

# MX4428

## Advanced Addressable Fire Alarm System

### Features

- Supports *MX* Series devices including the 850 Series Generation 6 Multi-Sensor analogue addressable detector range
- *SMARTSENSE* and *MX FASTLOGIC* (fuzzy logic) detection algorithms
- Network up to 50\* panels via RS485 copper pair or fibre optic cabling, or using IP via fibre optic or copper cabling.

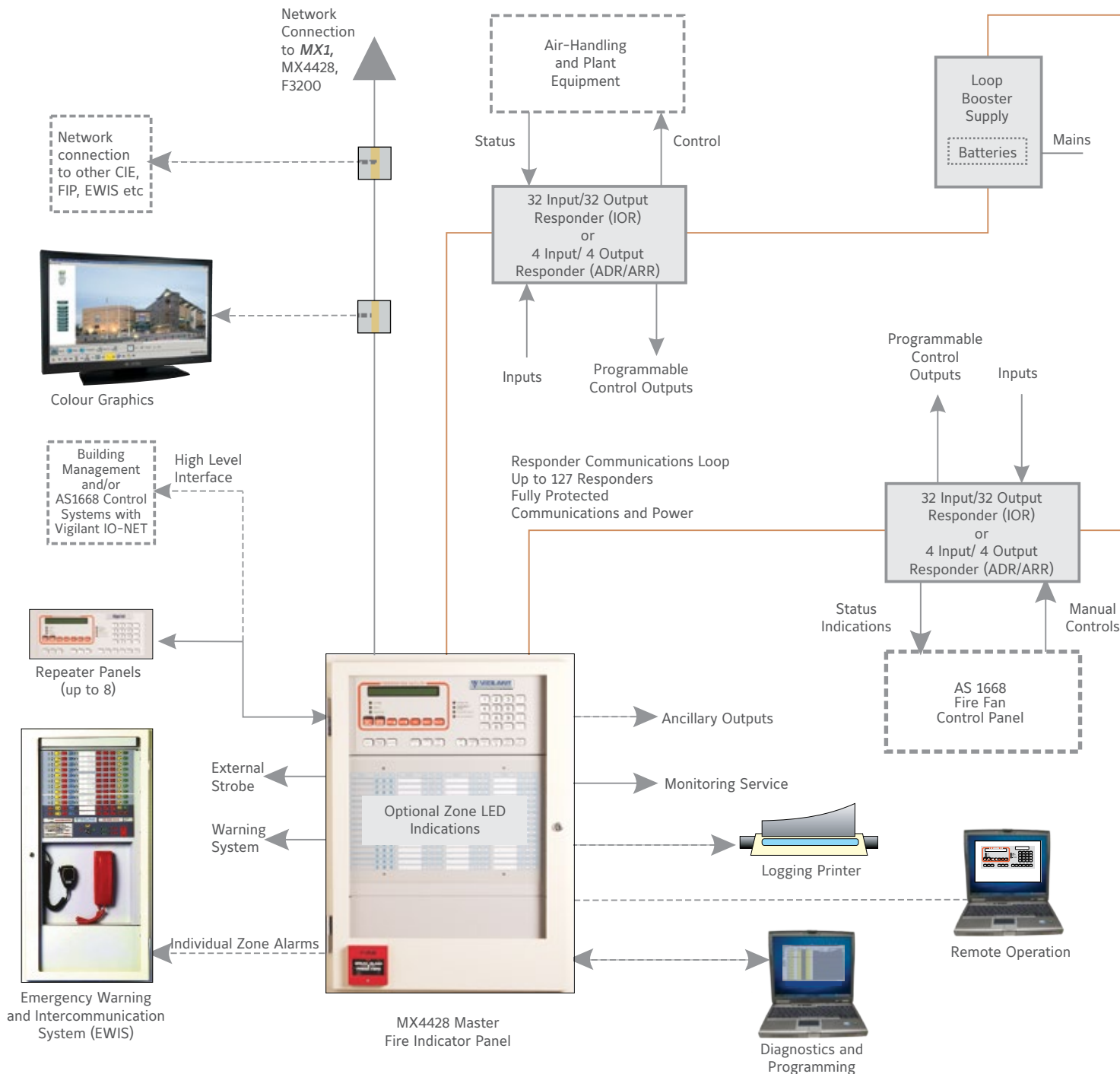
The VIGILANT MX4428 is an intelligent fire alarm system, incorporating *MX TECHNOLOGY* to provide advanced, analogue addressable fire detection.

