FIRE·LITE® ALARMS

Lamp Driver Module
LDM-32F
Instruction Manual

Fire Alarm System Limitations

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Installation Precautions

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

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

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

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

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

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

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

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

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

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

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

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

FCC Warning

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

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

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

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1. Introduction

General

The LDM Series Lamp Driver Modules, which consist of the LDM-32F master and LDM-E32F expander modules, are used to provide an interface to a custom graphic annunciator. The master module provides power and control for a maximum of three expander modules. Both these modules have output connectors which are used to drive lamps or LEDs and input connectors which are used for remote switch functions.

The Lamp Driver Modules may be connected to an MS-9200, MS-9600 or Sensiscan 2000 fire alarm control panel (FACP) to provide remote annunciation of the following:

- General system status:

General alarm	Municipal tie status
General trouble	System silence
General supervisory	Alarm relay status
NAC output status	

- Alarm and trouble status of zones or individual points
- Alarm only status of zones or individual points

The modules also interface to remote control switches which may be used to provide:

- System reset
- System silence
- System acknowledge
- Temporary activation of NAC outputs
- Alarm relay activation
- Other control functions

The modules interface to the host fire alarm control panel via an EIA-485 communications bus circuit. A maximum of 32 LDM-32Fs may be connected to the power-limited EIA-485 bus, but if other types of devices are also connected to the EIA-485 bus, the maximum number of LDM-32Fs must be reduced by the total of such devices. The EIA-485 wiring distance must not exceed 6000 feet and cannot be T-tapped. Multiple LDM-32Fs may be used to annunciate duplicate information.

Power to the LDM-32Fs is typically provided by the host FACP and must be power-limited, regulated 24 VDC. An external UL listed battery backed power supply may also be used.

Note: Careful consideration must be given to system battery calculations when power for the LDM modules and lamps or LEDs is provided by the host FACP. Refer to the specifications in the appropriate FACP technical manual when making these calculations.

Features

LDM-32F

The Lamp Driver Module LDM-32F has 32 alarm lamp/LED driver outputs which sink current to system common (–) on activation. A single positive (+) voltage is required to supply total operating power for all lamps or LEDs when all drivers are activated. The LDM-32F provides a separate driver for system trouble and inputs for a local lamp test switch. A maximum of 16 external control switches may be wired to the LDM-32F. DIP switch SW3 is used to enable or disable the onboard piezo, enable remote switch functions, select a flashing LED function for new alarms and troubles, and other functions. Switch SW4 is used to configure the module to annunciate 32 alarms or 16 troubles. A green ON LINE LED flashes to indicate ongoing communications with the host FACP. One LDM-32F supports up to 3 LDM-E32F modules. The LDM-32F is supplied with 4 standoffs and screws for mounting to a CHS-4L chassis or custom backbox.
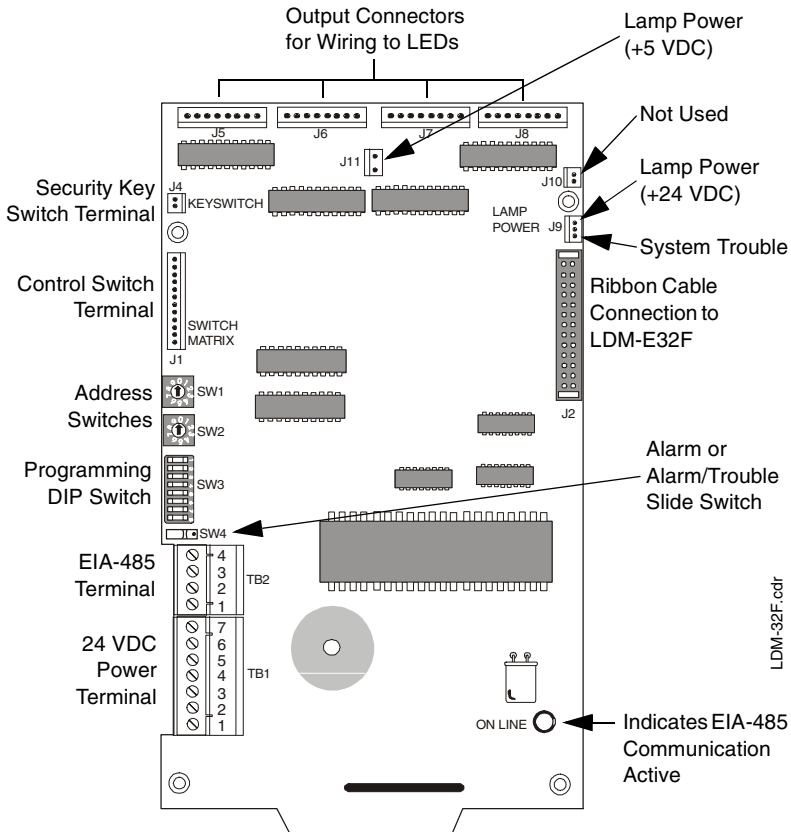
Figure 1 LDM-32F

LDM-E32F

Each LDM-E32F expander module provides 32 additional lamp/LED driver outputs from J5, J6, J7 and J8. The expander module has a slide switch SW4 for selecting alarm or alarm and trouble annunciation and an input for a local lamp test switch. In alarm mode, use only one LDM-32F and one LDM-E32F for a maximum of 56 alarm indicators and 8 system status indicators. In alarm/trouble mode, use one LDM-32F and three LDM-E32Fs for a maximum of 56 alarm indicators, 56 trouble indicators, 16 status indicators and 64 optional control switch inputs. Multiple sets of LDM-32Fs with LDM-E32F expanders increase the system annunciation capabilities beyond 56 zones or points. This is possible by various settings of address switches SW1 and SW2 on the LDM-32F (refer to Appendices). Each LDM-E32F is supplied with a 26-conductor expander ribbon cable, 4 standoffs and 4 screws.
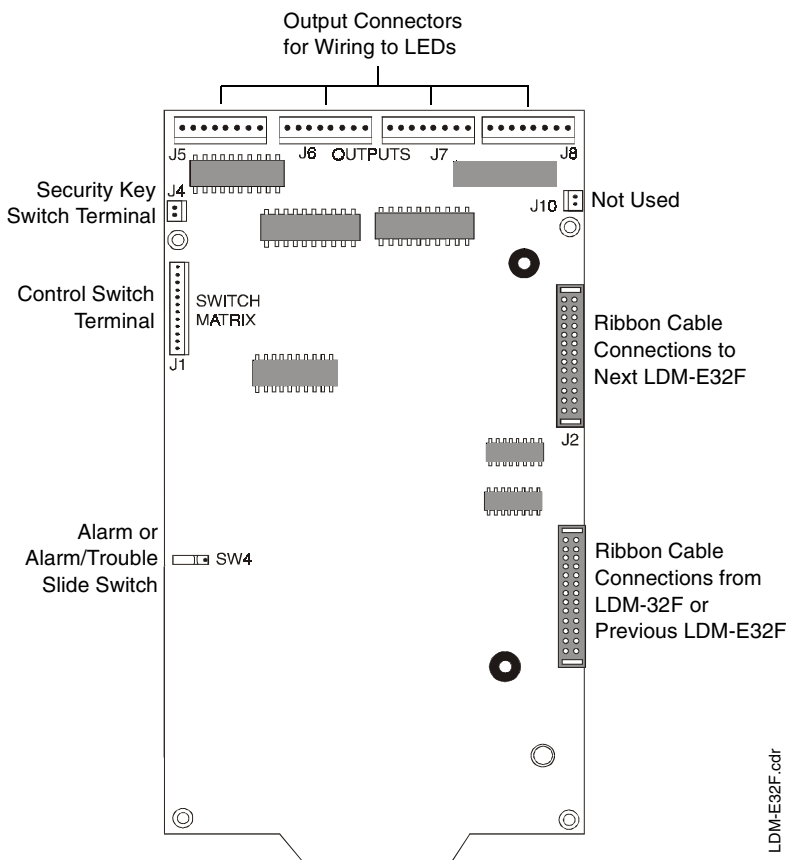
Figure 2 LDM-E32F

Connectors

J1 - Switch Matrix

Up to 16 optional external control switches and a local lamp test switch may be attached to the LDM-32F and LDM-E32F via J1 as shown in Figure 16 on page 24. In the Sensiscan 2000, the control switches may be mapped to the CPU function switches and <u>all</u> input and output modules. In the MS-9200 and MS-9600, the switches may only be used for remote Acknowledge, Reset, Drill and Silence. External switches must be momentary type.

J2 - Ribbon Cable Connection to J3

A single 26-conductor ribbon cable may be connected from J2 on the LDM-32F or LDM-E32F (see Figure 6 on page 18) to J3 on adjacent LDM-E32Fs. The ribbon cable carries power, ground and signaling from the master module to up to three expander modules. The preformed cables are supplied in fixed lengths of 24 and 48 inches.

J3 - Ribbon Cable Connection from J2

This connector supports a single 26-conductor ribbon cable from J2 of the previous LDM-32F or LDM-E32F. Refer to Figure 6 on page 18.

J4 - Key Switch Input

This two pin connector is provided as an input on LDM-32F and LDM-E32F modules for an external security key switch. Key switch contacts must be Normally Closed. The key switch prevents unauthorized use of remote control switches wired to J1.

J5, J6, J7 and J8 - Lamp/LED Driver Outputs

Each connector provides 8 driver outputs for a total of 32 drivers on each LDM-32F and LDM-E32F. Each driver is rated for a maximum of 30 volts and a current of 100 mA. Each bipolar Darlington open collector driver output must be current limited by an external resistor. 8-Point Shift and Flash functions are selectable by DIP switch SW3 (refer to "SW3 - Function DIP Switch" on page 13). Lamp/LEDs may function in 'alarm only' mode or 'alarm/trouble' mode as selected by switch SW4. Use the charts and examples shown in Appendices for additional information.

J9 - 24 VDC Lamp Power/System Trouble

Connector J9 is located only on the LDM-32F. J9 pin 1 provides 24 volts regulated power to all lamps/LEDs used in a custom graphic annunciator. The current limit of J9 pin 1 is dependent upon the current limits of the external power source being used. J9 pin 3 is a driver output for system trouble indication only. J9 pin 2 connects to system common.

J10 - Relay Expander

Not used on the Sensiscan 2000, MS-9200 and MS-9600.

J11 - 5 VDC Lamp Power

This connector is located only on the LDM-32F. J11 pin 1 provides 5 volts regulated power to all lamps/LEDs used in a custom graphic annunciator. The maximum current available from this output is 300 mA. This current is sufficient to power the maximum number of LEDs available with one LDM-32F and three LDM-E32Fs (from J5, J6, J7, J8 and one system trouble LED) provided the current rating per LED is 2 mA.

Switches

SW1 and SW2 - Address Switches

Two rotary BCD switches, located only on the LDM-32F, are used to set the LDM Series system address. Switch SW1 represents the 'ones' position and switch SW2 represents the 'tens' position of the address setting. In system configurations of 56 zones or less, the switches must be set to address 01 for all LDMs in the system. For configurations larger than 56 zones, multiple sets of LDMs are required with sequential addresses, the first LDM starting at address 01. Each incremental setting adds 64 zones/points to the system.

For example, an MS-9200 system requiring annunciation of alarms and troubles for all 198 points would require four sets of LDMs with addresses 01, 02, 03 and 04. The MS-9600 is an exception (refer to "Appendix C: MS-9600" on page 51 for information).

SW3 - Function DIP Switch

SW3, which is located only on the LDM-32F, is used to set the annunciator functions. Function settings include:

- Number of expanders connected
- 8-Point Shift enabled
- Receive Only communications to host FACP
- Receive/Transmit communications to host FACP
- Control Switch disable
- Piezo disable
- Flash Inhibit

Refer to "Function DIP Switch - SW3" on page 25 for additional information.

