FIRE FIGHTER'S GUIDE

1. VIEW NEXT/PREVIOUS ALARM

Press "NEXT" key once -
- The LCD will display the next alarm.

Press "PREV" key once -
- The LCD will display the previous alarm.

2. ACKNOWLEDGE DISPLAYED ALARM

Press "ACK" key once.
- LCD will display "ACKD" for the displayed alarm.
- If all alarms are acknowledged, the ALARM LED will go steady.

3. RESET DISPLAYED ALARM

Press "RESET" key once.
- LCD will display "PRESS ACKNOWLEDGE TO CONFIRM RESET".
- Press the ACK key within 10 seconds to reset the alarm.
- If the final alarm is reset the LCD will exit FF mode.

4. ISOLATE DISPLAYED ALARM

Press "ISOLATE" key once.
- LCD will display "PRESS ACKNOWLEDGE TO CONFIRM ISOLATE".
- Press the ACK key within 10 seconds to isolate the zone.
- The isolated LED will turn on.
- If the final alarm is isolated, the LCD will give an option to view isolated alarms.

5. ISOLATE/DE-ISOLATE EXTERNAL BELL

- Press the "EXTERNAL BELL ISOLATE" key once.
  If the "External Bell Isolate" LED is off it will turn on steady.
  The External Bell will turn OFF if it is on.
- If the "External Bell Isolate" LED is on, it will turn off.
  If any un-isolated alarms exist, the External Bell will ring.

6. ISOLATE/DE-ISOLATE WARNING SYSTEM

- Press the "WARNING SYSTEM ISOLATE" key once.
  If the "Warning System Isolate" LED is off it will turn on steady.
  The Warning System will turn OFF if it is on.
- If the " Warning System Isolate" LED is on, it will turn off.
  If any un-isolated alarms exist, the Warning System will sound.

REMOTE DISPLAY UNIT (RDU Mk2)

AS4428.1 OPERATOR'S MANUAL

Document Number: LT0252

Issue ..... 1.01; 19 July 2016

-- A P P R O V A L S --
AS4428.1 1998 – ActivFire Listing Number afp789 NZS4512 2003 – FPANZ Listing Number VF/615 AS/NZS CISPR 22 : 2006 AS/NZS 60950-1 : 2015

The RDU is a product of:

Tyco Fire Protection Products
17 Mary Muller Drive
Christchurch 8022
NEW ZEALAND

Tel : +64-3-3895096
Fax : +64-3-3895938

NOTICE

END USER LIABILITY DISCLAIMER

The RDU has a configuration programming facility which may be accessed from the keypad by using a password.

This programming facility allows the user to define detail of the operation of the RDU System which is being customised. It is possible for the user to program operational features that prevent the installed system from meeting statutory requirements.

Tyco Fire Protection Products does not accept responsibility for the suitability of the functions programmed by the user.

EMC COMPLIANCE

WARNING: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

AMENDMENTS

ISSUE	DATE	COMMENTS	ECO
1.00	16/1/09	Original Issue.	3996
1.01	19/07/16	Updated approvals & PSU rating for RCM.	4928

TABLE OF CONTENTS

THIS PAGE INTENTIONALLY LEFT BLANK

CHAPTER 1
INTRODUCTION

1.1 SCOPE

The Remote Display Unit (RDU) provides remote display and control facilities for compatible Vigilant[R] fire alarm systems.

This manual describes the operation of the RDU Mk2 operating in AS4428 mode. RDU Mk2 is an RDU using V5.xx onwards software, usually with an AS4428.1 Fire Fighter's type keypad. However, it can alternatively have the older AS1603.4 keypad.

AS1603.4 refers to the Australian Standard for Fire Detection Control & Indicating Equipment 1987. AS4428.1 superceded AS1603.4 in 1998 and AS1603.4 was withdrawn a few years later. There are differences in behaviour between an AS4428 RDU and an AS1603 RDU and between RDU Mk1 and RDU Mk2, and they each have their own operator manual, so it is necessary to ensure the correct manual is used as follows.

- LT0252 - RDU Mk2 AS4428 Operator's Manual
- LT0494 - RDU Mk2 AS1603 Operator's Manual
- LT0133 - RDU Mk1 AS1603 Operator's Manual

The RDU can be used in both New Zealand and Australia, and there are small differences in behaviour which are described in each manual, where appropriate, and listed in section 2.3.6. There is a programmable parameter which selects the country of installation - Australian or New Zealand. This manual describes both Australian and New Zealand operation.