It features support for 850 Series Generation 6 analogue addressable detectors, the *MX DIGITAL* protocol for communications with analogue loop devices, distributed “responder loop” architecture and powerful programmability.

### Advantages & Options

- *MX VIRTUAL* multi-sensor analogue addressable detectors
- Heat-enhanced photoelectric smoke and CO fire detectors
- Heat detectors programmable as rate-of-rise or fixed temperature only
- Compatible with Multi-Protocol Responder (MPR) and Series 130 analogue addressable devices
- Compatible with wide range of conventional detectors including Intrinsically Safe types
- Complies with AS 4428.1 and NZS 4512
- LCD Firefighter Facility (FF) and optional zone LEDs
- LCD zone description text with point text for each detector
- Event logging to internal history file and printer
- Printer logging includes zone text and point text
- Remote repeater panels, colour graphics displays
- “Tandem” mode for remote control of panel
- High level EWIS, BMS interface
- Networkable with other VIGILANT systems and/or XLG-C/S Colour Graphics
- Multi-panel IP and RS485 networking options
- Programmable outputs for Warning System, External Alarm (strobes & bells) and Ancillary Control
- Flow switch monitoring and remote testing
- AS 1668 air-handling smoke detection & control
- Powerful, field-programmable logic equations and timers
- Built-in clock / calendar with automatic daylight saving adjustment
- Comprehensive test facilities
- Automatic system self-tests
- Automatic battery connection and capacity tests
- Integral charger (5A, 10A)
- 19” rack format cabinets





## MX Detection Technology

The MX4428 supports these *MX VIRTUAL* multi-sensor fire detectors:

- 850PC Carbon Monoxide / Photoelectric Smoke / Heat Detector
- 850PH Photoelectric Smoke / Heat Detector
- 850P Photoelectric Smoke Detector
- 850H Heat Detector

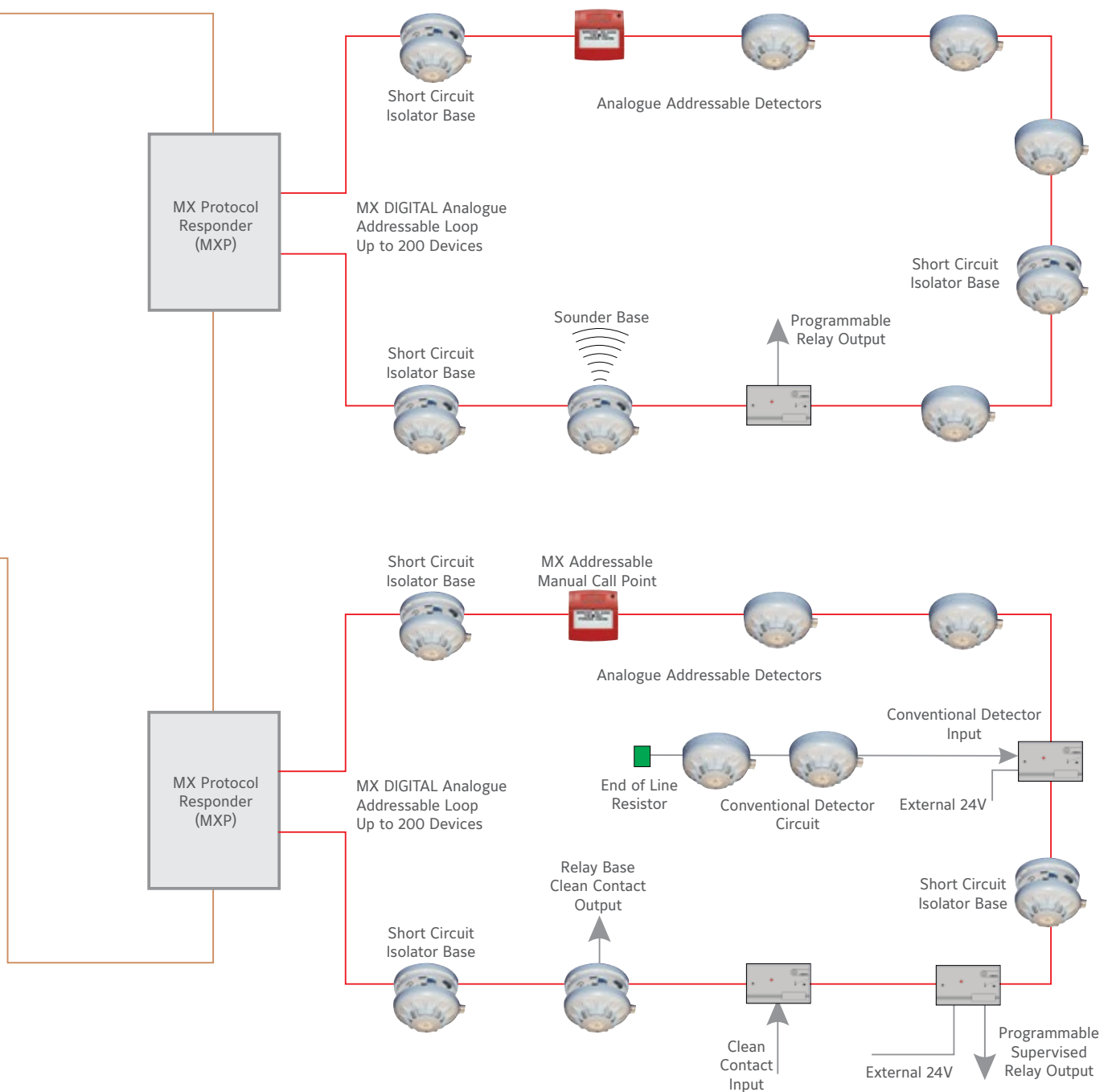
Each detector supports different programmable modes of operation including:

