02/17/2026

Lamp Driver Module
LDM2-60
LDM2-32

Instruction Manual

Document LS10385-000GE-E
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Fire Alarm & Emergency Communication System Limitations

While a life safety system may lower insurance rates, it is not a substitute for life and property insurance!

An automatic fire alarm system—typically made up of smoke detectors, heat detectors, manual pull stations, audible warning devices, and a fire alarm control panel (FACP) 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.

An emergency communication system—typically made up of an automatic fire alarm system (as described above) and a life safety communication system that may include an autonomous control unit (ACU), local operating console (LOC), voice communication, and other various interoperable communication methods—can broadcast a mass notification message. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire or life safety event.

The Manufacturer recommends that smoke and/or heat detectors be located throughout a protected premises 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. This document can be found at http://www.systemsensor.com/appguides/. 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, chimneys, even wet or humid areas 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, such as air conditioning vents.
- Smoke particles may be drawn into air returns before reaching the detector.

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

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

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

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

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

Audible warning devices such as bells, horns, strobes, speakers and displays 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:

- An emergency communication system may take priority over a fire alarm system in the event of a life safety emergency.
- Voice messaging systems must be designed to meet intelligibility requirements as defined by NFPA, local codes, and Authorities Having Jurisdiction (AHJ).
- Language and instructional requirements must be clearly disseminated on any local displays.
- 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 to or comprehend the meaning of the signal. Audible devices, such as horns and bells, can have different tonal patterns and frequencies. It is the property owner's responsibility to conduct fire drills and other training exercises to make people aware of fire alarm signals and instruct them on the proper reaction to alarm signals.
- In rare instances, the sounding of a warning device can cause temporary or permanent hearing loss.

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

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

Alarm Signaling Communications:

- **IP connections** rely on available bandwidth, which could be limited if the network is shared by multiple users or if ISP policies impose restrictions on the amount of data transmitted. Service packages must be carefully chosen to ensure that alarm signals will always have available bandwidth. Outages by the ISP for maintenance and upgrades may also inhibit alarm signals. For added protection, a backup cellular connection is recommended.
- **Cellular connections** rely on a strong signal. Signal strength can be adversely affected by the network coverage of the cellular carrier, objects and structural barriers at the installation location. Utilize a cellular carrier that has reliable network coverage where the alarm system is installed. For added protection, utilize an external antenna to boost the signal.
- **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 alarm signaling connections are recommended.

The most common cause of life safety system malfunction is inadequate maintenance. To keep the entire life safety 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 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 as required by National and/or local fire codes and should be performed by authorized professional life safety system installers only. Adequate written records of all inspections should be kept.

Limit-F-2020

Installation Precautions

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

WARNING - Several different sources of power can be connected to the fire alarm control panel. Disconnect all sources of power before servicing. 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 manuals are read and understood.

CAUTION - System Re-acceptance Test after Software Changes: To ensure proper system operation, this product must be tested in accordance with NFPA 72 after any programming operation or change in site-specific software. Re-acceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring. 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 0-49º C/32-120º F and at a relative humidity 93% ± 2% RH (non-condensing) at 32°C ± 2°C (90°F ± 3°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 its peripherals be installed in an environment with a normal room temperature of 15-27º C/60-80º F.

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

Like all solid state electronic devices, this system may operate erratically or can be damaged when subjected to lightning induced transients. Although no system is completely immune from lightning transients and interference, 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, or 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.

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.

Units with a touchscreen display should be cleaned with a dry, clean, lint free/microfiber cloth. If additional cleaning is required, apply a small amount of Isopropyl alcohol to the cloth and wipe clean. Do not use detergents, solvents, or water for cleaning. Do not spray liquid directly onto the display.

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.

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FCC Warning

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual may cause interference to radio communications. It has been tested and found to comply with the limits for Class A computing devices pursuant to Subpart B of Part 15 of FCC Rules, which is designed to provide reasonable protection against such interference when devices are 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 or her 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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In order to supply the latest features and functionality in fire alarm and life safety technology to our customers, we make frequent upgrades to the embedded software in our products. To ensure that you are installing and programming the latest features, we strongly recommend that you download the most current version of software for each product prior to commissioning any system. Contact Technical Support with any questions about software and the appropriate version for a specific application.

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This symbol (shown left) on the product(s) and / or accompanying documents means that used electrical and electronic products should not be mixed with general household waste. For proper treatment, recovery and recycling, contact your local authorities or dealer and ask for the correct method of disposal.

Electrical and electronic equipment contains materials, parts and substances, which can be dangerous to the environment and harmful to human health if the waste of electrical and electronic equipment (WEEE) is not disposed of correctly.

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Section 1: Product Overview

It is imperative that the installer understand the requirements of the Authority Having Jurisdiction (AHJ) and be familiar with the standards set forth by the following regulatory agencies:

• Underwriters Laboratories

• National Fire Protection Association

NFPA Standards

NFPA 72 National Fire Alarm Code

NFPA 70 National Electrical Code

NFPA 92 Standard for Smoke Control Systems

Underwriters Laboratories Documents:

UL 864 Standard for Control Units for Fire Protective Signaling Systems

UL 2017 for General-Purpose Signaling Devices and Systems

UL 2610 Standard for Commercial Premises Security Alarm Units and Systems

ULC-S527-19 Standard for Control Units for Fire Alarm Systems

ULCS524 -Standard for the Installation of the Fire Alarm Systems

Other:

EIA-232E Serial Interface Standard

EIA-485 Serial Interface Standard

NEC Article 250 Grounding

NEC Article 300 Wiring Methods

NEC Article 760 Fire Protective Signaling Systems

Applicable Local and State Building Codes

Requirements of the Local Authority Having Jurisdiction (LAHJ)

This product has been certified to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864, 10th Edition. Operation of this product with products not tested for UL 864, 10th Edition has not been evaluated. Such operation requires the approval of the local Authority Having Jurisdiction (AHJ).

For product compliance, refer to the UL listing cards located on the UL online certification directory at https://iq.ulprospector.com/en/.