There are two physical versions of RDU. The slim-line models (FP0787 and FP0788) provide an LCD display and operator controls in a thin cabinet with surface-mounting and flush-mounting options. It is intended to be powered by wiring from the associated fire alarm panel, and is supplied without MAF relays or internal power supply. The MAF-containing versions (FP0785 and FP0786) are supplied in a larger cabinet complete with its own MCP, internal power supply and MAF relay outputs. In addition to its LCD display, the full cabinet unit contains space to add zone LED displays.

The RDU operator display panel includes an alphanumeric "Liquid Crystal Display" (LCD) and a keypad. The keypad has numeric keys 0 to 9 and specific control keys, e.g., RECALL, BATT TEST, etc. The keypad is used to initiate a variety of actions such as zone reset or zone isolate. The RDU prompts the operator by displaying text on the LCD, often in the form of a menu with a list of numbered options. The CLEAR/ESC key can be used at any point to exit up a level to the previous menu, if any. Menu options are self-explanatory in most cases. This manual provides detailed instructions for operating the RDU, including which menu options and keypad functions are used to initiate particular actions.

It is recommended that the building owner's representative who is responsible for the fire alarm system, becomes familiar with the RDU operation by practice and by reference to this manual.

This manual includes the following chapters.

Chapter 1: **Introduction**: An introduction to this manual, other RDU Product manuals and the standards relating to fire alarms.

Chapter 2: **System Description**; A description of RDU features and functions.

Chapter 3: **Specifications**; RDU electrical & mechanical specifications.

Chapter 4: **General Display & Keypad Operation;** A description of display indications, menu structure and key functions.

Chapter 5: **Operating Instructions - Brigade Functions;** A detailed description of the operation and function of keys for FIRE FIGHTER'S use provided on the RDU ("ACK", "RESET", "ISOLATE", "EXTERNAL BELL ISOLATE", "WARNING SYSTEM ISOLATE", "PREV", and "NEXT").

Chapter 6: **Operating Instructions - System Functions;** A description of the operation and function of keys provided on the RDU for system operation, including status recalls and setting time and date.

Chapter 7: **Operating Instructions - Zone Functions;** A description of the operation and function of keys provided on the RDU for zone functions.

Chapter 8: **Operating Instructions - Relay/Output Functions;** A description of the RDU relay and output functions.

Chapter 9: **Operating Instructions - Test Functions;** A description of the operation of keys provided on the RDU to initiate tests including system test, battery test.

Chapter 10: **Placing Into Operation;** A description of how to place a system into operation. Also included is a System Commissioning Checklist.

Chapter 11: **System Testing & Maintenance;** A description of fault finding, routine testing and system maintenance.

1.2 ATTACHMENTS

A FIRE FIGHTER'S GUIDE is fixed inside the front cover for quick reference in emergencies. Your installation company should also provide the following documentation:

(a) An "AS INSTALLED" fire detection system diagram and/or summary, describing the installed layout of the FIP and RDU system configuration.

(b) Other "AS INSTALLED" information, such as System configuration parameters.

(c) A Maintenance Log-Book.

1.3 ASSOCIATED DOCUMENTATION

1.3.1 PRODUCT RELATED

The following manuals for the RDU are available:

RDU Mk2 AS4428.1 Operator's Manual	Part Number LT0252
RDU Mk1 Operator's Manual	Part Number LT0133
RDU Mk2 AS1603.4 Operator's Manual	Part Number LT0494
RDU Mk2 Installation & Programming Manual	Provides information for system design, installation and commissioning of an RDU Mk2 Part number LT0499.

1.3.2 STANDARDS RELATED

This manual makes reference to the following Australian Standards:

AS4428.1	Automatic Fire Detection and Alarm Systems Part 1 - Control and Indicating Equipment.
AS1670.1	Automatic Fire Detection and Alarm Systems- System Design, Installation and Commissioning.
AS1851	Maintenance of Fire Protection Equipment
AS/NZS CISPR22	Noise Emission Standard

This manual makes reference to the following New Zealand standards.

NZS4512	Automatic Fire Alarm Systems in Buildings.

