarm Output Circuit, Terminals L1 and L2

24 VDC @ 3.0 Amp Max. -- Supervised, 27K ELR, P/N 90-641-78.

Capacity to handle 70.7 V RMS Audio Circuits @ 250Watts Max. per circuit

Power Requirements @ 24 VDC

Normal Condition .....	4mA
Power Fail .....	4mA
Audible Circuit Trouble, Non-silenced .....	50mA
Audible Circuit Trouble, Silenced .....	58mA
Alarm Condition (less external load), Non-silenced .....	85mA
Alarm Condition, Silenced .....	58mA

## 640/R2 DUAL AUXILIARY RELAY PLUG-IN CARD

The R2 plug-in card assembly includes all necessary circuits and visual indicators for two independently controlled and isolated SPDT relay contacts.

### Visual Indicators:

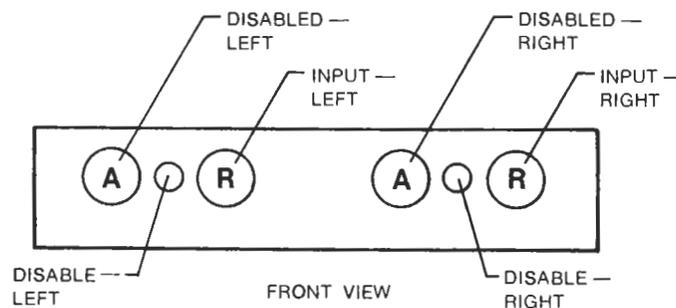
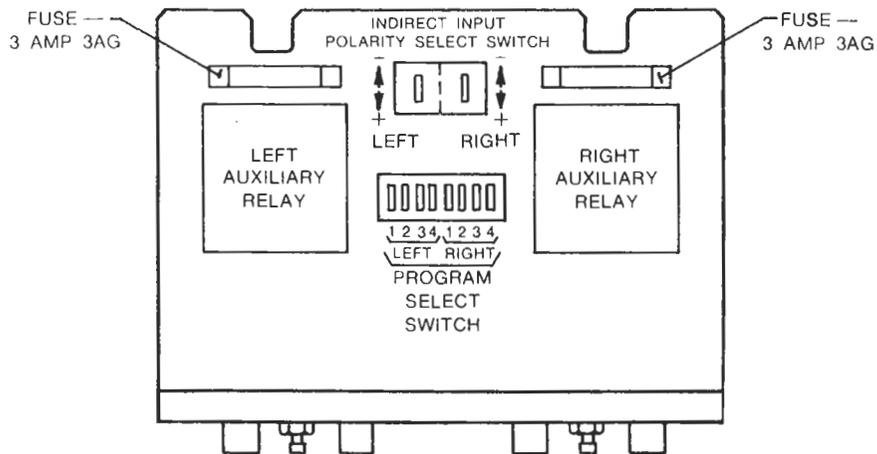
1. Auxiliary contacts disabled per relay
2. Auxiliary contacts input per relay

### Control Switches:

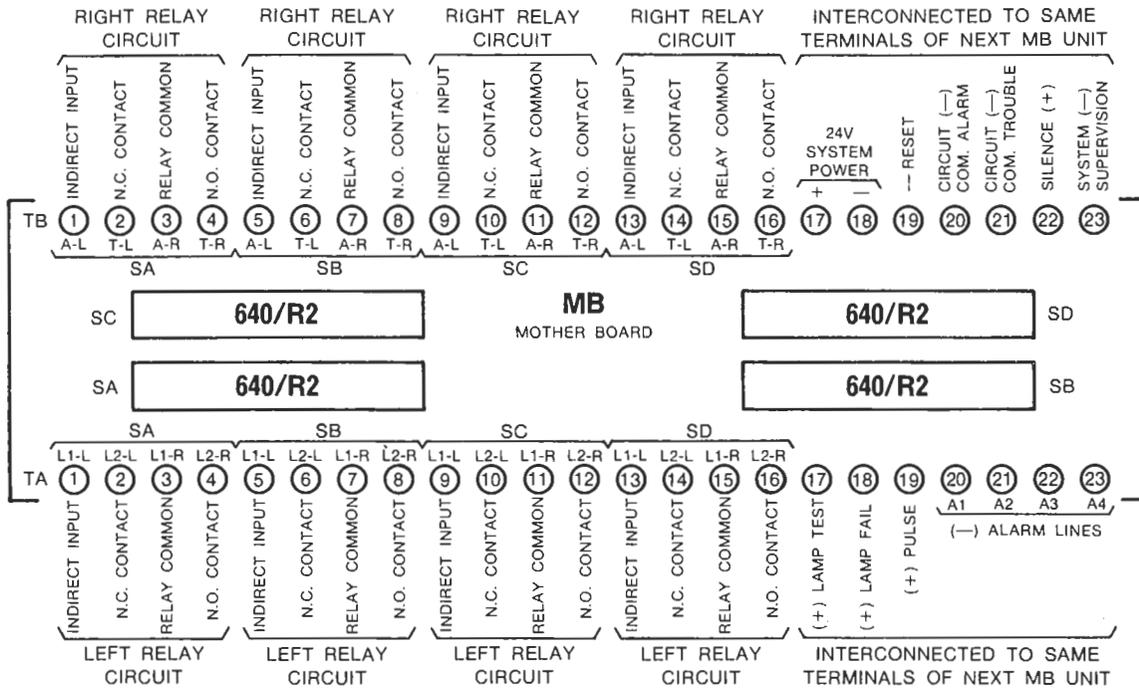
Disable switch per relay

### Operating Functions:

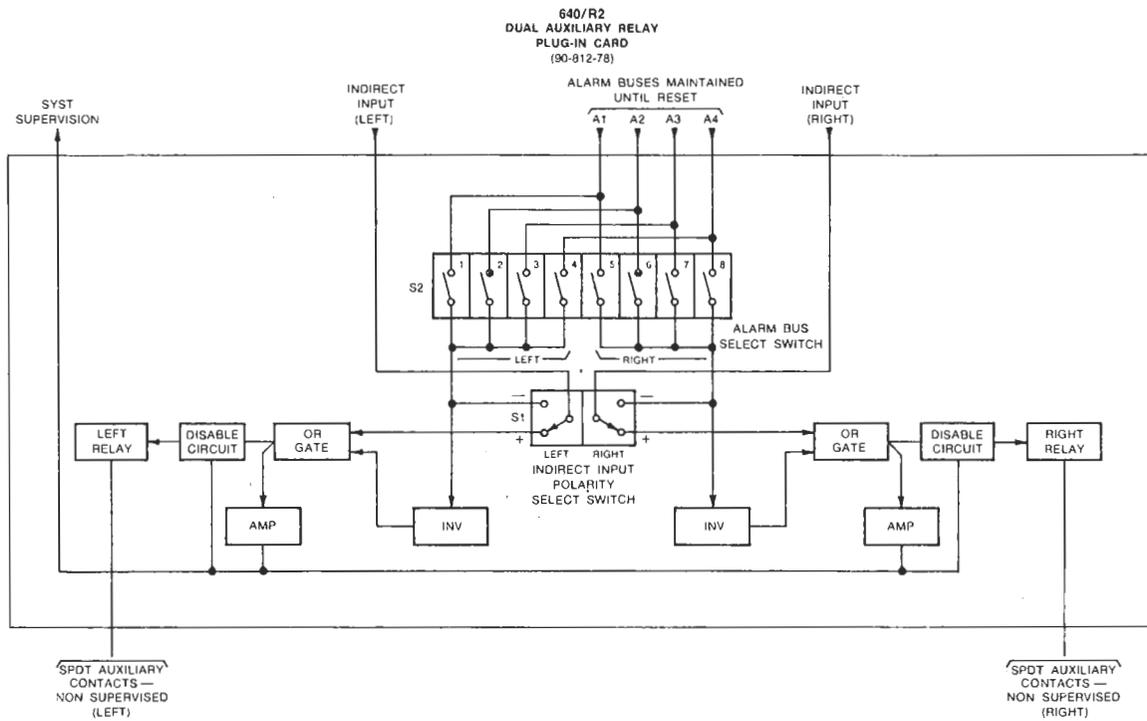
1. SPDT dry contacts rated to 3 amps @ 28 VDC or 120 VAC, resistive.
2. Alternate action pushbutton disable switches.
3. Inputs from alarm lines A1, A2, A3, and A4 plus indirect input terminals.
4. Indirect inputs are independently selectable to accept either positive or negative signals.
5. Relays may be activated separately or together as determined by programming.
6. Relay outputs are independently fused.



# FIELD CONNECTION



# FUNCTIONAL BLOCK



**PROGRAMMING**

The eight switches of S2 provide programming of the left and right circuits. When in the "ON" position, they will select the desired alarm line A1, A2, A3, or A4 to control the respective auxiliary relay.

Indirect input terminals may be jumper connected to annunciator output terminals associated with particular input circuits (zones), common alarm or common trouble. The indirect inputs may be used in lieu of or in addition to alarm lines A1 through A4.

**ELECTRICAL RATINGS**

Auxiliary relay contacts - 24 VDC or 120 VAC @ 3.0 Amp Max. non-supervised output. Terminal connections are:

FUNCTION	LEFT RELAY CIRCUIT	RIGHT RELAY CIRCUIT
Indirect Input	L1-L	A-L
Normally Closed Contact	L2-L	T-L
Common Contact	L1-R	A-R
Normally Open Contact	L2-R	T-R

Relay common contacts are fused @ 3 Amps.

Power Requirements @ 24 VDC

Normal Condition .....	0mA
Power Fail .....	0mA
Auxiliary Relay Disabled .....	41mA
Auxiliary Relay Operated .....	66mA
Auxiliary Relay Disabled but with Input .....	85mA

**640/TD TIME DELAY PLUG-IN CARD**

The TD plug-in card assembly includes all necessary circuits, visual indicators and control switches for a 1 through 8 minute time delay, selectable in one minute increments.

