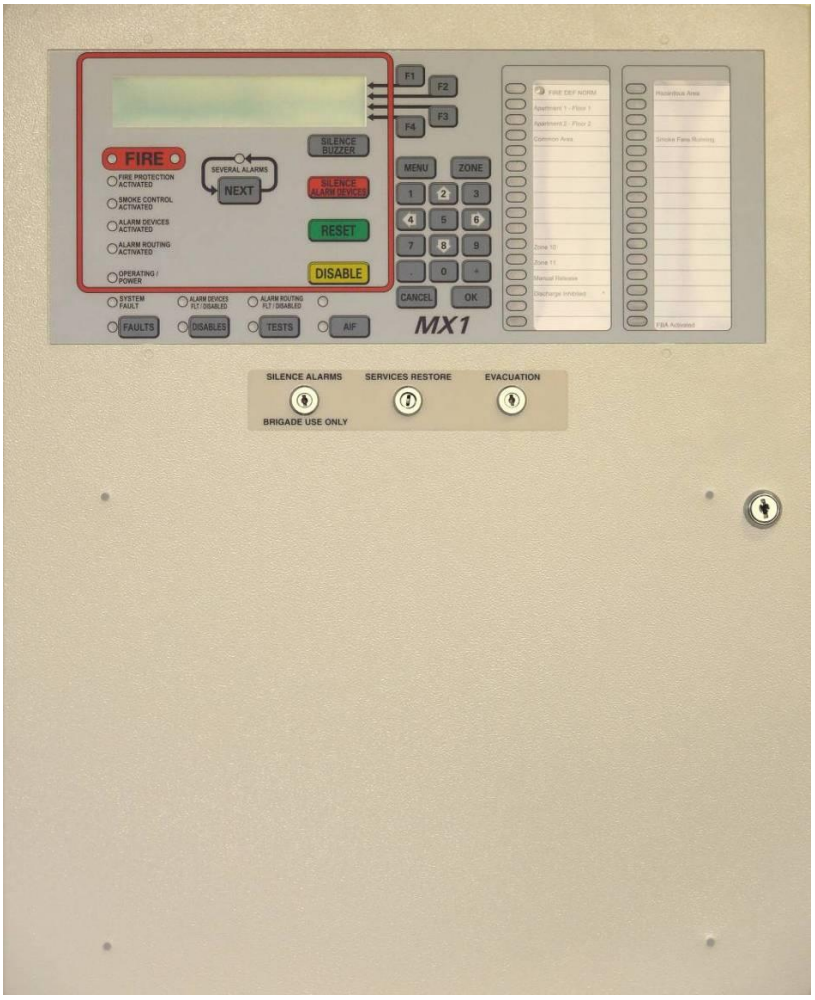
VIGILANT



MX1 FIRE ALARM SYSTEM
NEW ZEALAND INSTALLATION GUIDE

IMPORTANT **CARE REQUIRED FOR FIRST POWER ON** **READ PAGE 23 INSIDE**
REMOVE POWER TO *MX1* PANEL BEFORE PLUGGING IN OR DISCONNECTING MODULES SUCH AS THE 16-ZONE LED DISPLAY, LCD/KEYBOARD, *MX* LOOP CARD, ETC.

LT0360 **V2.45**

INTRODUCTION

This manual covers installation and wiring of the Vigilant *MX1* (NZ) fire alarm system. It covers both the Slimline (FP0893) and 15U (FP1010) cabinet formats, but is applicable also (with adaptation) to build-to-order systems in other cabinets.

MOUNTING INSTRUCTIONS

Location

The *MX1* Slimline cabinet is designed to be easily surface mounted on a wall or inset into a window frame or other cavity.

The 15U cabinet is designed to be surface mounted on a wall.

The cabinet location should:

- Be dry, with a moderate ambient temperature, 45°C absolute maximum.
- Not be subject to outdoor conditions without suitable protection.
- Position the LCD to be at typical eye level (see Figure 1).
- Have clear access and viewing for brigade staff and operators.
- Allow for the door to open at least 120°.

The *MX1* must not be installed in hazardous areas as defined in AS/NZS 3000.

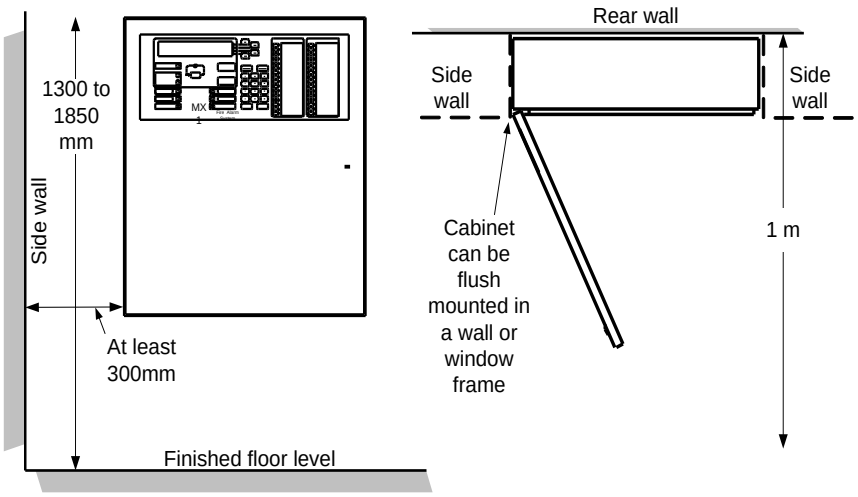


Figure 1(a) – Recommended Clearances – Slimline Cabinet

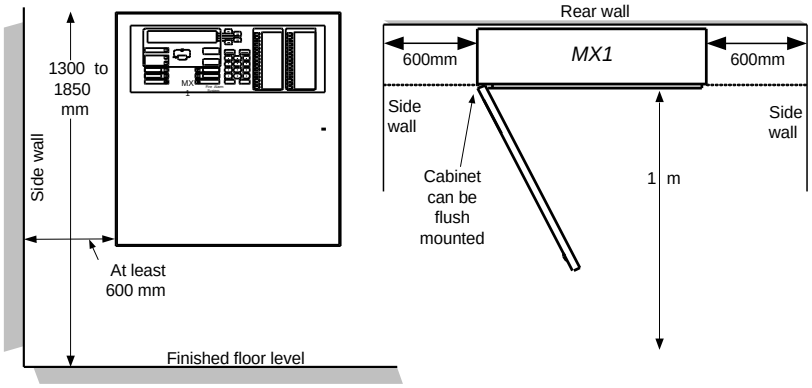


Figure 1(b) – Recommended Clearances – 15U Cabinet

Wall Mounting (Slimline Cabinet) (front-service use) – see Figure 2(a)

- Mark a horizontal line on the wall 27mm below the intended top of the cabinet.
- Mark a vertical line from the first line where the centre of the cabinet will be.
- Hold the mounting bracket against the wall with its top edge against the horizontal line and its central hole over the vertical line. Mark the location of the mounting screws.
- Fasten the mounting bracket to the wall but do not completely tighten the screws.
- Hang the cabinet on the mounting bracket and then tighten the screws.
- Drill a hole at the base of the cabinet and put a screw through it to lock the cabinet in position.

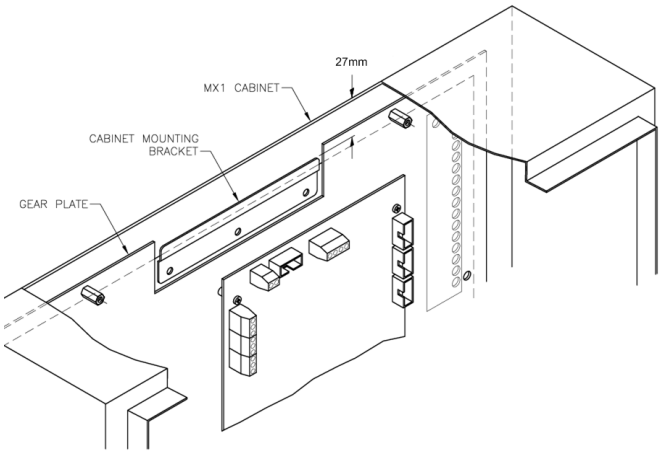


Figure 2(a)
Marking for the Slimline Cabinet Mounting Bracket

Window Mounting Slimline Cabinet (rear-service use)

The *MX1* Slimline cabinet can be mounted in a window frame for rear-service use in New Zealand. To do this, mounting holes must be drilled where necessary in the side and top or bottom of the cabinet. The mounting bracket cannot be used.

Note that the cabinet door opens within the vertical profile of the cabinet body, so the cabinet can be mounted flush in a cavity if required.

NOTE: If any drilling or filing is required inside the cabinet, remove the gear plate containing the circuit boards and the mains cover containing the power supply.
Unplug the power supply loom from the controller board, and unclip it from the cable clamps on the gear plate. Unplug the 10-way loom from the keyboard and unclip the loom from the front panel before removing the gear plate.
Clean out all swarf from the cabinet before replacing the gear plate and power supply.

Wall Mounting (15U Cabinet)

The 15U cabinet is supplied pre-drilled with four keyholes suitable for mounting screws of not more than 8mm shaft diameter and 11mm head diameter. A drilling template is supplied with each unit. Refer Figure 2(b). The keyhole detail is shown in Figure 2(c).

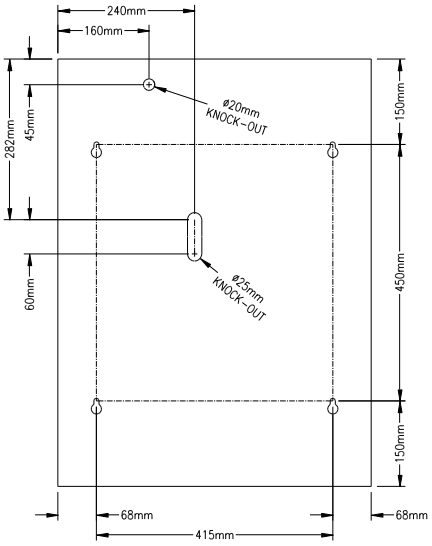


Figure 2(b)
Keyhole Pattern for Mounting 15U Cabinet

EXTERNAL WIRING

Cable Entry

Slimline Cabinet

There are four 20mm knockouts provided in the top and five knockouts in the bottom of the cabinet. Refer Figure 3(a). Other entry holes can be drilled as required.

To prevent water entering the cabinet, seal unused knockouts and any top cable entries. Where possible, use bottom cable entry with cables going down 100 mm below the cabinet before rising.

15U Cabinet

The 15U cabinet has 2 x 50mm and 5 x 20mm knockouts in the top and 2 x 50mm and 4 x 20mm knockouts in the bottom. Refer Figure 3(b).

Additionally, the 15U cabinet has two knockouts in the rear of the cabinet – behind matching slots in the gearplate. Refer Figure 2(b).

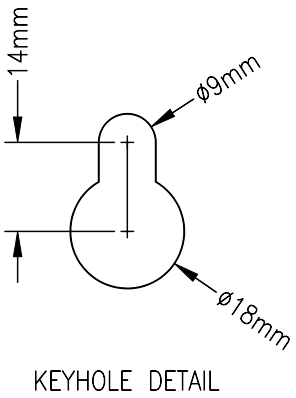


Figure 2(c) – Keyhole Detail

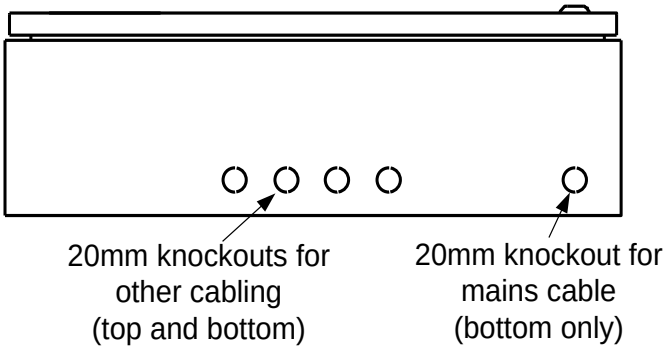


Figure 3(a) – Knockout positions on Slimline cabinet

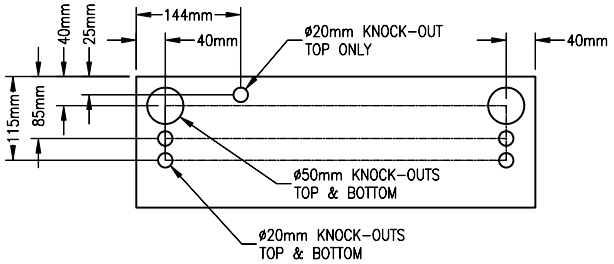


Figure 3(b) – Knockout positions on 15U cabinet

Slimline Cabinet General Power Outlet (current version)

A single switched GPO outlet is mounted on the right side of the cabinet, and the power supply module is plugged into it. See Figure 4(a).