1.4 GLOSSARY OF ABBREVIATIONS

The following abbreviations and terminology may be used in this manual:

AC	Alternating Current
"ALM"	Display abbreviation for ALARM
AVF	Alarm Verification, or check alarm.
AZC	Alarm Zone Circuit, commonly referred to as "Detection Zone"
AZF	Alarm Zone Facility, commonly referred to as "GROUP"
DC	Direct Current
DE-ISOLATE	Remove the isolate condition, also called Enable in AS 7240.2 type panels
EOL	End Of Line device
EPROM	(U.V.) Erasable PROM
FF	Firefighter's Facility
FIP	Fire Indicator Panel
FRC	Flat Ribbon Cable
ISOL	Display abbreviation for ISOLATED
ISOLATE	Zone or output is isolated so alarms or faults will not be processed and output will not turn on. Also called Disable in AS 7240.2 type panels
LCD	Liquid Crystal Display
LED	Light Emitting diode (Visual Indicator)
MAF	Master Alarm Facility
MCP	Manual Call Point (break glass switch)
O/C	Open Circuit
PCB	Printed Circuit Board
PSU	Power Supply Unit
RAM	Random Access Memory
RDU	Remote Display Unit
S/C	Short Circuit
VB	Battery Backed Voltage
VBF	Fused Battery Backed Voltage
VNB	Non-Battery Backed Voltage
VNBF	Fused Non-Battery Backed Voltage

1.5 GLOSSARY OF TERMINOLOGY

The following terminology is used in this manual:

Ancillary Equipment	:	Equipment external to Fire Alarm system
Ancillary Relay	:	Relay in FIP which operates ancillary equipment
Auto-Reset	:	Mode for one person testing of detectors; also referred to as in-situ mode
Auxiliary Output	:	Output for driving additional LEDs/relays
Baud	:	Bits per second
Brigade	:	Fire Brigade Authority, or any other authority which receives the FIP alarm signals
Control Output	:	Output from FIP to other equipment
Detector	:	Alarm Detection Device (electrical transducer)
FF Mode	:	The LCD is displaying the alarms list. Limited key entry permitted as per AS4428.1
Global	:	A function that may affect more than one zone
MAF Zone	:	Any zone that is configured to signal the brigade in the event of an alarm or fault
Mapping	:	Programmable causal relationship between inputs and outputs
Zone	:	Fire searchable area of building
Display extender board	:	Used with New Zealand operation only. It has common normal, fire and defect leds
Isolate	:	Zone or output is isolated so alarms or faults will not be processed and output will not turn on. Also called Disable in AS7240.2 type panels.
De-Isolate	:	Remove the isolate condition. Also called Enable in AS7240.2 type panels.

CHAPTER 2
SYSTEM DESCRIPTION

2.1 BASIC PRINCIPLES OF A FIRE ALARM SYSTEM

2.1.1 DETECTORS & ALARM ZONE FACILITY

A fire alarm system has sensors (electric transducers) which detect the presence of fire. These include heat detectors (thermals), product of combustion detectors (smoke), sprinkler system water flow switches, manual call points (break glass switches), and others.

The building being protected is divided into areas of limited size called zones. The detectors in each zone are connected to an electric circuit called an Alarm Zone Circuit (AZC). The portion of the FIP which controls the AZC is called the Alarm Zone Facility (AZF). When a detector detects fire (i.e., operates) it changes the electrical condition on the AZC and the AZF senses this (zone alarm). The detector remains in the operated state (latches) until the AZF temporarily removes the voltages to it (resets it). N.B. some detectors, e.g., flow switches, are non-latching.

As well as sensing when a detector has operated, the AZF can sense a fault in the AZC wiring (zone fault).

The zone isolate function prevents a zone alarm or fault being registered by the Master Alarm Facility (MAF). Refer to Fig 2.1.1.