**Visual Indicators:**

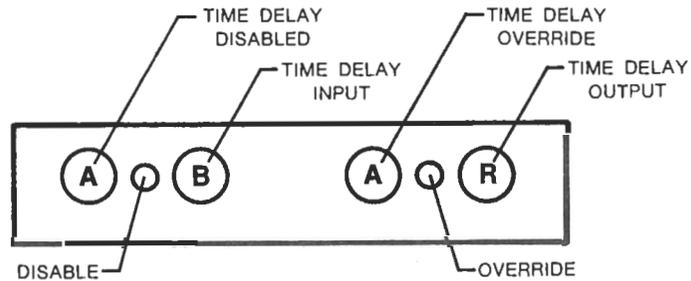
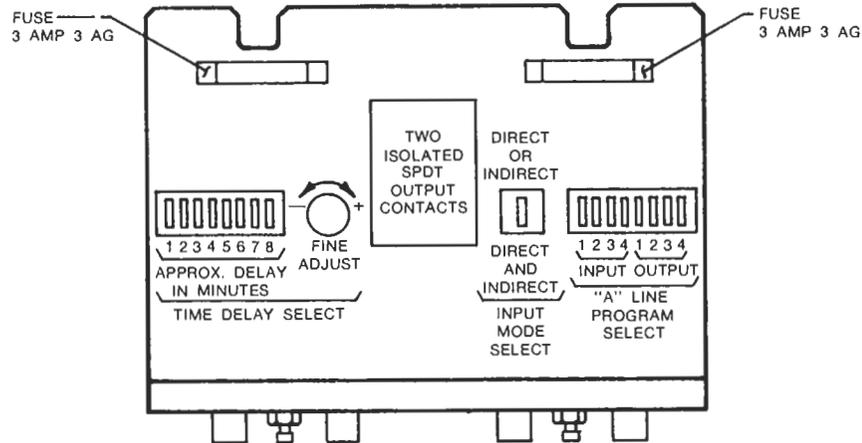
1. Input "DISABLE" Lamp
2. Time Delay "INPUT" Lamp
3. Manual "OVERRIDE" Lamp
4. Time Delay "OUTPUT" Lamp

**Control Switches:**

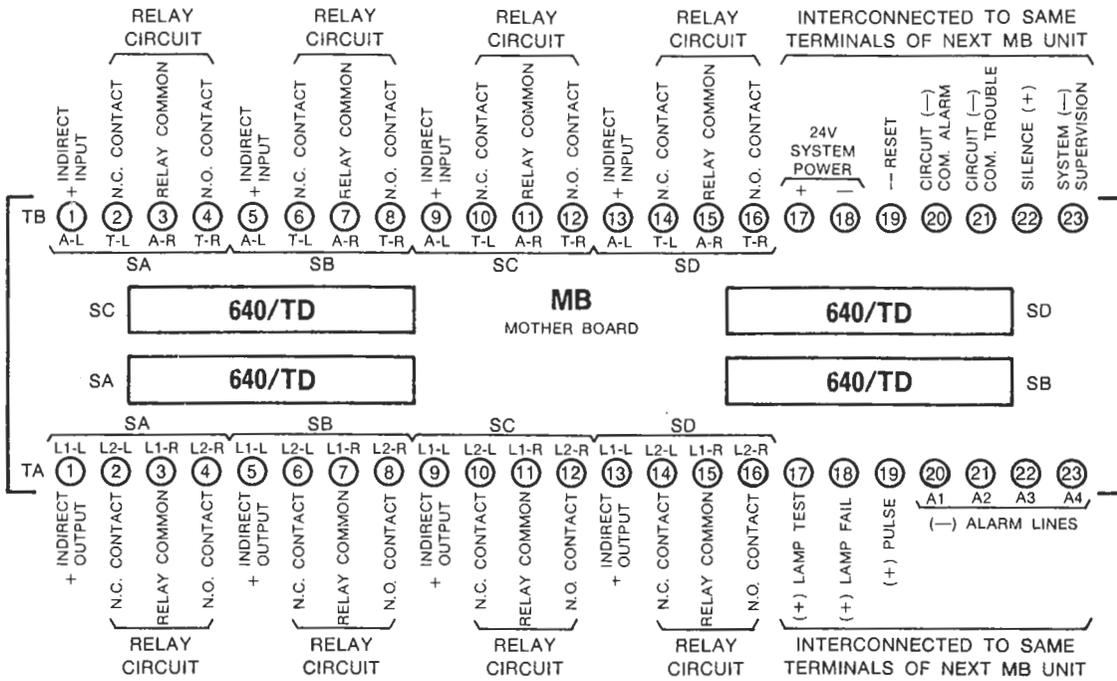
1. Input "DISABLE" Switch
2. Manual "OVERRIDE" Switch

**Operating Functions:**

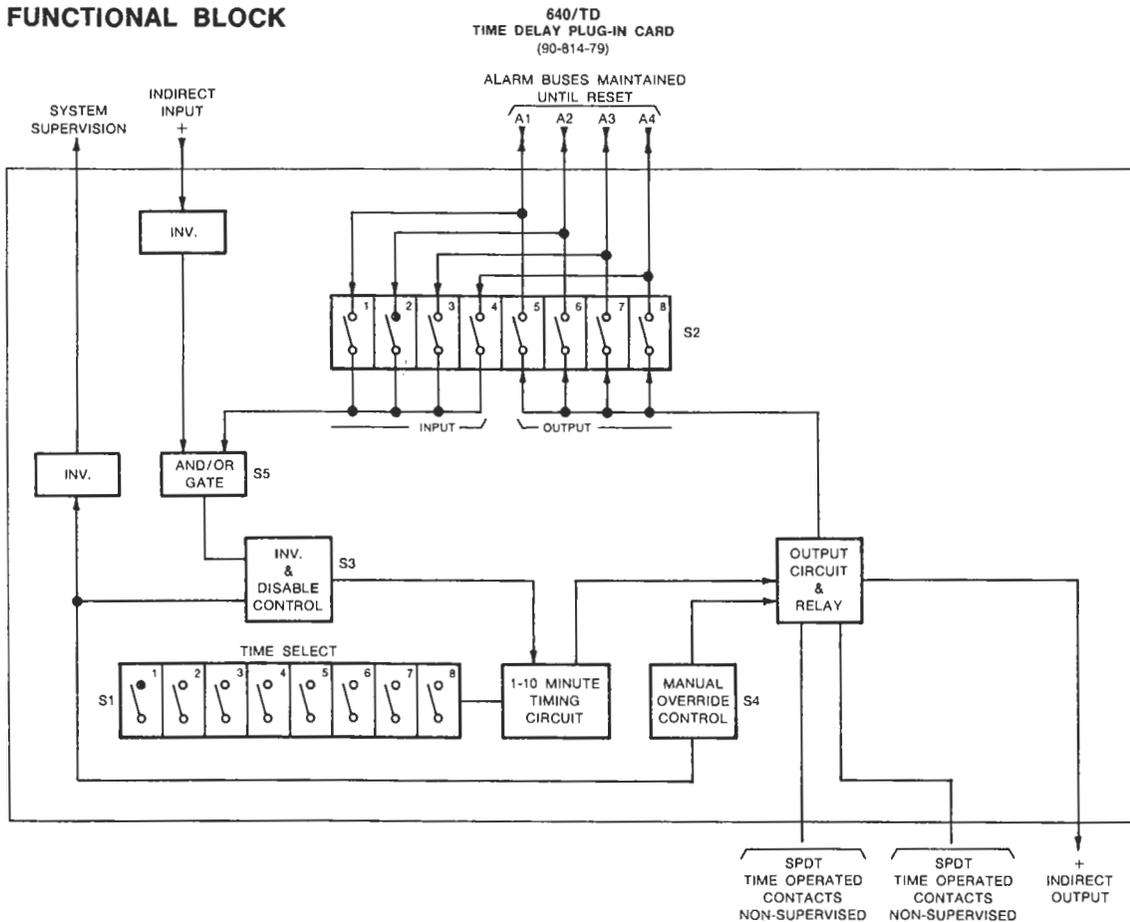
1. Selectable time delay of 1, 2, 3, 4, 5, 6, 7, or 8 minutes.
2. Programmable inputs from alarm lines A1, A2, A3 and A4 plus indirect input terminal.
3. Programmable outputs allow any unused alarm lines A1, A2, A3, and A4 to be selected and/or indirect output terminal.
4. Two electrically isolated and fused SPDT dry contacts rated to 3 amps @ 28 VDC or 120 VAC, resistive, operate when circuit times out or override switch is operated.
5. Alternate action pushbutton switches for disable and override are provided for manual control.
6. "AND" Gate may be selected into circuit causing time delay to start only when an alarm line input and an indirect input are simultaneously present.



# FIELD CONNECTION



# FUNCTIONAL BLOCK



**PROGRAMMING**

The eight switches of S1 allow selection of timing delay. When all switches are open, a delay of approximately ten minutes will occur. When a switch is closed, a delay of 1 through 8 minutes will occur, depending upon which switch is closed. Example: closing Switch No. 3 will cause a delay of approximately three minutes.

The eight switches of S2 provide input and output programming. Switches 1 through 4, when in the closed position, select the desired alarm line input from A1, A2, A3 or A4. Switches 5 through 8, when in the closed position, select the output to the desired alarm line, A1, A2, A3 or A4. Since both the input and output of the time delay plug are programmable, care must be exercised to keep the input and output on different alarm lines.

The indirect input terminal may be jumper connected to annunciator output terminals associated with particular input circuit (zones), common alarm or common trouble. The indirect output terminal may be jumper connected to indirect input terminals associated with particular output alarm or auxiliary control circuits. The indirect input and indirect output terminals may be used in lieu of or in addition to alarm lines A1 through A4.

The input mode select switch S5 has two positions—"DIRECT OR INDIRECT" or "DIRECT AND INDIRECT". In the "DIRECT OR INDIRECT" position an input from either the alarm lines or indirect input terminals will start the timing sequence. When in the "DIRECT AND INDIRECT" position, an input from the alarm lines plus from the indirect input terminals are necessary to start the timing sequence. If both are not present simultaneously, timing will not start.

**ELECTRICAL RATINGS**

Auxiliary relay contacts—24 VDC or 120 VAC @ 3.0 amp max. nonsupervised output.

Indirect output—Nominal 24 VDC @ 90 mA. MAX. non-supervised

Terminal connections are:

<b>Function</b>	<b>Terminals</b>
Indirect Input	A-L
Indirect Output	L1-L
Normally Closed Contact	T-L
Common Contact	A-R
Normally Open Contact	T-R
Normally Closed Contact	L2-L
Common Contact	L1-R
Normally Open Contact	L2-R

Relay common contacts are fused @ 3 amps.