- CO / Smoke plus Heat detection
- Heat-enhanced CO / Smoke detection
- CO / Smoke detection only
- Heat detection with fixed temperature plus rate-of-rise, or just fixed temperature detection

For specific applications, ionisation smoke, flame and heat-only detectors are also available.

Detection algorithms can be programmed for each detector to allow the detection capabilities of the system to be further optimised.

Up to 200 *MX* devices (detectors and addressable input/ output modules) may be connected to the *MX* detection loop, which terminates at an *MX* Protocol (MXP) responder.



*MX4428 Typical System Configuration*

The *MX DIGITAL* communications protocol used on this loop is designed to provide high reliability and fault resistance, with operation possible over many cable types. This often permits system upgrades using existing cable. The loop configuration ensures that communications continues in the event of a loop open circuit fault condition.

Short circuit isolators may be fitted to divide the loop into segments, so that a loop short circuit fault will affect only the devices in the same loop segment as the fault.

A wide variety of addressable modules and detector bases enable devices such as manual call points, clean contact inputs and outputs, and conventional detector circuits to be connected to the loop.

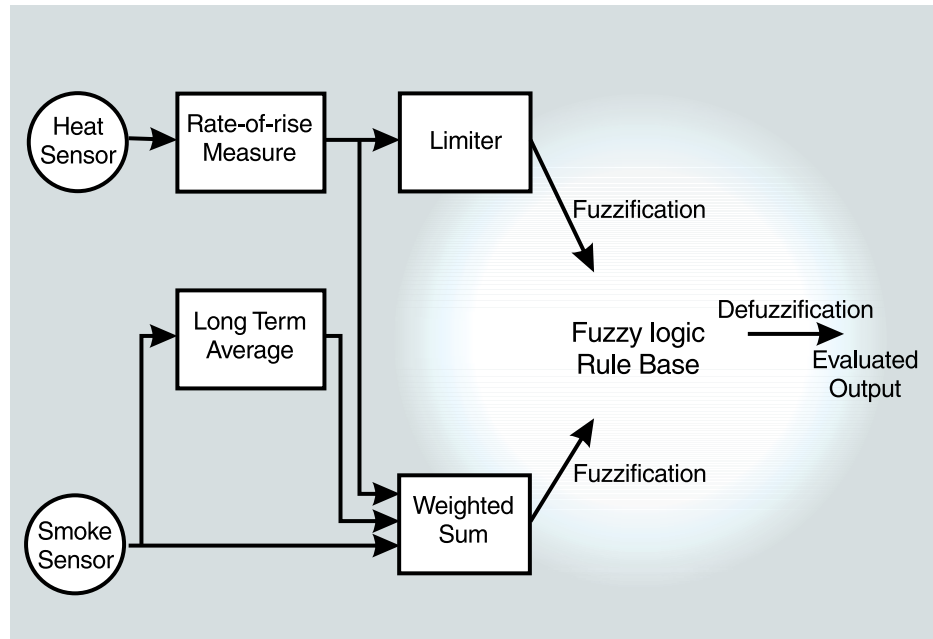
## Detection Algorithms

*MX FASTLOGIC* is a “fuzzy logic” based algorithm applied to photoelectric smoke and heat enhanced smoke detection, and designed to differentiate between the smoke and temperature patterns of real fires and typical causes of unwanted alarms.