SW4 - Alarm/Trouble Mode Switch

The Alarm/Trouble mode switch is installed on the LDM-32F and LDM-E32F. The switch setting on each expander module must match the switch setting of the associated LDM-32F. 'Alarm Only' mode causes the driver outputs to turn on only for alarm conditions per associated zone or point at the host FACP. 'Alarm/Trouble' mode causes the driver outputs to turn on for both alarm and trouble conditions per associated zone or point at the host FACP. Since this switch affects the assignments of connectors J5, J6, J7 and J8, make certain to review the appendices in this manual for additional information on wiring to the lamp/LED drivers.

Terminal Blocks

TB1 - 24 VDC Power, Earth Ground and Supervision

Removable terminal block TB1 appears only on the LDM-32F. 24 volts power-limited, regulated, non-resettable power from the host FACP or a compatible UL listed battery backed power supply must be connected to TB1-POWER IN (+) and TB1-COMMON IN (-). Terminals TB1-POWER OUT (+) and TB1-COMMON OUT (-) may be used to daisy chain the 24 volts to other LDMs or devices. Earth ground must be connected to TB1-EARTH. Terminals TB1-6 and TB1-N.C. SUPERVISION INPUT provide a supervised input which may be used to supervise local power sources or other devices. A trouble signal is transmitted to the host FACP upon an open circuit across these terminals. The input must be power-limited. If these terminals are not used, a jumper must be installed.

TB2- EIA-485 In/Out

Removable terminal block TB2 appears only on the LDM-32F. All LDM-32Fs must connect to the EIA-485 communications bus circuit for proper operation. The EIA-485 bus carries commands and data sent between the host FACP and the LDMs. The input must be power-limited.

Cables

Expander Ribbon Cable

The Expander Ribbon Cable (PN 75120) is supplied with the LDM-E32F to allow for connection to the LDM-32F master module. The cable connects between J2 of the LDM-32F or LDM-E32F and J3 of the next LDM-E32F.

The LDM-CBL24 and LDM-CBL48

Cable sets for connecting LDM-32F and LDM-E32F connectors to lamps/LEDs, switches, etc., are provided through the optional LDM-CBL24 (24" long) and LDM-CBL48 (48" long) cabling kits. Each cable has a plug on one end for connection to the LDM modules.

Each LDM-CBL24 cable kit includes:

- (4) P/N 75116, 24" cable consisting of 8 stranded, multicolored conductors. Cables connect to J5, J6, J7 and J8.
- (1) P/N 75122, 24" cable consisting of 10 stranded, multicolored conductors. Connects to J1, optional control switches.
- (1) P/N 75117, 24" cable consisting of 2 stranded, single color conductors. Connects to J1, Lamp Test Switch.
- (1) P/N 75118, 24" cable consisting of 3 stranded, multicolored conductors. Connects to J9 or J11, Lamp Power.

Each LDM-CBL48 cable kit includes:

- (4) P/N 75147, 48" cable consisting of 8 stranded, multicolored conductors. Cables connect to J5, J6, J7 and J8.
- (1) P/N 75150, 48" cable consisting of 10 stranded, multicolored conductors. Connects to J1, optional control switches.
- (1) P/N 75148, 48" cable consisting of 2 stranded, single color conductors. Connects to J1, Lamp Test Switch.
- (1) P/N 75149, 48" cable consisting of 3 stranded, multicolored conductors. Connects to J9 or J11, Lamp Power.

Key-lock Control Switch Security

A UL listed key-lock switch wired to J4 on the LDM-32F should be used to provide access security for all control switches wired to that set of LDM modules.

Note: Control switches will not function when the key-lock switch is in its closed position.
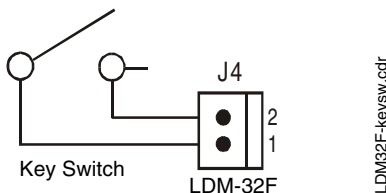
Figure 3 Key-lock Switch Wiring Diagram

Related Documentation

Further details about products referenced in this document can be found in the manuals for the particular fire alarm control panel and components.

Product	Part Number
MS-9200 Fire Alarm Control Panel Instruction Manual	51003
MS-9600 Fire Alarm Control Panel Instruction Manual	51335
Sensiscan 2000 Fire Alarm Control Panel Instruction Manual	15017
CAB-3F Series Cabinets Installation Document	15391

NOTES

2. Installation

External Cabinets

The CAB-A3F and the CAB-B3F are UL listed cabinets suitable for use in graphic annunciator applications. For size and dimensions, refer to the CAB-3F Series Installation Document.

Select and remove the appropriate knockout(s) on the cabinet.

Securely mount the cabinet.

Ground the cabinet to a solid electrical ground per NEC Article 250.

Pull all wiring into the cabinet. (Refer to the appropriate FACP manual for UL Power-limited Wiring Requirements.)

Note: Other cabinets such as those provided by custom graphic annunciator manufacturers may be used provided they meet UL requirements as UL listed secured enclosures.

CHS-4L Chassis

The CHS-4L chassis will support one LDM-32F module and up to three LDM-E32F expander modules. The chassis is mounted inside the CAB-A3F or the CAB-B3F cabinet.

Mount the CHS-4L Chassis to a cabinet and secure with the hardware provided. The Grounding Cable must be connected to the chassis mounting stud for connection to the annunciator's earth ground terminal for proper operation as well as to aid in transient protection. For each LDM module to be installed on the chassis, connect two female-to-female standoffs (provided) to the upper mounting studs on the chassis.
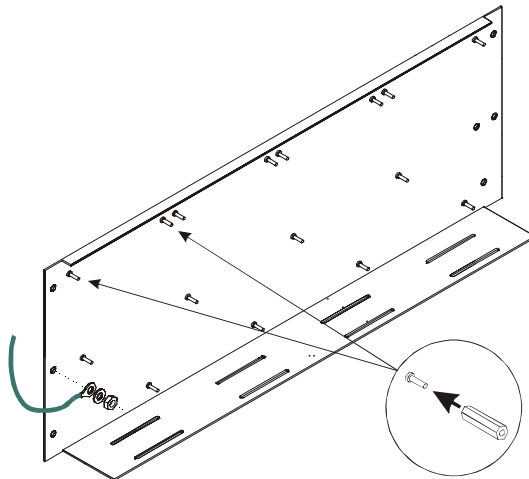
Figure 4 CHS-4L Mounting

Slip the bottom edge of the module or expander board into the slot on the chassis and move the module toward the standoffs. Secure the board to the standoffs with the screws provided. Repeat for installation of additional modules or expanders.
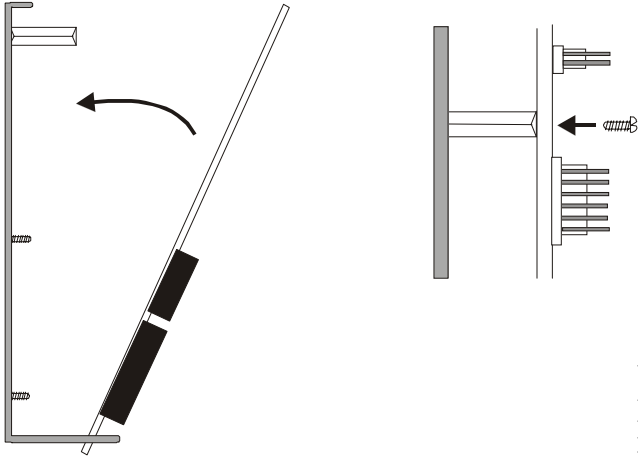
Ldminchs.cdr

Figure 5 Installing LDM Modules in CHS-4L

Connect an expander ribbon cable (P/N 75120) from the LDM-32F connector J2 to J3 of the first LDM-E32F expander module. If multiple LDM-E32F modules are to be used, connect additional cables from J2 to J3 as shown below. One LDM-32F may support a maximum of three LDM-E32F modules.

Expander Ribbon Cables

LDM-32F   LDM-E32F   LDM-E32F   LDM-E32F
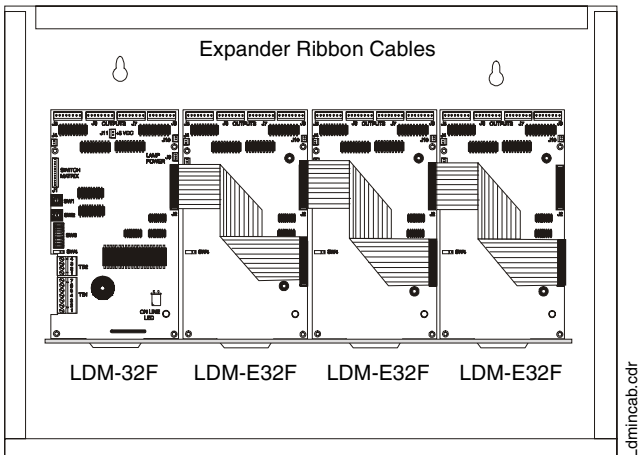
Ldmincab.cdr

Figure 6 LDMs Mounted in UL Listed Cabinet

Wiring the Power Terminal Block

24 VDC Power and Earth Ground

24 VDC power supplied to the LDM must be power-limited. This power is inherently supervised (loss of power also results in a communication failure at the control panel).

- Limit the total wire resistance to 10 ohms.
- Connect the Grounding Cable from the chassis to the earth ground terminal of TB1 (EARTH).
- Connect 24 VDC power to the POWER IN (+) and COMMON IN (–) terminals of TB1.
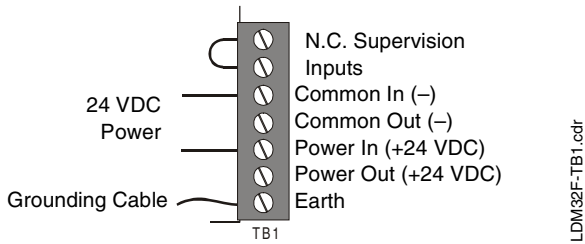
Figure 7 24 VDC Power Terminals - TB1

Wiring of multiple LDM-32F modules.
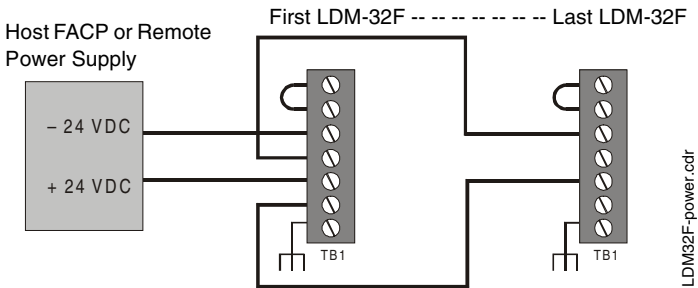
Figure 8 Multiple Module Wiring - 24 VDC

Supervision Input

The Supervision Input, which requires a normally-closed condition, can be used for supervising power sources or other devices. It must be power-limited. If employed, a change in status will be transmitted to the host control panel in the event of device failure or restoral.

If not used, a jumper must be installed across these terminals on TB1. A trouble signal will be registered by the control panel if a short circuit does not exist across terminals 6 & 7.
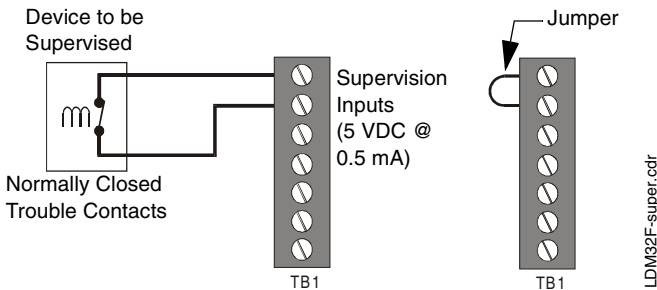
Figure 9 Wiring Supervision Terminals

Wiring the EIA-485 Terminal Block

A maximum of 32 LDM-32Fs may be connected to the EIA-485 bus, but if other types of devices are also connected to this bus, the maximum number of LDM-32Fs must be reduced by the total of such devices. Total annunciation and switch capability depends upon the number of expander modules used.

Communications between the Fire Alarm Control Panel and the LDM-32F is accomplished over a two-wire EIA-485 serial communications bus which must be power-limited. Communications between the host FACP and LDMs is supervised by the fire alarm control panel.