1.1 General

The LDM2-60/32 provides the Fire Alarm Control Panel (FACP) or Network Control Display with remote, serially-connected annunciators that include support for 60 external LEDs and 21 external switches. It is offered as two variants, the LDM2-60, which has 60 outputs and 21 inputs, and the LDM2-32, which has 32 outputs and 10 inputs. This allows the annunciator to remotely execute functions of the control panel in addition to displaying the status of the system. Communication between the FACP or Network Control Display and the LDM2-60/32 is accomplished over a power-limited, two-wire serial interface called AIO and can be connected to both the external and internal bus. The Power for the LDM2-60/32 is provided via a separate power-limited power loop from the control panel which is inherently supervised (loss of power results in a communication failure at the control panel). The LDM2-60/32 has on-board LED indicators that display power, trouble, test and transmit and receive on both the internal and external AIO bus. Refer to the FACP manual for the maximum of number of annunciators that may be installed as well as the maximum number of annunciators that can be configured as routers and the number of peripheral annunciators each router can support.

1.2 Power Requirements

The maximum LED current is 20mA and board itself consumes 50mA. Total current can be calculated by referring to Section 3.3 (pg 16) “Electrical Ratings and Current Calculations" for more information Limits. The number of AIO devices that can be powered in a particular system depends on the current available from the control panel’s power supply. Refer to the FACPs installation manual for more details.

1.3 Wire Runs

Communications between the Fire Alarm Control Panel and the LDM is accomplished over an AIO communications bus which must be power-limited. Communications between the host FACP and LDMs is supervised by the Fire Alarm Control Panel. Power supplied by the host control panel or external power supply must be power-limited. It is inherently supervised (loss of power also results in a communication failure at the control panel). Refer to appropriate control panel manual for UL Power-limited Wiring Requirements.

AIO Wiring Specifications: The AIO 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 6,000 feet (1,800 m). The wiring must be an 18 AWG to 16 AWG (0.75 to 1.5 mm2) twisted shielded pair cable having a characteristic impedance of 120 ohms, +/- 20%. Limit the total wire resistance to 100 ohms on the AIO circuit, and 10 ohms on the LDM power circuit. 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. Mount cabinet or backbox and draw all wiring into enclosure. An end-of-line termination must be enabled on the last AIO device, router and peripheral, on each AIO bus, and should be disabled on all other AIO devices. Refer to Figure 2.1, “LDM2-60/32 Board Layout (LDM2-60 is shown)” on page 9 for switch location.

NOTE: All enclosures, including the FACP backbox, must be connected to earth ground. Never use the shield for ground purposes. Terminate the AIO shield at the Fire Alarm Control Panel only.

1.4 Power Requirements & Electrical Ratings

Operating voltage: 18V to 30VDC

Standby Current: (Board Only; All Outputs off)	LDM2-32 26 mA	@18 VDC
	LDM2-60 26 mA	@18 VDC
Maximum Alarm Current (all outputs on):	LDM2-32: 756 mA	@18 VDC
	LDM2-60: 1,468 mA	@18 VDC

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

Section 2: Installation and Configuration

2.1 Installation Checklist

1. Mount the cabinet or backbox. Select an appropriate knockout on the enclosure. Ground the enclosure to a solid metallic earth ground.
2. Mount chassis in backbox. If a CHS-4L is to be used in mounting the LDM, connect the chassis to the cabinet as illustrated in Figure Figure 2.3 on page 11 Secure standoffs (supplied) to the chassis or enclosures as shown in Figure 2.2 on page 10.
3. Connect AIO annunciator wiring. Pull all annunciator wiring into the enclosure. Terminate the shield as shown in Figure 2.4 on page 11.
4. Connect annunciator wiring to the removable terminal blocks. Maintain 0.25" spacing between power-limited and nonpower-limited wiring which must also enter/exit the enclosure through separate knockouts.

NOTE: The End-of-Line termination switch (switch 3 for the external AIO bus and switch 5 for the internal AIO bus) must be set to ON at the last annunciator on the AIO circuit, all other annunciators on the circuit should be set to OFF.

5. Connect LED and switch wiring to the removable terminal blocks. Maintain 0.25" spacing between power-limited and nonpower-limited wiring which must also enter/exit the enclosure through separate knockouts.
6. Connect Power to LDM. LDM outputs can be powered from 24 VDC or 5 VDC, depending on the loading required. For information on supplying power for the annunciator, refer to the specific FACP appendix in this manual, and to the panel for your FACP's power supply.

WARNING: RISK OF EQUIPMENT DAMAGE

DISCONNECT ALL POWER SOURCES BEFORE MAKING ELECTRICAL CONNECTIONS. FOLLOW INSTALLATION AND SAFETY PROCEDURES PROVIDED IN FACP AND POWER SUPPLY MANUALS

7. Set Control Switches (optional). If normally-open switches are to be installed on the LDM to permit the execution of system control functions and point-control
8. Configure the LDM2-60/32. Set the address on the LDM annunciator. Refer to the appropriate FACP manual.
9. Program and test the LDM2-60/32. After complete installation, the Lamp Driver must be programmed into the control panel. Program the LDM as if it were an annunciator. After programming the fire alarm control panel to accept the annunciators, fully test the LDMs by ensuring that each switch and LED performs its intended function.

CAUTION: STATIC SENSITIVE COMPONENTS

THE CIRCUIT BOARD CONTAINS STATIC-SENSITIVE COMPONENTS. ALWAYS GROUND YOURSELF WITH A PROPER WRIST STRAP BEFORE HANDLING ANY BOARDS SO THAT STATIC CHARGES ARE REMOVED FROM THE BODY. USE STATIC SUPPRESSIVE PACKAGING TO PROTECT ELECTRONIC ASSEMBLIES