*SMARTSENSE* is a field-proven, reliable detection algorithm, providing unwanted alarm reduction, compensation for ambient conditions and a wide range of programmable sensitivity settings.

Both detection algorithms provide:

- Detector pre-alarm sensing for early warning of a potential alarm
- Compensation for soiling and changes in ambient conditions
- Logging “detector dirty alert” when compensation limits are about to be exceeded, to allow maintenance to be scheduled
- Heat sensor can be programmed to act independently as a Heat Detector



*MX FASTLOGIC*

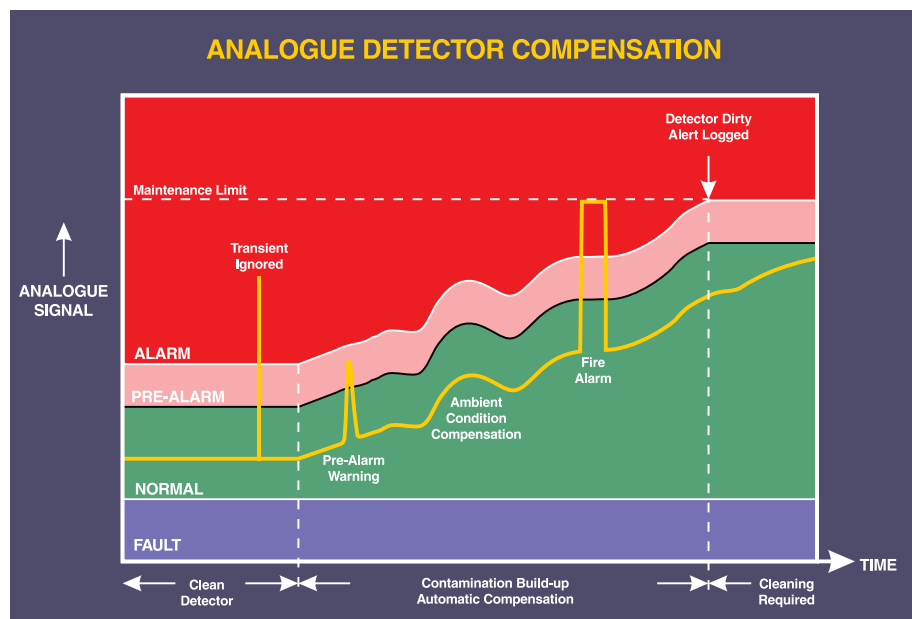
## Detector Drift Compensation

As time goes by, dirt or other contaminants can accumulate inside the smoke sensing chamber, which can cause the “clean air” value (smoke detector value in the absence of smoke) to change - either up or down.

The MX4428 fire alarm panel filters the analogue value(s) from each detector in a number of ways and applies the results to a series of comparisons to determine the various conditions - e.g. fault, pre-alarm, alarm, dirty/maintenance alert, etc.

This processing is configured by programmable values that can be set up in MX4428 - some of which are general and some of which are specific to particular devices.

By continuously monitoring and adjusting the detector’s clean air value, the integrity of the detector’s analogue values is maintained, whilst reducing nuisance alarms.



## Responder Loop Design

Central to the MX4428 system is the proven "Responder Loop" architecture, which allows intelligent responders to be either distributed at selected locations around the protected premises, or located centrally at the FIP.

Analogue addressable loop wiring and other inputs and outputs are terminated at these responders, which in turn are connected by the 4-wire responder loop to the FIP.

The responder loop is fully protected: a partial or complete break, or short, anywhere on the loop is detected and isolated automatically at the adjacent responders.

All system operations are fully maintained even in the presence of the fault condition.

This design offers many benefits:

- Cable concentration at the master FIP is greatly reduced
- Installed cost is lower because the loop design requires less wiring than conventional methods
- Compatibility with many existing conventional and analogue addressable systems, providing a ready upgrade path
- Ideal suitability as a main panel upgrade with old sub-panels connecting via responder inputs
- High-integrity communications is fully supervised and protected by redundant paths
- Loop fault sensing and isolation is provided at every responder
- Intelligent diagnostics identifies location of faults rapidly
- Expansion and alterations are easily accommodated with minimal additional wiring
- Responder Loop Boosters permit virtually unlimited loop length
- No additional multicore wiring is required for AS 1668 controls, but optional use of dedicated IO-NET (PLC) system is also possible.