2.1.2 ALARM VERIFICATION

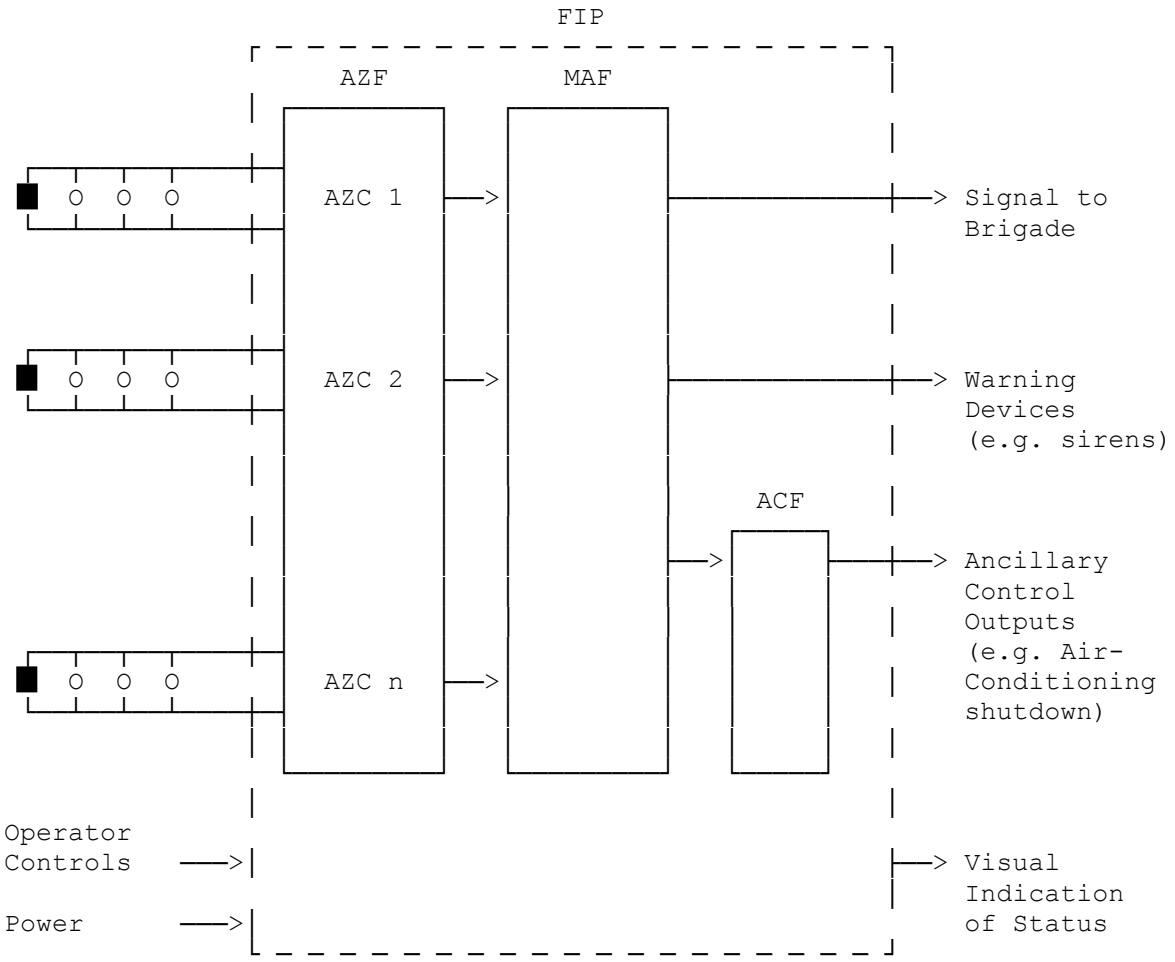
When programmed (by the installer) to do so, the AZF may perform a verification function on sensed alarms. This Alarm Verification (AVF) functions as follows:

When an AZF senses that a detector has operated, it does not register alarm immediately but delays for a period of time and then resets the detector (typical total delay is 11 seconds). If that, or another detector on the AZC operates within the next 150 seconds (or similarly programmed period) then the AZF recognises that as a verified alarm, and generates alarm to the MAF.

2.1.3 DISPLAY

There is a display of zone status which allows the operator to see if a particular zone is normal or is in alarm or fault, and if it is isolated.

There is also a separate display of common status which shows if any zone in the system is in alarm, fault, or is isolated.



KEY

AZC = Alarm Zone Circuit
AZF = Alarm Zone Facility
MAF = Master Alarm Facility
ACF = Ancillary Control Facility
FIP = Fire Indicator Panel
❍ = Detector
■ = End of Line (circuit) Device

FIG 2.1.1
BASIC FIRE ALARM SYSTEM

2.1.4 MASTER ALARM FACILITY (MAF)

The MAF receives each zone's status (normal, alarm, fault) and transmits it (via a signalling device) to the Brigade. It also operates the system alerting devices (e.g. warning system) to warn people to evacuate the building.