2.2 Board Layout

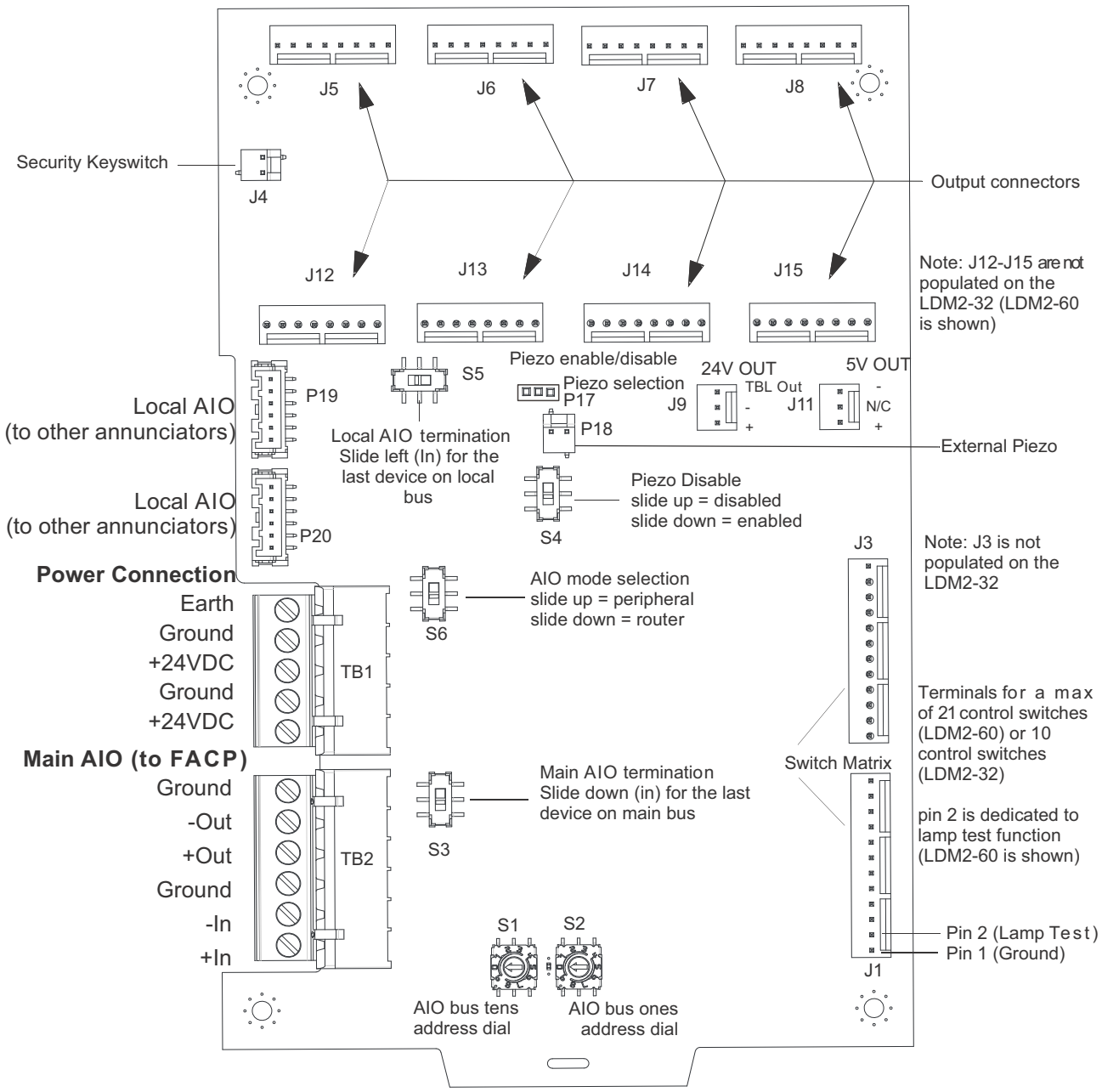


Figure 2.1 LDM2-60/32 Board Layout (LDM2-60 is shown)

NOTE: J3 for input switch is also not populated for LDM2-32. On the LDM2-32 the following is not populated: output terminal blocks J12, J13, J14, and J15. On LDM2-60 the J15 header output #57 to #60 are available for LED output. Output #62 mirrors trouble output on J9-3 header and other outputs (#61,#63 and #64) are set for future use.

2.3 Mount the Cabinet or Backbox and Install Annunciator

The LDM2-60/32 annunciators must be mounted in special backboxes, the ABB Series, or in the CAB-4/5 series cabinets using a hinged dress panel, the DP-4A, DP-T2A, DP-4A-CB4, or DP-T2A-CB4. The LDM2-60/32 can be mounted on a CHS-L4. Refer to the ABB, CAB-4, or CAB-5 Series Installation Documents for enclosure mounting instructions.

2.3.1 External Cabinets

The CAB-5, CAB-A4 and the CAB-B4 are UL listed cabinets suitable for use in graphic annunciator applications. For size and dimensions, refer to the CAB-5 and CAB-4 Series Cabinets Product Installation Document. Other cabinets such as those provided by custom graphic annunciator manufacturers may be used provided they meet UL requirements as UL listed secured enclosures. Select an appropriate knockout on the enclosure. Mount the cabinet and ground it to a solid metallic earth ground.

2.3.2 External Piezo

In Canada, use of external piezo kit, AIO-PIEZO, is required when the LDM2-32/60 is in a locked enclosure. Suitable remote enclosures are the ABB-1 or ABB-2. See section 2.3.1 for more information about using a custom graphic annunciator cabinet.

1. To mount the LDM2-32/60 in a the ABB-1, one ABP-1 blank plate is required. For an ABB-2, two ABP-1 blank plates are needed.
2. Mount ABP-1s to the front dress plate of enclosure
3. Using the mounting hardware provided with the LDM2, connect the provided female-to-female standoffs on the back of the ABP-1.
4. Mount the AIO-PIEZO enclosure dress panel using provided hardware.
5. Connect the AIO-PIEZO to connector P18 on the LDM2-32/60.
6. Change jumper P17 from the INT position to EXT.

2.3.3 CHS-4L Chassis

The CHS-4L chassis will support up to four LDM2-60/32 modules. The CHS-4L chassis may be mounted inside the CAB-A4 and the CAB-B4 backboxes. Note that a solid earth ground connection is required for proper operation as well as to aid in transient protection. Two female-to-female standoffs must be installed to the chassis to secure the LDMs in place. (See Figure 2.2). Mount the CHS-4L Chassis to a cabinet and secure with the hardware provided. A Grounding Cable Assembly must be connected to the chassis mounting stud for connection to the annunciator's *Earth Ground* terminal. 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.