## AS 1668 Air-Handling

The MX4428 accommodates AS 1668 air-handling controls using its Input/ Output Responders (IOR) and analogue loop input/ output devices.

Compact and economical Fire Fan Control Panels may be constructed using IORs to monitor manual control switches and operate status indicators.

Remote programmable outputs interface to remote air-handling units.

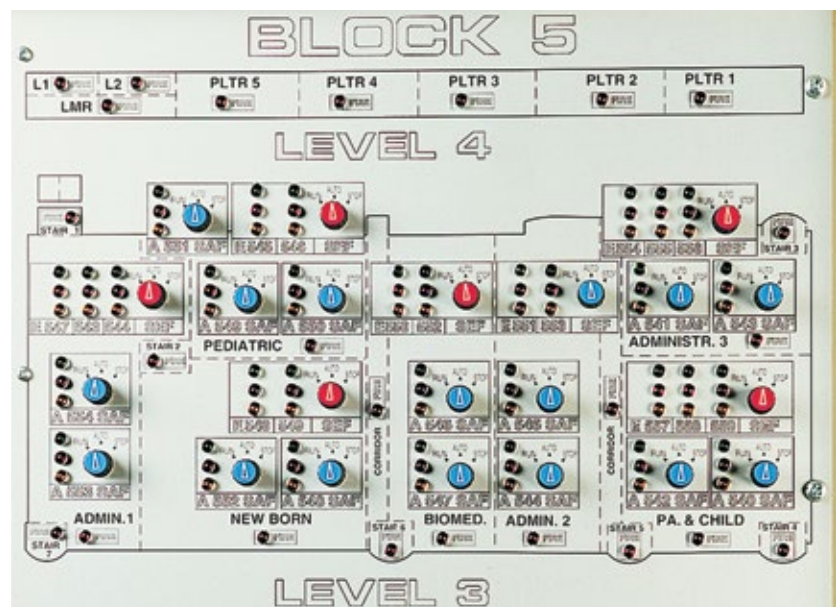
## Easily Expanded

The built-in display capabilities of the MX4428 are comprehensive.

Input devices are grouped in up to 528 zones, and zone alarms are displayed on the LCD and optional printer complete with programmable description text.

Zone LED displays may also be fitted. Point text provides additional display expansion with individually programmable LCD and printer text for each addressable point.

The number of points to be monitored can be readily increased by adding responders to the responder loop. This loop can support up to 16 MXP Responders equating to 3,200 analogue addressable points.



Fire Fan Control Panel

## Networking

Two networking options are available for the MX4428:

- RS485 using the I-Hub ring over copper or fibre-optic cable
- IP Networking using PIBs over copper or fibre-optic cable.

Both options allow:

- An MX4428 panel to display and control alarms from remote MX4428 or F3200 panels
- A "master" panel to perform brigade signalling for selected sub-panels
- Sharing of warning system and network variable status
- "Tandem" mode operation of remote panels
- Remote access and diagnostics from off-site.

Network-compatible products include:

- MX1, MX4428, F3200 panels, mimic panels (NLDU), Network Display panels (NDU), Compact Firefighter (FF) display, Nurse Station Annunciator (NSA), XLG-C/S colour graphics, Panel-Link Modbus Bridge (PMB), QE90 EWIS panel and event printers.

If an MX1 panel is used as the master panel, up to 250 sub-panels (including the MX4428) can be networked together into one large system.

## MX4428 19" Rack Mounting System

MX4428 cabinets are in "19 inch" rack format. In addition to the standard 15U cabinet, four larger cabinet heights in two depths allow systems to be assembled as required.

A 4U inner door contains the user keypad and FF incorporating the LCD. A 7U display extender door holds multiples of 64 zone LED indications (4U 80 zone compact option also available).