The cabinet must be supplied with a dedicated mains feed direct from a main switchboard (refer AS/NZS 3000). A 10A circuit breaker is required for the MX1 slimline cabinet.

Terminate the incoming Mains earth wire to the screw terminal block beneath the GPO. Do not loosen or remove the earth wire from the terminal block to the GPO.

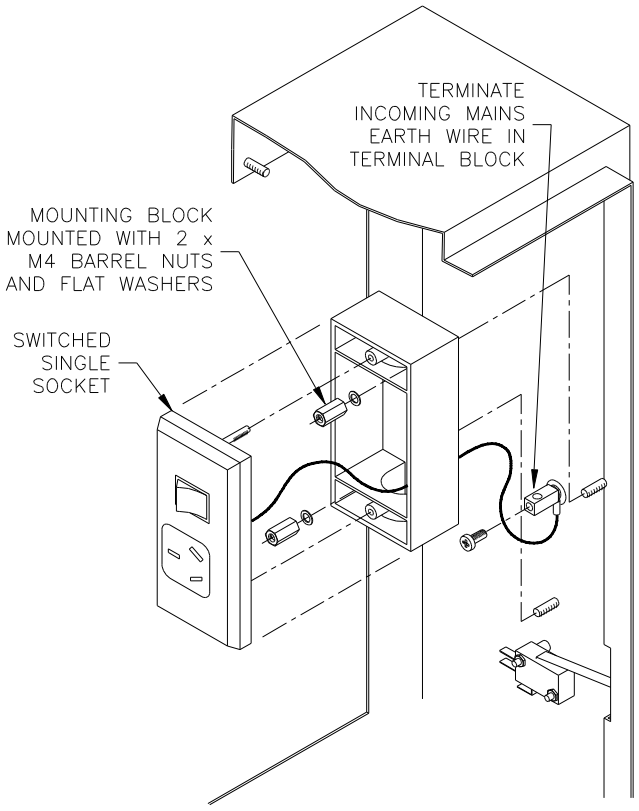


Figure 4(a) – Slimline Cabinet General Power Outlet

15U Cabinet

The cabinet must be supplied with a dedicated mains feed direct from a main switchboard (refer AS/NZS 3000). A 10A circuit breaker is required for a 15U cabinet with the standard MX1 5A PSU.

A dual switched GPO is supplied with the MX1 and must be wired by a suitably qualified technician to comply with NZ electricity safety regulations.

It is recommended the cable entry knockout behind the mains block be used for the mains cable entry. Alternatively route the mains cable as shown in Figure 4(b) to minimise electrical interference between the mains supply and the other circuits connected to the electronics.

Terminate the incoming Mains earth wire to the screw terminal block beneath the GPO. Do not loosen or remove the earth wire from the terminal block to the GPO.

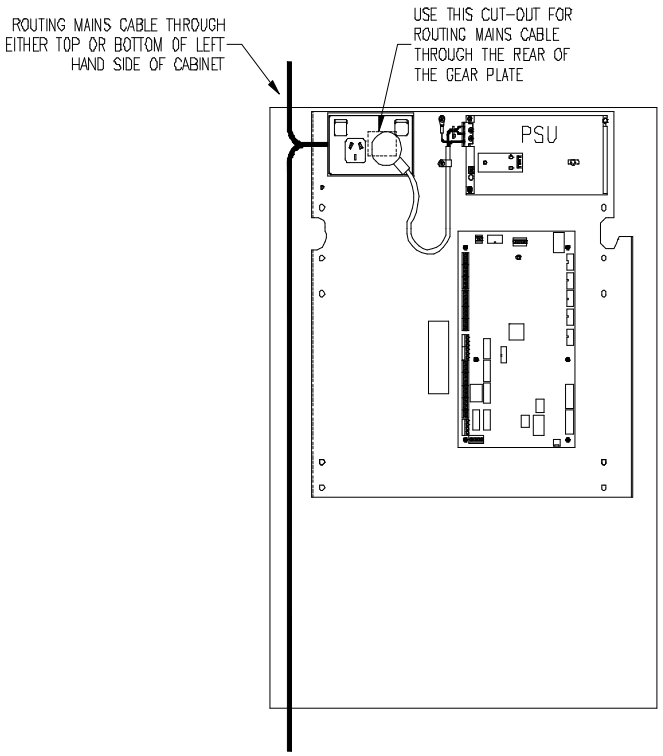


Figure 4(b) - 15U Cabinet Mains Wiring

Battery Wiring

The MX1 Slimline cabinet has space for a pair of 12V batteries up to 17Ah (or 24Ah mounted on their sides). These will be sufficient for most brigade-connected systems.

The MX1 15U cabinet has space for a pair of 12V batteries up to 40Ah.

Many non-brigade-connected systems will require up to 40Ah batteries to meet the 72 hour standby operation requirements. These will not fit in the MX1 Slimline cabinet, and will require a separate cabinet which must be located as near as practical to the MX1.

The wiring between the external battery cabinet and the MX1 should use 4mm2 cable to minimise voltage drop.

The lead interconnecting the two batteries is provided with the MX1 and includes an inline 20A blade fuse.

Refer Figure 5.

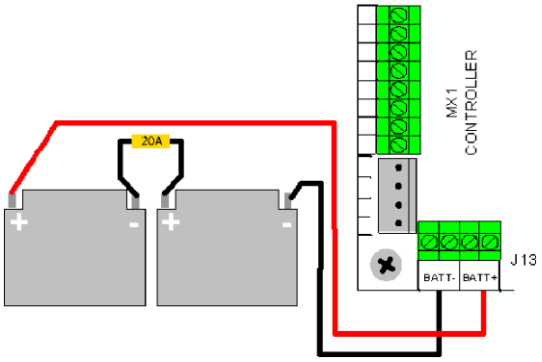


Figure 5 – Battery wiring to MX1 Controller

Addressable Loop Wiring

Figure 6 shows the general form of the addressable loop wiring from the *MX1*.

The screw terminals on the controller board can accommodate loop wire of up to 4.0mm^2 in size.

Correct polarity must be maintained around the loop as most *MX* devices are polarity sensitive.

NZS 4512:2010 requires that short circuit isolators (isolator base, isolator module, or in-built to module/detector) be located at zone boundaries to restrict the effect of short circuits or overloads to a single zone.

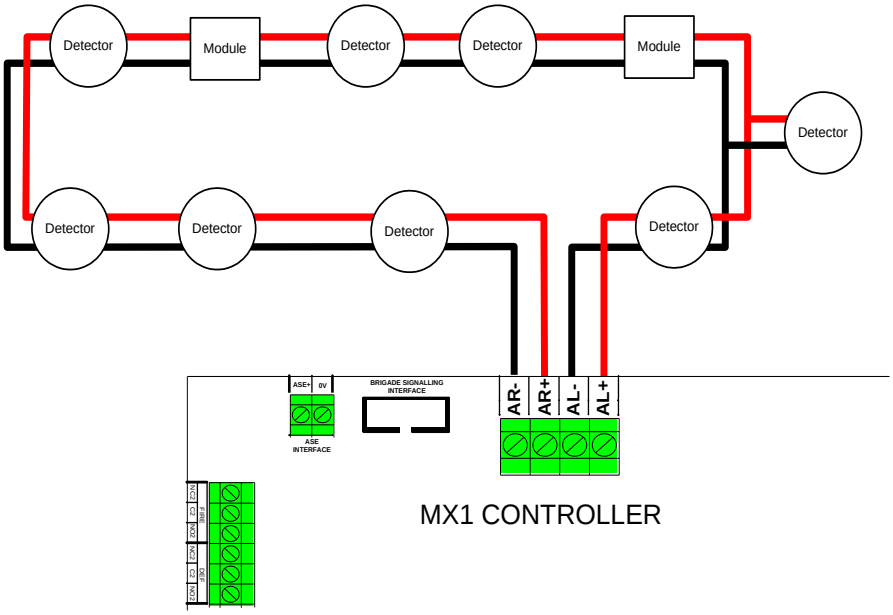


Figure 6 – Addressable Devices on *MX* Loop

Note that the 850P, 850PH, 850PC and 850H detectors have built-in short circuit isolators when fitted to 4B-C bases.

Refer to the *MX1* System Design Manual (LT0361) for detailed information on acceptable current loads and wire sizes for the addressable loop wiring.

A range of brackets is available for mounting certain *MX* modules in the *MX1* 15U Cabinet – typically where the *MX* Loop Cards mount. Refer to the relevant installation instructions LT0557 and LT0591 for details.

INTERNAL WIRING

T-Gen2

These instructions describe a basic installation of a T-Gen2 tone generator on the left hand side of an MX1 15U gearplate (T-Gen 60 or the T-Gen 120) or the MX1 slimline gearplate (only the T-Gen 60) or on the right hand side of the 15U gearplate (T-Gen-60) and wiring it to the ANC1 terminals.

Refer to LT0667 T-Gen2 Installation and Operating Instructions and LT0442 MX1 Wiring Diagrams for installations involving:

- Mounting in other positions on the 15U or BTO gearplates.
- Mounting and use of the 3U T-Gen2 User Interface door.
- Mounting and use of the 100V Splitter or 100V Switcher modules.
- Use of slave T-Gen2 units.
- Connection of paging consoles.
- Configuring the T-Gen2 to use non-default operation.

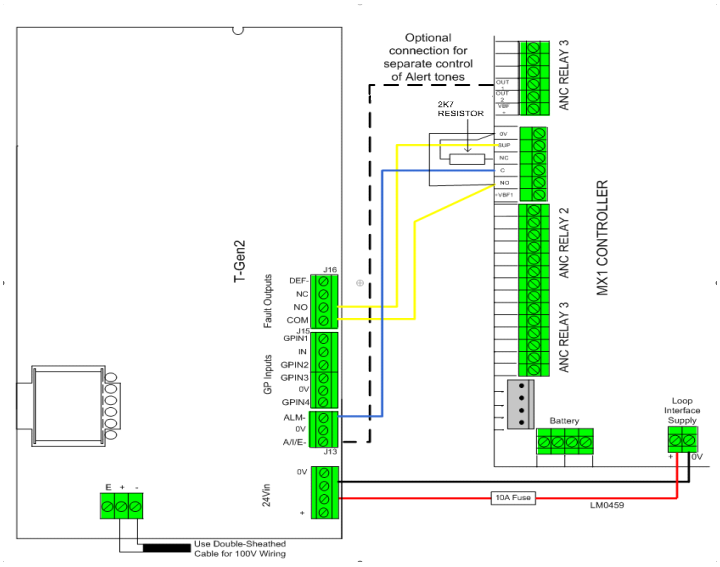


Figure 7a – Wiring Ancillary Relay 1 to T-Gen2 – Grade 3

The T-Gen 60 mounts onto the *MX1* gear plate in the 'responder footprint' position, which has five holes with plastic standoffs and one metal standoff.

The T-Gen 120 mounts onto the 15U *MX1* gear plate in the 'responder footprint' position, but is fixed in place using four M4 screws and the MX Loop card mounting holes.

When mounting the T-Gen 60 on the right hand side-fold of the gear plate, four double-ended plastic standoffs and two male/female standoffs are fitted to the fold to hold the T-Gen60.

The T-Gen2 can be connected to the ANC1 relay output as shown in Figure 7a, with power wiring modifications, as shown, to the pre-made loom (LM0319) included for this purpose. The loom plugs in to the 6 way header on ANC1 (remove the red +VBF and black 0V wires if present).

For a *Grade 3* solution, a single T-Gen2 can take its power from the *MX1* Loop Interface Supply Terminal (J33) through a 10A fuse. Use the LM0459 and fuse provided with the T-Gen2.

ANC2 could be used to control the T-Gen2 instead of ANC1, but this will require manual wiring as the supplied loom supports only ANC1. The *MX1* must be configured to have "Contact" supervision enabled for whichever ANC 1 or 2 output is being used.

When the T-Gen2 Alert tone must be controlled by the *MX1*, one of the GP OUT terminals can be connected to the T-Gen2's A/I/E- input, as shown in the diagram. This is not default operation, and the *MX1* must be specially configured.

T-Gen2 must be programmed to use the AS2220 configuration (refer to LT0667 for details on how to do this).

A T-Gen2 can be controlled by the *MX1* ANC3 relay, using the wiring shown in Figure 7b. ANC3 supervision is set to "ANC3".