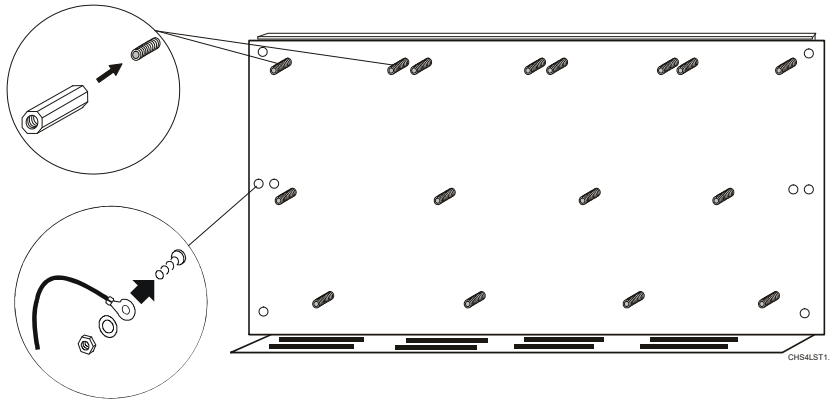


Figure 2.2 CHS-4L Mounting

NOTE: The LDM2-60/32 can be mounted in the standard option-board locations in panel-specific chassis such as the CHS-M2 and CHS-M3. Select a location according to the instructions given for option boards in your FACP manual, and follow the mounting instructions provided there.

Slip the bottom edge of the LDM board into the slot on the CHS-4L chassis and move the module toward the standoffs. Secure the LDM to the standoffs with the screws provided. Repeat for installation of additional LDM modules.

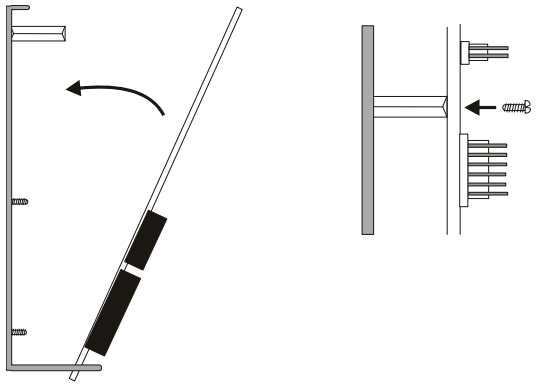


Figure 2.3 Installing LDM Modules in CHS-4L

2.4 Shielding the AIO Circuit

The AIO circuit must be wired using a twisted pair cable having a characteristic impedance of 120 ohms, +/- 20%. Do not run cable adjacent to, or in the same conduit as, 120-volt AC service, noisy electrical circuits that are powering mechanical bells or horns, audio circuits above 25 Vrms, motor control circuits, or SCR power circuits.

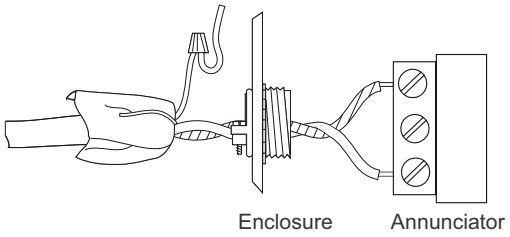


Figure 2.4 Terminating the Shield

NOTE: Shielded wire is not necessary but when it is used, the shield should be connected to system ground (not earth) at the FACP and ground on the Main AIO connector (TB2) at the LDM2-60/32. If the LDM2-60/32 is using a remote power supply, the shield will serve as the AIO reference wire.

2.5 Earth Ground

Connect earth ground to a mounting screw on the backbox or cabinet. During mounting, the backbox or cabinet should have been connected to a solid earth ground such as a cold water pipe. Ground for the LDM2-60/32 is on terminal TB1

2.6 Connecting the Annunciator Security Tamper Switch

The Security Tamper Switch input on the router may be used to connect to a switch on the cabinet door to prevent the touchpoints on the router or any peripherals from being active until the door is open. Leave the jumper (J4) open to have the switch inputs always active. Connect a switch that will short the jumpers when the door is closed to disable the switch inputs.

To install the Security Tamper Switch, follow these steps (all parts identified are included in the STS-1 Kit):

1. Mount the tamper switch bracket (#50160134-001) onto the mounting stud in the upper left corner of the cabinet door using a #4-40 nut (#36045).
2. Install tamper magnet onto tamper switch bracket.
3. Install tamper switch with wire leads (#30113) onto the upper right corner of the dress plate on the cabinet.
4. Use wire nuts (16-22AWG Blue UL 105C #36039) to connect wire leads from the dress plate to the wire assembly (#75148).
5. Plug the Annunciator Security Tamper Switch on the cabinet into the Security Tamper Switch connector (J4) on the LDM2-60/32

2.7 Power and AIO Circuit Connections

Select an appropriate knockout on the enclosure for the wiring to run through and snap it out. Pull all annunciator wiring into the enclosure. Connect annunciator wiring to the removable terminal blocks at this time. See “Power Requirements” on page 6 for circuit requirements.

NOTE: All power must be turned off when connecting the 24 VDC power to the annunciator. Reapply power according to the instructions in the control panel manual.

The LDM2-60/32 power source must be filtered, non-resettable, 24 VDC listed for fire-protective signaling use. Sources include FACP power supplies and auxiliary power supplies. The power run to the annunciator need not contain a power supervision relay because loss of power is inherently supervised through communication loss (AIO communication loss is registered at the control panel during loss of power to the annunciator).

When wiring for router to peripheral, connector TB2 is the Main AIO bus connection to wire the router to the FACP. Connectors P19 and P20 are used for the Local AIO bus to wire from the router to the peripherals and to wire from one peripheral to the next peripheral.

Each LDM-CBL-24 cable kit includes:

(4) P/N 75116 24” cable consisting of 8 stranded, multicolored conductors. Cables connect to J5. J6, J7 and J8 and J12, J13, J14 and J15.

(1) P/N 75122, 24” cable consisting of 10 stranded multicolored conductors. Connects to J1 and J3 optional control switches.

(1) P/N 75117, 24” cable consisting of 2 stranded, single color conductors. Connects to J1, Lamp Test Switch. (Note: Lamp Test Switch is only available on J1 header).

(1) P/N 75117, 24” cable consisting of 3 stranded, single color conductors. Connects to J9 or J11, Lamp Power.

Each LDM-CBL-48 cable kit includes

(4) P/N 75147 48” cable consisting of 8 stranded, multicolored conductors. Cables connect to J5. J6, J7 and J8 and J12, J13, J14 and J15.