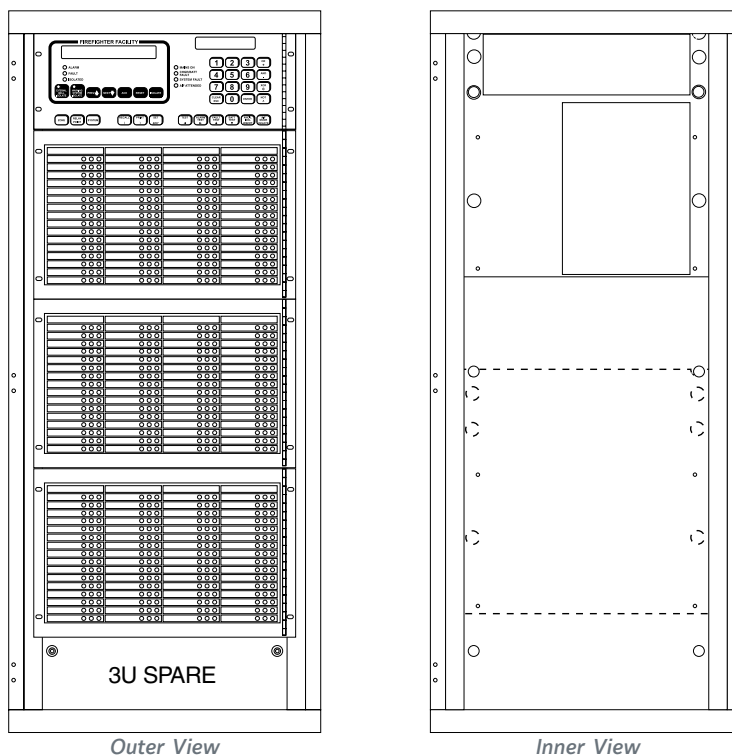
A variety of other inner doors and 19 inch rack modules are available including blank doors and panels, modules for mounting AS 1668 controls, gas flooding system zone controls, warning system controls, and alarm signalling equipment.

Custom designed graphic mimic diagrams may also be mounted in the inner door position. The provision of 450mm(H) x 460mm(W) gear plates allow the mounting of standard equipment internally:

- Main board,
- Power Supplies,
- Responders,
- Loop Booster,
- I/O Responder complete with termination boards,
- T-Gen2 Emergency Warning system

Other gearplate options include a blank gearplate for mounting other types of equipment, and larger size gear plates for the larger cabinets.

28U Typical MX4428 Rack 192 Zones maximum



## Cabinet Features

- All-welded construction
- Cabinets available hinged left or right
- Modular system
- Standard components:
  - Gear plates
  - Inner doors
  - Blanking plates (1,2,3,4,5,6,7U)
- Optional components:
  - 1U document shelves available in two depths (120mm and 295mm)
  - ASE mounting plate
  - T-Gen2 occupant warning system user interface
  - Gas/Suppression control doors
- IP65 cabinet options available to special order

## MX4428 Rack Cabinet Specifications

Cabinet Size		15U	18U	21U	28U	40U
Number of extender inner doors:	Master	1	2	2	3	3
	Extender	2	2	3	4	4
Maximum number of LED displays:	Master	64	128	128	192	192
	Extender	128	128	192	256	256
Spare space at bottom:	Master	4U	0U	3U	3U	15U
	Extender	1U	4U	0U	0U	12U
Standard size gearplates (max.):		1	1	1	2	3
Overall Height (mm):		750	885	1050	1330	1865
Overall Width (mm):		550	575	575	575	575
Overall Depth (mm):		15U: 211 (176 internal)				
		18U: 28U, 40U: 205 or 380 (135 or 310 internal)				
		21U: 350 (310 internal)				
Cabinet Material:		15U cabinet 1.2mm mild steel, other cabinets 1.6mm mild steel				
Cabinet Finish:		Baked epoxy powdercoat				
Cabinet Colour:		Cream Wrinkle (special colours available on request)				

## Easy to Operate

Operation is straightforward with the MX4428's keypad and alphanumeric LCD. The 40 character, 2 line LCD zone control panel meets the AS 4428.1 "Firefighter Facility" (FF) requirements. It provides clear indication of the alarm location, including the zone number, the operated point or circuit number and a text description of the alarm zone.

Point text provides a unique text description of the analogue point that caused the alarm, which can also be displayed.

Next and Prev keys allow easy scrolling through the 99 event zone alarm buffer, while all current alarms, faults and isolated zones can be separately recalled.

An internal history log stores the previous 900 events, and these can be recalled to the LCD at any time.

The optional English language printer output provides a 30 character text description of the zone or point, and a date / time stamp to allow rapid tracing of events. The printer may be selected to log any or all of: zone events, circuit events, point events, keypad commands.

"Tandem Mode" enables the panel keypad to be operated from a remote computer for diagnostic or remote monitoring purposes.