Wiring Specifications

- The EIA-485 circuit cannot be T-tapped; it must be wired in a continuous fashion from the control panel to the LDMs.
- The maximum wiring distance between the panel and LDMs is 6000 feet.
- The wiring must be a 18 AWG to 14 AWG twisted shielded pair cable having a characteristic impedance of 120 ohms, +/- 20%.
- Limit the total wire resistance to 100 ohms.
- Do not run cable adjacent to, or in the same conduit as, 120 volts AC service, noisy electrical circuits that are powering mechanical bells or horns, audio circuits above 25 VRMS, motor control circuits, or SCR power circuits.

Note: Never use the shield for grounding purposes. Terminate the EIA-485 shield at the Fire Alarm Control Panel only.

Wire Chart

Standard Annealed Copper Wire						
Wire Size A.W.G	Diameter in Mils	Cross Section		Ohms per 1000 feet		Pounds per 1000 feet
		Circ. Mils	Sq. Inch	@ 77°F.	@ 149°F.	
14	64	4110	0.00323	2.85	2.97	12.4
16	51	2580	0.00203	4.09	4.73	7.82
18	40	1620	0.00128	6.51	7.51	4.92

Table 1 Wire Specifications

EIA-485 Shield in Conduit

When the EIA-485 wiring is in conduit, connect the shield to system common. The shield can enter the cabinet, but must be insulated from the cabinet (no electrical contact). Between LDMs, wire-nut multiple shields together (which can be inside of the respective LDM enclosure but ensure that the shield does not contact earth ground).
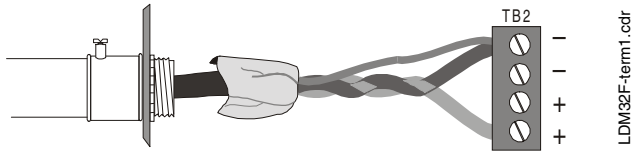
Figure 10 Terminating the Shield in Conduit

EIA-485 Shield Not in Conduit

When the EIA-485 wiring is not in conduit, terminate the shield at the outside of the FACP cabinet. Do not allow the shield to enter or even touch the cabinet housing the LDMs. Between LDMs, wire-nut multiple shields together outside of the respective enclosures. Ensure that the shield does not touch earth ground at any junction points.
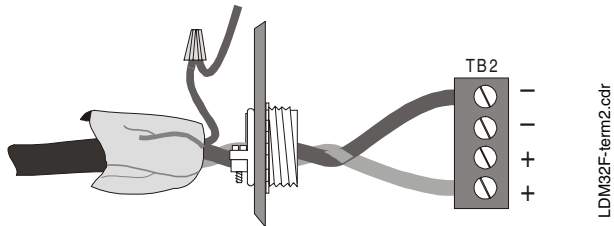
Figure 11 Terminating the Shield with No Conduit

EIA-485 - TB2 Terminals

Wire as shown below.

Note: Leave a 120 ohm ELR installed across the EIA-485 Out terminals at the last LDM-32F on the circuit (see below). All other LDM-32Fs should not have a resistor installed.

TB2

In (–)
Out (–)
Out (+)
In (+)

LDM32F-TB2.cdr
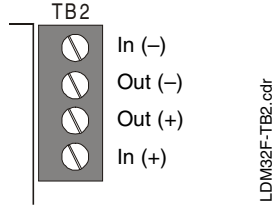
Figure 12 EIA-485 Terminal Block - TB2

Multiple wiring of EIA-485 circuits.

First LDM-32F -- -- -- -- -- -- Last LDM-32F

Host FACP

EIA-485 (–)

EIA-485 (+)

TB2

TB2

ELR

LDM32F-mult.cdr
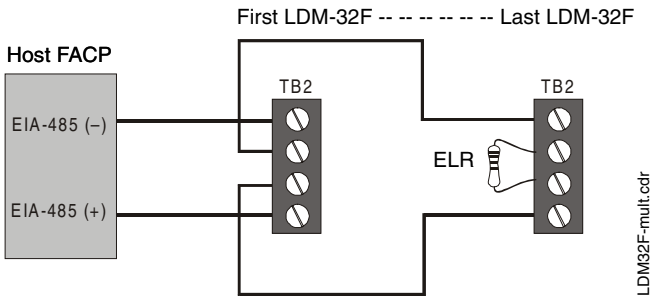
Figure 13 Wiring Multiple LDM-32Fs - EIA-485

Wiring for Lamp/LED

- All LEDs must be located in the same room as the LDM modules.
- For 5 volt output use a 680 ohm, 1/4-watt resistors for each point if using 2 mA LEDs.
- For 24 volt output use a 10K ohm, 1/4-watt resistors for each point if using 2 mA LEDs.
- LEDs: use red for alarm points, yellow for trouble points and green for output points.
- Use the cables supplied in the cable kit to wire connectors on LDM.

The figure below illustrates LEDs being powered by the 5 volt output from LDM-32F, J11 pin 1.
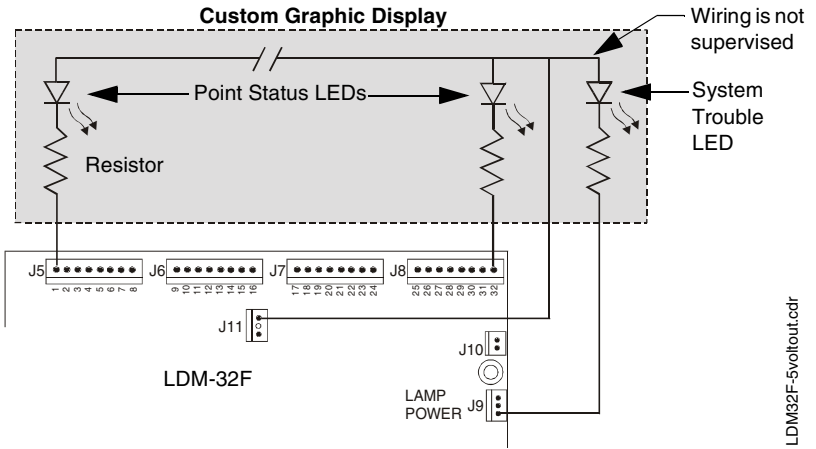
Figure 14 Typical LDM-to-Graphics Display Connection @ 5VDC

The figure below illustrates LEDs being powered by the 24 volt output from LDM-32F, J9 pin 3.
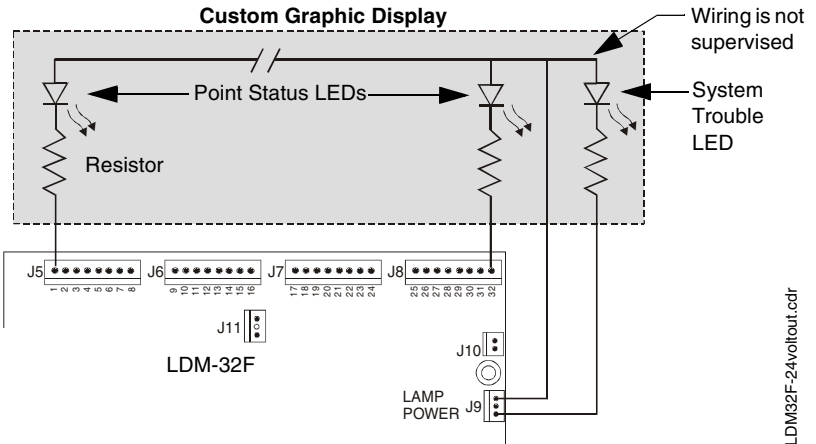
Figure 15 Typical LDM-to-Graphics Display Connection @ 24VDC

Wiring the Control Switch

Each LDM must be set for Alarm/Trouble mode by positioning slide switch SW4 to the right, for the optional control switches to function (the acknowledge/lamp test switch will work in either mode). In this configuration, each LDM-32F and LDM-E32F provides 16 alarm drivers, 16 trouble drivers and 16 control switches. The alarm and trouble drivers are assigned to host FACP zones/points via user setup. Not all switches must be used - switches can be wired only for desired functions.

- Switches must be UL listed to switch 5 volts DC @ 0.5mA.
- Switches must be key-lock type, secured in a locked enclosure or a security key switch must be installed to control access.
- All switches must be installed in the same room as, and no more than 20 feet from, the LDM enclosure. Wiring must be in conduit.
- Optional zone/point control switches must be momentary type.
- Use the cables supplied in the cable kit to wire the control switches.
- See Appendices for specific FACP information.

Note: Switches 5 - 16 are not used in this example.
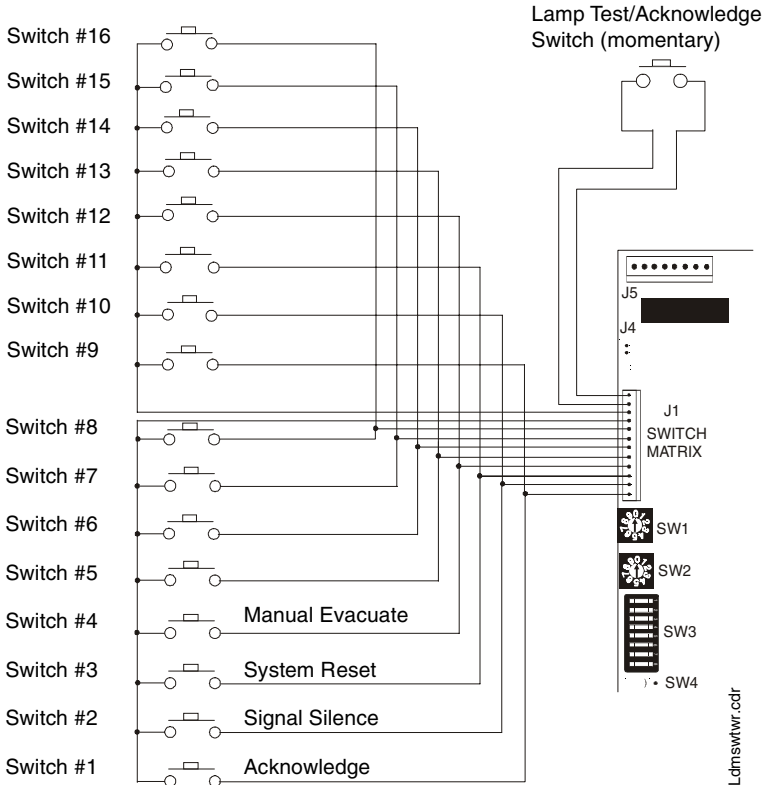
Figure 16 Optional Zone/Point Control Switch Wiring

Configuring the LDMs

Address Switches - SW1 and SW2

It is critical to the operation of the LDMs that the Address Switches be set correctly.

To set the LDM-32F's address to '01', position the arrow on SW2 (tens) so it points to **0** and position the arrow on SW1 (ones) so it points to **1**.

Figure 17 Address Switches SW1 & SW2

Function DIP Switch - SW3

These switches are used to determine how the LDM-32F operates. The following illustration provides details on DIP switch placement in the On and Off position:

Side View of Switch Shown in the OFF Position
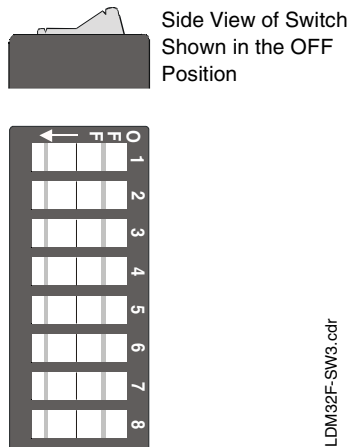
Figure 18 Function DIP Switch

Switch Settings

1 - Not Used: This switch must be set "OFF"

2 - Expanders Installed: None = OFF; One = ON; Two = OFF; Three = ON

3 - Expanders Installed: None = OFF; One = OFF; Two = ON; Three = ON

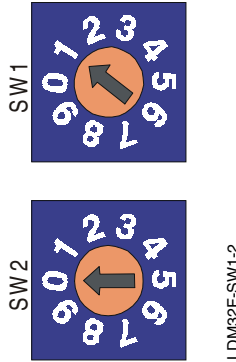**4 - Eight-Point Shift:** Set switch "ON" to switch the FACP LED function annuciation from the first eight annunciator positions on the LDM-32F to the last LDM-E32F expander positions 57 - 64. This shift can only be set on an LDM-32F set for address 01 (system using 56, or less, software zones).