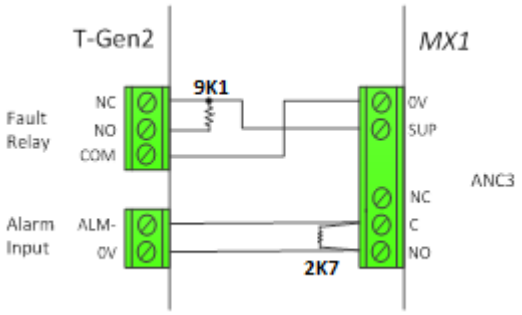


Figure 7b – T-Gen2 Wiring Using ANC3

For larger systems consider the use of pre-built T-Gen2 BOWS or EWS panels (FP1144, FP1134 or FP1129) or BTO systems.

For a Grade 2 multi-zone installation there are 2 options to implement the zone selection:

1) Use the RZDU output of the MX1 to interface to the T-Gen2 (via FP1143 HLI Module or directly), or
2) Use the 16-way relay expansion board PA0470 that can be connected to the *MX1* LCD/Keyboard and wired to the General Purpose Input connections of the T-Gen2.

T-GEN 50

Both the Slimline cabinet and 15U cabinet gear plates are fitted with five plastic standoffs and one metal standoff to mount a T-GEN 50 tone generator.

This can be connected to either of the ANC1 or ANC2 relay outputs as shown in Figure 8.

A pre-made loom is available for this purpose, part number LM0319, which will plug in directly to the 6 way header on ANC1. An LM0319 is supplied with each *MX1*.

If the T-GEN 50 is fitted elsewhere, for example in a separate FP0944 empty Slimline *MX1* cabinet, then an LM0401 (1.3m long) can be used or the LM0319 wiring can be extended.

This wiring provides complete supervision of wiring open and short circuits, as well as passing the state of the T-GEN 50's fault relay to the *MX1* controller. The 10kΩ resistor is critical to this supervision and should not be omitted, or a different value substituted.

When the T-GEN 50 Alert and Evacuation tones must be separately controlled by the *MX1*, one of the GP OUT terminals must be connected to the T-GEN 50's A/I/E- input, as shown. This is not default operation, and the *MX1* must be specially configured.

Refer to the T-GEN 50 Installation Manual (LT0186) for information about its DIP switch and link settings, but the following settings are required at least:

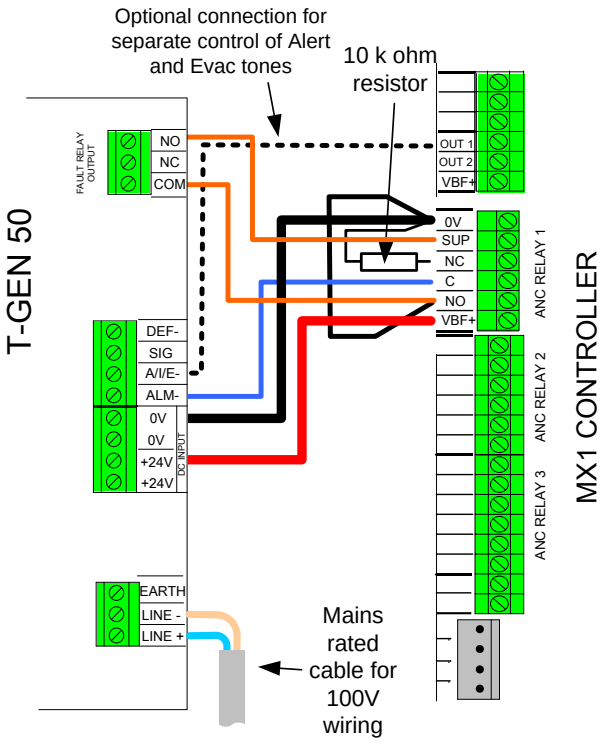


Figure 8 – Wiring Ancillary Relay 1 to T-GEN 50

- SW4 = ON, to enable Alarm Input supervision
- SW5=OFF, for non-latching ALM
- LK7 = RELAY, to enable the Fault Relay output
- LK2 and LK6 = MASTER

The *MX1* must be configured to have "contact" supervision enabled for whichever of ANC1 or ANC2 relay is used.

Mini-Gen

Mini-Gen is an alternative tone generator to T-GEN 50, but with lower power and fewer facilities.

The *MX1* Slimline cabinet gear plate has mounting footprints for two Mini-Gens, overlapped with the T-GEN 50 footprint. The first Mini-Gen should be mounted in the lower position, so that it is earthed by the metal standoff. The second Mini-Gen is mounted on plastic standoffs, and should be earthed to the first Mini-Gen as shown in Figure 9.

On the 15U cabinet gear plate both Mini-Gens are mounted on plastic stand-offs. Earth the Mini-Gens using the spare earth lead included in the panel.

Mini-Gens must be connected to the ANC3 relay output since this has sufficient current rating. This relay can be configured for full supervision of loudspeaker wiring, using the 27kΩ EOLRs provided with the *MX1*.

All Mini-Gens must have their 2W supervision link fitted. If only one Mini-Gen is used, the unused 27kΩ EOLRs must be connected to its DC terminals so that there are still three EOLRs in total.

The *MX1* must be configured to have “ANC3” supervision enabled for the ANC3 relay.

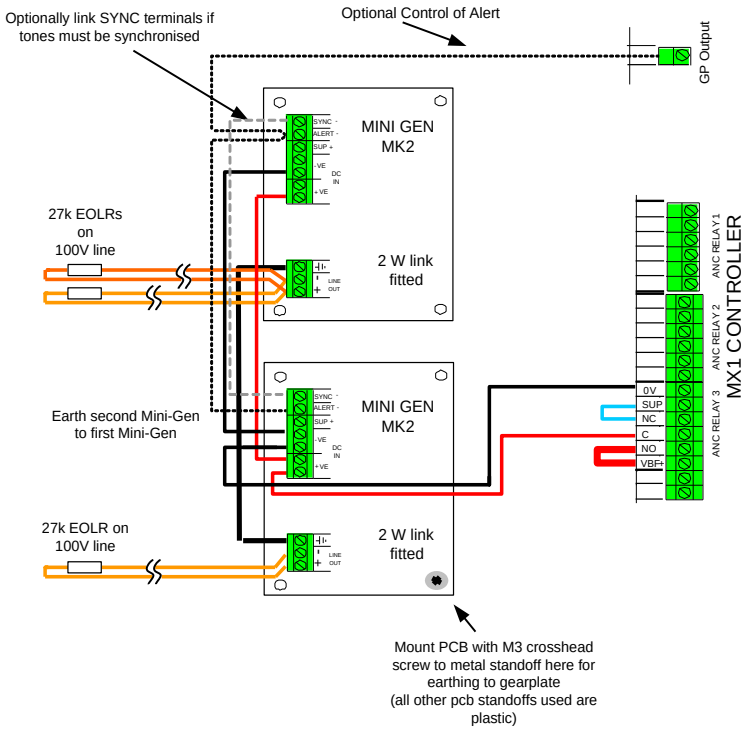


Figure 9 – Wiring Ancillary Relay to Mini-Gen(s)

Multiple Branched Loads

Ancillary relay ANC3 can supervise wiring to controlled loads on up to three branches. This output can switch loads up to 5A resistive at 30V. Figure 10 shows the necessary wiring.

The loads must all be isolated with diodes as shown in the figure. A suitable diode for loads up to 1A each is 1N5404.

Inductive loads such as bells must have suppression capacitors or diodes fitted as well.

For a single branch, the EOLR is 9.1kΩ. For two branches, each EOLR is 18kΩ. For three branches, each EOLR is 27kΩ.

Suitable EOLRs are supplied with the *MX1*.

The *MX1* must be configured to have “ANC3” supervision enabled for the ANC3 relay.

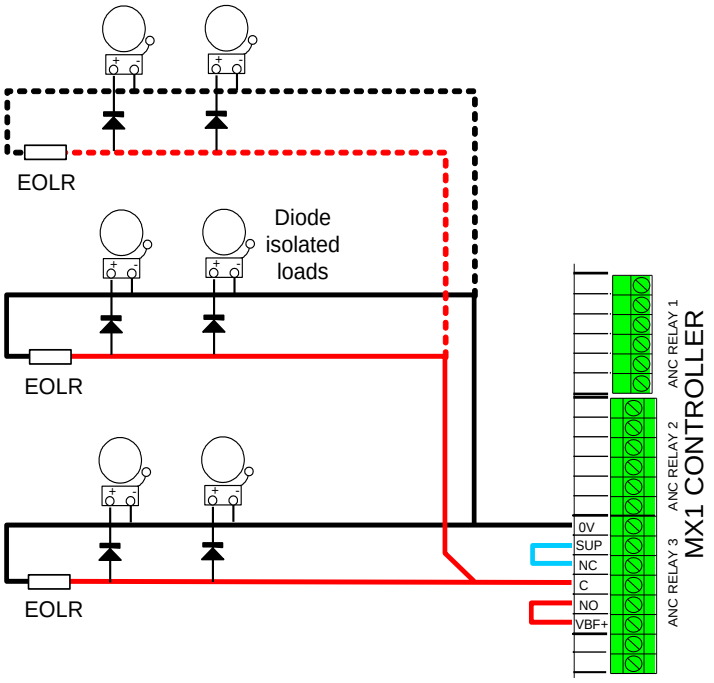


Figure 10 – Wiring for multiple branched loads with supervision

Ancillary Relay Load Supervision

Ancillary relays ANC1 and ANC2 can be used to supervise load wiring for short and open circuit faults, using the wiring shown in Figure 11.

Full supervision is only possible for a single load, or multiple loads wired in series. Multiple parallel loads cannot be reliably supervised.

The load can be wired directly if its resistance is 400Ω to 18kΩ. Loads of less than 400Ω require a series diode for correct supervision. A suitable diode is 1N5404. The minimum rated load is 25Ω.

The *MX1* must be configured to have the supervision input operate in “load” mode.

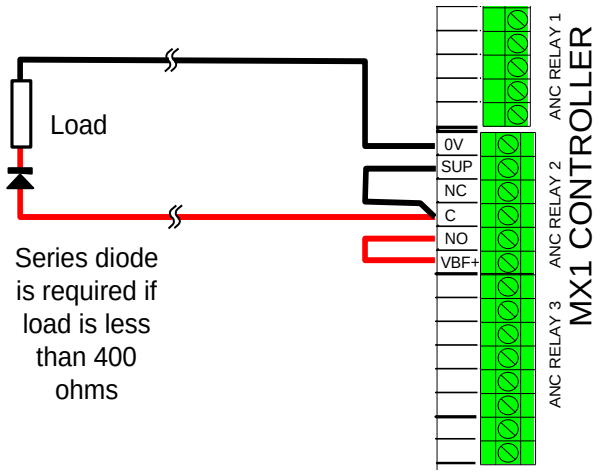


Figure 11 – Wiring for switched load with supervision

Door Holders

Figure 12 shows wiring for a method of connecting normally-energised loads such as door holders to the ancillary relays, powered from the non-battery-backed supply VNBF, and with wiring supervision.

This method supervises both supply leads, and can be used with either ANC1 or ANC2 relays. The two EOLRs must have the same value, but this can be anything between 2.7kΩ and 27kΩ. Either of the 18kΩ or 27kΩ EOLRs provided with the *MX1* are suitable.

Inductive loads such as door holders must have a suppression diode connected as shown. A suitable diode is 1N5404.

Note that ANC1 and ANC2 contacts are only rated at 1A inductive at 30V.

The *MX1* must be configured to have the supervision input operate in “door holder” mode.

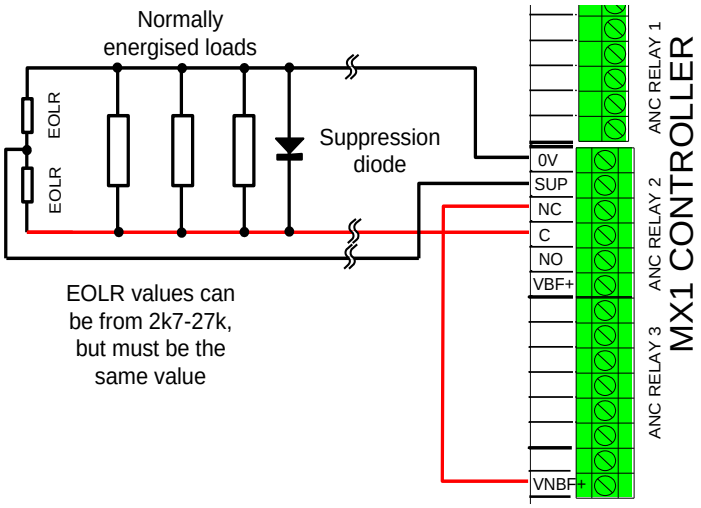


Figure 12 – Wiring to Normally-Energised VNBF Loads with supervision

General Purpose Inputs (IN1, IN2)

MX1 has two identical protected inputs which can be used for supervised connection to clean contacts or open collector style outputs of other equipment, e.g., sprinkler FBA/DBA.