Individual (or blocks of) zones can be isolated, the Warning System and External Bell can be isolated, but the MAF (i.e. Brigade signalling) cannot be isolated.

In the RDU it is possible to have alarm zones which are not "mapped" to the MAF or ancillary outputs, i.e., when in alarm, do not cause a Brigade signal or relay activation.

2.1.5 ANCILLARY CONTROL FACILITY

The ancillary control facility consists of electric relays (electrically controlled switches) which can be used to switch equipment which is not directly part of the Fire Alarm System. Examples include shutting down air conditioning plant, returning lifts to a certain floor and releasing fire stop doors held open by electric door holders.

2.1.6 REMOTE DISPLAY UNIT

The zone status can be annunciated remotely from the fire alarm system on a Remote Display Unit (RDU). The RDU also provides the ability to control the fire alarm system. Zone alarms can be acknowledged, reset and isolated at the RDU and zone alarm test and fault test can also be initiated if these capabilities are enabled with programming. Up to 8 RDUs can be connected to any one FIP. An RDU can also have its own MAF and ancillary control facility hardware.

2.2 RDU SYSTEM DESCRIPTION

2.2.1 GENERAL

An RDU performs the functions of the Control and Indicating Equipment (CIE) as specified by the Australian Standard AS4428.1 Automatic Fire Detection and Alarm Systems and by NZS4512 for New Zealand operation. The differences between New Zealand and Australian operation are listed in section 2.3.6.

The RDU can connect to a variety of fire panels, including F3200, F4000 LCD or F4000 Non-LCD FIPs, MX4428, MX1, FP1600 Mk3 and Sigma 5. There are slight variations between fire panels and the software revisions therein that affect the capability of the RDU, and where appropriate, these are described in this manual.

An RDU can simply mimic the FIP zone status or it can be programmed to allow the operator to acknowledge, test, reset or isolate zones from the RDU. The RDU can be programmed to select which zones that it monitors and controls. This means that in a system with multiple RDUs, each RDU could be assigned the zones corresponding to its own particular sector. For each zone of interest, the RDU is programmed to select whether it displays alarms for the zone and whether it can issue commands (e.g. alarm acknowledge, alarm reset, etc.) for the zone.

The RDU can use the zone text that comes from the FIP or it can be programmed with its own zone text. This allows the RDU to have zone text that is meaningful in the area the RDU is located in and be different from FIP zone text which might have to be more general.

The RDU can also be programmed to select which LEDs show which zone status. Up to 33 display boards (16 zones per board) can be connected to an RDU (with suitable power supply), allowing one LED per zone on a 528 zone maximally configured FIP. The RDU also allows multiple zones to map to the same LED, providing common indication. Hence the RDU can be configured to show only zones of interest on its LEDs.

There are two physical types of RDU, 19" rack cabinet and slimline as shown in Figures 2.1.2 & 2.1.3 respectively. The 19" rack cabinet version ("MAF RDU") is supplied in a larger cabinet (FP0785 - 15U, 750H, 550W, 230mmD) complete with a MAF/PSU module and Manual Call Point (MCP). There is provision for mounting up to four or five 16 Zone LED boards as an optional extra within the cabinet. FP0786 is an 8U version of FP0785.

The slimline models provide an LCD display and operator controls in a thin cabinet with surface-mounting (FP0787 - 177H, 450W, 50mmD) and flush-mounting (FP0788) options. The slimline models are line powered from the FIP, do not have a MAF/PSU module, and there is no provision for internal mounting of 16 Zone LED display boards or a Manual Call Point (MCP). If required, these items can be connected externally to the slimline cabinet.

2.2.2 DISPLAYS

The primary display of the RDU is a 2 line by 40 character LCD on which status information and prompts are shown. The LCD has backlight illumination which is turned on when there is an alarm or operator interaction.

Common status and system status is indicated on 9 LEDs adjacent to the LCD, including common alarm, fault and isolate, plus system fault, warning system isolate, external bell isolate, charger fault, mains on and AIF attended. The AIF attended LED is currently always off/ unused.