5 - Receive Only: Set this switch "ON" for each LDM series that will provide the same information as another LDM series in a different physical location.
Note: When two or more LDM series hold the same address, all but one must be configured as "Receive Only".

6 - Piezo Disable: Set this switch "ON" to disable the piezo from sounding for any event. (The piezo will also be disabled if Flash Inhibit is "ON".)

7 - Switch Inhibit: To disable the point control switches on the LDMs from functioning, set this switch "ON". When inhibited, the local lamp test switch continues to function. In addition, the acknowledge/lamp test switch will function only in a local capacity, unrecognized by the host FACP.

8 - Flash Inhibit: Set this switch "ON" to disable the flashing of LEDs associated with unacknowledged events. Flash Inhibit also disables the piezo from sounding.

Mode Switch - SW4

Set the mode of operation to:

"Alarm/Trouble" by sliding the switch to the **right**
"Alarm Only" mode by sliding the switch to the **left**.

Alarm/Trouble
Mode

Alarm Only
Mode

LDM32F-SW4.cdr

Figure 19 Mode Select Switch - SW4

3. Operation

Lamp Test/Acknowledge

A separate, dedicated lamp test switch is required for each LDM-32F and LDM-E32F (see "Wiring the Control Switch" on page 24). A switch installed for LAMP TEST/ACKNOWLEDGE performs two functions:

1. When pressed, it will light all LEDs wired to the specific LDM module (except the On Line LED) and will sound the inte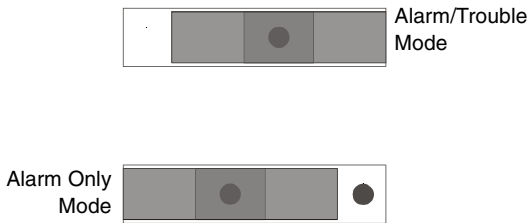gral piezo (if enabled) for as long as the switch is held down. *The Lamp Test switch will light only the LEDs on the module to which it is wired.*

2. The switch connected to the LDM-32F, when pressed, acknowledges all status changes (for both the LDM-32F and any LDM-E32F expanders). Flashing LEDs will latch on solid and the piezo will be silenced.

On Line LED

This green LED, located on the LDM-32F module (see Figure 1 on page 10), flashes during communication with the host control panel.

Graphic Annunciator Lamps/LEDs

To adhere to standard fire alarm control panel convention and remain consistent with other products that may exist in the system, the following color convention is employed:

Red Alarm LEDs - To indicate an alarm condition for an Initiating Device Circuit or a software zone.

Yellow Trouble LEDs - To indicate a trouble condition exists on an initiating or indicating device circuit or zone. Yellow trouble LEDs also are used to indicate general system trouble conditions such as low battery, earth fault, general system trouble, etc.

Green Controlled Output LEDs - Indicates that power is applied or that the controlled output circuit or device has been activated. Applicable to notification appliance, relay, speaker, telephone, and time control circuits.

Note: The graphic annunciator may contain a yellow *System Trouble* LED and a red *System Alarm* LED which will light for all trouble or alarm conditions (respectively) in the system (not just for those points of zones mapped to the LDM master/expanders).

NOTES

4. LDM Communications

Receive Only LDM-32Fs

For duplicate annunciation of system points, LDMs can be configured for Receive Only annunciation. Receive Only LDMs must be set to the same address as the LDM they duplicate, but are not fully supervisable. Receive Only LDMs intercept information being transmitted to a Receive/Transmit LDM so that this information can be duplicated at an intermediate display location. When configured for Receive Only operation, LDMs cannot transmit information to the host control panel. Remote Acknowledge, Silence, or Reset cannot be performed. Control switches on Receive Only LDMs are for local lamp test only. If a Receive/Transmit LDM is located at the end of the EIA-485 bus, it will provide supervision of Receive Only LDMs located on the EIA-485 bus between the Receive/Transmit LDM and the FACP.

Receive/Transmit LDM-32F

LDMs that are configured to serve as full-function annunciators can both receive status information for annunciation as well as transmit commands to the control panel through custom-wired point control switches. This allows the LDM to initiate control panel switch functions from a remote location in addition to displaying the status of the system. In order for wiring connecting all Receive/Transmit LDMs to be supervised, the LDM-32F addressed as '01' must be placed at the end of the EIA-485 loop farthest from the FACP. Only address '01' is supervised.
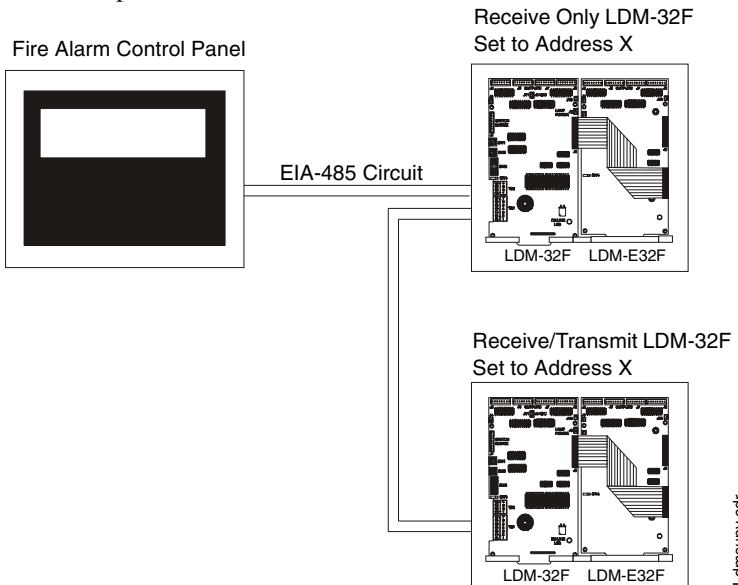
Figure 20 LDM-32F Supervision

NOTES

5. Electrical Ratings and Current Calculations

Lamp Driver Electrical Ratings

LDM modules may use either 24 VDC (regulated) or internal 5 VDC for powering connected LEDs. 5 volt usage conserves power but is limited in the current available to drive the LEDs. Refer to "Wiring for Lamp/LED" on page 23 for connection illustrations.

5 Volt LED Power Limitations			
LED Current Desired (mA)	Max Number of LEDs	Number of Modules LDM-32F	LDM-E32F
2	130	1	3
5	66	1	1
10	34	1	0

Table 2 Power Limitations

Note: The LDM-32F drives 32 LEDs and each LDM-E32F drives 32 more LEDs. An LDM system configured for Alarm and Trouble Display Mode and employing three expanders could have as many as 128 LEDs, all of which are activated during Lamp Test.

Maximum Current per Driver: **100 mA** *(external circuit must limit current)*

Maximum Voltage rating per output driver: **30 VDC**

Supervised circuit (typical rating): **5 volts DC @ 0.5 mA**

Bipolar Darlington Open Collector NPN Transistor

Supervision of LDM points

Any LEDs or lamps connected to the LDM-32F or LDM-E32F are not supervised for failure. Therefore, all LEDs or lamps, must be located in the same room as the LDM modules.

Calculating Standby and Alarm Currents

The LDM series annunciators draw their power from the Fire Alarm Control Panel and must be considered when calculating primary and secondary power requirements. Refer to the installation manual for the particular control panel employed for the calculation of power requirements for the entire system.

1. Enter Standby Total obtained here into the standby calculation tables of the installation manual.

2. Enter Alarm Current Total obtained here into the alarm calculation tables of the installation manual.

Standby Current			
Number of LDM-32F Modules	[ ]	X 40 mA[1] =	
Number of LDM-E32F Expanders	[ ]	X 2 mA =	
	Standby Total =		[ ] amps
Alarm Current			
Number of LDM-32F Modules	[ ]	X 56 mA =	
Number of LDM-E32F Expander	[ ]	X 18 mA =	
Number of LEDs[2]	[ ]	X [ ]mA per LED=	
Number of LEDs[3]	[ ]	X [( )mA/3]=	
	Alarm Current Total =		[ ] amps

1. The 0.040 amps can be reduced to 0.030 for modules with Piezo disable or Flash Inhibit selected.
2. Use this line for calculations if LEDs are powered from 24 VDC source.
3. Use this line for calculations if LEDs are powered from the 5 VDC source from J1 on the LDM-32F.

Table 3 Power Requirement Calculations

Appendix A: Sensiscan 2000

Capabilities

When installed with a Sensiscan 2000, the LDM Series modules can annunciate general system status; the status of all initiating and notification circuits and output relays. Plus, manually activate all points via control switches. Each lamp driver output may be assigned to one and only one system I/O point:

Optional Sensiscan 2000 plug in Modules -

IZ-8F - Initiating Device Circuits (alarm and trouble)
IZ-4F/IZE-AF - Initiating Device Circuits (alarm and trouble)
IC-4F/IC-4CCF - Notification Appliance Circuits (trouble)
ICE-4F - Notification Appliance Circuits (trouble)
CR-4F/CRE-4F - Control Relay Modules
TC-2F/TC-4F - Time Control Modules

Sensiscan 2000 modules are user configurable. Refer to the Sensiscan 2000 Manual.

System Control Switches -
Acknowledge
Signal Silence
System Reset
Activate selected system outputs (notification circuits, relays)

System Control Switches on the Sensiscan 2000 CPU may be remoted via the LDM series modules. Also, zone/point control switches may be configured.

Trouble Indication

Communication between the CPU and the LDMs is accomplished over a two-wire EIA-485 serial communication bus. The EIA-485 bus is supervised by the Sensiscan 2000. Loss of communication results in System Trouble and Module Failure indications at the CPU.

## Programming and Testing the LDM-32F

After complete installation, the Lamp Driver Module(s) must be programmed into the control panel as if it were an annunciator. After programming the fire alarm control panel to accept them, fully test the LDM(s) by ensuring that each switch and LED performs its intended function, and that the LDM(s) can perform the functions outlined in "3. Operation" on page 27.

Power Supply Connection

The LDMs may be powered by an MPS-24AF or an MPS-24BF. The power run to the LDMs need not contain a Power Supervision Relay since loss of power is inherently supervised.

MPS-24AF Main Power Supply

Connect the power run for the LDMs to MPS-24AF TB3, Terminals 1 (+) and 2 (–). Maximum current is 1 amp.

To LDM-32F TB1
Power In (+)

To LDM-32F TB1
Common In (–)
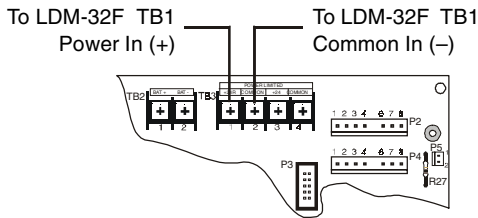
Figure 21 MPS-24AF Power Supply Connections

MPS-24BF Main Power Supply

Connect the power run for the LDMs to MPS-24BF TB2, Terminals 1 (+) and 2 (–). No more than 200 mA current can be drawn from these terminals in standby or alarm.

To LDM-32F TB1
Power In (+)

To LDM-32F TB1
Common In (–)
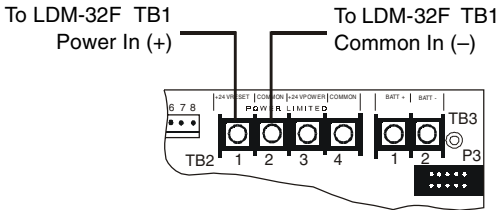
Figure 22 MPS-24BF Power Supply Connections

EIA-485 Connection

The EIA-485 bus that communicates with the LDM must be connected to the CPU as illustrated below.

Note: The CPU must be Revision D or greater. (The revision level of the CPU is marked on a label affixed to the upper board.)