Figure 12 shows examples of connection to a normally-open contact and to an open collector output, both with defect supervision. The EOLRs can be any value between 1.5kΩ and 3.3kΩ; 2.7kΩ EOLRs are provided with the *MX1*. The diode can be any general purpose silicon diode such as 1N4004.

If supervision is not required, the EOLR can be omitted. If short circuit defect supervision is not required, the diode can be omitted, i.e., wired through. Note that short circuit supervision is not possible for a connection to an open collector output.

The *MX1* must be configured with user logic or a zone mapping for these inputs to produce any effect. There is no default action.

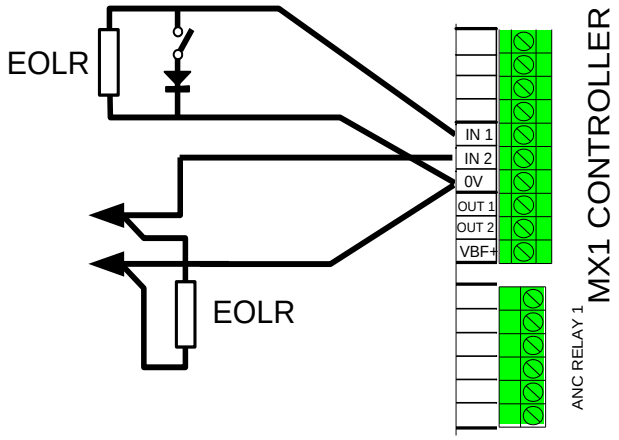


Figure 13 – Wiring General Purpose Inputs

General Purpose Outputs (OUT1, OUT2)

MX1 has two protected open collector outputs which can be used for driving small loads, e.g., external buzzers or relays.

Figure 14 shows examples of connection to a fault buzzer and an external relay. The maximum load current is 500mA for each output, i.e., 54Ω minimum load resistance. The relay suppression diode can be any general purpose diode such as 1N4004.

Each output can be configured for open circuit fault detection if this is required.

The *MX1* must be configured with user logic or a zone mapping for these outputs to produce any effect. There is no default action.

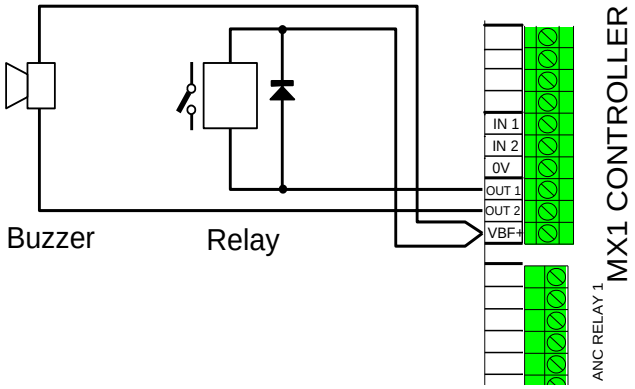


Figure 14 – Wiring General Purpose Outputs

SGD or Brigade Relay Interface

The gear plate has plastic standoffs fitted to mount a GP SGD, part number PA0862, or GP Brigade Relay Interface, part number PA0861; in the top left part of the Slimline cabinet or on the top of the right-hand gear plate return of the 15U gear plate.

The PA0861 or PA0862 is connected to the Brigade Signalling Interface connector on the Controller either by an FRC loom, part number LM0172, supplied with the unit, or a (longer) LM0084 supplied with the 15U *MX1*.

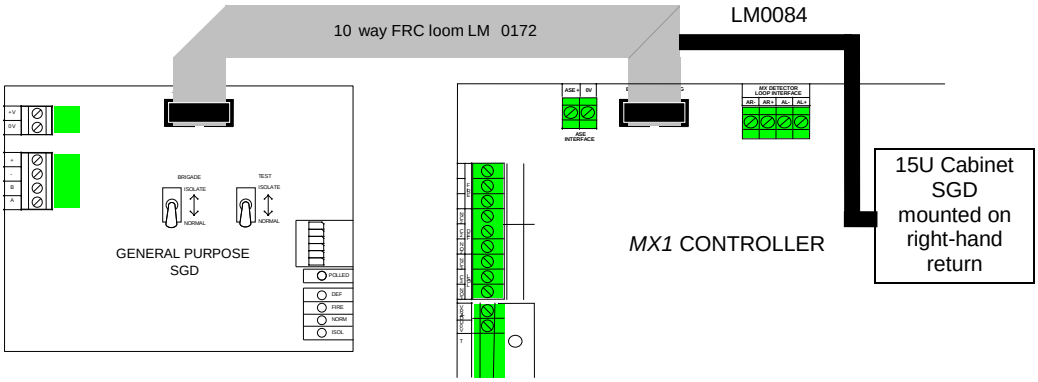


Figure 15 – FRC Connection to GP SGD or Brigade Relay Interface

RZDU

Up to eight Remote Display Units or Alarm Display Units (Nurse Station Annunciator or Compact FF) can be connected to the RZDU interface on the MX1. Other RZDU protocol devices (e.g. T-Gen2, IO-NET or QE90 EWIS) can also be connected to the MX1 via the RZDU bus.

RZDU devices that are separately powered should not be connected to the +VRZDU line, but must be connected to the 0V line.

The TXRZDU and RXRZDU signals must “cross-over” between the MX1 panel and the first RZDU device, as shown in Figure 16A. There must not be any wiring crossover between subsequent RZDU devices.

Wiring between RZDU devices can be a daisy chain or a star format.

The cable can be a single four core type or a pair of twin core types.

If there is an HLI link to a T-Gen2 this changes the wiring arrangement.

The master T-Gen2 is connected to the *MX1* RZDU bus as the first device using the FP1143 High Level Interface (HLI) board. All field RZDU devices must be connected along with other RZDU protocol devices such as IO-NET controllers to the RZDU Field connection (J4) on the HLI board. This isolates any field short circuit so the MX1 - T-Gen2 connection keeps working.

The TX and RX signals must “cross-over” between the *MX1* panel and the HLI Board RZDU FIP connection. Power +V and 0V is connected from the MX1 to the RZDU FIP (J3) connection. The RZDU FIELD connection towards the first RZDU device must be cross-over too, as shown in Figure 16B. The HLI Board is connected to the T-Gen2 using a 10-way ribbon cable from J2 of the HLI board to J29 on the T-Gen2.

A direct connection can be made from the *MX1* to the T-Gen2 without an HLI Board when there are no field RZDU devices and a spare serial port (2, 3 or 4) on *MX1* is available. Connect J29 of T-Gen2 to the appropriate serial port on the *MX1* to match the serial port assigned to the RZDU port in the *MX1* configuration.

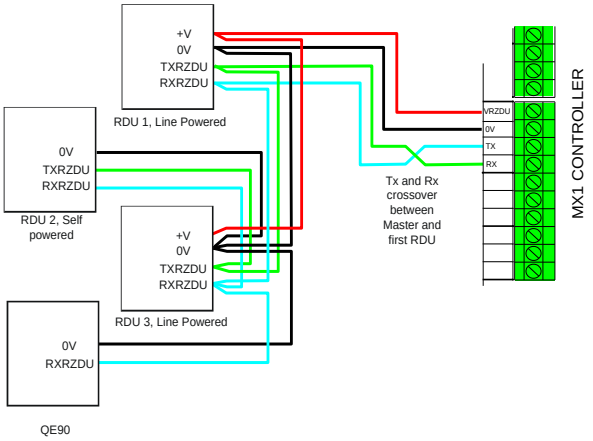


Figure 16A – Wiring to RZDU Devices

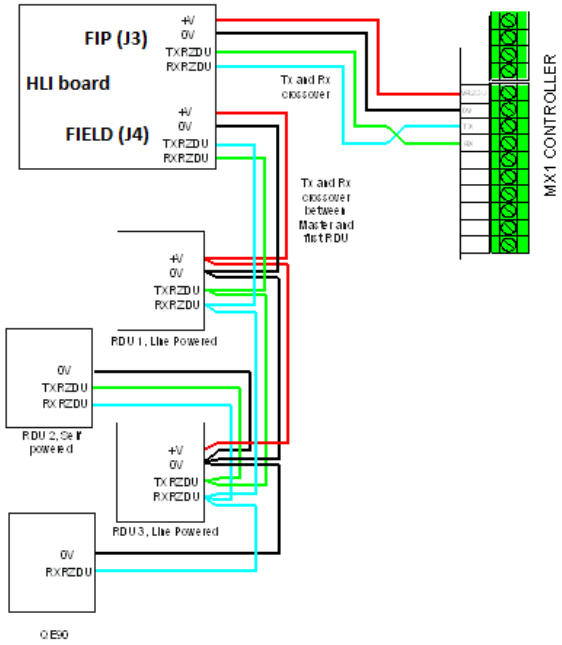


Figure 16B – Wiring to RZDU Devices using FP1143 (HLI)

ZONE LED DISPLAYS

Rear Service Slimline Cabinet

MX1 is supplied with one zone LED display board fitted on the gear plate in a rear service format, as shown in Figure 17A.

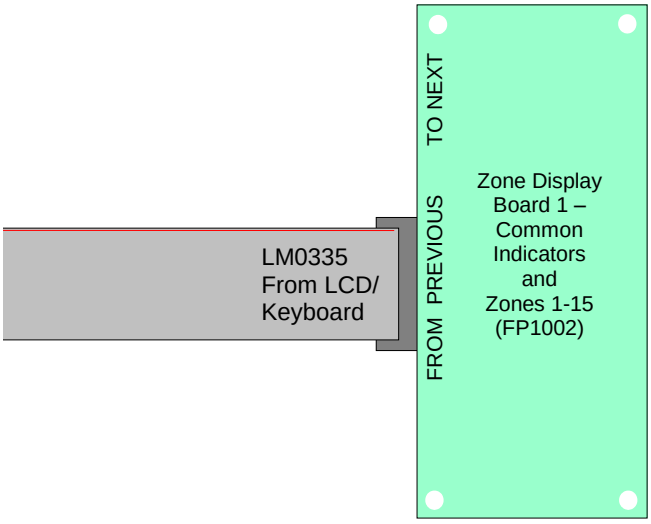


Figure 17A – Single Zone Display on gear plate (Rear Service format)

A second zone display (part number FP1002) can be fitted, as shown in Figure 17B.

Note that the FRC loom from the LCD/keyboard on the door must be moved from the first display board to the second display board, and the second display board connected to the first display board with the LM0291 FRC loom provided with the zone display kit (FP1002).

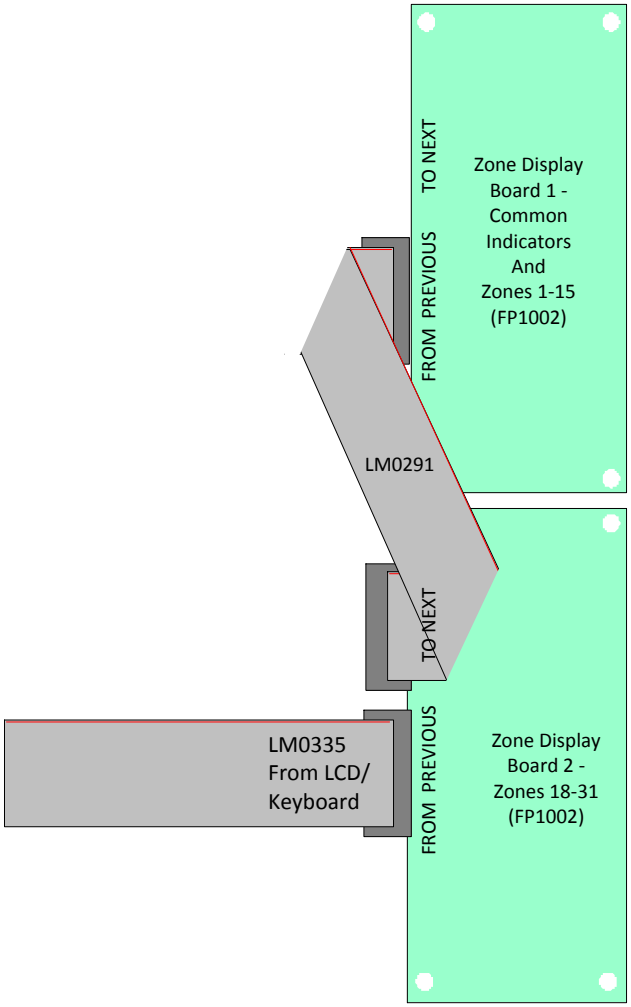


Figure 17B – Double Zone Displays on gear plate (Rear Service format)

Front Service Slimline & 15U Cabinet

A rear service Slimline cabinet can be converted to front service format by unclipping the display board(s) from the plastic standoffs on the gear plate and moving them to the metal standoff mounts on the front panel, as shown in Figures 18 and 19.