Power requirements @ 24 VDC:

Normal Condition, No Input .....	0 mA
Power Fail, No Input .....	0 mA
Time Delay Running .....	52 mA
Manual Disable Operated .....	50 mA
Time Delay Operated .....	128 mA
Manual Override Operated .....	113 mA

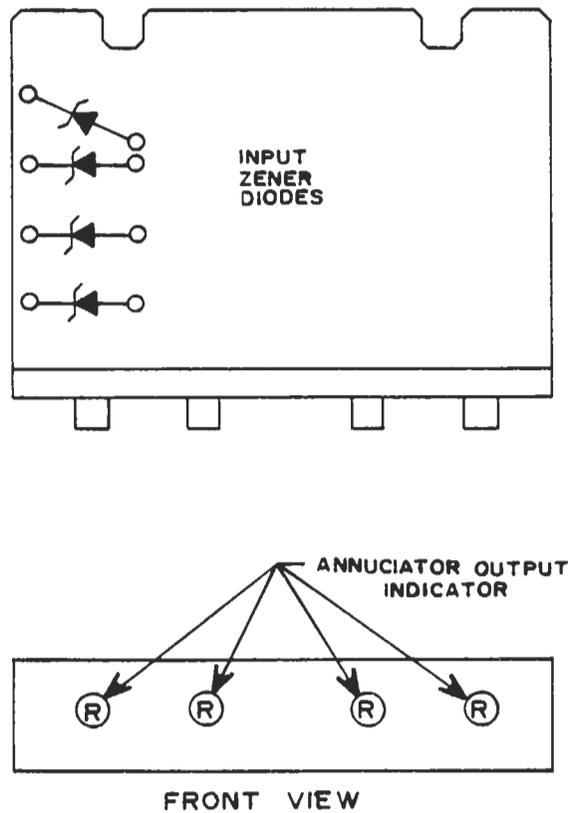
## 640/AN4 FOUR ZONE ANNUNCIATOR PLUG-IN CARD

The AN4 plug-in card assembly includes all the necessary circuits and visual indicators for four non-lock, non-supervised remote annunciator outputs.

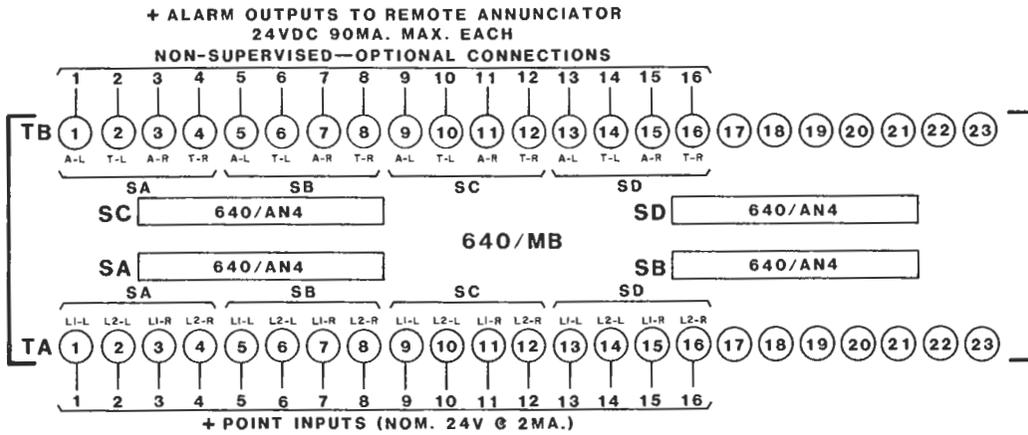
Visual Indicators include four red lamps; one per circuit.

Operating Functions:

1. Non-locking, non-supervised annunciator outputs from amplified inputs.
2. Class "A" compatible when used in conjunction with the S2A plug-in card.
3. Lamp test/lamp fail circuits become active when a 640/COM-B is used within the system.

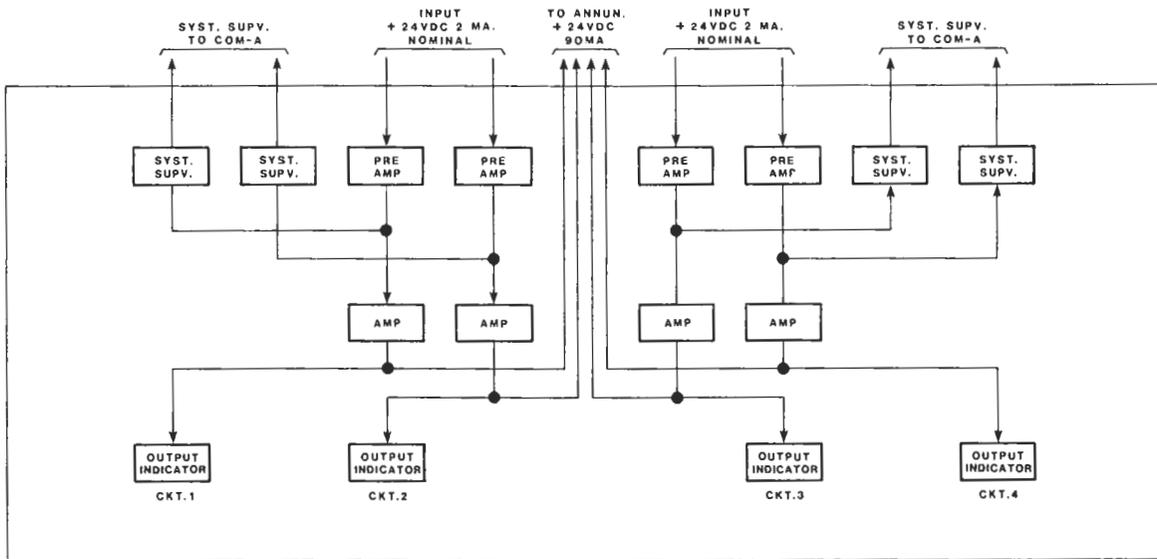


# FIELD CONNECTIONS



**DESCRIPTION:** The 640/AN4 IS A NON-LOCKING, NON-SUPERVISED ANNUNCIATOR CARD WITH AMPLIFIED INPUTS  
IT HAS PROVISION FOR LAMP FAIL AND LAMP TEST WHEN USED WITH A 640/COM-B COMMON CARD

## FUNCTIONAL BLOCK DIAGRAM



## ELECTRICAL RATINGS

Power requirements @ 24 VDC (per plug-in card)  
Card produces a non-supervised + 24 VDC 90 MA max output to a remote annunciator from a nominal + 24 VDC 2 MA input.

Normal and Standby Current, 6 ma @ 24 VDC\*

One circuit tripped, 55 ma @ 24 VDC\*

Four circuits tripped, 190 ma @ 24 VDC\*

\*with no external load.

## 640/S1A INPUT CIRCUIT PLUG-IN CARD

The S1A plug-in card assembly includes all necessary circuits and visual indicators for one Class "A" input circuit (zone). One 16 point DIP socket is mounted on the plug-in card and will accept either of two programming modules.

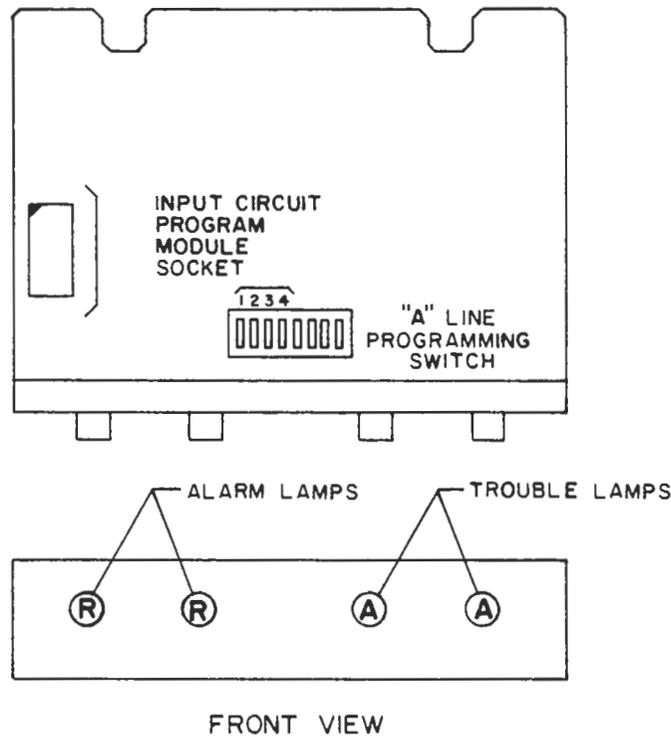
Programming modules include:

1. 640/OS for standard Class "A" input circuits.
2. 640/OS-S for Class "A" on which are connected loop powered smoke detectors as well as non-powered devices.

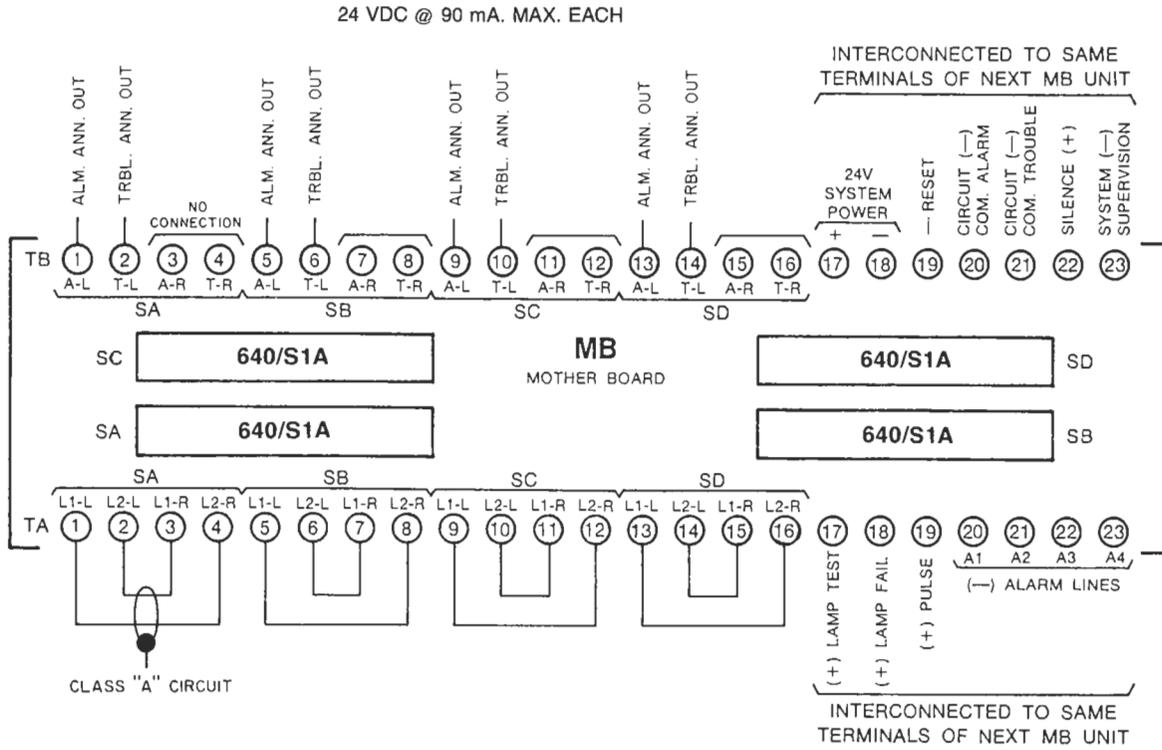
The visual indicators include two amber trouble lamps and two red alarm lamps.