(1) P/N 75150, 48” cable consisting of 10 stranded multicolored conductors. Connects to J1 and J3 optional control switches.

(1) P/N 75148, 48” cable consisting of 2 stranded, single color conductors. Connects to J1, Lamp Test Switch. (Note: Lamp Test Switch is only available on J1 header).

(1) P/N 75149, 48” cable consisting of 3 stranded, single color conductors. Connects to J9 or J11, Lamp Power.

NOTE: Pin 1 Ground is dedicated ground for Lamp Test switch only. Do not use to return LED current through Pin 1.

NOTE: The AIO-CBL must be ordered whenever configuring AIO devices as peripherals (kit contains 4X6” ribbon cables and 1X48” ribbon cable).

2.8 Lamp/LED Wiring

NOTE: All LEDs/lamps being driven by the LDM series must be located in the same room as the modules. Use cable kits for wiring from connectors on LDM.

- .

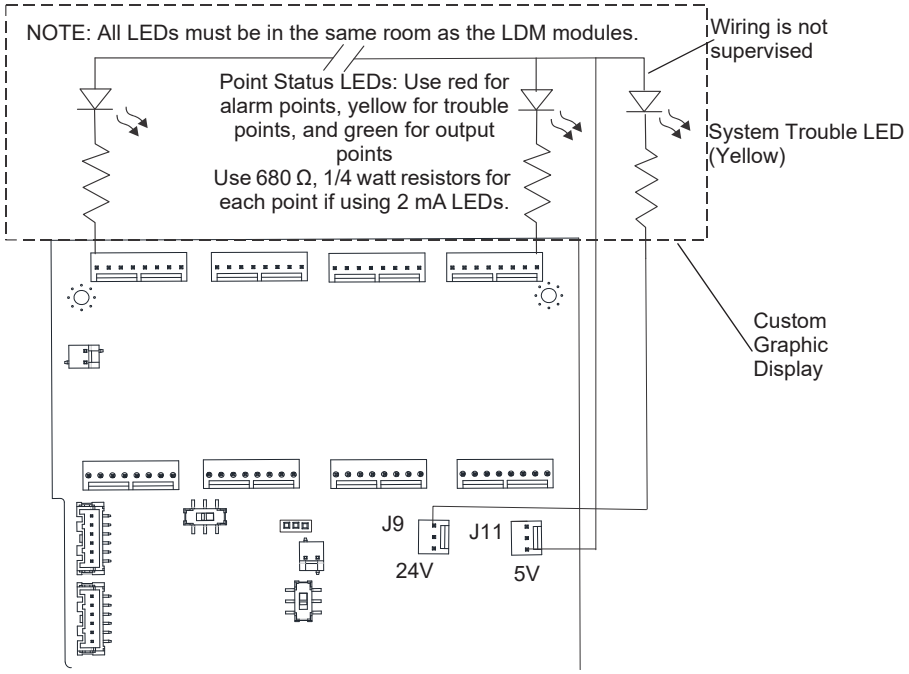


Figure 2.5 Typical LDM-to-Graphics Display Connection @ 5VDC

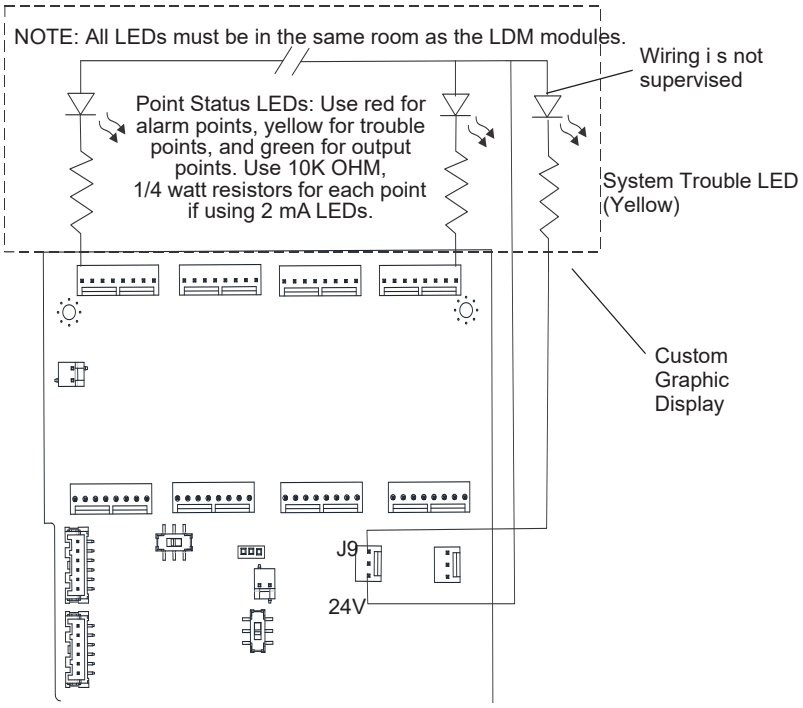


Figure 2.6 Typical LDM-to-Graphics Display Connection @ 24 VDC

2.9 Control Switch Wiring

Optional zone/point control switches can be programmed as either momentary or toggle. When an LDM switch is configured as a "toggle," the switch position may not reflect the current state of the point/zone, etc. if the point or zone is subsequently controlled by another means (e.g., an ACM, the panel, etc.). Refer to the FACP programming tool for more information. Wiring from the LDM to the control switches must be in conduit and in the same room as the LDM since the wires are not supervised. Use the cables supplied in the cable kits to wire the control switches.[1]

1. 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. Switch wiring must be in conduit.