The excess length of the LM0335 loom can be folded and clipped in place on the front panel.

A front service index will also require fitting (see next section).

The 15U cabinet is front service only.

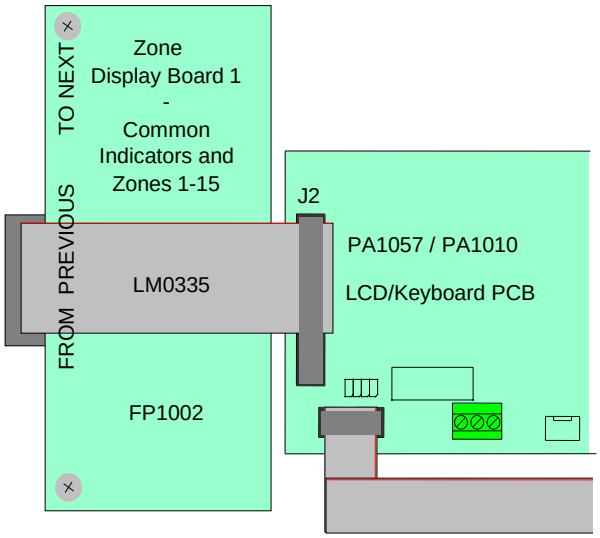


Figure 18 – Single Zone Display on front panel (Front Service format)

A second front service zone display board (part number FP1002) can be fitted, as shown in Figure 19.

Note that the FRC loom from the LCD/keyboard must be moved from the first display board to the second display board, and the second display board connected to the first display board with the LM0291 FRC loom provided with the zone display kit (FP1002).

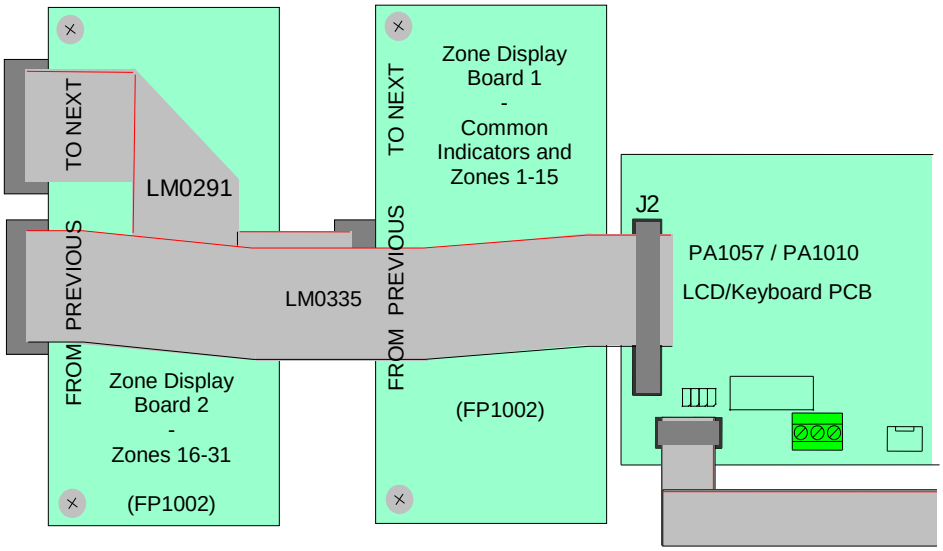


Figure 19 – Double Zone Displays on front panel (Front Service format)

The 15U cabinet can optionally be fitted with up to two 4U doors (ME0457) which can each hold five of these zone display modules, giving a total of 191 zones of indication. One LM0092 cable will be needed to run from the LCD/keyboard to the highest number zone LED board on the ME0457, and 1 x LM0056 will be needed to connect LED displays on one ME0457 to either the next or to the *MX1* 4U inner door. An additional LM0056 will be needed when the second ME0457 is fitted. Drawing 1982-88 shows example arrangements.

ZONE DISPLAY LABELLING

Front Service Slimline & 15U Cabinet

Zone displays mounted on the front panel can be labelled with strips of card slipped through the slot in the panel above each display. A pre-printed set of labels on grey card is available as LB0600 (5 strips per sheet). One sheet is supplied with each *MX1*.

Alternatively, a template file (LT0369) is available. The required text is entered into this template document, which is then printed at 100% scaling onto suitable material (grey card).

The optional Slimline cabinet front service index (part number FA2417) is fastened to the door of the cabinet with four hex head screws supplied with the *MX1*. The engraving on the front service index needs to match the wording of the zone indicator labelling.

Plastic push-in blanking plugs (HW0287) are also supplied with the *MX1*. These are a press-fit into the front door index mounting holes when a front service index is not required. Refer Figure 20. 15U cabinets will generally require a separate index and zone display unit for brigade use.

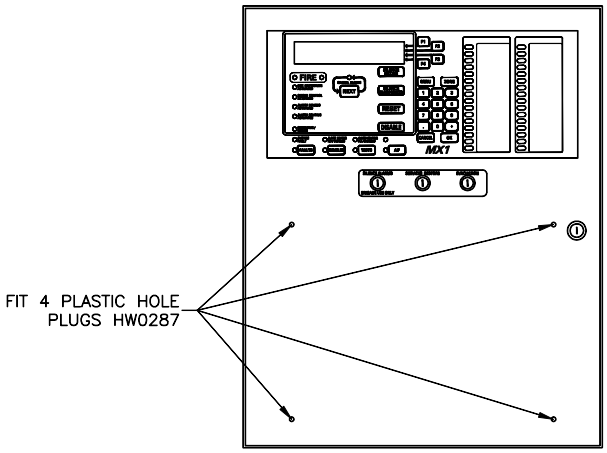


Figure 20 – Positions of Push-in blanking plugs (HW0287)

Rear Service Slimline Cabinet

Zone displays in a rear service format are labelled by engraving the rear service index. The rear service index, supplied with each *MX1* Slimline cabinet, can be removed by removing the internal gear plate holding the controller and other circuit boards. See page 3 for details of removing the gear plate.

Blank strips from LB0600 may be slipped into the unused front panel zone display positions to hide the holes and fasteners in the panel.

***MX* Loop Card**

The installation of the *MX* Loop Card is detailed in the *MX1* Loop Card Install Instructions (LT0443). A copy of LT0443 is included with every FP0950 *MX* Loop Card kit.

Remote Fire Brigade Panel (RFBP)

The *MX1* Remote FBP is powered by and communicates with the *MX1* panel. Installation and wiring of the RFBP is described in LT0545, supplied with each RFBP.

***MX1* 15U Cabinet**

Additional installation and wiring information is contained in the *MX1*-Au Fire Alarm System – Wiring Diagrams (LT0442). Note that some information in LT0442 is Australian-specific.

***MX1* Networking**

MX1 panels can be networked together in a variety of ways normally using copper data cable or fibre optic cable. Depending on the system design requirements the network interface will either be Intelligent Hubs (I-HUBs) or Panel-Link IP Bridges (PIBs). I-HUBs are usually interconnected in a ring using RS485 data copper cable, but can also be interconnected with fibre optic cable with the addition of OSD139 Fibre Optic modems. PIBs are usually used with Fibre Optic switches, Ethernet Extenders, or shielded Ethernet (STP) cables. This section covers the most common applications and includes the mounting of the I-HUB and PIB in the NZ Slimline and 15U cabinets, the wiring between the I-HUB / PIB and the *MX1* Controller board, and the mounting and wiring of OSD139 Fibre Optic modems for use within I-HUB and the mounting and wiring of Moxa Fibre Optic Ethernet switches for use with the PIB.

Ring Networking Using I-HUBs

For detailed information on mounting, wiring and programming of the I-HUB including use in other configurations and network topologies please refer to the Panel-Link Intelligent I-HUB User's Manual (LT0229).

The I-HUB can be used in a number of different network configurations. It is recommended to use the "RING" configuration shown in Figure 21. The I-HUB comes pre-configured for ring operation, with Port 5 (J4) connected to the *MX1* serial port configured for networking.

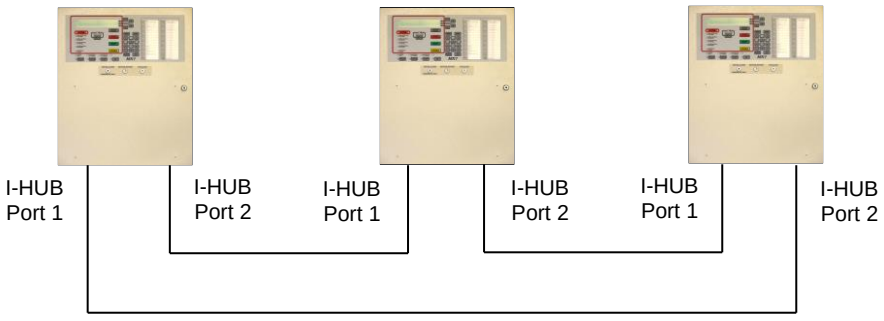


Figure 21 – Network Ring Example

I-HUB Wiring

The I-HUB is powered by one of the *MX1*'s +VBF supplies. This supply must not be used for any directly-connected field wiring, to ensure that fuse failure caused by an external wiring fault does not disable the network. Alternatively, the I-HUB (and fibre modems if included) could be powered off the Loop Interface Supply terminals J33 using a fused power lead (e.g., a spare LM0459 supplied with an *MX* Loop Card). The I-HUB's J4 TTL serial port is connected using loom LM0152 to whichever serial port (0, 2, 3 or 4) is configured in the *MX1* for networking as shown in Figure 22.

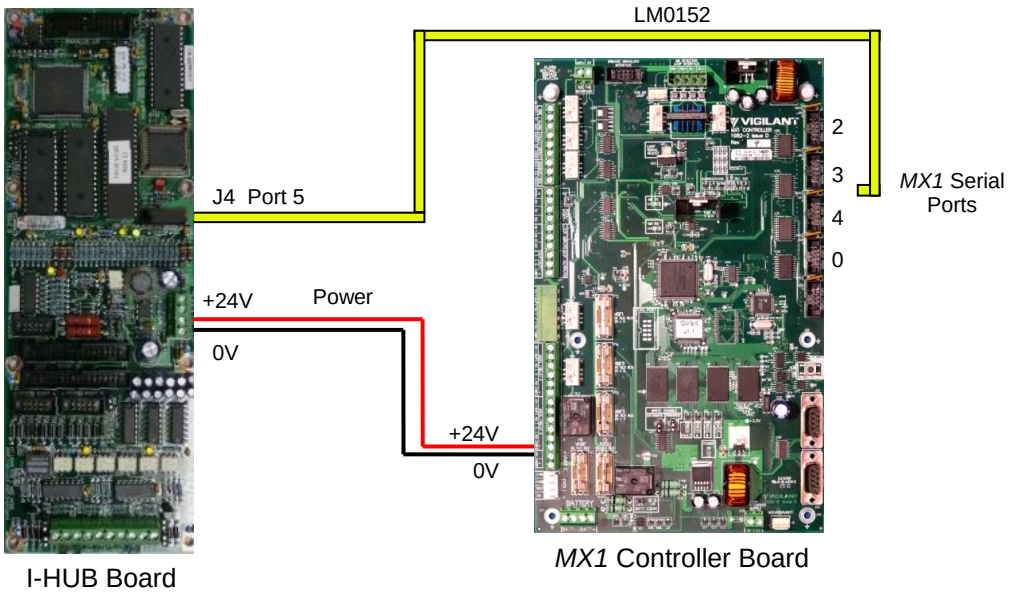


Figure 22 – I-HUB to *MX1* Wiring

I-HUB Copper Ring

The I-HUBs are typically connected in a ring configuration as shown in Figure 23.

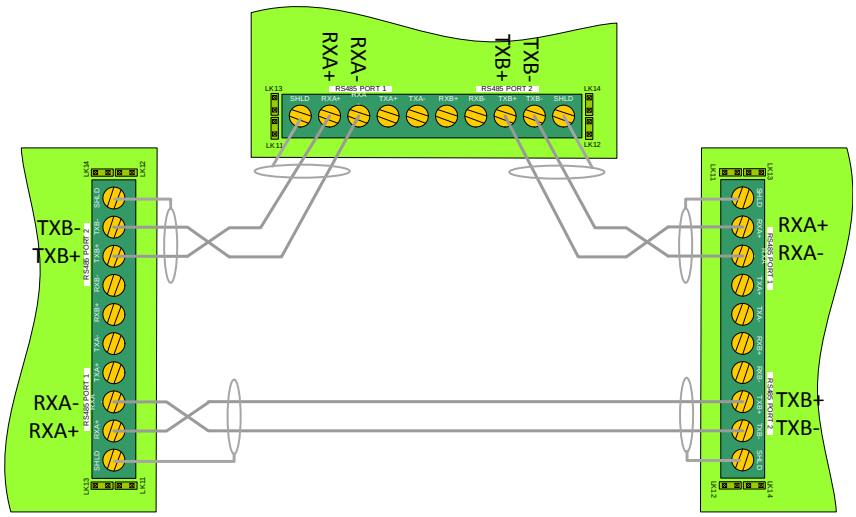


Figure 23 – I-HUB Ring Wiring

Links LK11, LK12, LK13 and LK14 must be installed on each I-HUB.