EIA-485
To TB2 In (–)

EIA-485
To TB2 In (+)

Sensiscan 2000 CPU
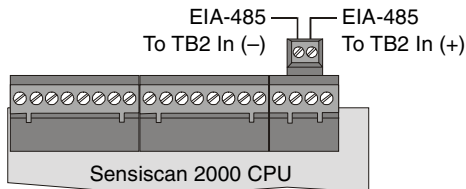
Figure 23 EIA-485 Connection to CPU

Lamp/LED Driver Operation

LDM Address Switches (SW1 & SW2) must be set to address **'01'**.

Lamp Driver outputs do not latch - they track or follow the status of each zone/point that they are assigned to annunciate. The table below defines the ON status of each lamp driver output.

Note: Control Switches marked 'Not Used' will still function as local LAMP TEST or local ACKNOWLEDGE switches for their respective points.

Note: If Alarm Only mode is selected, column labeled Yellow LED is not applicable and control switches do not function.

| CPU Points[1]	Alarm (Red LED)	Trouble/Supv (Yellow LED)	Control Switches[2]
Annunciator Point #1	System Alarm	System Trouble	Acknowledge
Annunciator Point #2	Not Used	Signal Silence	Signal Silence
Annunciator Point #3	Not Used	Not Used	System Reset
Annunciator Point #4	Not Used	Supervisory Condition	Not Used
Annunciator Point #5	NAC #1 Activated[3]	Trouble Status of Circuit	NAC #1
Annunciator Point #6	NAC #2 Activated[3]	Trouble Status of Circuit	NAC #2
Annunciator Point #7	Remote Signaling of Municipal Tie Activated[3]	Trouble Status of Circuit	Remote Signaling of Municipal Tie
Annunciator Point #8	Alarm Relay Activated[3]	Module Trouble, Power Failure, or Disabled Circuit	Alarm Relay

1. If the 8-Point Shift (DIP switch #4 of SW3) is set ON, the eight Sensiscan 2000 CPU functions (ACK, SIL, RESET, LAMP TEST, NAC1, NAC2, MUNTIE, RELAY) will be shifted from annunciator points 1 through 8 (as shown above) to points 57 through 64 (provided those points exist in the system and the LDM-32F is set to address 01).
2. Optional control switches are active only if all of these conditions are met:
   a) '8-Point Shift' (DIP switch #4) is set to OFF.
   b) Receive Only (DIP Switch #5) is set to OFF.
   c) Switch Inhibit (DIP Switch #7) is set to OFF.
3. Use green LEDs to indicate activation on controlled output circuits.

Table 4 Annunciator Point Assignment to LDMs

The following table defines the point assignments if incorporating the optional modules available on the Sensiscan 2000.

Optional Modules	Alarm (Red LED)	Trouble/Supv (Yellow LED)	Control Switches[1]
IZ-8F	Alarm Status per Circuit	Trouble Status per Circuit	Not Used
IZ-4F/IZE-4F	Alarm Status per Circuit	Trouble Status per Circuit	Not Used
IC-4F/IC-4CCF	Indicates Activation[2]	Indicates Trouble per Circuit	Momentarily Turns On NAC Output When Pressed[3]
ICE-4F	Indicates Activation[2]	Indicates Trouble per Circuit	Momentarily Turns On NAC Output When Pressed[3]
CR-4F/CE-4F	Indicates Activation[2]	Indicates Trouble per Circuit	Relays[3]
TC-2F/TC-4F	Indicates Activation[2]	Indicates Trouble per Circuit	Remote Switch Functions[3]

1. Optional control switches are active only if all of these conditions are met:
    a) '8-Point Shift' (DIP switch #4) is set to OFF.
    b) Receive Only (DIP Switch #5) is set to OFF.
    c) Switch Inhibit (DIP Switch #7) is set to OFF.
2. These Status LEDs are active only when the Sensiscan 2000 is programmed for Output Status. Use green LEDs to indicate activation on controlled output circuits.
3. These control switches require that the Sensiscan 2000 be programmed for Output Control.

Table 5 Optional Modules Annunciator Point Assignment to LDMs

Alarm Only Operation

The table below illustrates the configuration of the LDM Series modules to annunciate alarms for up to 56 zones/points (no troubles) with the first eight points (P1 through P8) dedicated to the Sensiscan 2000 system status annunciation (see Figure 24 below).

Note: Control switches do not function in Alarm Only configuration.

Note: The Address switch sets the limit of annunciator points per LDM series. With the address set to 01, the limit is 64 annunciated points.

LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	System Status	1 to 8	9 to 16	17 to 24
LDM-E32F	25 to 32	33 to 40	41 to 48	49 to 56

Table 6 Alarm Only Operation

Alarm Only Operation with 8-Point Shift

The table below illustrates the configuration of the LDM Series modules to annunciate alarms for up to 56 zones/points (no troubles) with the last eight points (P57 through P64) dedicated to the Sensiscan 2000 system status annunciation (see Figure 24 below).

It is assumed that the '8-Point Shift' will be selected only on systems containing 56 zones/points or less, or a total of 64 annunciator points or less.

Note: Control Switches do not function in Alarm Only mode.

Note: Address switch sets the limit of annunciator points per LDM series. With the address set to 01, the limit is 64 annunciated points.

LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	1 to 8	9 to 16	17 to 24	25 to 32
LDM-E32F	33 to 40	41 to 48	49 to 56	System Status

Table 7 Alarm Only Operation with Shift

System Status Indicators

NAC #2 ON (Green LED)

NAC #1 ON (Green LED)

Municipal Tie ON (Red LED)

Not Used

System Alarm (Red LED)
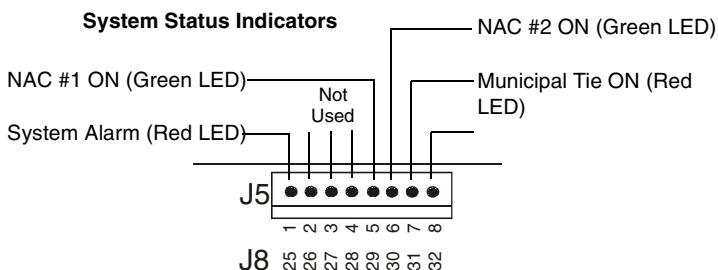
LDM32F-J5.cdr

Figure 24 System Functions to Output Connectors - 1

Alarm/Trouble Operation

The table below (also see Figure 25 on page 39) illustrates the configuration of the LDM Series modules to annunciate alarms and troubles for up to 56 zones/points with the first eight points - 16 LEDs (J5: P1 through P8 and J6: P1 through P8) dedicated to Sensiscan 2000 system status annunciation (see Figure 26 on page 39).

LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	System Status		1 to 4	5 to 8
1st LDM-E32F	9 to 12	13 to 16	17 to 20	21 to 24
2nd LDM-E32F	25 to 28	29 to 32	33 to 36	37 to 40
3rd LDM-E32F	41 to 44	45 to 48	49 to 52	53 to 56

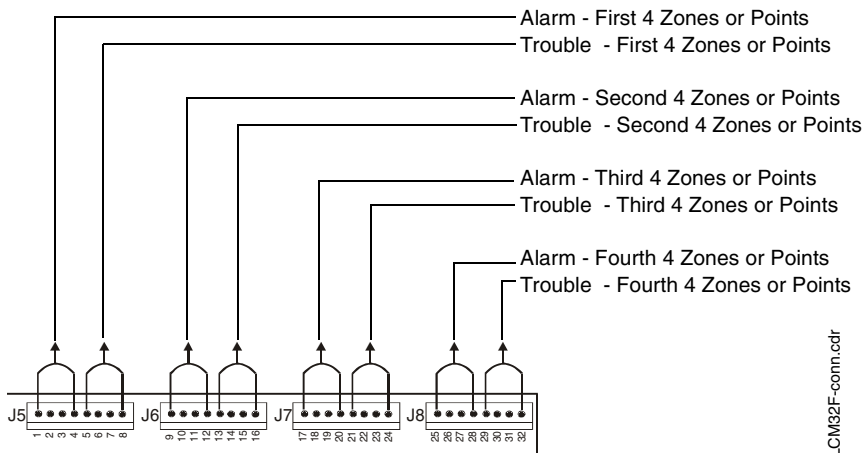**Table 8 Alarm/Trouble Operation**

Alarm/Trouble Operation with 8-Point Shift

The table below (also see Figure 25 on page 39) illustrates the configuration of the LDM Series modules to annunciate alarms and troubles for up to 56 zones/points with the last eight points - 16 LEDs (J7: P1 through P8 and J8: P1 through P8) dedicated to Sensiscan 2000 system status annunciation (see Figure 27 on page 39).

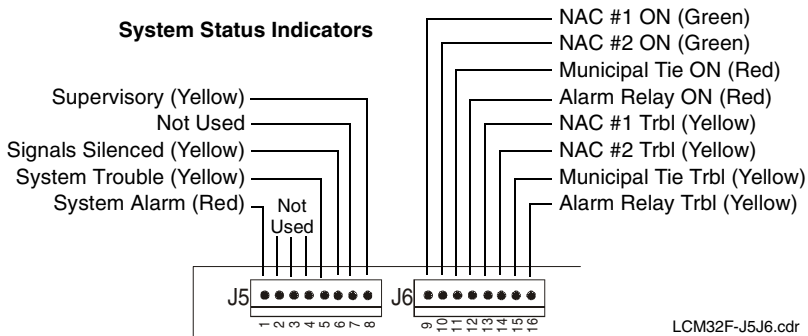| LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	1 to 4	5 to 8	9 to 12	13 to 16
1st LDM-E32F	17 to 20	21 to 24	25 to 28	29 to 32
2nd LDM-E32F	33 to 36	37 to 40	41 to 44	45 to 48
3rd LDM-E32F	49 to 52	53 to 56	System Status	

Table 9 Alarm/Trouble Operation

The figure below is an example of the connections used when setting the LDM module for Alarm/Trouble mode.

Alarm - First 4 Zones or Points
Trouble - First 4 Zones or Points

Alarm - Second 4 Zones or Points
Trouble - Second 4 Zones or Points

Alarm - Third 4 Zones or Points
Trouble - Third 4 Zones or Points

Alarm - Fourth 4 Zones or Points
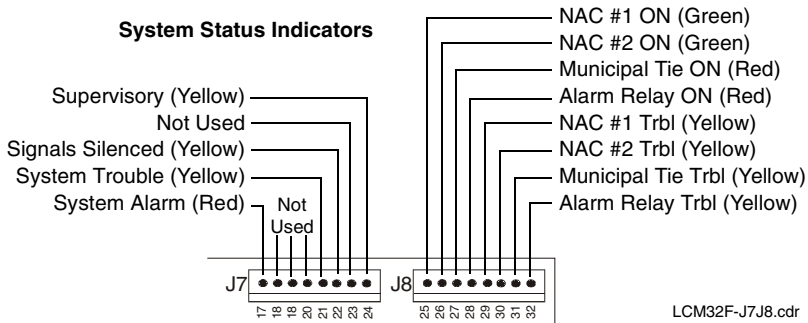Trouble - Fourth 4 Zones or Points

LCM32F-conn.cdr

Figure 25 Connections for Alarm/Trouble

The figure below illustrates pin usage of output connectors for system functions in Alarm/Trouble mode.

System Status Indicators

NAC #1 ON (Green)
NAC #2 ON (Green)
Municipal Tie ON (Red)
Alarm Relay ON (Red)
NAC #1 Trbl (Yellow)
NAC #2 Trbl (Yellow)
Municipal Tie Trbl (Yellow)
Alarm Relay Trbl (Yellow)

Supervisory (Yellow)
Not Used
Signals Silenced (Yellow)
System Trouble (Yellow)
System Alarm (Red)
Not Used

LCM32F-J5J6.cdr

Figure 26 System Functions to Output Connectors - 1

The figure below illustrates pin usage of output connectors for system functions in alarm/trouble mode with 8-Point shift selected.