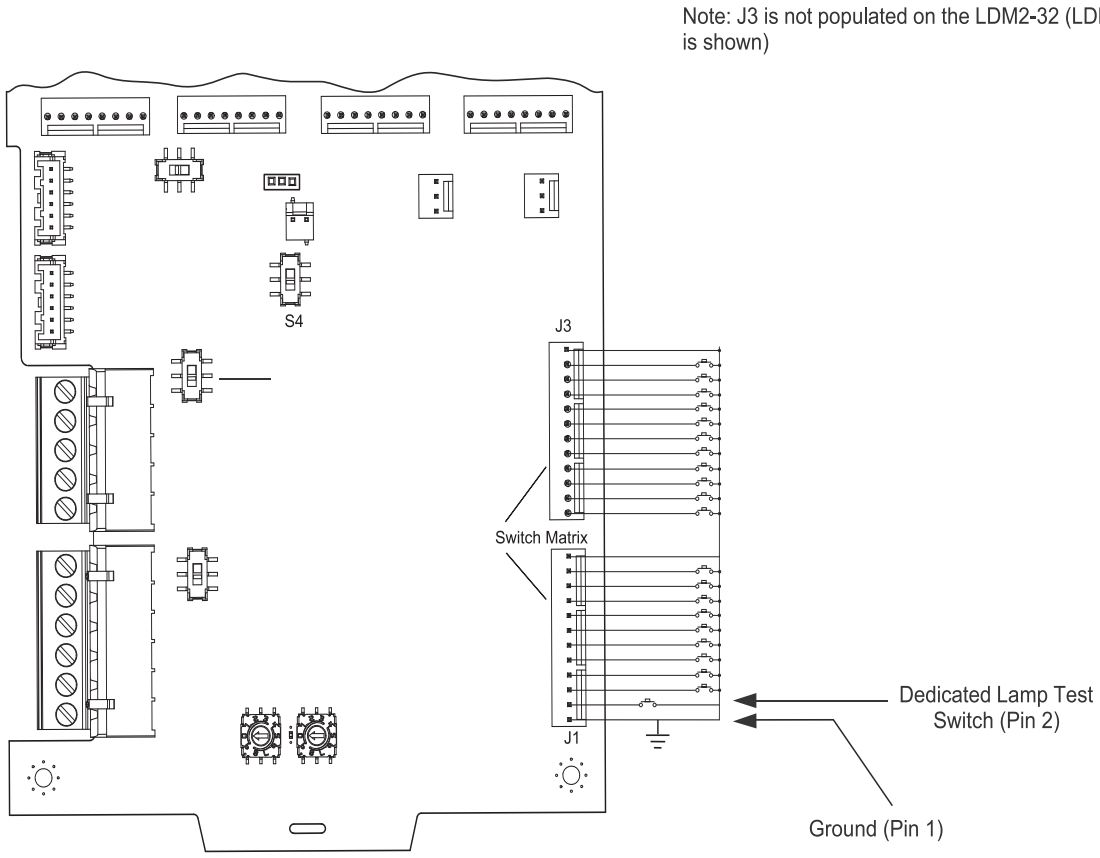


Figure 2.7 Optional Zone/Point-Control Switch Wiring

In this configuration, each LDM2-32 provides 9 alarm drivers, trouble drivers and control switches excluding one lamp test switch. The LDM2-60 provides for an additional 20 alarm drivers, 20 trouble drivers and 20 control switches. The alarm and trouble drivers are assigned to host FACP zones/points via user setup/installation. Not all switches must be used - switches can be wired only for desired functions. To determine the function of each switch and driver in a specific FACP application, refer to the appropriate FACP Installation Manual. A UL-listed key-lock switch wired to J4 on the LDM2-32 and LDM2-60 should be used to provide access security for all control switches wired to that set of LDM modules. Control switches will not function when the key lock switch is in its closed position.

2.10 Setting Addresses and Switches

2.10.1 End-of-Line Termination Switch

For Class B/DCLB wiring, the end-of-line termination switch must be enabled at S3 on the last device on the Main AIO circuit. For Class A/DCLA wiring, the termination switch is only enabled at the FACP.

The end-of-line termination switch must be enabled at S5 on the first and last devices on the Local AIO circuit. All other annunciators should have these switches set to disable. Refer to Figure 2.1 on page 9 for switch locations.

2.10.2 Addressing the LDM2-60/32

Set the address with rotary switches S1 and S2 on the annunciator. Turn the arrow with a small flat-head until it points to the correct digit. S1 selects the Tens digit of the address. S2 selects the Ones digit of the address. Refer to Figure 2.1 on page 9 for switch locations. These addresses must match what is entered into the programming tool associated with your FACP's programming.

The system supports up to 10 router devices connected to the control panel using up to 10 unique addresses. Each router can have up to 15 peripheral devices connected to it. Refer to the FACP manual for the maximum number of devices allowed on the AIO circuit, including routers and peripherals.

Each device will have a router address and a peripheral address. For devices configured as routers, the peripheral address will be 0 and the router address will be what is selected by S1 and S2. For devices configured as peripherals, the peripheral address will be what is selected by S1 and S2 and the router address will be the address of the router it is connected to.

Refer to your control panel documentation for valid addresses.

Ensure the AIO mode switch, S6, is properly configured for Router or Peripheral device.

2.11 System Alarm Piezo

An onboard piezo will sound if the LDM2-60/32 is in trouble or alarm. Ensure that the jumper on P17 is on the right two pins to select onboard piezo. To select the external piezo, ensure the jumper is on left two pins. Refer to Figure 2.1, “LDM2-60/32 Board Layout (LDM2-60 is shown)” on page 9 for jumper location. Slide S4 down to enable the system alarm piezo, onboard or external, slide up to disable the alarm.

In the programming tool associated with your FACP, under AIO Board Settings, each LDM2-60/32 has a general setting for “Enable Piezo Operation To Follow LED Blink Pattern.” When that setting is checked, the System Alarm Piezo must be enabled. If the System Alarm Piezo is disabled when the operation is enabled in the programming tool associated with your FACP, the panel will generate a trouble message.

Section 3: Electrical Ratings and Current Calculations

3.1 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 Figure 2.6 and Figure 2.5 on page 12-13 for connection illustrations

Maximum Current per LED: 20 mA *(external circuit must limit current)*

Maximum Voltage rating per output driver: 30 VDC

LED outputs are Bipolar Darlington Open Collector NPN Transistor

3.2 Supervision of LDM points

Any LEDs or lamps connected to the LDM2-60/32 are not supervised for failure. Therefore, all LEDs or lamps, must be located in the same room as the LDM modules.