Wire the RS485 ring, preferably using shielded cable, from Port 2 TXB+ and TXB- to Port 1 RXA+ and RXA- on the next I-HUB, repeating around the ring. The cable shields should be wired to the shield terminals. The two shield screw terminals are joined together and are isolated from the chassis and I-HUB power grounds.

In ring mode, the I-HUB network ports 1 and 2 are pre-configured to operate at 57,600 baud. The recommended maximum cable length is 300 meters un-terminated (when using 0.75mm² screened cable). When ports 1 and 2 are terminated, the cable length (0.75mm² screened cable) may be increased to 1,500 meters. Termination is detailed in Section 3.9 of the I-HUB User Manual (LT0229).

I-HUB Fibre Optic Ring

Ports 1 and 2 can be combined to operate in a 2-wire ring arrangement with other I-HUBs using fibre optic modems and fibre optic cable. Fibre optic modems convert the RS485 signal interface into optical signals for transfer via optical cable. Fibre optic transmission is not affected by electrically 'noisy' environments and offers significant advantage where long 'cable' lengths are required.

For fibre segments, I-HUB links LK11 and LK13 (Port 1), LK12 and LK14 (Port 2), (located either side of the screw terminal block) must be removed.

Figure 24 shows a wiring diagram for use with OSD139AF optical modems. These are the recommended fibre optic modems for use with the I-HUB. These units support a maximum baud rate of 57,600 over two fibres per leg. The DTE/DCE switch needs to be set in the DTE position.

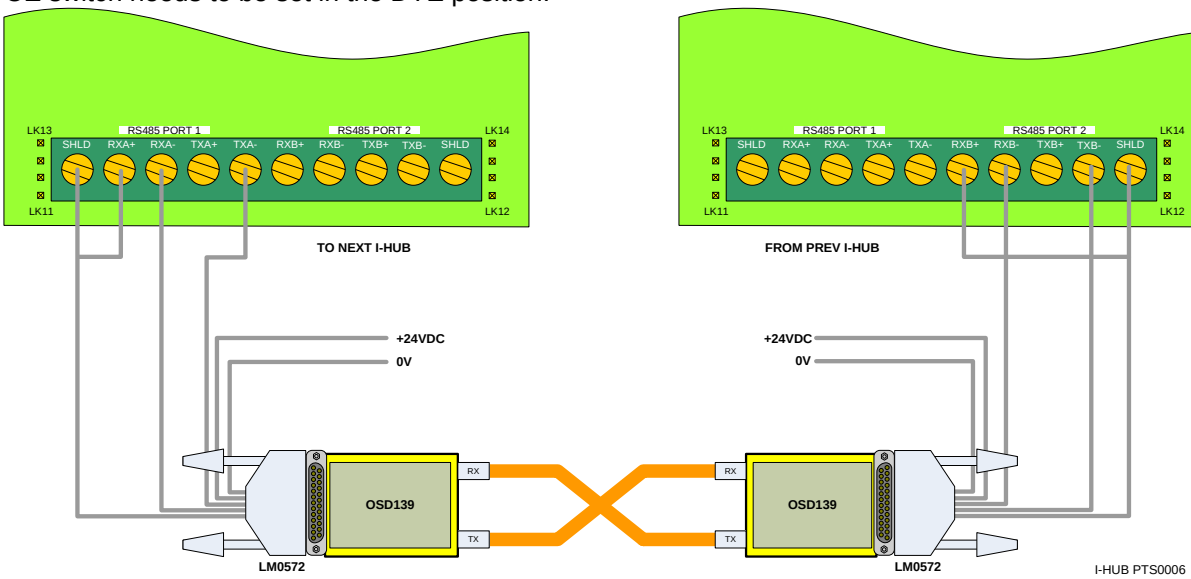


Figure 24 – I-HUB Fibre Ring Wiring

The LM0572 cable should have the 10 way FRC connector cut off, and the labelled leads wired into the appropriate terminals of the I-HUB.

The OSD139 fibre optic modem is available in both single-mode (OSD139AFL) and multi-mode (OSD139AF) variants. Typically, single-mode fibre is suitable for a least 25km and multi-mode for at least 3km. However specific optical loss budget calculations will need to have been carried out for the design of the network.

Note: In Figure 24 the isolated RS485 ports 1 and 2 are connected to the I HUB's 0V and 24V. This could violate the earth isolation system and therefore both the segment on port 1 and the segment on port 2 must use fibre optic cabling. Isolation is still maintained between I HUBs via the non-conductive nature of fibre cabling.

If an I-HUB requires both copper and fibre connections contact Johnson Controls technical support for details.

I-HUB Mounting

Slimline Cabinet

The I-HUB (FP0771) is mounted in the left side of the cabinet. Remove the I-HUB module from its mounting plate and mount it on the standoffs using 8 screws as shown in Figure 25. Optional OSD fibre modems can be mounted on the gear plate or on the right-hand side of the cabinet in place of the *MX1* Loop Card using the FP1032 OSD139 Fibre Optic Modem Bracket (see Figure 25 & 26).

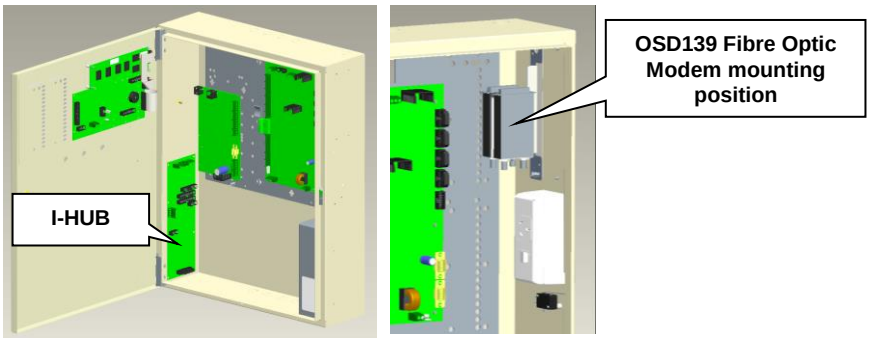


Figure 25 – I-HUB mounting in Slimline cabinet

Figure 26 – OSD139 Fibre Optic Modem Bracket (FP1032) with two OSD139 modems

Note: When using fibre cabling you must allow for cable entry and the minimum bend radius in deciding the cable route to the modems (commonly 60-90mm for field cables, 40mm for patch leads).

15U Cabinet

The I-HUB (FP0771) is usually mounted on the right hand gearplate flange (see Figure 27). Optional OSD fibre modems can be mounted on the *MX1* gearplate in place of *MX1* Loop Cards by using the FP1032 OSD139 Fibre Optic Modem Bracket (see Figure 26).

Note: When using fibre cabling you must allow for cable entry and the minimum bend radius in deciding the cable route to the modems (commonly 60-90mm for field cables).

Figure 27
I-HUB Mounted on right side Flange

Networking Using PIBs

For detailed information on mounting, wiring and programming the PIB, Moxa switch and Ethernet Extender please refer to the PIB User Manual (LT0519).

The PIB comes pre-configured for the recommended “RING” configuration using Moxa fibre switches as shown in Figure 28.

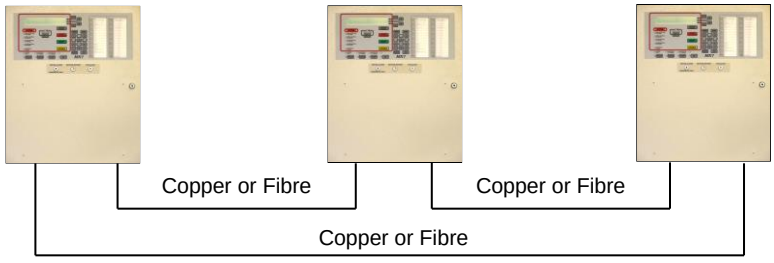


Figure 28 – PIB Ring Network

PIB Wiring

The PIB and other network equipment are powered by the *MX1* via one of the *MX1*’s +VBF supplies. This supply must not be used for any directly-connected field wiring. Alternatively, the PIB, Moxa switch, and Ethernet Extender

(if present) can be powered off the LOOP INTERFACE supply terminals J33, using a fused lead (e.g., a spare LM0459 supplied with an *MX* Loop Card). The PIB's J24 serial port is connected using loom LM0576 to whichever serial port (0, 2, 3 or 4) is configured in the *MX1* for networking.

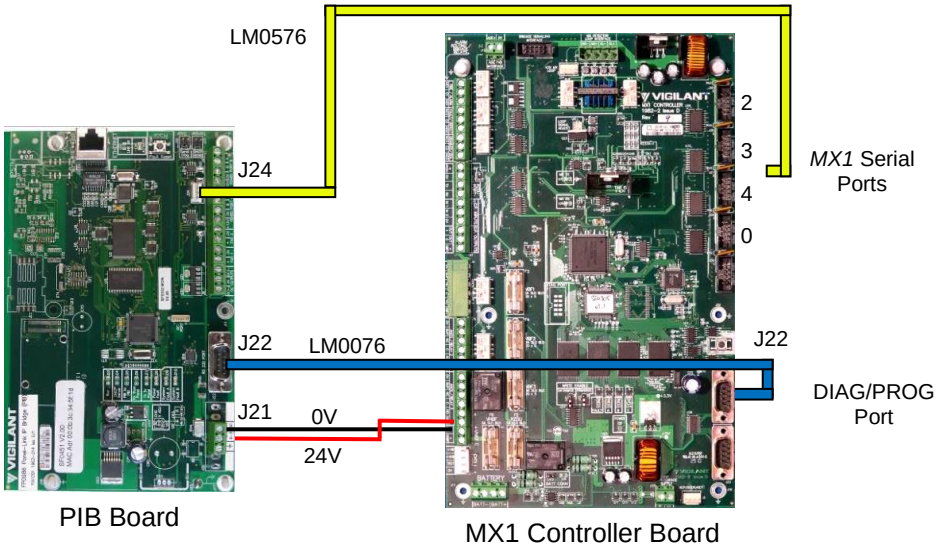


Figure 29 – PIB to *MX1* Wiring

To enable the PIB to be used to remotely access the *MX1* for programming, remote diagnostics or remote operation, then a null modem serial cable LM0076 must be fitted between the PIB's RS232 Port J22 and the *MX1's* Diag/Prog port J22 as shown in Figure 29.

The PIB is connected to the Moxa Fibre/Ethernet switch as shown in Figure 30.

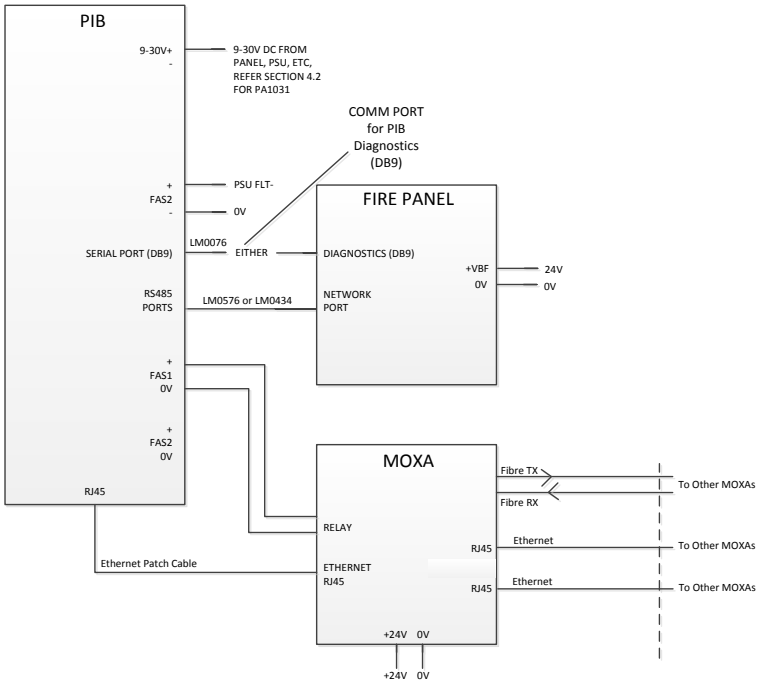


Figure 30 – PIB and Moxa Switch Wiring

Two standard versions of the Moxa fibre switch are available from Johnson Controls:

Part No	Description	Comment
SU0319	MOXA 5 PORT E/NET SW (2 MULTI MODE FIBRE)	This switch has 3 Ethernet ports and 2 multi-mode fibre ports with SC connectors.
SU0320	MOXA 5 PORT E/NET SW (2 SINGLE MODE FIBRE)	This switch has 3 Ethernet ports and 2 single-mode fibre ports with SC connectors.