System Status Indicators

NAC #1 ON (Green)
NAC #2 ON (Green)
Municipal Tie ON (Red)
Alarm Relay ON (Red)
NAC #1 Trbl (Yellow)
NAC #2 Trbl (Yellow)
Municipal Tie Trbl (Yellow)
Alarm Relay Trbl (Yellow)

Supervisory (Yellow)
Not Used
Signals Silenced (Yellow)
System Trouble (Yellow)
System Alarm (Red)
Not Used

LCM32F-J7J8.cdr

Figure 27 System Functions to Output Connectors - 2

Control Switch Operation

Circuit corresponds to a specific I/O module installed in user configured Sensiscan 2000.

The first 8 control switches of the LDM-32F will correspond to CPU switch functions as shown below, if "8-Point Shift" is not selected.

With "8-Point Shift" selected, the first 8 control switches move to the 3rd LDM-E32F and are assigned to Circuits 57 through 64 as shown below.

Note: It is assumed that Sensiscan 2000 systems with "8-Point Shift" selected will be 56 zones/points or less.

Switch Position	LDM-32F	-----	3rd LDM-E32F
1	Acknowledge		Not Used
2	Signal Silence		Not Used
3	System Reset		Not Used
4	Not Used		Not Used
5	NAC #1		Not Used
6	NAC #2		Not Used
7	Municipal Tie		Not Used
8	Alarm Relay		Not Used
9	Not Used		Acknowledge
10	Not Used		Signal Silence
11	Not Used		System Reset
12	Not Used		Not Used
13	Not Used		NAC #1
14	Not Used		NAC #2
15	Not Used		Municipal Tie
16	Not Used		Alarm Relay

Table 10 Switch Control Functions

Appendix B: MS-9200

Capabilities

When installed with a MS-9200, the LDM Series modules can annunciate the status of 56 software zones or 198 points plus system status. Each lamp driver output is assigned to one and only one system I/O point:

Addressable Devices -
Detectors - SD350, SD350T, CP350, H350, H350R, D350P & D350LP
Monitor Modules - MMF-300, MMF-301, MMF-302 & MDF-300
Control Modules - CMF-300
Addressable Pull Stations - BG-12LX

System Control Switches -
Acknowledge, Signal Silence, System Reset & Drill

Trouble Indication

Communication between the MS-9200 and the LDMs is accomplished over a two-wire EIA-485 serial communication bus. The EIA-485 bus is supervised by the MS-9200. Loss of communication results in system trouble message on the panel's display.

Programming and Testing the LDM-32F

After complete installation, the Lamp Driver Module(s) must be programmed into the control panel as if it were an annunciator. After programming the fire alarm control panel to accept them, fully test the LDM(s) by ensuring that each switch and LED performs its intended function, and that the LDM(s) can perform the functions outlined in "3. Operation" on page 27.

Power and EIA-485 Connections

Regulated 24 VDC power and the EIA-485 communication circuit must be connected to the MS-9200 as illustrated below.

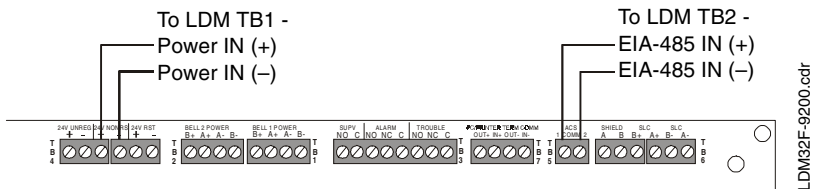**Note:** An external power source may be used to power the LDM Series.

Figure 28 MS-9200 Circuit Board connections

Configuration

The control panel needs to be programmed to either "Points" or "Zones", depending on which type of address is to be annunciated.

LDM Address Switches (SW1 & SW2) must be set to address '01', '02', '03' or '04'. The CPU will differentiate between the addresses.

- For Zones use address 01 (56 zones).
- For Points use addresses 01, 02, 03 and 04 (198 points).

Note: Do not omit any address when annunciating 198 points or the MS-9200 will indicate a constant trouble.

Alarm Only Annunciation of Zones

The table below illustrates the configuration of the LDM Series modules to annunciate the alarm state of all 56 software zones (no zone troubles), and two NACs, with the first eight points of address '01' dedicated to the MS-9200 system function LEDs (see Figure 29 below).

| LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	Sys Funct	Z1 to Z8	Z9 to Z16	Z17 to Z24
LDM-E32F	Z25 to Z32	Z33 to Z40	Z41 to Z48	Z49 to Z56

Table 11 Alarm Only Setup

Alarm Only Annunciation of Zones - With 8-Point Shift

The table below illustrates the configuration of the LDM Series modules to annunciate the alarm state of all 56 software zones (no zone troubles), and two NACs, with the last eight points of address '01' dedicated to the MS-9200 system function LEDs (see Figure 29 below).

LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	Z1 to Z8	Z9 to Z16	Z17 to Z24	Z25 to Z32
LDM-E32F	Z33 to Z40	Z41 to Z48	Z49 to Z56	Sys Funct

Table 12 Alarm Only Setup with Shift
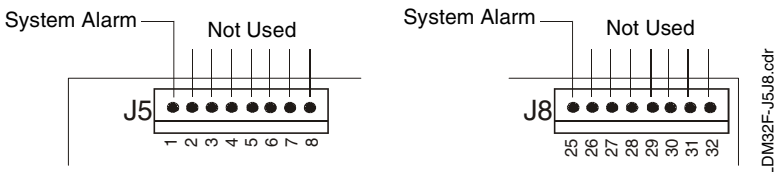
Figure 29 System Functions to Output Connectors - 1

Alarm/Trouble Annunciation of Zones

The table below (also see Figure 30 on page 44) illustrates the configuration of the LDM Series modules to annunciate the alarm and trouble states for all 56 software zones with the first eight points of address '01' dedicated to the MS-9200 system functions (see Figure 31 on page 44).

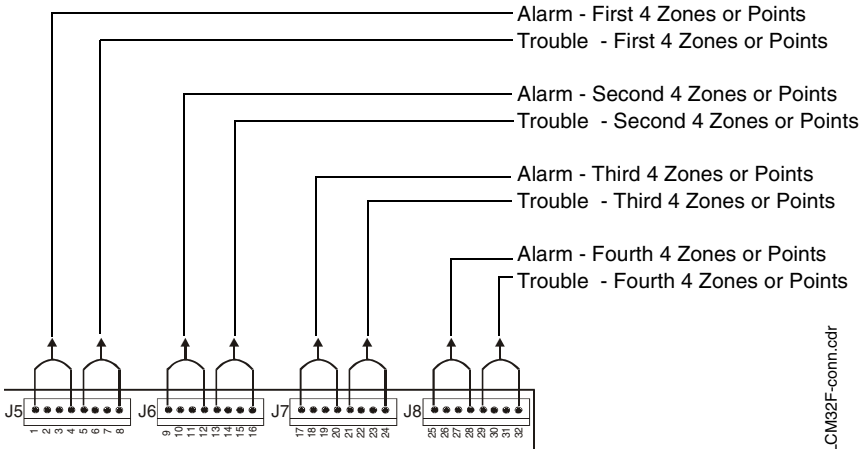| LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	System Functions		Z1 to Z4	Z5 to Z8
1st LDM-E32F	Z9 to Z12	Z13 to Z16	Z17 to Z20	Z21 to Z24
2nd LDM-E32F	Z25 to Z28	Z29 to Z32	Z33 to Z36	Z37 to Z40
3rd LDM-E32F	Z41 to Z44	Z45 to Z48	Z49 to Z52	Z53 to Z56

Table 13 Alarm/Trouble Setup

Alarm/Trouble Annunciation of Zones - With 8-Point Shift

The table below (also see Figure 30 on page 44) illustrates the configuration of the LDM Series modules to annunciate the alarm and trouble states for all 56 software zones with the last eight points of address '01' dedicated to the MS-9200 system functions as listed below (see Figure 32 on page 44).

LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	Z1 to Z4	Z5 to Z8	Z9 to Z12	Z13 to Z16
1st LDM-E32F	Z17 to Z20	Z21 to Z24	Z25 to Z28	Z29 to Z32
2nd LDM-E32F	Z33 to Z36	Z37 to Z40	Z41 to Z44	Z45 to Z48
3rd LDM-E32F	Z49 to Z52	Z53 to Z56	System Functions	

Table 14 Alarm/Trouble Setup with Shift
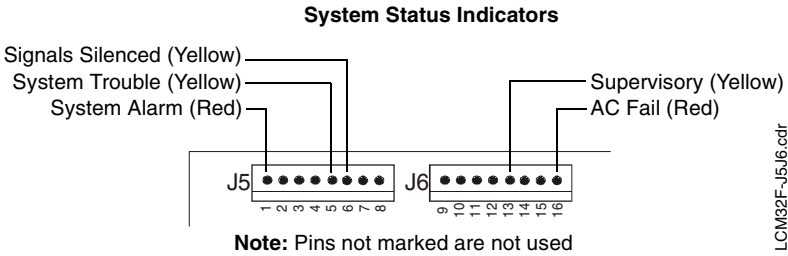
The figure below is an example of the connections used when setting the LDM module for Alarm/Trouble mode.

Alarm - First 4 Zones or Points
Trouble - First 4 Zones or Points

Alarm - Second 4 Zones or Points
Trouble - Second 4 Zones or Points

Alarm - Third 4 Zones or Points
Trouble - Third 4 Zones or Points

Alarm - Fourth 4 Zones or Points
Trouble - Fourth 4 Zones or Points

LCM32F-conn.cdr

Figure 30 Connections for Alarm/Trouble

The figure below illustrates pin usage of output connectors for system functions in alarm/trouble mode.

System Status Indicators

Signals Silenced (Yellow)
System Trouble (Yellow)
System Alarm (Red)

Supervisory (Yellow)
AC Fail (Red)

J5   J6

LCM32F-J5J6.cdr

Note: Pins not marked are not used

Figure 31 System Functions to Output Connectors - 1

The figure below illustrates pin usage of output connectors for system functions in alarm/trouble mode with 8-Point shift selected.

System Status Indicators

Signals Silenced (Yellow)
System Trouble (Yellow)
System Alarm (Red)

Supervisory (Yellow)
AC Fail (Red)

J7   J8

LCM32F-J7J8.cdr

Note: Pins not marked are not used
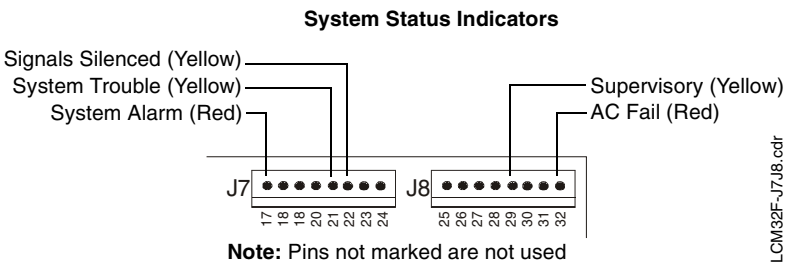
Figure 32 System Functions to Output Connectors - 2

Alarm Only Annunciation of Points

The tables below illustrate the configuration of the LDM Series modules to annunciate the alarm state of all 99 points (detectors or modules) with the first eight points of address '01' dedicated to the MS-9200 system functions (see Figure 29 on page 42).

Detectors

Set address '01' and '02' for detectors.

LDM Module Address '01'	LDM Output Connectors			
	J5	J6	J7	J8
LDM-32F	Sys Funct	1 to 8	9 to 16	17 to 24
LDM-E32F	25 to 32	33 to 40	41 to 48	49 to 56

LDM Module Address '02'	LDM Output Connectors			
	J5	J6	J7	J8
LDM-32F	57 to 64	65 to 72	73 to 80	81 to 88
LDM-E32F	89 to 96	97 to 99	Not Used	Not Used

Table 15 Alarm Only Setup - Detectors

Modules

Set address '03' and '04' for modules.

LDM Module Address '03'	LDM Output Connectors			
	J5	J6	J7	J8
LDM-32F	1 to 8	9 to 16	17 to 24	25 to 32
LDM-E32F	33 to 40	41 to 48	49 to 56	57 to 64

LDM Module Address '04'	LDM Output Connectors			
	J5	J6	J7	J8
LDM-32F	65 to 72	73 to 80	81 to 88	89 to 96
LDM-E32F	97 to 99	Not Used	Not Used	Not Used

Table 16 Alarm Only Setup - Modules

Alarm Only Annunciation of Points - With 8-Point shift

The tables below illustrate the configuration of the LDM Series modules to annunciate the alarm state of all 99 points (detectors or modules) with the last eight points of address '01' dedicated to the MS-9200 system functions (see Figure 29 on page 42).