3.3 Calculating LDM Series Standby and Alarm Currents

Current Draw for LED Power @ 24 VDC

Standby Current

[ ] # of LDM2-60/32 Modules	X	23mA[1*]	=	
Standby Total			=	

Alarm Current[2*]				
[ ] # of LDM2-32 Modules	X	50 mA	=	
Internal Piezo				
[ ] # of LDM2-32 Modules		35mA	=	
External Piezo				
[ ] # of LDM2-60 Modules	X	51mA	=	
Internal Piezo				
[ ] # of LDM2-60 Modules	X	42mA	=	
External Piezo				
[ ] # of LEDs*	X	[ ] ma per LED	=	
[ ] # of LEDs†	X	[{ } mA/4]	=	
Alarm Total		@24VDC	=	

* Use this line for calculations if LEDs are powered from 24 VDC source.

† Use this line for calculations if LEDs are powered from the 5 VDC source from J11 on the LDM2-60 or the LDM2-32.

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.
2. Enter Alarm Current obtained here into the alarm calculation tables.
3. Total peripherals current powered from a router cannot exceed 1.5A.

NOTE: When power for peripherals are daisy chained from a router through the P19/P20 connector and total peripheral current exceeds the 1.5A limit, the red wires (pin 2 and 6 on HPN:50188905) must be cut and power must be routed through the TB1 connector for the first peripheral after the cut.

Notes

Section 4: Programming and Operations

4.1 Capabilities

The LDM2-60/32 is used to provide an interface to a custom graphic annunciator. The LDM2-60/32 has output connectors which are used to drive lamps or LEDs and input connectors which are used for remote switch functions.

The LDM2-60/32 may be connected to fire alarm control panels (FACP) to provide remote annunciation of the following:

• General system status:
– General Alarm
– General Trouble
– General supervisory
– Notification Appliance Circuit (NAC) output status
– System silence
– Alarm relay status
• Alarm and trouble status of zones or individual points
• Alarm only status of zones or individual points

The LDM Series 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

4.2 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, software zone or addressable initiating device.
- **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.

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 annunciator).

4.3 LDM2-60/32 Communications

Receive/Transmit LDM2-60/32

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.

4.4 LDM2-60/32 LED Indicators

The following tables show LED states and frequencies on the LDM.

LED	Indicator	State When Active
LED 7	Trouble	Yellow
LED 3	Power	Green (normal, board has power)
LED 2	TXE (External AIO transmit)	Flickering
LED 1	RXE (External AIO receive)	Flickering
LED 4	Test	Green (normal/on-line) OFF (off-line)
LED 6	TXI (Internal AIO transmit)	Flickering
LED 5	RXI (Internal AIO receive)	Flickering

State	Test LED 4 (Green)	Trouble LED 7 (Yellow)
Offline	OFF	1Hz
Online (normal)	1Hz	OFF
Enrollment	1Hz	1Hz

State	Test LED 4 (Green)	Trouble LED 7 (Yellow)
Firmware Update	1Hz	2Hz

4.5 LDM60/32 Lamp Test

The LDM has one pin dedicated to Lamp Test on the Switch Matrix (see Figure 2.1 on page 9 for pin location)

4.6 Programming the Fire Alarm Control Panel for Remote Annunciation

Annunciator points must be programmed into the programming tool associated with your FACP before the annunciators will function. Refer to Figure 2.1, "LDM2-60/32 Board Layout (LDM2-60 is shown)" on page 9 for setting router and peripheral addresses. All inputs are customizable except for the Lamp Test input (pin 2 on J1). For more information on how to program the annunciators into FACP memory, and to map system points and logic zones to annunciator points, refer to the *programming tool associated with your FACP's Help File.* The source syntax for programming the outputs and external switches in your programming tool associated with your FACP are described in the tables below:

NOTE: If "Blink When Active" is checked in the LDM2-32/60 programming, only point types that are Acknowledgeable will blink. Only point types with an asterisks (*) next to them are acknowledgeable and will blink for the indicated event.

LDM2-32/60 Outputs					
Point Types Supported	**Values**	**Active**	**Trouble**	**Disable**	**Normal/ Inactive**
Detector: NxLyDz or LyDz	where x=0-240, y=1-10, z=1-159	*Yes	*Yes	*Yes	Yes
Module: NxLyMz or LyMz	where x=0-240, y=1-10, z=1-159	*Yes	*Yes	*Yes	Yes
Zone: NxZy or Zy	where x=0-240, y=1-1999	*Yes	*Yes	*Yes	Yes
Logic Zone: NxZLy or ZLy	where x=0-240, y=1-, Z=1-2000	Yes	Yes	*Yes	Yes
Bell Circuit Point: NxBy	where x=0-240, y=1-4	Yes	*Yes	*Yes	Yes
Speaker Point: NxAySz	where x=0-240, y=1-32, Z=1-4	Yes	*Yes	*Yes	Yes
PAM Point: NxlyAzSp	where x=0-240, y=1-1044, Z=0-32, p=1-4	Yes	Yes	Yes	Yes
Special Function Zone: NxZFy or ZFy (excludes Special Function Zone 36)	where x=0-240, y=0-47, Z=1-10	Yes	Yes	Yes	Yes
Special Function Zone 36: NxZFy.p or ZFy.p	where x=0-240, y=36, Z=1-10, p=1-10 (RLD addresses)	Yes	*Yes	*Yes	Yes
PMB NACs: NxPyNACz	where x=0-240, y=1-3, Z=1-4	Yes	Yes	Yes	Yes
Releasing Zone State: NxZRy.z or ZRy.z DISCHARGE = 1 FIRST ALARM = 2 PRE-DISCHARGE = 3 ABORT = 4 CROSS ABORT(IRI only) = 5 SOAK EXPIRED = 6	where x=0-240, y=0-49, Z=1-6	Yes	Yes	Yes	Yes
Water Releasing Zone State: NxZWy.z or ZWy.z DISCHARGE = 1 FIRST ALARM = 2 SOAK EXPIRED = 3	where x=0-240, y=0-99, Z=1-3	Yes	Yes	Yes	Yes
Acknowledged Events	Event.FireAlarm Event.COPreAlarm Event.Security Event.CriticalProcess Event.Supervisory Event.Trouble Event.PreAlarm Event.Disable	Yes	No	No	Yes
Unacknowledged Events	Event.FireAlarmUnAck Event.COPreAlarmUnAck Event.SecurityUnAck Event.CriticalProcessUnAck Event.SupervisoryUnAck Event.TroubleUnAck Event.PreAlarmUnAck Event.DisableUnAck	Yes	No	No	Yes