Operating Functions:

1. Lamp test/Lamp fail circuits which become active when a 640/COM-B is used within the system.
2. Resounding common trouble and common alarm buses.
3. Outputs for remote trouble and alarm annunciator lamps, non-supervised.
4. Locking circuits for alarm and trouble.
5. Programming switches allow any combination of alarm lines A1, A2, A3, and A4 to be selected for connection from the circuit (zone) into the alarm line buses.
6. Alarm line outputs are maintained until reset.



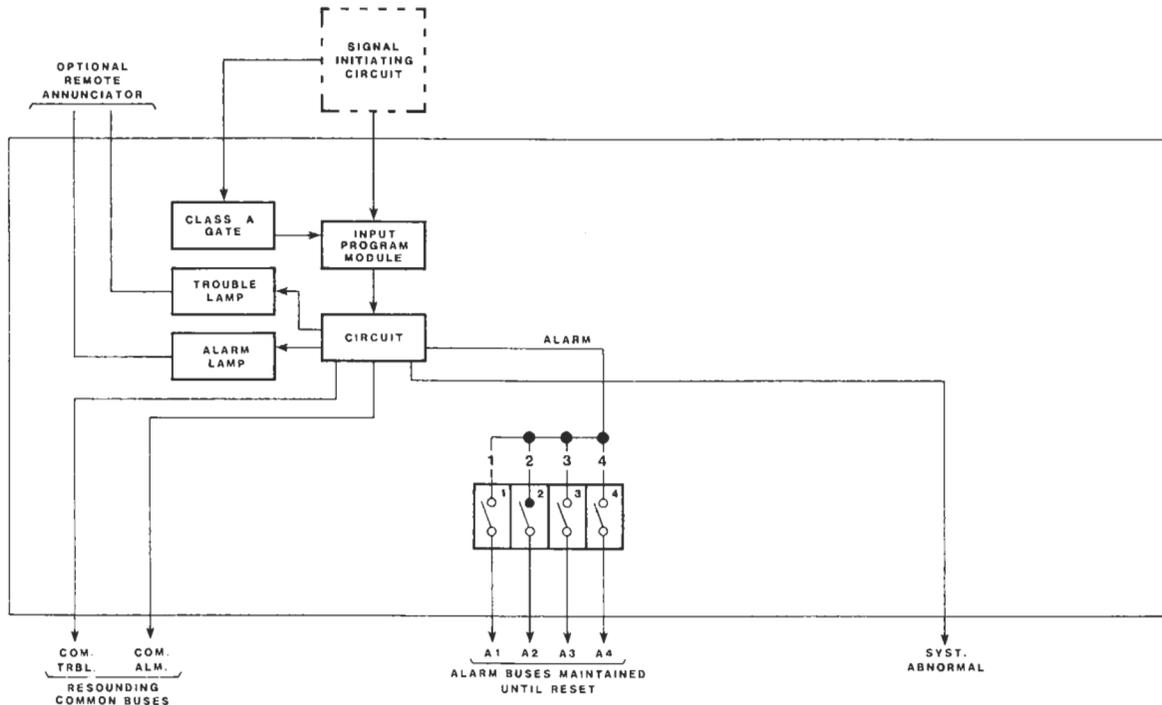
# FIELD CONNECTIONS



# FUNCTIONAL BLOCK

FUNCTIONAL BLOCK DIAGRAM

640/S1A  
INPUT PLUG-IN CARD



## PROGRAMMING

There are four active program switches on each 640/S1A plug-in card. BASIC SYSTEM OPERATION does not make use of the switches however, they are necessary for many of the alternate functions such as non-silencing waterflow alarms, maintained reverse polarity alarm transmission, zoned alarm output circuits and similar situations.

- Switch 1 connects A1 alarm bus
- Switch 2 connects A2 alarm bus
- Switch 3 connects A3 alarm bus
- Switch 4 connects A4 alarm bus

Program switches, when in the ON position, connect alarm output of input circuit into selected internal alarm bus, A1, A2, A3 and/or A4.

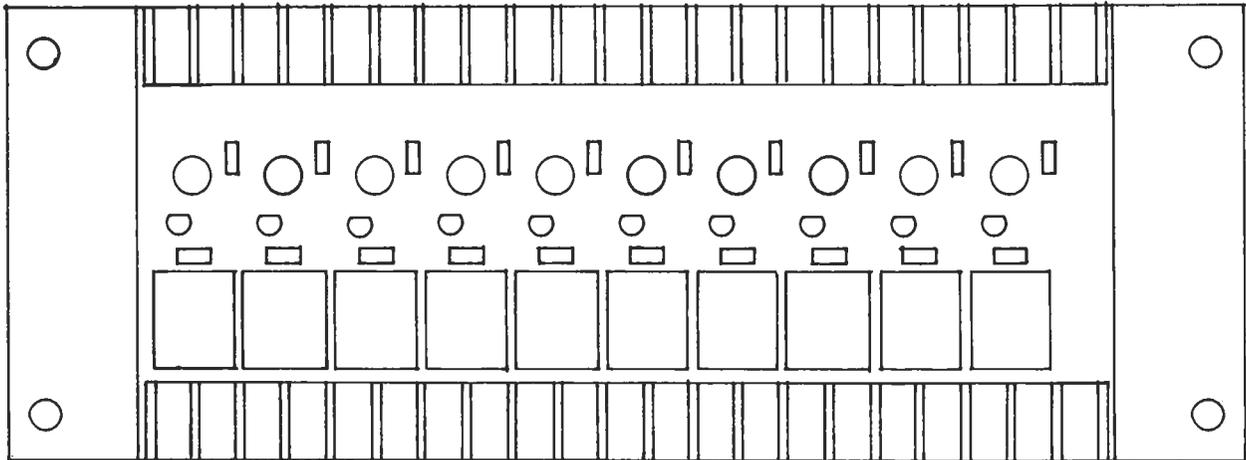
## ELECTRICAL RATINGS

Power Requirements @ 24VDC (per plug-in card)

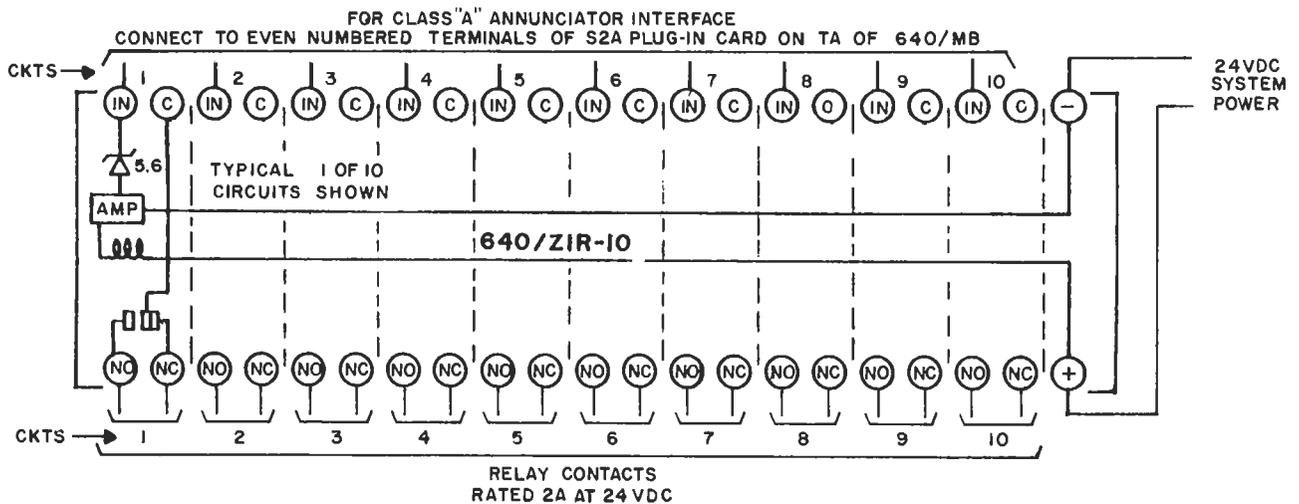
with Program modules	640/OS	640/OSS
Normal & Standby Power Condition	6.11 mA	9.78 mA
Trouble	99.1 mA	102.2 mA
Alarm	98.4 mA	101.9 mA

## 640/ZIR-10 INTERFACE RELAY BOARD ASSEMBLY

The ZIR-10 has ten individual relays, each with a zener diode input and SPDT 2 amp. dry contacts. A positive 12 to 30 volt input may actuate an individual relay or is programmable for activating two, three or four adjacent relays. The ZIR-10 mounts in place of a 640/MB Mother board and provides a method to drive remote annunciator zone lamps from Class A circuits of 640/S2A plug in cards.



## FIELD CONNECTION/FUNCTIONAL BLOCK



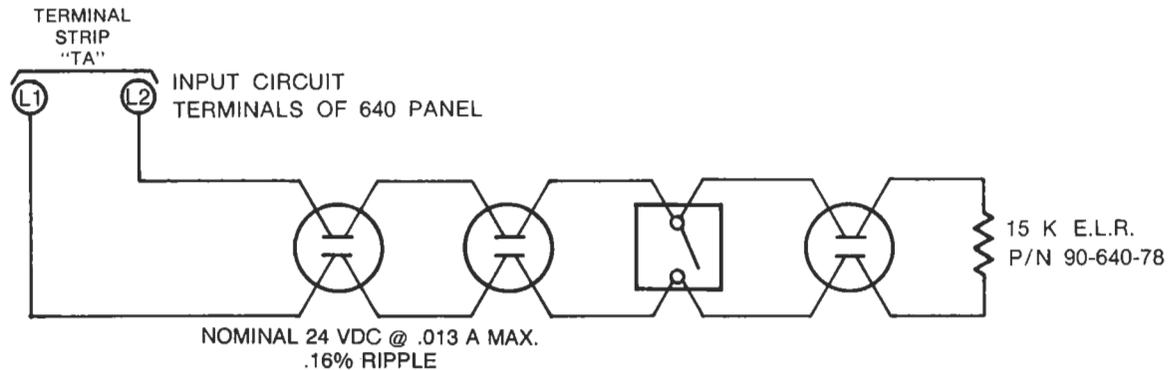


**INSTALLATION AND CHECKOUT**

Field wiring must be in accordance with National Electric Code, NFPA Pamphlet 70 and Local Codes having jurisdiction. **Minimum** wire sizes shall be 18 AWG for signal input circuits, 16 AWG for alarm and auxiliary output circuits and 14 AWG for AC power connection. Typical field wiring connection details are provided as a guide in wiring of input devices, alarm signaling devices and power connections. Refer to applicable wiring details for the particular devices being employed.