If shielded CAT3/5/6 copper Ethernet cable (STP) is being used to connect from one Moxa switch to the next (<100m) refer to the PIB User Manual (LT0519) for installation and wiring details.

A Westermo Ethernet Extender module (SU0328) may be used to provide a bidirectional extension of Ethernet signals over a single cable pair. It is designed for use with telephone cable, but will generally work with other cable types, albeit over a shorter distance for the same speed.

The quoted performance is 9 Mbps over 2,000m or 3 Mbps over 5,000m (0.5mm^2 cable). However the speed achieved may vary depending on the cable. If you propose to use an Ethernet Extender over existing cabling that is not telephone cable, it would be prudent to do some tests before assuming that the existing cable will be satisfactory.

Note: 3 Mbps is adequate for most fire networks.

See Figure 31 for wiring, and refer to the PIB User Manual (LT0519) for configuring the Ethernet Extenders as “CO” (Central Office) or “CPE” (Customer Premises Equipment).

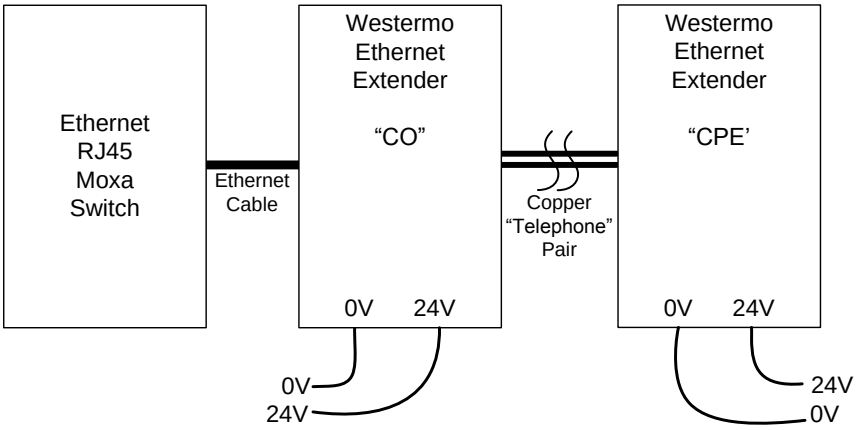


Figure 31 – Ethernet Extender Wiring

PIB Mounting

The PIB (FP0986) is required to be earthed and the recommended earthing method is via 2 metal standoffs (J17 and J19) in the positions shown in Figure 32. The other standoffs may be plastic or metal. If J17 and J19 are not earthed this way, then earth leads (included with the PIB) must be fitted to the adjacent earth tabs J23 and J25, with the leads electrically connected to the gearplate/cabinet earth.

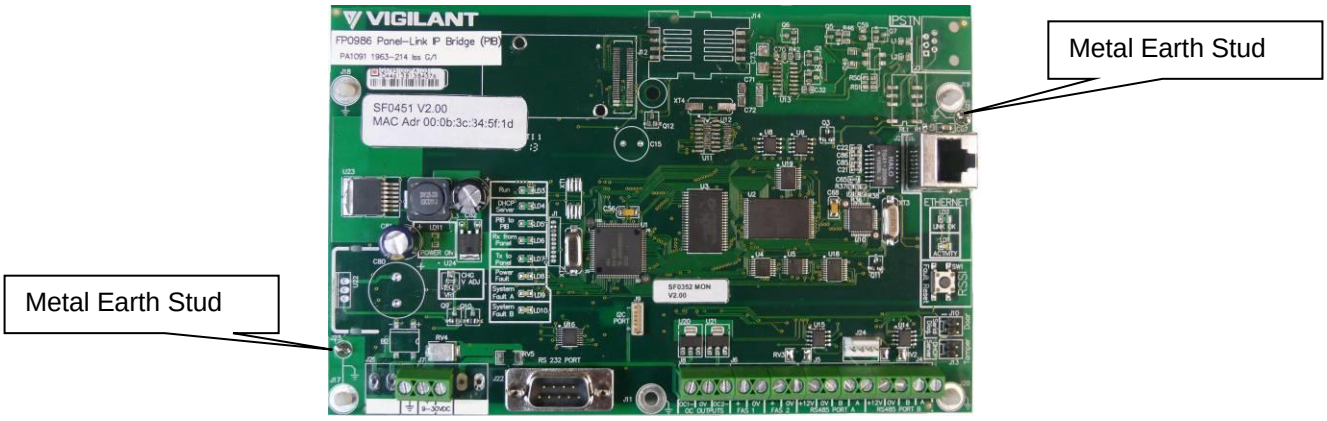


Figure 32 – PIB Earthing

Slimline Cabinet

The PIB is mounted on the 5 plastic standoffs and 1 metal standoff on the left side of the gear plate as shown in Figure 33.

An Earth loom must be connected between the J25 Earth tab (top left) on the PIB to the Earth stud on the left side of the cabinet.

A Moxa switch and one Ethernet extender (or 2 Ethernet extenders) can be mounted using one FP1012 mounting bracket. This bracket is mounted using 4 screws as shown in Figure 33.

Note: The Moxa switch needs to be earthed to the cabinet via the earth screw on its top, and the Ethernet extender requires 10mm of clear air around it for ventilation.

Note: When using fibre cabling you must allow for cable entry and minimum bend radius in deciding the fibre cable route to the switch (commonly 60-90mm for field cables, 40mm for patch leads).

The batteries will need to be located in a separate cabinet.

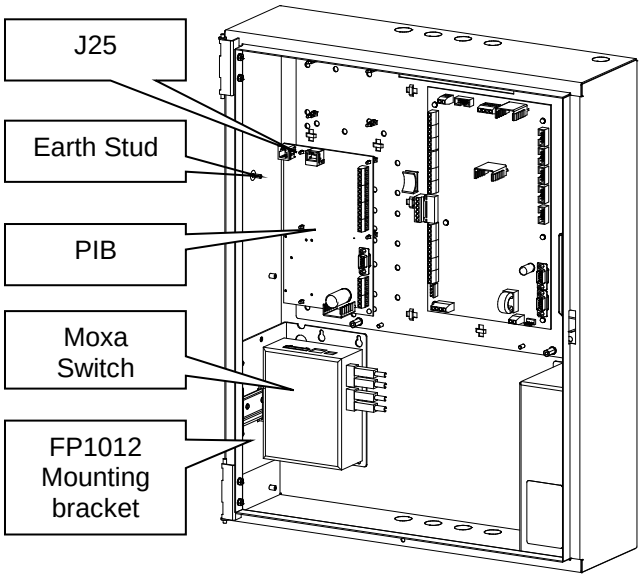


Figure 33 – PIB mounting in Slimline cabinet

15U Cabinet

The recommended mounting position for the PIB is on the right hand gearplate flange. This provides suitable earthing. Alternatively the PIB can be mounted on the left side of the gear plate on one of the two suitable footprints, but this will leave less room for *MX* Loop Cards, etc.

Figure 34 shows the 3 possible mounting positions for the PIB on the 15U *MX1* gearplate.

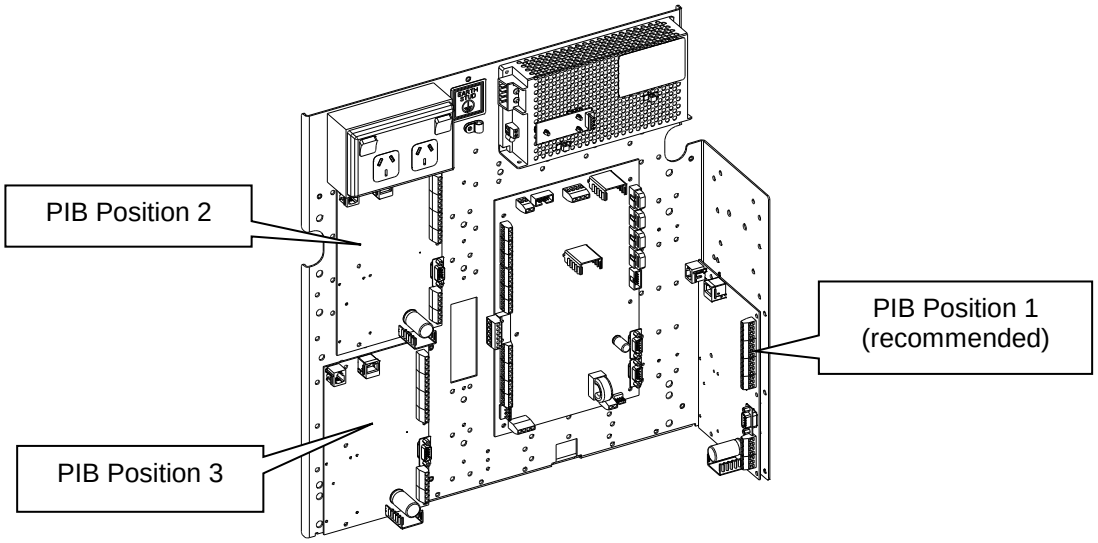


Figure 34 – Possible PIB Mounting Positions

When mounting the PIB in position 2, earth leads will need to be fitted between earth tabs J23 and J25 and the gearplate. When mounting the PIB in position 3 an earth lead will be required to be fitted between earth tab J25 and the gearplate. No earth lead is required for J23 as there is a metal standoff on the gearplate.

A Moxa switch and one Ethernet extender (or 2 Ethernet extenders) can be mounted using one FP1012 mounting bracket. This bracket is mounted on the left side of the gearplate, as shown in Figure 35. Note the Moxa switch needs to be earthed to the cabinet via the earth screw on its top, and the Ethernet extender requires 10mm of clear air around it for ventilation.

It is possible to mount the PIB and the FP1012 in the same position to allow room for other devices such as *MX* Loop Cards. But in this case only the Moxa switch or an Ethernet Extender can be mounted on the FP1012 bracket and the PIB LEDs will not be visible.

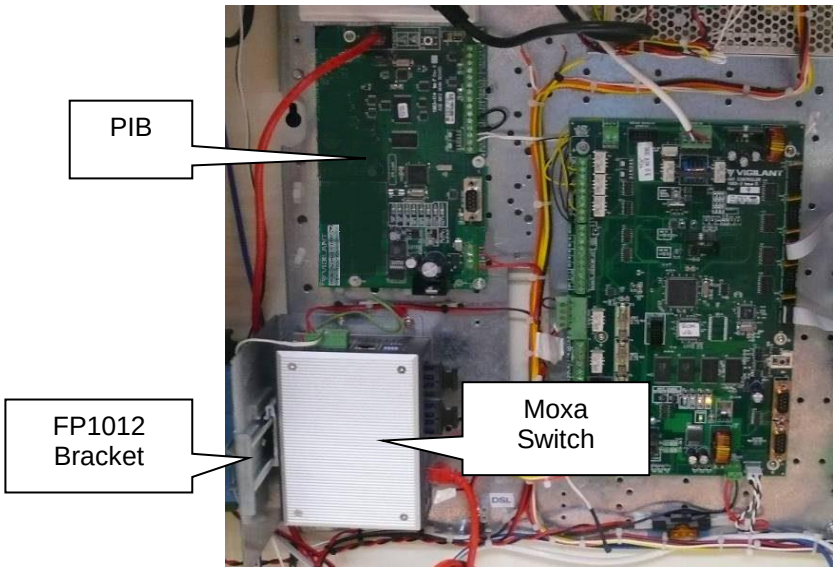


Figure 35 – PIB Mounting Example with Fibre Switch

Note: When using fibre cabling you must allow for cable entry and minimum bend radius in deciding the fibre cable route to the switch (commonly 60-90mm for field cables, 40mm for patch leads).