## Control Panel Facilities

- LCD Control Panel (40 char. x 2 lines)
- Firefighter's controls (FF): Acknowledge, Reset, Isolate, Next, Previous, Warning System Isolate, External Bell Isolate

- Recalls: Alarms, Faults, History (900 events), Zone Status, Point Status, System Status, Activating circuit/point, Search for detector % dirty
- Alarm Zone functions: Zone Test, Zone Isolate, Zone Reset, One person detector "in situ" test (auto-reset)
- Ancillary Control Zone functions: Isolate, Reset, Relay Test
- System functions: Battery Test, Warning System Test, External Bell Test, Lamp Test, System Test, Brigade Test, System Fault Reset
- System and individual zone status indications.

Repeater display panels provide comprehensive remote display and control including: remote FF and/ or zone LEDs; display of activating circuit/ point; zone isolate, reset, test; warning system/ bell test; status recall of zones, system and history (refer to separate datasheet).

## Fully Field-Programmable

For very straightforward applications, configuration of the MX4428 is automatic. For custom requirements, a software configuration tool gives password-protected access to the MX4428's programming facility.

System configuration programming provides a wide range of options including networking and operation of remote displays. Freely programmable circuit to zone mapping allows maximum flexibility for custom design of the LED display layout.

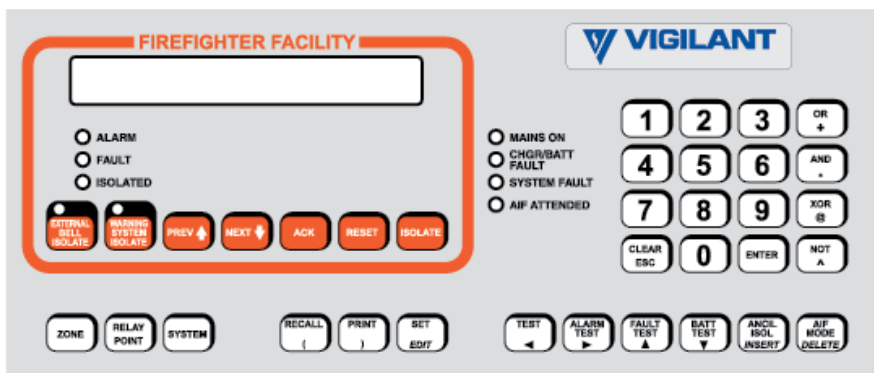
Powerful control programmability is available through timers, Boolean logic expressions, variables and system state tokens.

Virtually any monitoring and control function can be configured in the field using MX4428's programming facility. Site-specific configuration parameters are stored in nonvolatile EEPROM memory which remains protected even if the system's power supply is removed.

## Programming Facilities

The following parameters can be programmed:

- **Point functions:**
  - Point Type
  - Algorithm (MX Photoelectric only)
  - Temperature enhancement (MX Photoelectric and CO only)
  - Heat type A, B, C, D (C, D MXP only)
  - Alarm/ Pre-Alarm sensitivity
  - Upper Tracking Limit
  - Dirty Detector Alert Limit
  - Output control
  - 30 character text name
- **Circuit functions:**
  - Circuit to Zone mapping
  - Circuit enable/ disable
  - Input monitoring type
- **Zone functions:**
  - Normal
  - Flowswitch
  - Dual hit
  - Master Alarm/ Indication only
  - Isolatable/ non-isolatable zones
  - Flow switch test relay
  - 30 character text name
  - Ancillary control
  - Latching/ Not
  - Zone type text
- **Output logic programming:**
  - Variables
  - Timers
  - Boolean AND, OR, XOR, NOT
  - Relay to Ancillary mapping
  - Supervision enable/ disable
- **System functions:**
  - Time/ date
  - Upload
  - Query/ help
  - Recall History (900 events)
  - Analogue loop/ line (MPR only)
  - List all off-normal zones
  - Adjust global settings
  - Two Analogue default sensitivities
  - Flow switch delays
  - Automatic test times
- **Repeater Panel Programming:**
  - Zones to be displayed
  - Display or relay/ mimic driver
  - Global or local key functions
  - Internal or external power supply
  - Zone text download command



Control Panel Layout

## Specifications

### System Capacity

Input Points:	Up to 3,200 depending on configuration.
Zone Indications:	Up to 528, freely assignable.
Programmable Outputs:	Up to 508 plus two FIP relays.
Responders:	Up to 127 addresses. MXP, MPR, IOR may count as more than one address.
Analogue Loop:	Up to 16 MXPs, 32 MPRs, depending on configuration. 2 wire loop, 2km max. O/C tolerant. S/C isolator bases/ modules available.
Repeater Panels:	Up to 8 (more without control, or by using network).