Detectors

Set address '01' and '02' for detectors.

LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	1 to 8	9 to 16	17 to 24	25 to 32
LDM-E32F	33 to 40	41 to 48	49 to 56	Sys Funct

LDM Module Address '02'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	57 to 64	65 to 72	73 to 80	81 to 88
LDM-E32F	89 to 96	97 to 99	Not Used	Not Used

Table 17 Alarm Only Setup - Detectors (shift)

Modules

Set address '03' and '04' for modules.

LDM Module Address '03'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	1 to 8	9 to 16	17 to 24	25 to 32
LDM-E32F	33 to 40	41 to 48	49 to 56	57 to 64

LDM Module Address '04'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	65 to 72	73 to 80	81 to 88	89 to 96
LDM-E32F	97 to 99	Not Used	Not Used	Not Used

Table 18 Alarm Only Setup - Modules (shift)

Alarm /Trouble Annunciation of Points

The table below (also see Figure 30 on page 44) illustrates the configuration of the LDM Series modules to annunciate the alarm and trouble states for all 99 points (detectors or modules) with the first eight points of address '01' dedicated to the MS-9200 system functions (see Figure 31 on page 44).

Detectors

Set address '01' and '02' for detectors.

LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	System Functions		1 to 4	5 to 8
1st LDM-E32F	9 to 12	13 to 16	17 to 20	21 to 24
2nd LDM-E32F	25 to 28	29 to 32	33 to 36	37 to 40
3rd LDM-E32F	41 to 44	45 to 48	49 to 52	53 to 56

LDM Module Address '02'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	57 to 60	61 to 64	65 to 68	69 to 72
1st LDM-E32F	73 to 76	77 to 80	81 to 84	85 to 88
2nd LDM-E32F	89 to 92	93 to 96	97 to 99	Not Used

Table 19 Alarm/Trouble Setup - Detectors

Modules

Set address '03' and '04" for modules

LDM Module Address '03'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	1 to 4	5 to 8	9 to 12	13 to 16
1st LDM-E32F	17 to 20	21 to 24	25 to 28	29 to 32
2nd LDM-E32F	33 to 36	37 to 40	41 to 44	45 to 48
3rd LDM-E32F	49 to 52	53 to 56	57 to 60	61 to 64

LDM Module Address '04'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	65 to 68	69 to 72	73 to 76	77 to 80
1st LDM-E32F	81 to 84	85 to 88	89 to 92	93 to 96
2nd LDM-E32F	97 to 99	Not Used	Not Used	Not Used

**Table 20 Alarm/Trouble Setup - Modules**

Alarm /Trouble Annunciation of Points - With 8-Point Shift

The table below (also see Figure 30 on page 44) illustrates the configuration of the LDM Series modules to annunciate the alarm and trouble states for all 99 points (detectors or modules) with the last eight points of address '01' dedicated to the MS-9200 system functions (see Figure 32 on page 44).

Detectors

Set address '01' and '02' for detectors.

LDM Module Address '01'	LDM Output Connectors			
	J5	J6	J7	J8
LDM-32F	1 to 4	5 to 8	9 to 12	13 to 16
1st LDM-E32F	17 to 20	21 to 24	25 to 28	29 to 32
2nd LDM-E32F	33 to 36	37 to 40	41 to 44	45 to 48
3rd LDM-E32F	49 to 52	53 to 56	System Functions	

LDM Module Address '02'	LDM Output Connectors			
	J5	J6	J7	J8
LDM-32F	57 to 60	61 to 64	65 to 68	69 to 72
1st LDM-E32F	73 to 76	77 to 80	81 to 84	85 to 88
2nd LDM-E32F	89 to 92	93 to 96	97 to 99	Not Used

Table 21 Alarm/Trouble Setup - Detectors (shift)

Modules

Set address '03' and '04" for modules

LDM Module Address '03'	LDM Output Connectors			
	J5	J6	J7	J8
LDM-32F	1 to 4	5 to 8	9 to 12	13 to 16
1st LDM-E32F	17 to 20	21 to 24	25 to 28	29 to 32
2nd LDM-E32F	33 to 36	37 to 40	41 to 44	45 to 48
3rd LDM-E32F	49 to 52	53 to 56	57 to 60	61 to 64

LDM Module Address '04'	LDM Output Connectors			
	J5	J6	J7	J8
LDM-32F	65 to 68	69 to 72	73 to 76	77 to 80
1st LDM-E32F	81 to 84	85 to 88	89 to 92	93 to 96
2nd LDM-E32F	97 to 99	Not Used	Not Used	Not Used

Table 22 Alarm/Trouble Setup - Modules (shift)

Configuration Diagram

The following diagram illustrates the configuration of LDM modules for 198 point Alarm/Trouble annunciation.

All LDM modules are set to "Receive/Transmit".

The LDM-32F addressed as '01' must be placed at the end of the EIA-485 circuit in order to provide electrical supervision of the wiring between all LDMs on the loop.
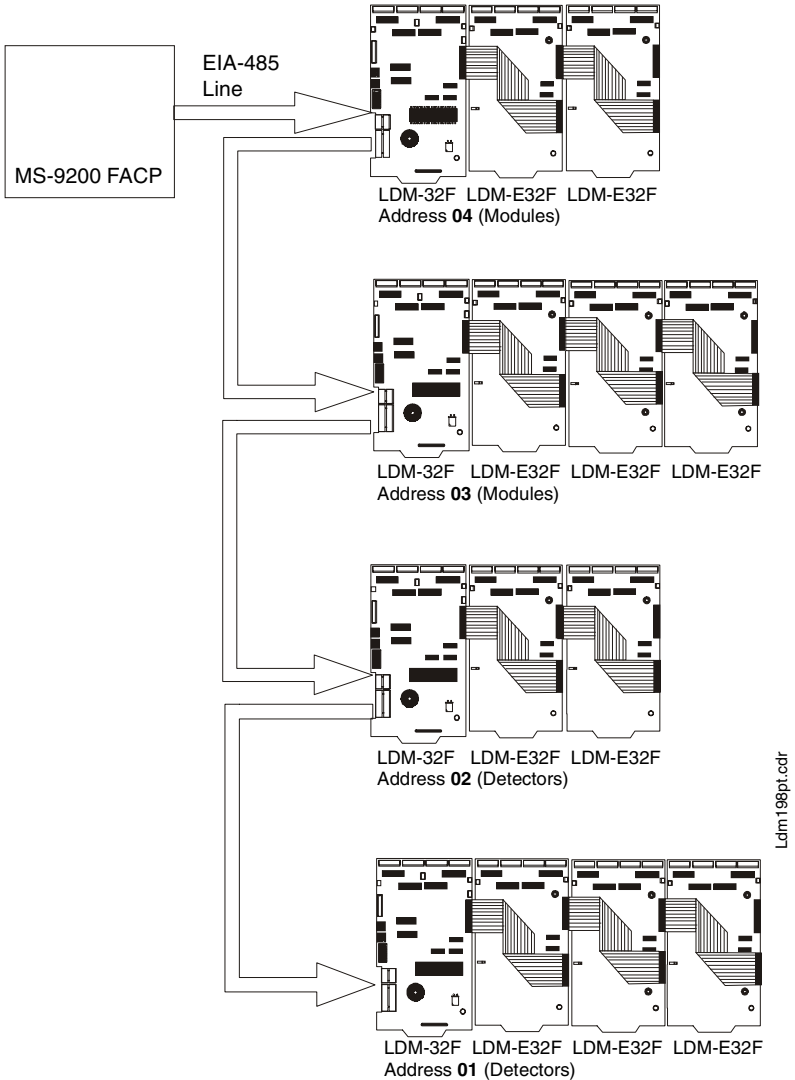
Figure 33 Configuration for 198 Point Alarm/Trouble

NOTES

Appendix C: MS-9600

Capabilities

When installed with a MS-9600, the LDM Series modules can annunciate the status of 99 software zones or 318 points (per SLC Loop) plus system status. Each lamp driver output is assigned to one and only one system I/O point:

Addressable Devices -
Detectors - SD350, SD350T, CP350, H350, H350R, D350P & D350LP
Monitor Modules - MMF-300, MMF-301, MMF-302 & MDF-300
Control Modules - CMF-300
Addressable Pull Stations - BG-12LX

System Control Switches -
Acknowledge, Signal Silence, System Reset & Drill

Trouble Indication

Communication between the MS-9600 and the LDMs is accomplished over a two-wire EIA-485 serial communication bus. The EIA-485 bus is supervised by the MS-9600. Loss of communication results in system trouble message on the panel's display.

Programming and Testing the LDM-32F

After complete installation, the Lamp Driver Module(s) must be programmed into the control panel as if it were an annunciator. After programming the fire alarm control panel to accept them, fully test the LDM(s) by ensuring that each switch and LED performs its intended function, and that the LDM(s) can perform the functions outlined in "3. Operation" on page 27.

Power and EIA-485 Connections

Regulated 24 VDC power and the EIA-485 communication circuit must be connected to the MS-9600 as illustrated below.

Note: An external power source may be used to power the LDM Series.
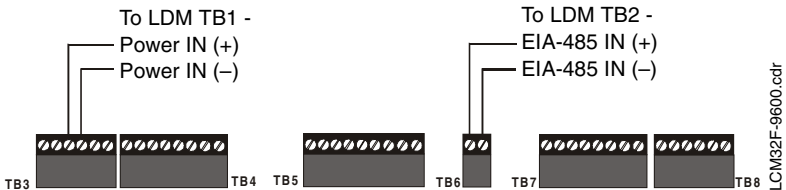
Figure 34 MS-9600 Circuit Board connections

Configuration

Setting Rotary Switches

LDM Address Switches (SW1 & SW2) must be set to an address. Use the following table to set these switches.

Note: Do not omit any address when annunciating 636 points or the MS-9600 will indicate a constant trouble.

M = Module   D = Detector

FACP Address	SW1	SW2	Relay Activation for:
1	0	1	8 System Points & Zones 1-56
2	0	2	Zones 57-99 & 2 NACs
3	0	3	Loop 1, Address M1 - M64
4	0	4	Loop 2, Address M1 - M64
5	0	5	Loop 1, Address M65 - M128
6	0	6	Loop 2, Address M65 - M128
7	0	7	Loop 1, Address M129 - M159 & Loop 2, Address M129 - M159
8	0	8	Loop 1, Address D1 - D64
9	0	9	Loop 2, Address D1 - D64
10	1	0	Loop 1, Address D65 - D128
11	1	1	Loop 2, Address D65 - D128
12	1	2	Loop 1, Address D129 - D159 & Loop 2, Address D129 - D159
13 - 19			Not Used
20	2	0	8 System Points & Zones 1-56
21	2	1	Zones 57-99 & 2 NACs
22	2	2	Loop 1, Address M1 - M64
23	2	3	Loop 2, Address M1 - M64
24	2	4	Loop 1, Address M65 - M128
25	2	5	Loop 2, Address M65 - M128
26	2	6	Loop 1, Address M129 - M159 & Loop 2, Address M129 - M159
27	2	7	Loop 1, Address D1 - D64
28	2	8	Loop 2, Address D1 - D64
29	2	9	Loop 1, Address D65 - D128
30	3	0	Loop 2, Address D65 - D128
31	3	1	Loop 1, Address D129 - D159 & Loop 2, Address D129 - D159

Table 23 SW1 & SW2 Switch Settings

Note: If a UDACT-F is installed and selected in control panel programming, it will automatically assign addresses 20 - 31 to the UDACT-F and disable the selection of these addresses.

Alarm Only Annunciation of Zones

The table below illustrates the configuration of the LDM Series modules to annunciate the alarm state of all 99 software zones (no zone troubles), and two NACs, with the first eight points of address '01' dedicated to the MS-9600 system functions (see Figure 35 below).

LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	Sys Funct	Z1 to Z8	Z9 to Z16	Z17 to Z24
LDM-E32F	Z25 to Z32	Z33 to Z40	Z41 to Z48	Z49 to Z56

LDM Module Address '02'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	Z57 to Z64	Z65 to Z72	Z73 to Z80	Z81 to Z88
LDM-E32F	Z89 to Z96	Z97 to Z99 & NAC1, NAC2 ON		

Table 24 Alarm Only Setup

Alarm Only Annunciation of Zones - With 8-Point Shift

The table below illustrates the configuration of the LDM Series modules to annunciate the alarm state of all 99 software zones (no zone troubles), and two NACs, with the last eight points of address '01' dedicated to the MS-9600 system functions (see Figure 35 below).

LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	Z1 to Z8	Z9 to Z16	Z17 to Z24	Z25 to Z32
LDM-E32F	Z33 to Z40	Z41 to Z48	Z49 to Z56	Sys Funct

LDM Module Address '02'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	Z57 to Z64	Z65 to Z72	Z73 to Z80	Z81 to Z88
LDM-E32F	Z89 to Z96	Z97 to Z99 & NAC1, NAC2 ON		

Table 25 Alarm Only Setup with Shift
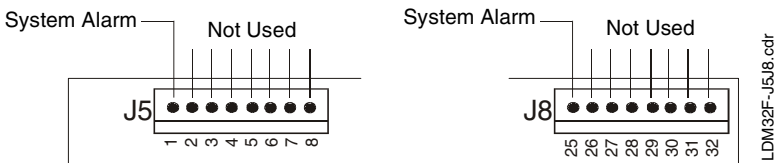
Figure 35 System Functions to Output Connectors - 1

Alarm/Trouble Annunciation of Zones

The table below (also see Figure 36 on page 55) illustrates the configuration of the LDM Series modules to annunciate the alarm and trouble states for all 99 software zones, and two NACs, with the first eight points of address '01' dedicated to the MS-9600 system functions (see Figure 37 on page 55).

LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	System Functions		Z1 to Z4	Z5 to Z8
1st LDM-E32F	Z9 to Z12	Z13 to Z16	Z17 to Z20	Z21 to Z24
2nd LDM-E32F	Z25 to Z28	Z29 to Z32	Z33 to Z36	Z37 to Z40
3rd LDM-E32F	Z41 to Z44	Z45 to Z48	Z49 to Z52	Z53 to Z56

LDM Module Address '02'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	Z57 to Z60	Z61 to Z64	Z65 to Z68	Z69 to Z72
1st LDM-E32F	Z73 to Z76	Z77 to Z80	Z81 to Z84	Z85 to Z88
2nd LDM-E32F	Z89 to Z92	Z93 to Z96	Z97 to Z99 & NAC1, NAC2 ON	

Table 26 Alarm/Trouble Setup

Alarm/Trouble Annunciation of Zones - 8-Point Shift

The table below (also see Figure 36 on page 55) illustrates the configuration of the LDM Series modules to annunciate the alarm and trouble states for all 99 software zones, and one NAC, with the last eight points of address '01' dedicated to the MS-9600 system functions as listed below (see Figure 38 on page 55).

LDM Module Address '01'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	Z1 to Z4	Z5 to Z8	Z9 to Z12	Z13 to Z16
1st LDM-E32F	Z17 to Z20	Z21 to Z24	Z25 to Z28	Z29 to Z32
2nd LDM-E32F	Z33 to Z36	Z37 to Z40	Z41 to Z44	Z45 to Z48
3rd LDM-E32F	Z49 to Z52	Z53 to Z56	System Functions	

LDM Module Address '02'	LDM Output Connectors			
	J5	**J6**	**J7**	**J8**
LDM-32F	Z57 to Z60	Z61 to Z64	Z65 to Z68	Z69 to Z72
1st LDM-E32F	Z73 to Z76	Z77 to Z80	Z81 to Z84	Z85 to Z88
2nd LDM-E32F	Z89 to Z92	Z93 to Z96	Z97 to Z99 & NAC1, NAC2 ON	

Table 27 Alarm/Trouble Setup with Shift

The figure below is an example of the connections used when setting the LDM module for Alarm/Trouble mode.

Alarm - First 4 Zones or Points
Trouble - First 4 Zones or Points

Alarm - Second 4 Zones or Points
Trouble - Second 4 Zones or Points

Alarm - Third 4 Zones or Points
Trouble - Third 4 Zones or Points

Alarm - Fourth 4 Zones or Points
Trouble - Fourth 4 Zones or Points

LCM32F-conn.cdr
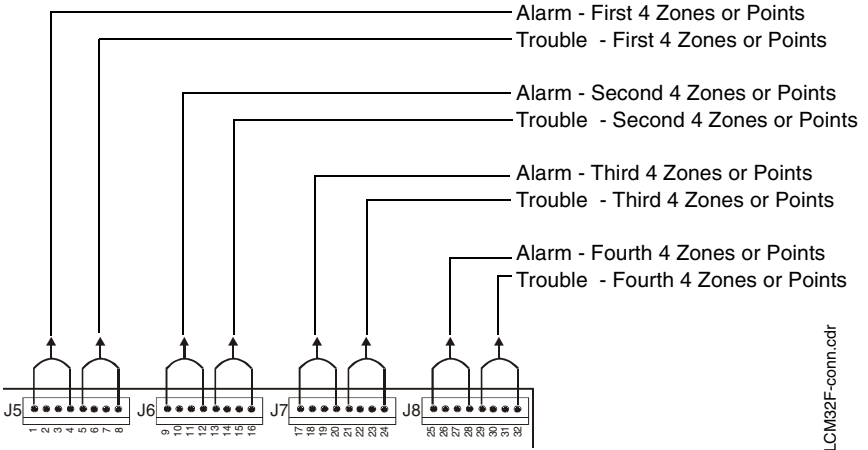
Figure 36 Connections for Alarm/Trouble

The figure below illustrates pin usage of output connectors for system functions in alarm/trouble mode.

System Status Indicators

Program Mode (Yellow)
Signals Silenced (Yellow)
System Trouble (Yellow)
Power (Green)
System Alarm (Red)

Supervisory (Yellow)
Walktest
Battery Trouble (Yellow)
AC Fail (Red)

LCM32F-J5J6.cdr

Note: Pins not marked are not used
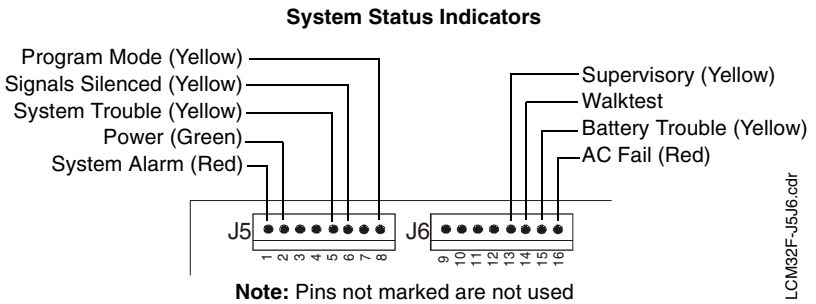
Figure 37 System Functions to Output Connectors - 1

The figure below illustrates pin usage of output connectors for system functions in alarm/trouble mode with 8-Point shift selected.

System Status Indicators

Program Mode (Yellow)
Signals Silenced (Yellow)
System Trouble (Yellow)
Power (Green)
System Alarm (Red)

Supervisory (Yellow)
Walktest
Battery Trouble (Yellow)
AC Fail (Red)

LCM32F-J7J8.cdr

Note: Pins not marked are not used
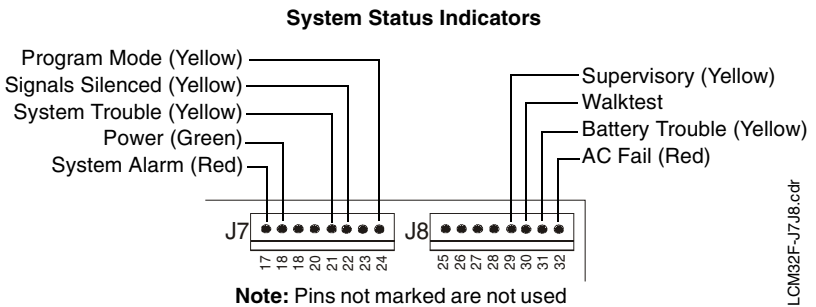
Figure 38 System Functions to Output Connectors - 2

Alarm Only Annunciation of Points

The following table displays an example of setting up an LDM Series to annunciate the control panel's SLC Loop #1, Modules M65 to M128 in Alarm Only mode.

By referring to Table 23 on page 52 it can be determined what address can be set to annunciate any other group of address points.

LDM Module Address '05' (SLC Loop #1)	LDM Output Connectors			
	J5	J6	J7	J8
LDM-32F	M65 to M72	M73 to M80	M81 to M88	M89 to M96
LDM-E32F	M97 to M104	M105 to M112	M113 to M120	M121 to M128

Table 28 Alarm Only Setup

Alarm/Trouble Annunciation of Points

The following table displays an example of setting up an LDM Series to annunciate the control panel's SLC Loop #1, Modules M65 to M128 in Alarm/Trouble mode. (See Figure 36 on page 55).

By referring to Table 23 on page 52 it can be determined what address can be set to annunciate any other group of address points.

LDM Module Address '05' (SLC Loop #1)	LDM Output Connectors			
	J5	J6	J7	J8
LDM-32F	M65 to M68	M69 to M72	M73 to M76	M77 to M80
1st LDM-E32F	M81 to M84	M85 to M88	M89 to M92	M93 to M96
2nd LDM-E32F	M97 to M100	M101 to M104	M105 to M108	M109 to M112
3rd LDM-E32F	M113 to M116	M117 to M120	M121 to M124	M125 to M128

Table 29 Alarm/Trouble Setup

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Index

Limited Warranty

The manufacturer warrants its products to be free from defects in materials and workmanship for eighteen (18) months from the date of manufacture, under normal use and service. Products are date-stamped at time of manufacture. The sole and exclusive obligation of the manufacturer is to repair or replace, at its option, free of charge for parts and labor, any part which is defective in materials or workmanship under normal use and service. For products not under the manufacturer's date-stamp control, the warranty is eighteen (18) months from date of original purchase by the manufacturer's distributor unless the installation instructions or catalog sets forth a shorter period, in which case the shorter period shall apply. This warranty is void if the product is altered, repaired, or serviced by anyone other than the manufacturer or its authorized distributors, or if there is a failure to maintain the products and systems in which they operate in a proper and workable manner. In case of defect, secure a Return Material Authorization form from our customer service department. Return product, transportation prepaid, to the manufacturer.

This writing constitutes the only warranty made by this manufacturer with respect to its products. The manufacturer does not represent that its products will prevent any loss by fire or otherwise, or that its products will in all cases provide the protection for which they are installed or intended. Buyer acknowledges that the manufacturer is not an insurer and assumes no risk for loss or damages or the cost of any inconvenience, transportation, damage, misuse, abuse, accident, or similar incident.

THE MANUFACTURER GIVES NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR OTHERWISE WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. UNDER NO CIRCUMSTANCES SHALL THE MANUFACTURER BE LIABLE FOR ANY LOSS OF OR DAMAGE TO PROPERTY, DIRECT, INCIDENTAL, OR CONSEQUENTIAL, ARISING OUT OF THE USE OF, OR INABILITY TO USE THE MANUFACTURER'S PRODUCTS. FURTHERMORE, THE MANUFACTURER SHALL NOT BE LIABLE FOR ANY PERSONAL INJURY OR DEATH WHICH MAY ARISE IN THE COURSE OF, OR AS A RESULT OF, PERSONAL, COMMERCIAL, OR INDUSTRIAL USE OF ITS PRODUCTS.

This warranty replaces all previous warranties and is the only warranty made by the manufacturer. No increase or alteration, written or verbal, of the obligation of this warranty is authorized.

Fire·Lite® Alarms

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