Necessary wire sizes should be calculated based on actual circuit load and length of run.

**FIELD WIRING**

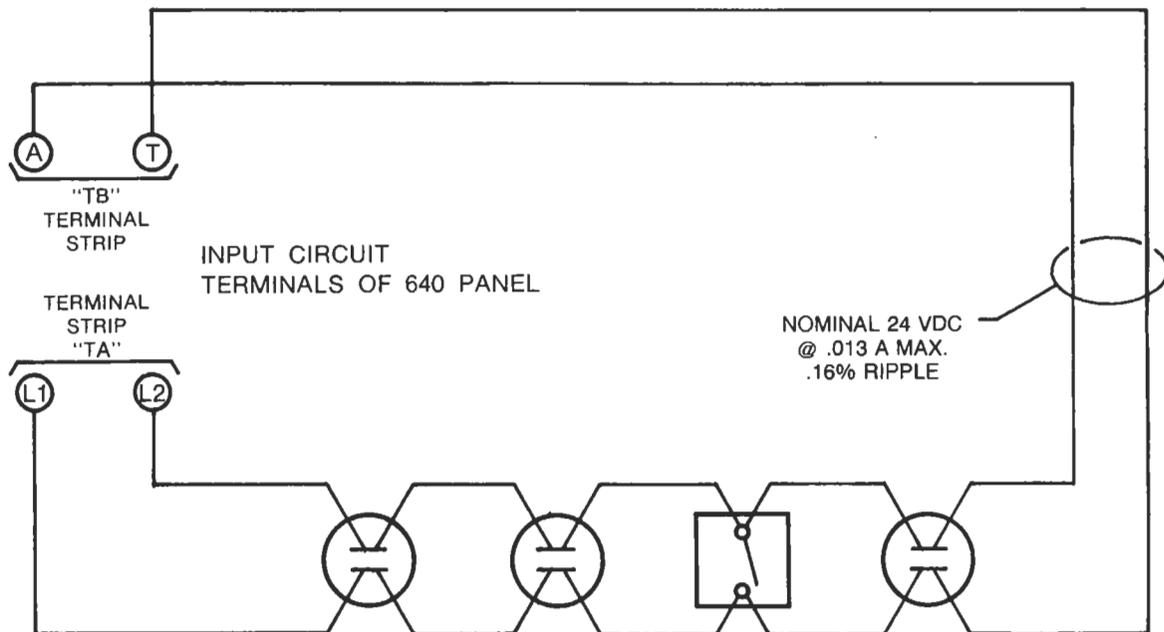


**SUPERVISED AUTOMATIC DETECTOR AND/OR MANUAL FIRE ALARM STATION CIRCUIT, NON-CODED.**

FOR USE WITH S2 OR S2C PLUG-IN CARD AND 640/OS MODULES OR S2B PLUG-IN CARD.

Manual Station and Automatic Heat Detector, Class "B"

Drawing 99-049-78

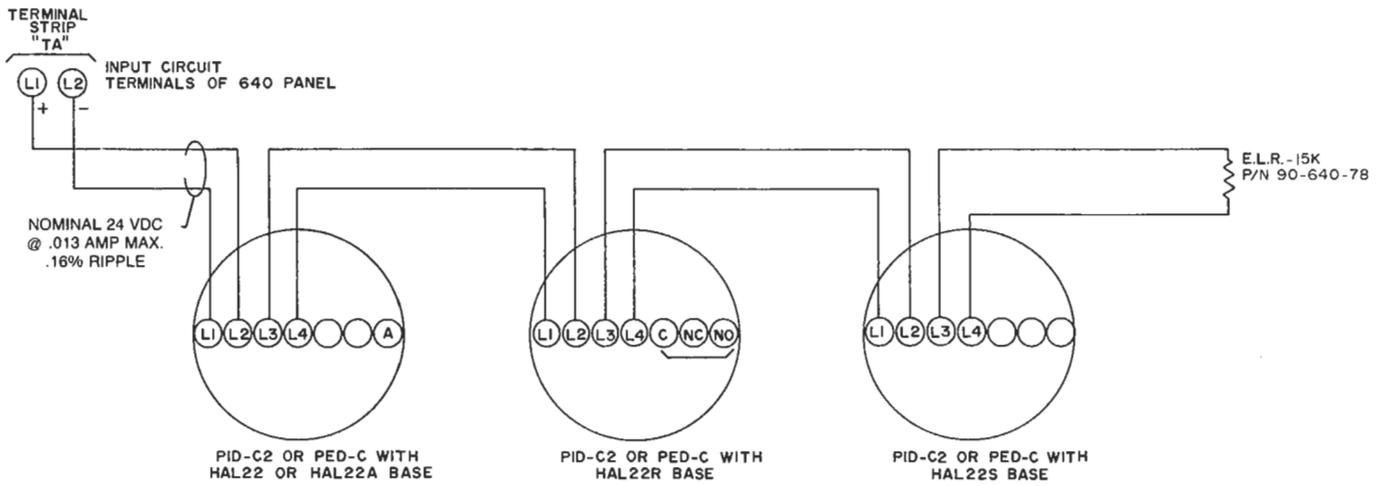


**SUPERVISED AUTOMATIC DETECTOR AND/OR MANUAL FIRE ALARM STATION CIRCUIT, NON-CODED.**

FOR USE WITH S2A PLUG-IN CARDS AND 640/OS MODULES.

Manual Station and Automatic Heat Detector, Class "A"

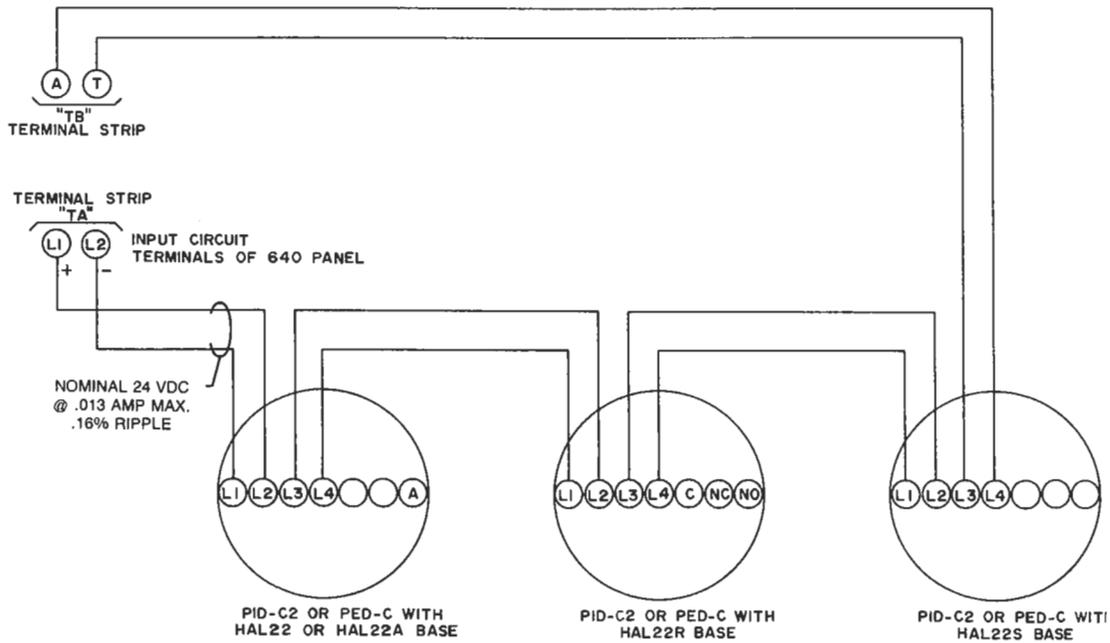
Drawing 99-050-78



SUPERVISED IONIZATION OR PHOTOELECTRIC DETECTOR CIRCUIT, NON-CODED.  
 SUITABLE FOR USE WITH S2 OR S2C PLUG-IN CARDS AND 640/OSS MODULES-20 DETECTORS MAX., CLASS "B".

Ionization Detectors, Class "B"

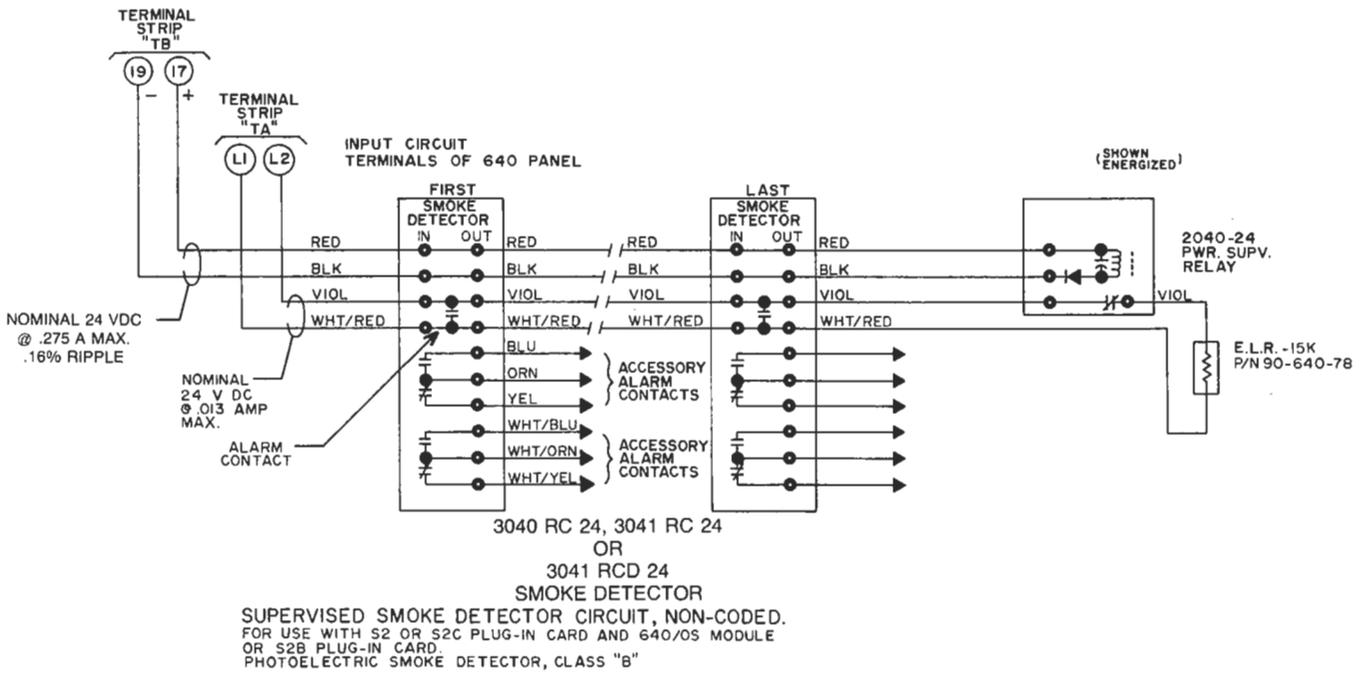
Drawing 99-507-82



SUPERVISED IONIZATION OR PHOTOELECTRIC DETECTOR CIRCUIT, NON-CODED.  
 SUITABLE FOR USE WITH S2A PLUG-IN CARD AND 640/OSS MODULES-20 DETECTORS MAX., CLASS "A".