LDM2-32/60 Outputs					
Point Types Supported	**Values**	**Active**	**Trouble**	**Disable**	**Normal/ Inactive**
Detector Subaddresses: NxLyDz.p	where X=0-240, y-1-10, z=1-159, p = one of the following subaddresses: CO HEAT PHOTO ALERT FIRE1 FIRE2 UNSAFE MONITOR SAFE	Yes	No	No	Yes
Smoke Control Appliance State: NxSCAy.z	where x=0-240, y=1-650, z = one of the following appliance states: ON OFF TRANSITIONING OFF/AUTO TO ON TRANSITIONING ON/AUTO TO OFF TROUBLE NORMAL AC FAIL LOCKOUT PENDING ON PENDING OFF SERVICE DISCONNECT TRANSITION ON/OFF TO AUTO	Yes	No	No	Yes
Smoke Control Zone State: NxSCZy.z	where x=0-240, y=1-650, z = one of the following zone states: ON/EXHAUST PRESSURE OFF/ISOLATING PURGE TEST OFF/ISOLATING TIMER PURGE TIMER TEST TIMER IDLE TROUBLE NORMAL AC FAIL LOCKOUT IDLE TIMER	Yes	No	No	Yes
VIRTUAL POINTS: NXvY	Where x=0-240, y=510	Yes	No	No	Yes

LDM2-32/60 External Switches											
Point Types Supported	**Values**	**Disable**	**Control**	**Cancel**	**SCA On**	**SCA Off**	**SC Auto**	**SCZ Purge**	**SCZ On/ Exhaust**	**SCZ Pressurize**	**SCZ Off/ Isolate**
Detector: NxLyDz or LyDz	where x=0-240, y=1-10, z=1-159	Yes	No	No	No	No	No	No	No	No	No
Module: NxLyMz or LyMz	where x=0-240, y=1-10, z=1-159	Yes	Yes	No	No	No	No	No	No	No	No
General Zone: NxZy or Zy	where x=0-240, y=1-1999	Yes	Yes	No	No	No	No	No	No	No	No
Logic Zone: NxZLy or ZLy	where x=0-240, y=1-1999	Yes	No	Yes	No	No	No	No	No	No	No
Bell Circuit Point: NxBy	where x=0-240, y=1-4	Yes	Yes	No	No	No	No	No	No	No	No
PAM Point: NxlyAzSp	where x=0-240, y=1-1044, Z=0-32, p=1-4	Yes	Yes	No	No	No	No	No	No	No	No
PMB NACs: NxPyNACz or PyNACz	where x=0-240, y=1-3, Z=1-4	Yes	No	No	No	No	No	No	No	No	No
Virtual Points: NxVy or Vy	where x=0-240, y=0-510	No	Yes	No	No	No	No	No	No	No	No
Smoke Control Appliance: NxSCAy or SCAy	where x=0-240, y=1-650	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Smoke Control Zone: NxSCZy or SCZy	where x=0-240, y=1-650	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Cancel: NxZLy or ZLy	where x=0-240 y=1-2000 where x=0-240 y=1-2000	No	No	No	Yes	Yes	No	No	No	No	No

4.7 Configurations for Specific Applications

The LDM2-60/32 is a vital part of voice alarm applications. An LDM2-60/32 allows for manual selection of speaker or telephone circuits and can provide common system annunciation of circuits and logic zones. Dedicated annunciators are required for each of the following specific types of applications:

- Common System Annunciation
- Speaker and Telephone Mode

4.7.1 Common System Annunciation

This remote annunciator must be programmed to annunciate the status of all points in the system, either by device/module, or by grouping points into general zones or logic zones and annunciating the status of those zones. Every point in the system must be represented by at least one annunciator point at each remote location.

NOTE: More than one monitor-type device may be programmed to a single annunciator point. This multiple-mapping of initiating devices will operate the point active and trouble LEDs of an annunciator point with Boolean “OR” functionality

4.7.2 Speaker Mode with the FACP

The LDM2-60/32 may be used as an interface for the audio system when the FACP is configured as a network node in network display mode. The LDM2-60/32 may be used to map speaker circuits to monitor their status, map to PAM points for monitoring or control, telephone points, and All Call functions.

4.8 Event Priority

The FACP will use the highest priority event in the system that is mapped to that annunciator to appropriately control the pattern played by that annunciator. The telephone will be at a priority above trouble, but below all other events.

4.9 LDM2-60/32 Set as Router

The router node shall function as the piezo representative for all peripheral nodes connected to that router.

NOTE: If the peripheral is configured but is offline; the router will still indicate the event.

4.10 LDM2-60/32 Set as Peripheral

The piezo setting for the peripheral annunciator will control the router sounds for the events mapped to the peripheral.

NOTE: If the router or peripherals contain telephone points, or the peripherals have the piezo enabled for events, the router piezo must be supervised.

4.11 Piezo Enable

Enable the piezo for acknowledgeable events such as Alarms, Supervisory and Troubles. Off-hook telephone points will activate the piezo irrespective of this setting. The piezo will be supervised if this is selected or telephone points are assigned.

Function	Piezo
Fire Alarm	Steady pattern for unacknowledged events
Security	8Hz pattern for unacknowledged events
Supervisory	1Hz pattern for unacknowledged events
CO Alarm, Pre-Alarm, CO Pre-Alarm	2Hz pattern for unacknowledged events
Critical Process, Hazard/Weather Alert	1Hz pattern for unacknowledged events
Disable, Trouble	1Hz pattern for unacknowledged events
Telephone	8Hz pattern for unanswered points
Non-Fire Events (Speaker Activations, Zone Activations, Output Device Activations)	Not used

Table 4.1 Piezo Operation for FACP Functions

NOTE: The audible pattern will only be active for unacknowledged/unanswered events.

4.12 Testing the LDM2-60/32

After programming, fully test the LDM to ensure that each switch performs its intended function, that each LED lights in the correct color, and that the LDM can perform the functions outlined in this manual. Perform a lamp test to ensure all LEDs light correctly.

4.13 FSAE (Fire Service Access Elevator) Operation

The ACM-30(W) can be used as an annunciator for FSAE applications. Please see a compatible FACP manual for additional information on programming and configuration.

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