The display panel consisting of the LCD, LEDs and keypad is called the operator display panel. The part of the display panel surrounded by a red border is called the Firefighters Facility (FF). It includes the common zone status LEDs for alarm, isolate and fault, and the Warning System and Bell Isolate LEDs.

As an optional extra, individual zone status (alarm, isolate and fault) can be displayed on LEDs by fitting the appropriate number of 16 Zone LED display boards. A 16 Zone LED display board (3 column version only) includes as standard an open collector transistor output for each zone which can be used to drive an internal or remote mimic display.

For New Zealand operation, an optional display extender board (PA0742) may be connected to provide 3 common LEDs (fire, defect, normal), inputs (silence alarms, trial evac, building services restore, lamp test, and external defect), and some outputs - ancillary fire and defect outputs.

2.2.3 SERIAL COMMUNICATIONS PORT

A serial port is included in the RDU to provide the connection to the FIP.

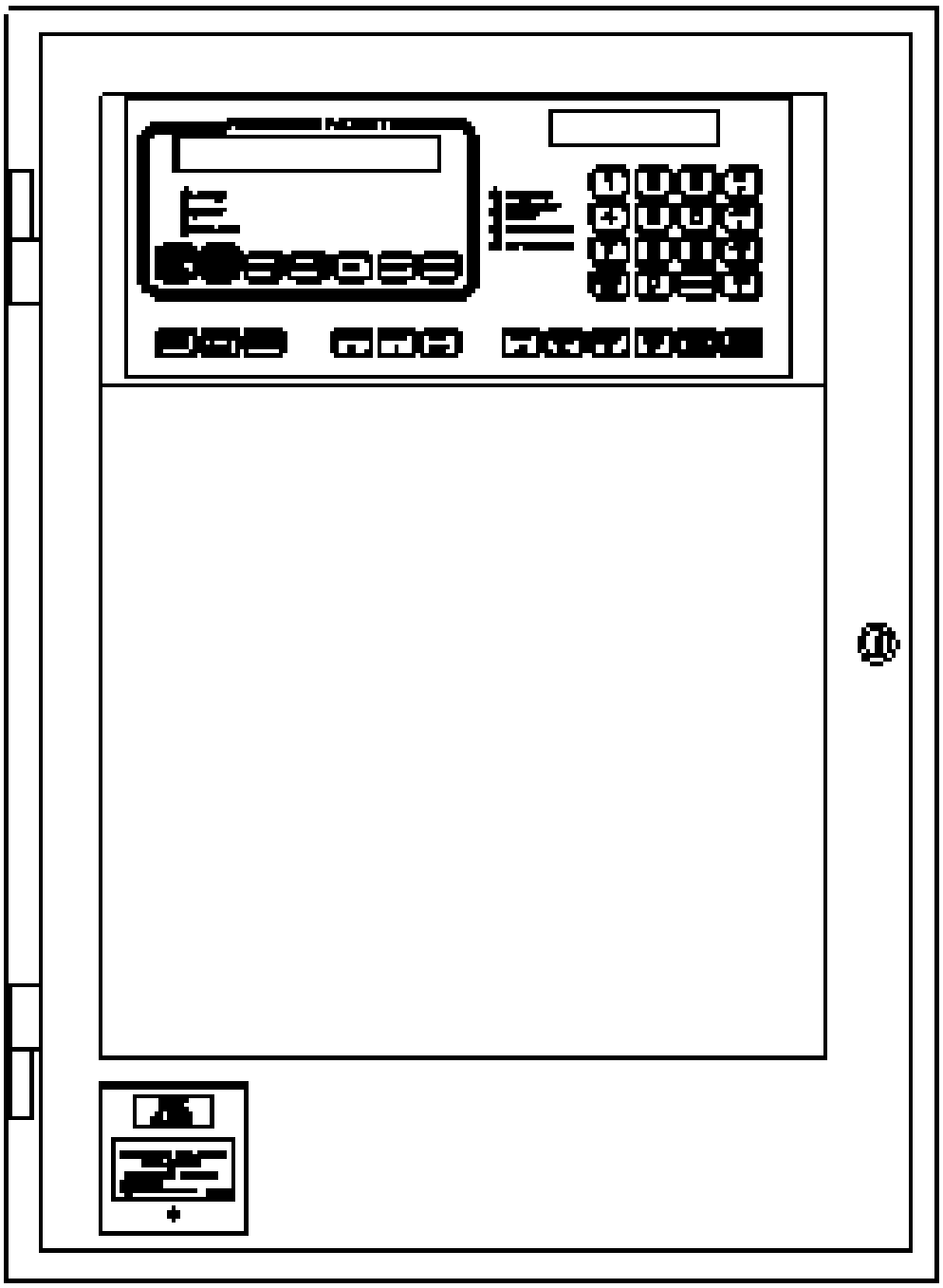


FIG 2.1.2
FP0785 MAF CONFIGURED RDU

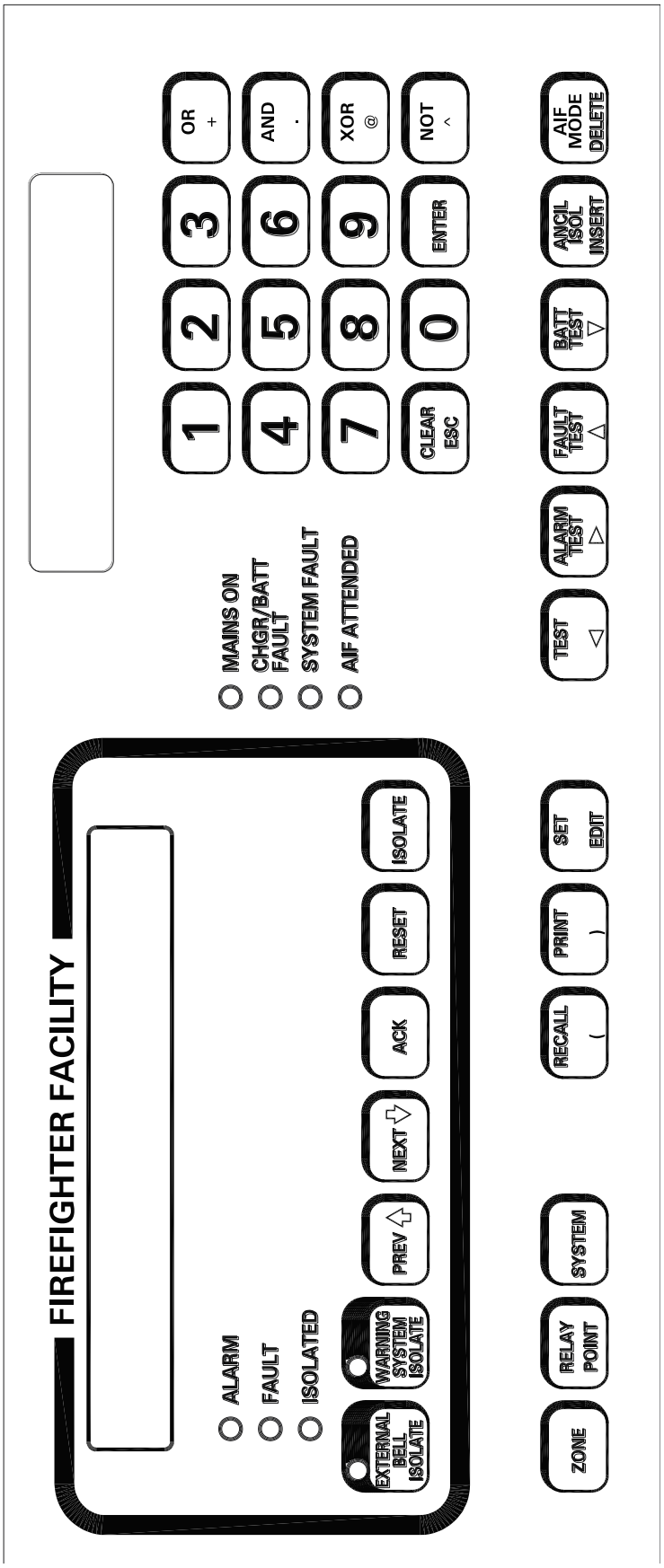


FIG 2.1.3
FP0787 NON-MAF CONFIGURED RDU

2.2.4 LOGGING PRINTER & HISTORY

A serial printer may be connected to the RDU printer/programmer port to provide a log of events and operator actions, and also to print the programmed database.