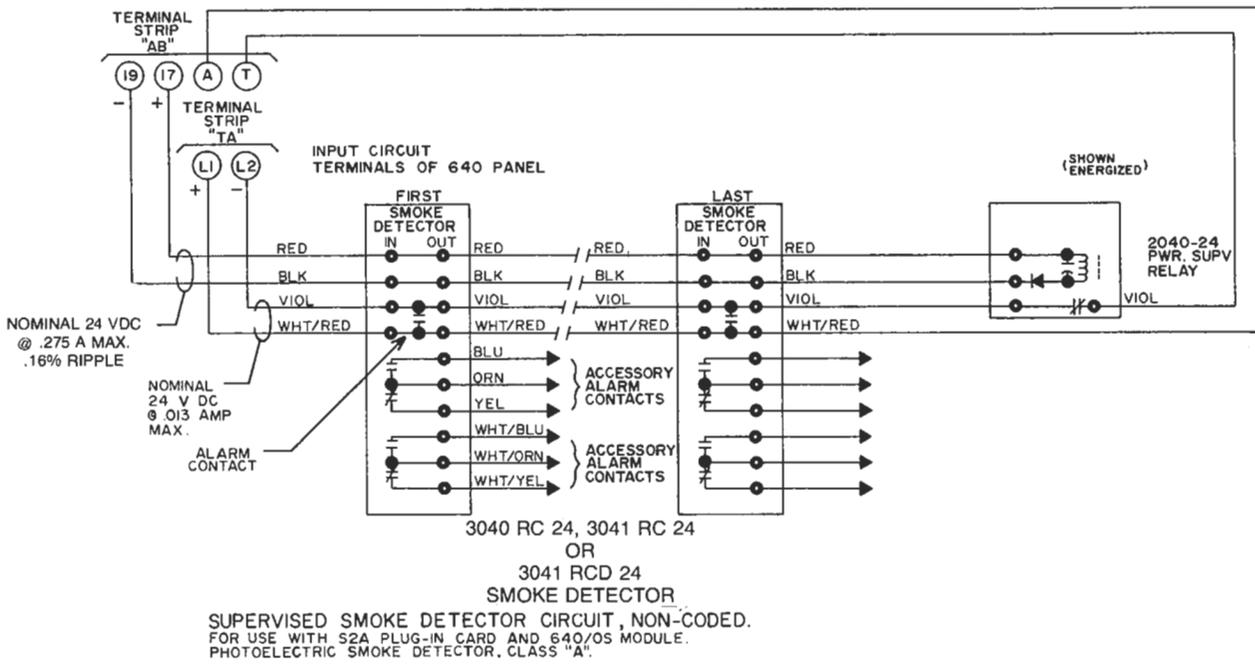
Ionization Detectors, Class "A"

Drawing 99-506-82



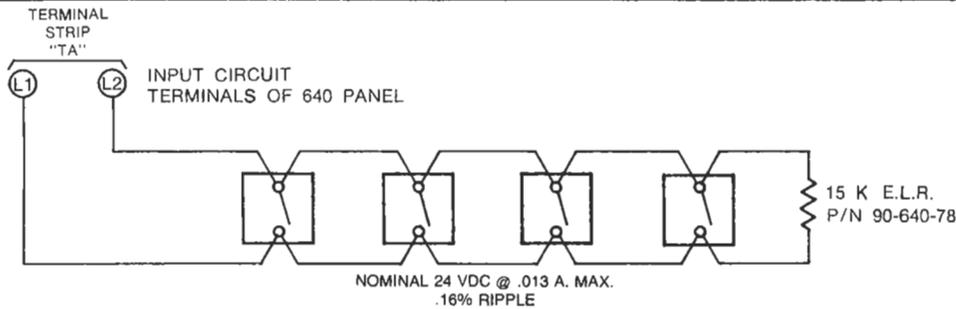
Photoelectric Smoke Detectors, Class "B"

Drawing 99-505-82



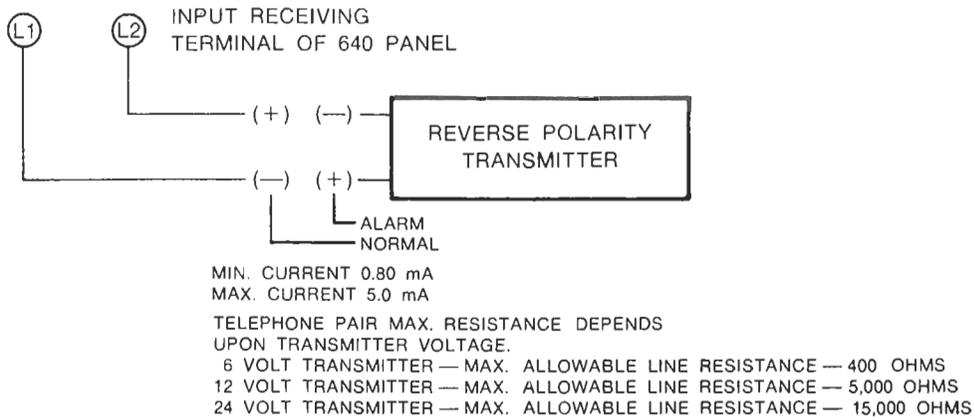
Photoelectric Smoke Detectors, Class "A"

Drawing 99-504-82



Sprinkler Supervisory Detection Circuit, Class "B"

Drawing 99-078-73

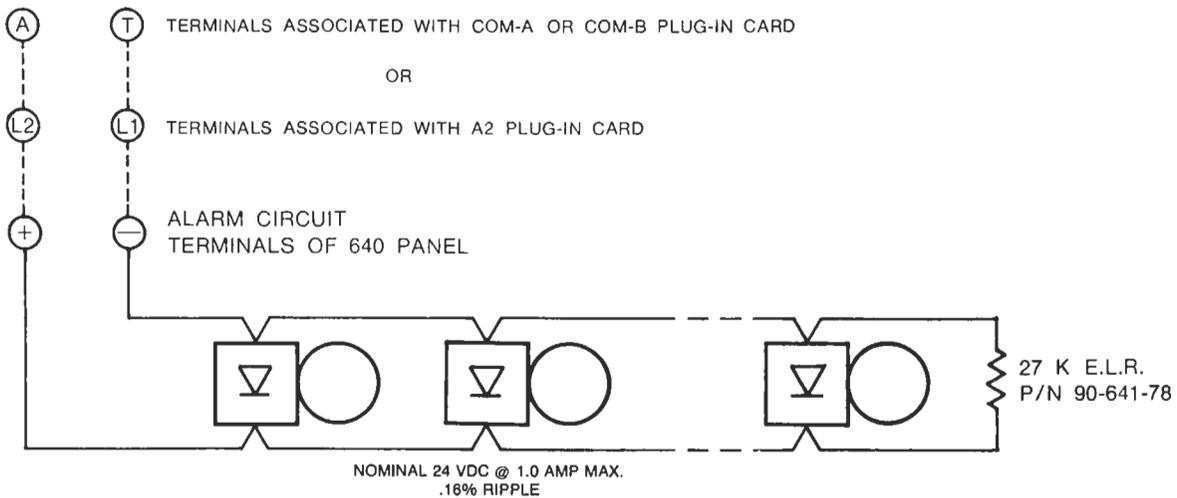


**SUPERVISED REVERSE POLARITY RECEIVING CIRCUIT, NON-CODED.**

FOR USE WITH S2 OR S2C PLUG-IN CARDS & 640/RP MODULES.

Reverse Polarity Receiving Input Connection

Drawing 99-056-78

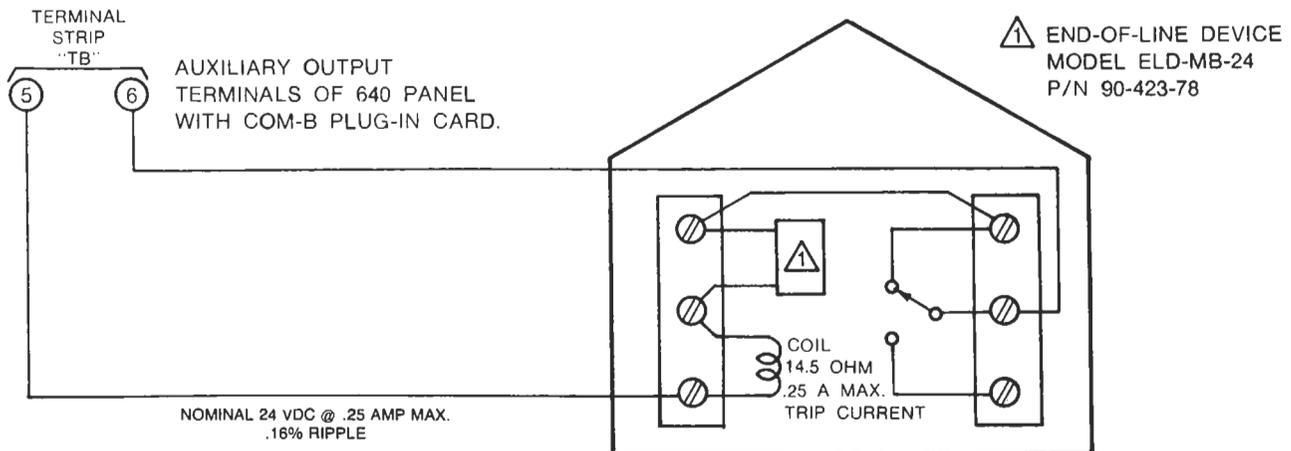


**SUPERVISED ALARM CIRCUIT — REQUIRES POLARIZED DEVICES**

SUITABLE FOR USE WITH MODEL 34 24 VDC ALARM HORNS, MODEL 46 SERIES 24 VDC ALARM BELLS, MODELS 7001 AND 7002 SERIES 24 VDC STROBE HORNS.