### Physical

Cabinet Size (mm):	15U 19" rack. 750H x 550W x 230D (incl. MCP). For larger rack mount cabinets refer to table on page 6.
Cabinet Material:	1.2mm mild steel (15U). Baked epoxy powdercoat finish in Cream Wrinkle.
Style:	Wall mounting. Outer door hinges on left (003 key lock) to access controls. Inner door hinges on right.
Shipping Weight:	25kg (without batteries).
Responder Size (mm):	240H x 180W x 50D (MXP, MPR, ADR-M).
Responder Material:	1.0mm mild steel, galvanised finish.
Shipping Weight:	ADR-M, MPR: 1.3 kg, ARR-M, MXP: 1.4kg.
Temperature:	-5°C to 45°C operating.
Humidity:	Up to 95% RH (non-condensing).
Ingress Protection	IP30

### Power Supply (Master FIP and Loop Boosters)

Mains Supply:	240Vac +6% -10%, 50Hz, 150VA.
Internal Battery:	24V sealed lead-acid, capacity up to 40Ah.
Internal Charger:	27.3V (nominal), 5A (10A option) regulated, temperature-compensated.
Battery Monitoring:	Charger high/ low, battery low/ fail. Supervision of battery connection and capacity.

### Inputs

ADR-M:	20V nominal, conventional detector circuits.
IOR:	Clean contacts, optionally supervised.
MXP (per MXP loop):	Up to 200 MX detectors and input/ output modules. Photoelectric smoke or CO combined with optional heat, ionisation smoke, heat (programmable for Type A, B, C or D), flame, supervised hard contacts, VLC-800MX VESDA LaserCOMPACT.
MPR (per MPR loop):	Up to 99 photoelectric, laser, or ionisation analogue smoke detectors, analogue heat detectors (programmable for Type A or B). Up to 99 input/output modules.
Other Inputs:	Supervised MCP at master & repeaters.

### Outputs

Monitoring Service Relays:	Alarm (2), Fault, Isolated, Stand-by (power supply supervision). 2A, 30Vdc resistive.
FIP Relays:	Two relays (one relay 2A, 30Vdc resistive, with built-in supervision, other relay switched 24V, battery backed, 1.5A max.). Programmable for operation as External Bell, Warning System, or Ancillary output. Additional supervision modules available.
Responder Relays:	Supervised, individually programmable: 1A, 30Vdc resistive.
I/O Responder:	2A Relays or 100mA, 28V transistor pulldown (1.1V). Programmable supervision.
Analogue Loop:	Addressable supervised relays: 2A resistive, 1A inductive, 30Vdc.
Ancillary Supplies:	24V; battery-backed and non battery-backed, 1.5A max. each (can be expanded).
Display Mimic:	External Alarm LEDs or relays (100mA max.).
Other Outputs:	External Sounder (28V, 200mA max.).

### Networking

Capacity:	Up to 50* panels on MX4428/F3200 network
I-HUB:	RS485 / fibre ring (mix possible)
IP (Internet Protocol):	Uses PIB and Ethernet Switch over fibre ring plus Ethernet Extender for use over copper pair. LAN connection possible (for non-listed use).

\* Using MX1 as the main FIP, up to 250 panels (MX1/MX4428/F3200/NDU/etc.) may be networked together using I-HUB with copper or fibre optic ring, or over IP using the PIB with copper or fibre optic cable.

## Detector Compatibility

The MX4428 is compatible with most of the VIGILANT MX 850 and 814 range of analogue addressable detectors and modules. It is also remains compatible with a range of legacy analogue addressable detectors for upgrades and retrofits.

In addition, it is compatible with hard contact devices and a wide range of "20 volt" industry-standard, conventional detectors.

A full list of compatible devices is contained in the VIGILANT Fire Detection Device Compatibility Guide.

## Approved

The MX4428 is certified to Australian Standard AS 4428.1-1998:

"Fire detection, warning, control and intercom systems - Control and indicating equipment, Part 1: Fire."

ActivFire Listing No. afp-1446

The MX4428 complies with the New Zealand Standard NZS 4512:2010 "Fire Detection and Alarm Systems in Buildings".

FPA(NZ) Listing Number VF/117

Hong Kong Fire Services Department approved

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VIGILANT, a respected regional brand of Johnson Controls, is a technology leader in the Australian and New Zealand fire detection markets with AS and NZS product approvals. The VIGILANT product line includes a comprehensive range of MX TECHNOLOGY fire detection products and the market-leading QE90 voice evacuation systems. VIGILANT product is widely supported throughout Australia and New Zealand by a network of installation companies, service companies and distributors.

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