AS1668 Fire Fan Controls

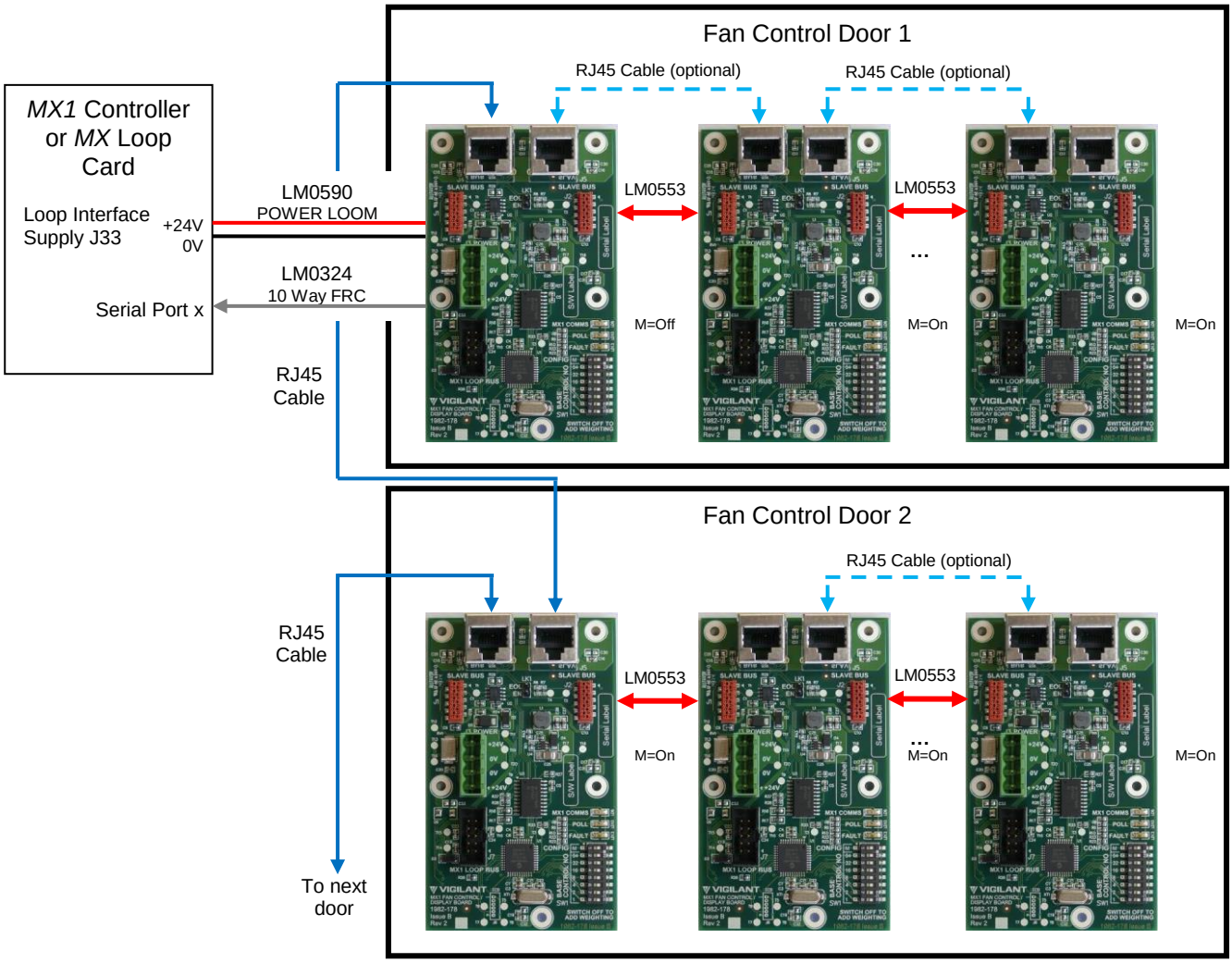


Figure 36 – *MX1* Fan Control Boards Wiring Diagram

AS1668 fan controls are mounted in *MX1* 15U panels by using *MX1* AS1668 3U 19" rack doors (FP1056) that come with 2 fan controls fitted. Each door can accommodate 12 controls in total by the addition of five FP1057 Fan Controls Expansion Kits. Each kit provides 2 fan controls. The *MX1* panel can support up to 126 fan controls (63 boards), although additional cabinets will be required for more than 36 controls in a 15U cabinet.

Installation of the *MX1* Fan Controls is detailed in the *MX1* Fan Controls Install Instructions (LT0587). A copy of LT0587 is included with every FP1056 *MX1* Fan Controls 3U 19" rack door and FP1057 *MX1* Fan Controls expansion kit.

A generalized wiring arrangement is shown in Figure 36.

Note:
The DIP switch on each fan control needs to be set to a unique odd number from 1 to 125. All controls must have their 'M' switch set to ON except the one that connects to the *MX1* Controller or *MX* Loop Card serial port, which has its 'M' switch set to OFF.

INITIAL POWER ON

The *MX1* is shipped with a factory default configuration loaded.

WARNING:	Do not connect the battery when first powering up. Use the mains power supply alone to start with, so that the current into any wiring faults will be limited to a reasonably safe level. When the *MX1* system is first powered-up, its default factory configuration will make its GP outputs and ANC outputs turn on and off at approximately 30 second intervals.

Care should therefore be taken that the activation of outputs at first power-up will not cause adverse effects. Ensure that alerting devices, brigade signalling, and other outputs are not initially connected, or are otherwise isolated.

Note also that with the factory default configuration there will almost certainly be some combination of unusual faults displayed – some of which come and go as the outputs turn on and off. This is normal for the default configuration.

A suitable site-specific database configuration should be loaded into the *MX1* before further connections are made, and before any testing commences.

Temporarily disconnect the alerting device(s), and switch the *MX1* on.

The green "POWER" LED on the controller should light, and the yellow "C" LED should flash once a second.

The LCD/keyboard will beep briefly, and the LCD will display its software version number briefly before changing to the main *MX1* system display.

Within 30 seconds, the buzzer should sound. Press SILENCE BUZZER on the keypad to stop the noise. Press FAULTS and verify that a battery connection fault is displayed. (This may take up to 30 seconds).

Connect the battery. The green "BATT CONN" LED on the controller should light, unless the battery is very flat. If this LED does not light, briefly short together the pins of adjacent LK3 with a screwdriver or similar. The LED should light, and the battery should start charging. If the battery is very, very flat, short LK3 for a longer period until the charger can pull the battery voltage up enough.

Within 30 seconds, the battery connection fault should clear.

Temporarily connect one of the 0V terminals on the controller to the gear plate. Within 10 seconds, an earth fault should be indicated. Remove the connection. The earth fault should clear within 10 seconds.

Note that connecting a PC to the Diag/Prog serial port may also generate an earth fault (depending on the PC). This is normal and will clear when the PC is disconnected.

At this stage, all the field wiring can be connected to the *MX1*. If an earth fault occurs when a piece of wiring is connected, this wiring should be checked and the fault cleared before proceeding further.

Final Configuration

The *MX1* site configuration data file is created separately and loaded into the *MX1* using special software.

Design of the fire alarm system is outside the scope of this installation guide. Refer to the *MX1* System Design Manual (LT0361).

Operation

An *MX1* Operator Manual (LT0344) is supplied with each *MX1*. This manual describes how to use the alphanumeric display and keypad on the front of the *MX1* to view the status of the system and to perform basic service functions.

For more detailed information about testing and maintenance of the system, refer to the *MX1* Service Manual (LT0366).

Installation Hardware Supplied

* = Slimline cabinet only

\# = 15U cabinet only

EOLRs: 2 x 2.7kΩ, 1 x 9.1kΩ, 2 x 18kΩ, 3 x 27kΩ, 1 x 5.6kΩ
1 x LT0344 *MX1* Operator Manual
1 x LT0360 *MX1* NZ Installation Guide
1 x LT0356 Inspection Checklist or LT0542 15U Checklist
1 x LM0319 TGEN Connection Loom
4 x M3 x 12mm screws – for mounting optional Zone Display Board, T-GEN, etc.
1 x 003 key
4 x M5 screws, nuts and washers for attaching battery leads to batteries
Battery leads - 1 x Red, 1 x black, 1 x red inter-battery link
2 x LB0600 zone display blanking strips
4 x plastic plugs to fill front service index mounting holes if not used *
2 x FA1163, M4 Barrel Nuts (for Mains Socket) *
1 x Cabinet Mounting Bracket *
1 x Bulgin key for Silence Alarms, Services Restore & Evacuation switches
4 x hex-head screws for mounting front service index *
2 x FU0048, 3A fuses (spares) #
2 x WA0040, M6 plastic washers (spares for door modules) #
1 x LM0231 Earth Loom (spare to earth modules) #
1 x LM0084 long 10-way FRC (for SGD) #
1 x LT0435 Cabinet Mounting Template #
1 x Wormald Domex Label #

MX1 Fire Alarm System – SPECIFICATIONS

Physical	Dimensions:	
	Slimline	590 x 480 x 140mm (H x W x D)
	15U	750 x 550 x 210mm (H x W x D)
	Construction:	
	Slimline	1.2mm mild steel, zinc coated. Baked epoxy powdercoat finish. 003 key
	15U	1.6mm mild steel, zinc coated. Baked epoxy powdercoat finish. 003 key
	Shipping Weight:	
	Slimline	12 kg approx., excluding batteries
	15U	24 kg approx., excluding batteries.
Environmental	Temperature/ Humidity	0 to +45°C operating, up to 95% RH (non-condensing)
	Cabinet Protection	IP41 (Slimline), IP30 (15U)
Power supply	Mains Input	Single phase 200-260VAC, 50-60Hz, 1.2A
	DC Output	27.3V, 5.0A DC charging, 5.5A DC current limit (nominal) 4.0A DC continuous long term Slimline model (FP0893) 5.0A DC continuous long term all other models.
	Batteries	Slimline holds 2 x 12V sealed lead-acid batteries, up to 17Ah capacity (24Ah possible side-on). 15U cabinet holds up to 40Ah.
	Fused supplies	Three VBF and one VRZDU terminals (battery-backed) and one VNBF (non battery-backed) terminal, wire capacity 2.5mm^2. Each output is fused at 3A (20 x 5 slow blow cartridge type).
Addressable Device Loop	Output loop current Terminals	Up to 1.0A continuous. Overcurrent cutout at 1.1A (nominal). AL+, AL-, AR+, AR-. Wire capacity 4.0mm^2.
MX Loop Card	Output loop current Loop Terminals Power Terminals	Up to 1.0A continuous. Overcurrent cutout at 1.1A (nominal). AL+, AL-, AR+, AR-. Wire capacity 4.0mm^2. +24V, 0V x 2. Wire capacity 4.0mm^2.
Inputs	GP IN 1 GP OUT 2	Two protected supervised general purpose inputs suitable for connection to contact or open collector outputs. EOLR value is 1.5kΩ-3.3kΩ.
Ancillary Relay Outputs	ANC1 and ANC2	Each relay provides a voltage-free set of changeover contacts, rated at 1A inductive or 2A resistive at 30VDC. Configurable contact, load or door-holder mode supervision. ANC1 has a demountable screw terminal header compatible with pre-made loom LM0319 to connect to a T-Gen2 or T-GEN 50 tone generator. ANC2 has 2.5mm^2 capacity screw terminals.
	ANC3	A single set of voltage-free changeover contacts, 5A resistive at 30V. Negative bias supervision of up to three branches of wiring is possible from this relay. EOLR values are 9.1kΩ for a single branch, 2 x 18kΩ for a double branch and 3 x 27kΩ for a triple branch.
Other outputs	GP OUT 1 GP OUT 2	Two protected general purpose open collector 2.5mm^2 outputs which can be used to drive loads of up to 500mA. Load mode supervision is optional on these outputs.
Serial ports	Diag/Prog	Male DB9 connector configured as DTE. For connection to PC for diagnostics, programming, or firmware update. Requires null-modem cable, e.g., LM0076. Can be connected to a modem for dial-in remote access. This requires a straight serial cable.
	Serial Port 1	Male DB9 connector configured as DTE. Suitable for connection to a logging printer. Requires null-modem cable for printer connection, e.g., LM0076.
	Other Serial Ports	Five 10 way headers configured as logic level (0-5V) DTE. Display Port is dedicated to the LCD/Keyboard connection. Data rate is fixed at 19200 bps, 8 bits, no parity. Serial Port 0 by default is assigned to RZDU, but can be re-assigned to other functions. Serial ports 2, 3, 4 and 0 are configurable for *MX* Loop Cards, Remote FBP, or Network Interface.
	RZDU Port	Four 2.5mm^2 capacity screw terminals, for connection to up to 8 remote display devices using RZDU protocol.
Brigade Interfaces	SGD Interface	10 way FRC header suitable for connection to VIGILANT® GP SGD (PA0862) or GP Brigade Relay Interface (PA0861).
	ASE Interface	Isolated and protected screw terminal, 4mm^2 capacity, for 2 wire connection to an ASE FAS input. Transmits Alarm, Fault and Isolate. (Not currently used in NZ).
	Brigade Relays	Three sets of voltage-free changeover contacts, rated at 1A inductive at 30V, with 2.5mm^2 capacity terminals, for Fire/Alarm, Defect/Fault, and Isolate/Disable signalling.

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