Audible Alarm Circuit, Polarized Supervision

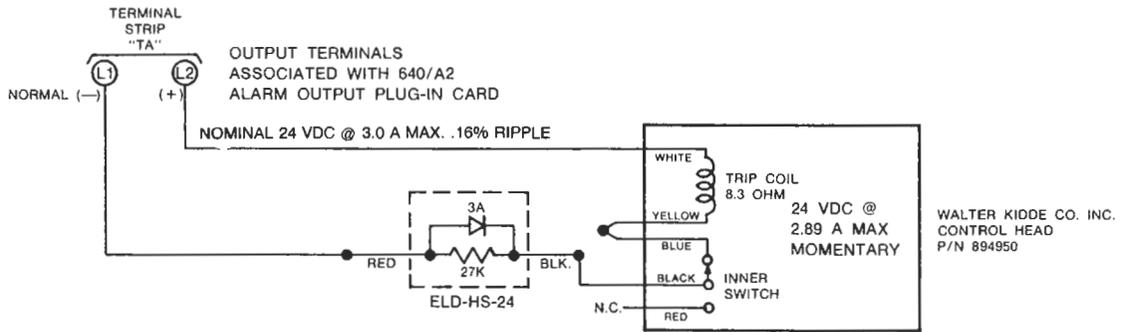
Drawing 99-055-78



**SUPERVISED POLARIZED LOCAL ENERGY TRIP MUNICIPAL MASTER BOX CIRCUIT.**

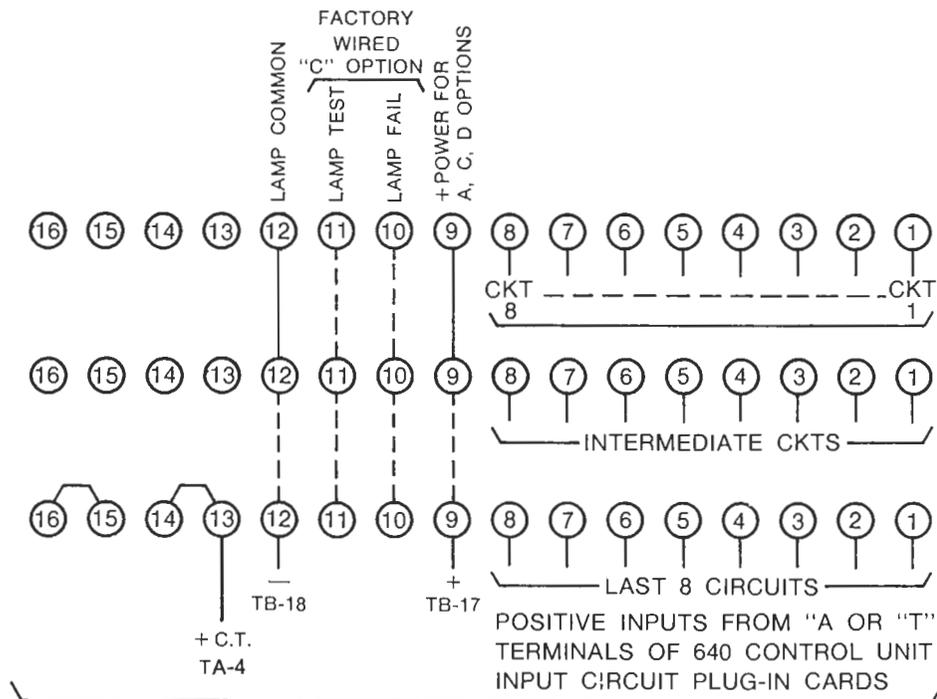
Master Box Connection Detail

Drawing 99-048-78



**SUPERVISED POLARIZED HALON SOLENOID CONTROL CIRCUIT**  
**Halon Solenoid Connection**

Drawing 99-072-78



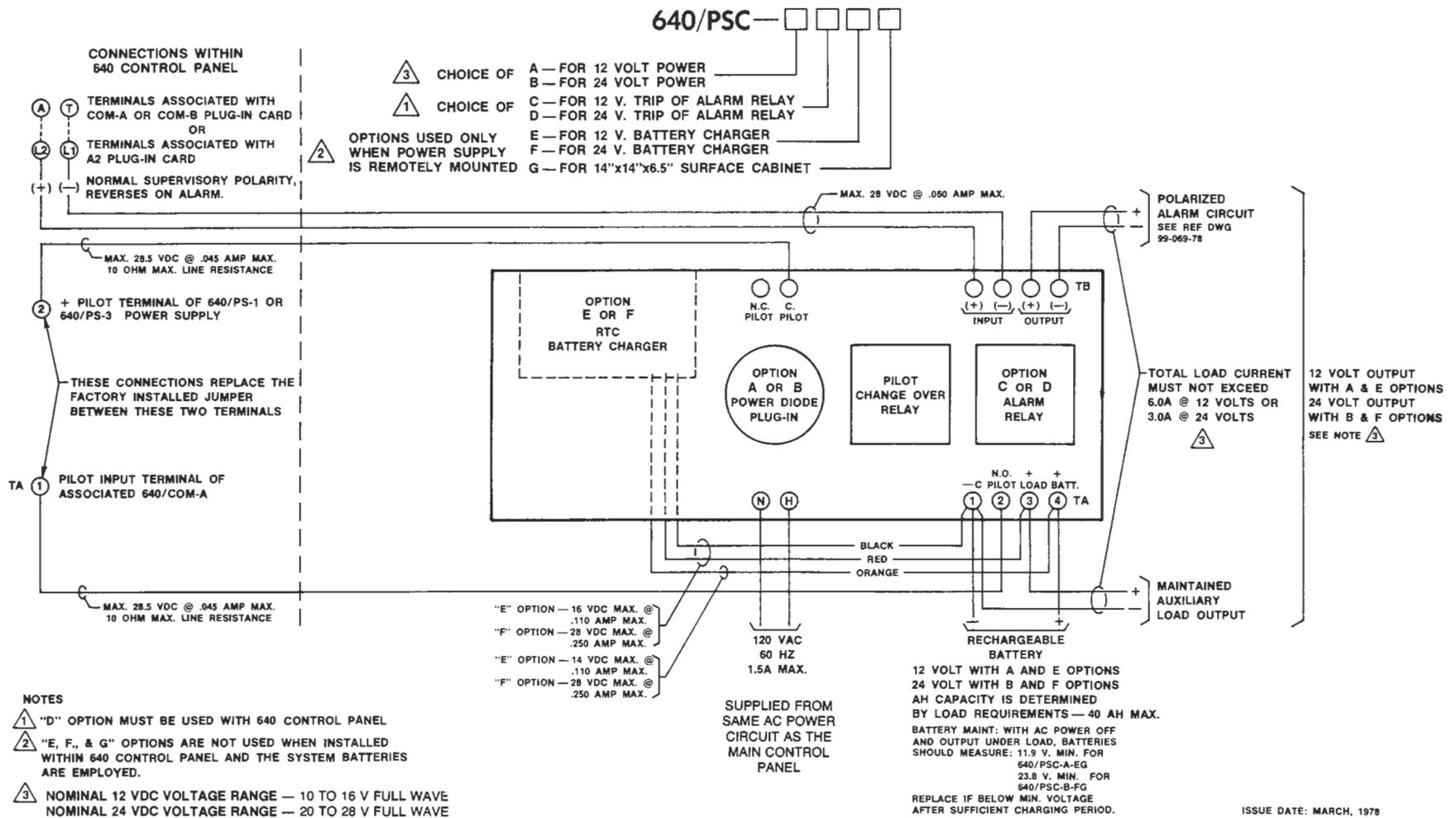
SEE REFERENCE DRAWING 99-035-77  
 FOR 640 SYSTEM CONTROL UNIT

**NOTES:**

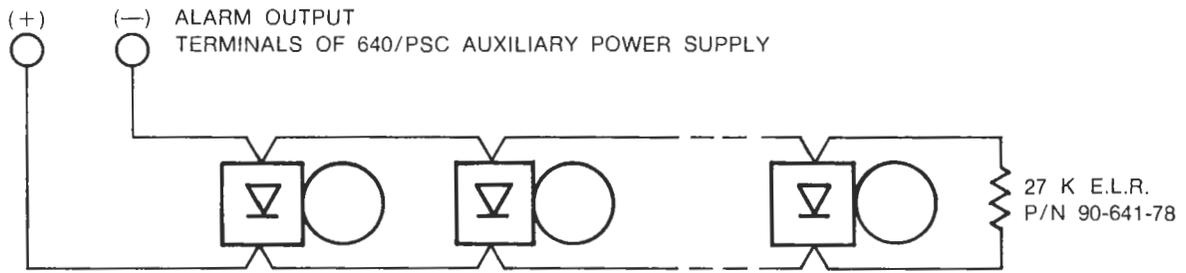
1. BW SERIES MAY BE WITH OR WITHOUT ANY COMBINATION OF OPTION SUFFIXES A, B, C, OR D.

BW Series Annunciator Interconnection Detail

Drawing 99-057-78



640/PSC Power Supply Connection Detail



NOMINAL 12 FW @ 6.0 AMP MAX.  
 NOMINAL 24 FW @ 3.0 AMP MAX.

**SUPERVISED ALARM CIRCUIT — REQUIRES POLARIZED DEVICES**

SUITABLE FOR USE WITH MODEL 34, 12 OR 24 VDC ALARM HORNS,  
 MODEL 46 SERIES 12 OR 24 VDC ALARM BELLS, MODELS 7001 AND  
 7002 SERIES 12 OR 24 VDC STROBE HORNS.

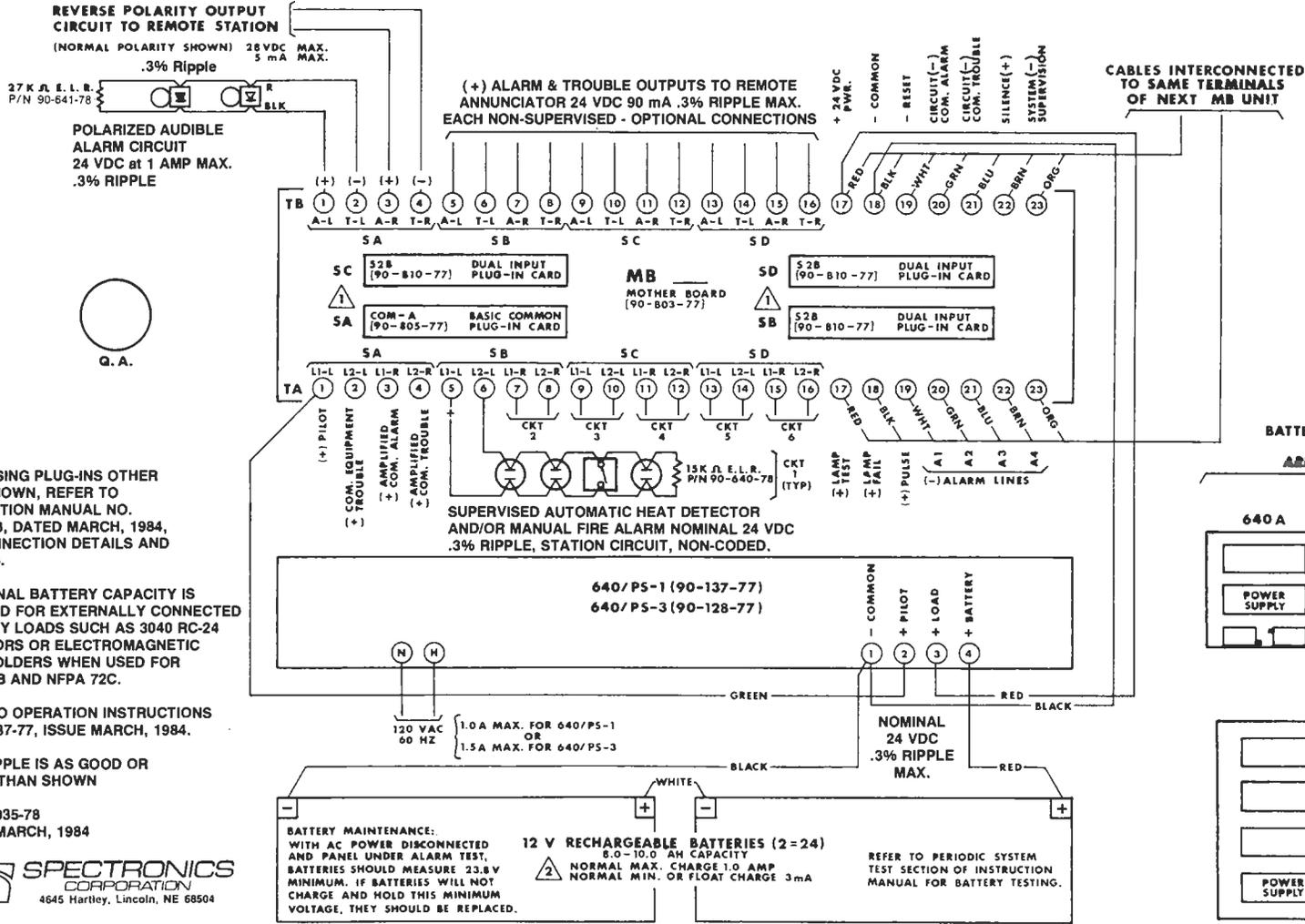
640/PSC Alarm Output Circuit

Drawing 99-069-78

# 640 SYSTEM

INTENDED FOR CONNECTION TO A POLARITY REVERSAL CIRCUIT OF A REMOTE STATION RECEIVING UNIT HAVING COMPATIBLE RATINGS.

MULTIPLE CIRCUIT FIRE ALARM CONTROL PANEL FOR NFPA 72A LOCAL, NFPA 72B AUXILIARY, NFPA 72C REMOTE STATION PROTECTED PREMISES AND NFPA 72C REMOTE STATION RECEIVING.



**NOTES:**

- 1 WHEN USING PLUG-INS OTHER THAN SHOWN, REFER TO INSTRUCTION MANUAL NO. 99-067-78, DATED MARCH, 1984, FOR CONNECTION DETAILS AND RATINGS.
- 2 ADDITIONAL BATTERY CAPACITY IS REQUIRED FOR EXTERNALLY CONNECTED STAND-BY LOADS SUCH AS 3040 RC-24 DETECTORS OR ELECTROMAGNETIC DOOR HOLDERS WHEN USED FOR NFPA 72B AND NFPA 72C.
- 3 REFER TO OPERATION INSTRUCTIONS NO. 99-037-77, ISSUE MARCH, 1984.
- 4 % OF RIPPLE IS AS GOOD OR BETTER THAN SHOWN

DWG. NO. 99-035-78  
ISSUE DATE: MARCH, 1984



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37-048-78



640 System Typical Field Wiring Connections

Drawing 99-035-78

## CONTROL PANEL CHECKOUT

**IMPORTANT:** Prior to installing plug-in cards, applying AC power or connecting batteries, assure all wiring is free of grounds, shorts or opens. Verify end-of-line resistor values and proper polarity of polarized devices with the aid of an ohm meter. Once all field wiring is checked and properly terminated within the control panel, proceed with final set-up of the Control Panel.

1. Install plug-in cards in appropriate sockets of the mother board(s). (Do not remove factory installed jumper from any unused socket. These jumpers should be removed from the sockets only when plug-in card supervision is desired. This causes a constant sounding of the trouble buzzer whenever a card is removed from its socket.)
2. Apply AC power and momentarily depress the "RESET" switch. (The "Power Trouble" Lamp should be on at this point and trouble buzzer will be silenced.)
3. Install and connect emergency batteries. (Observe polarity--Red lead connects to battery positive and black lead connects to battery negative.)
4. Once the batteries are connected, the panel should be in a Normal Condition with only the green "Power Pilot" Lamp on.

## TESTING

1. **NORMAL CONDITION**
  - a. Green Power Pilot Lamp ON and all audible devices are silent.
  - b. Check Power Supply Terminals 1(-) and 3(+) for 28.0 volts D.C.
  - c. Reverse Polarity Transmitter of COM-A is applying approximately 28 volts to terminals TB3(+) and TB4(-). When COM-B is used, terminals TB7(+) and TB8(-) will also be 28 volts.
2. **POWER FAIL** is indicated by the green "Power Pilot" Lamp being off and sounding of the trouble buzzer. Momentarily depressing the "Silence" switch will cause the trouble buzzer to be silenced and the "Power Trouble" Lamp to light.
  - a. Removal of AC power causes the above indication and automatically returns to normal upon restoration of AC.
  - b. Removal of the battery fuse causes the trouble buzzer to sound until silenced at which time the "power trouble" Lamp turns ON. The Pilot Lamp remains lit during this condition.
  - c. Disconnecting a battery lead causes the green "power pilot" to go off and the trouble buzzer to sound until silenced at which time the "power trouble" lamp is lit. Reconnecting the battery lead automatically returns panel to normal.
  - d. Reverse polarity transmitter(s) terminals should read zero volts during any power fail condition.
3. **LAMP FAIL/LAMP TEST** (available when COM-B is used)
  - a. All input circuit trouble and alarm lamps (except alarm lamps of S2C plug-in card) will be lit while "Lamp Test" switch is depressed.
  - b. A burned out trouble lamp or both alarm lamps of a circuit will be indicated by the "Lamp Fail" light flashing and the trouble buzzer sounding until silenced. Replace any faulty lamps, reinstall proper colored lens cap and test.
4. **GROUND FAULT** (available when COM-B is used) is indicated by a flashing "Ground Fault" lamp and sounding of the trouble buzzer until silenced.
  - a. The ground fault circuit detects a ground of 1,000 ohms or less on all field wiring.
  - b. Terminal TA5 of mother board in which COM-B is installed in socket SB must be connected to a good earth ground.
  - c. Momentarily connect a 1,000 ohm resistor between TA5 and any terminal having connected field wiring to simulate a ground on the system. The fault will be indicated both visually and audibly. Removal of ground condition will allow panel to automatically return to normal.
  - d. Reverse polarity transmitter will send trouble during ground fault condition.

5. TROUBLE CONDITIONS (usually a result of abnormal field wiring or faulty connections of any supervised circuit)
  - a. Signal input circuits are tested by disconnecting one side of the circuit wiring from its input terminal. This results in the yellow circuit trouble lamp associated with that zone being lit and the trouble buzzer sounds until silenced. Reconnecting the wiring and depressing the "Reset" switch will return the panel to normal.
  - b. Alarm output circuits of COM-A, COM-B and A2 plug-in cards are tested by shorting the output circuit terminals and/or disconnecting one side of the circuit wiring from its output terminal. This results in the particular output trouble lamp being lit and the trouble buzzer sounding until silenced. Restoring the wiring will automatically return the control panel to normal.
  - c. All supervised circuits should be tested per above paragraphs(a) or(b).
  - d. Reverse polarity transmitter will send trouble during any trouble condition.
  
6. ALARM CONTROL (a result of shorted input circuit wiring or a connected initiating device contacts being closed)

An alarm is indicated by the two red zone lamps being lit and the audible alarm devices sounding.

  - a. Plug-in cards S2, S2A, S2C, or S2D with 640/OS or 640/OSS program modules and plug-in card S2B are alarm tested by momentarily connecting a 1,000 ohm resistor across the input circuit terminals. This results in the red circuit alarm lamps associated with that zone being lit, the alarm output lamp(s) being lit, the alarm devices sounding until silenced and the reverse polarity transmitter(s) operating causing terminal TB3 to become negative and terminal TB4 to become positive. (COM-B transmitter sensing an alarm will cause terminal TB7 to become negative and terminal TB8 to become positive.) Removing the 1,000 ohm test resistor and operating the reset switch will return the control panel to normal.
  - b. Plug-in cards S2, S2C, or S2D with 640/RP Program Modules are alarm tested by reversing the normal polarity on the input terminals (normal polarity is negative on L1 and positive on L2). This results in both red circuit alarm lamps and yellow circuit trouble lamp associated with that zone being lit, trouble buzzer sounds, the alarm devices sound until silenced and the reverse polarity transmitter operates. Restoring the input polarity to normal and operating the reset switch will return the control panel to normal.
  - c. Operation of any signal initiating device will cause the same operation per paragraph (a) above and the alarm transmission of any remote transmitter will cause the same operation per paragraph (b) above.

## PERIODIC SYSTEM TESTS

Proper system operation is assured only by performing scheduled testing of the entire system including all connected devices and equipment.

1. Inform all concerned personnel and the Fire Department of your intended test and its approximate duration.
2. Check control panel--green pilot lamp should be lit.
3. Operate a signal initiating device and check that all alarm signals are functioning properly. Reset control panel to normal.
4. Remove AC power from control panel. Panel will go into a power failure mode and operate from emergency batteries.
5. With the AC power removed, conduct tests on all scheduled signal initiating devices, restoring each device and resetting the control panel after each device has been tested. Check to assure all alarm signals are functioning properly under emergency power.

**IMPORTANT:** During an alarm test (maximum load) measure the battery voltage. Fully charged batteries connected for 24 volt operation should measure 23.8 volts minimum.

6. Visually check all indicator lamps for operation. This will require disconnecting one side of the alarm circuit wiring from its terminals to check the audible trouble lamp(s). Reconnect wiring to terminal.
7. Reconnect AC power to control panel and check for normal condition.
8. Inform all concerned personnel and the Fire Department that your tests are complete and to respond to any alarms.



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