Events which are printed include:

Zone Events, e.g. Alarm, Fault;
Zone Commands, e.g. Reset, Isolate, Alarm test, Fault test;
System Events, e.g. communication failures, battery faults, etc.

The printout includes the time and date, the cause of the event (e.g. Zone, Relay, or RDU), and the event type. For zone events, the text name for the zone is shown. If the printer is offline, the RDU will store more than 300 events in its print queue before discarding new events.

The RDU separately maintains an internal history queue of the most recent events. The history can be viewed on the LCD or output to the printer. The history queue holds over 1000 events. When a new event occurs and the history queue is full, the oldest event is removed from the queue to make room for the new event.

2.2.5 PROGRAMMER PORT

The printer/programmer port can be used to save or load the programmed database on to a computer. The saved database can be reloaded into the RDU (or another RDU) at some future time and is much faster than reprogramming the entire database from the RDU keypad.

2.2.6 MAF-CONFIGURED RDU

2.2.6.1 MAF Outputs

The MAF-configured RDUs provide 7 relays as standard on the MAF/PSU module. These can be used to switch alarm bells and ancillary equipment such as door holders, air-conditioning shutdown, etc. The MAF standby, alarm, fault and isolate relays should not be used for signalling to the brigade, the brigade connection should be made to the FIP.

Each zone can be programmed to operate these relays when the appropriate condition is present, e.g., Alarm, Fault, Isolate, etc.

2.2.6.2 Power Supply

A MAF-configured RDU has a 3 Amp battery charger/power supply as standard. There is adequate room for large batteries. An optional 6 Amp battery charger/power supply is available.

Fuse protected battery backed and non-battery backed supplies are available to power external loads such as bells, illuminated signs, interposing relays, gas release solenoids, door holders, etc.

2.3 SYSTEM STRUCTURE & CONFIGURATION

2.3.1 MAF-CONFIGURED RDUS (FP0785 & FP0786)

Controller board
This mounts on the 4U inner door. It contains the microprocessor and firmware. The keypad, LCD, buzzer and status LEDs are all connected to the controller board.

MAF/PSU board
This mounts on the cabinet rear wall. It includes the battery charger, power supply, fuses, brigade and ancillary relays and associated screw terminal connectors.

16 LED Display (optional)
This mounts on the optional 7U inner door. It includes 16 sets of 3 LEDs plus 16 open collector outputs driven from zone alarm status.

16 Relay Driver (optional)
Mounts on 7U inner door. It includes 16 open collector outputs driven from zone alarm.

16 Relay Board (optional)
Mounts internally in cabinet. Includes 16 sets of voltage free change-over contacts driven by the open collector outputs of either the 16 Zone LED Display boards or the 16 Relay Driver boards.

Display Extender Board (optional)
This is used in New Zealand mode only and may mount on the optional 7U inner door or in an external cabinet.

2.3.2 STRUCTURE & INTER-CONNECTION : MAF-CONFIGURED

A basic MAF Configured RDU system has one Controller and one MAF/PSU, interconnected by Flat Ribbon Cable (FRC). Refer to Fig 2.2.2.

Where 16 zone LED display boards are fitted, the default configuration is that zone 1 corresponds to the top row of LEDs (referred to as LED set 1) on the "last" display board, zone 2 to the row below it (LED set 2), etc, (i.e. top to bottom, left to right). The "last" display board (LEDs 1 to 16) is at the end of the chain of display boards (i.e. electrically the furtherest away from the FIP) and the first display board is electrically closest to the FIP. The "last" display board (LEDs 1 to 16), is normally mounted on the leftmost position on the front panel (when viewed from the front), and shows zones 1 to 16 by default. The mapping of zones to LEDs is programmable, so with a non-default configuration, the zones may not necessarily be shown in numerical order of zone number. For zones which are ACZ type zones (ancillary control zone or relay zone), the zone alarm LED is on if the relay is energised, the isolate LED is on if the relay is isolated, and the fault LED is on if the relay has a supervision fault.

There are two types of display board; one type has three columns of LEDs and the other type has two columns. For the two column board, the red LEDs (first column) always show the alarm state, but the amber LEDs can be configured (with programming) to show a combination of fault and isolate as follows. When one or more zones that map to an LED are isolated, the amber LED is on steady; otherwise, if one or more zones are in fault, the amber LED flashes at 2 hz; otherwise, the amber LED is off.

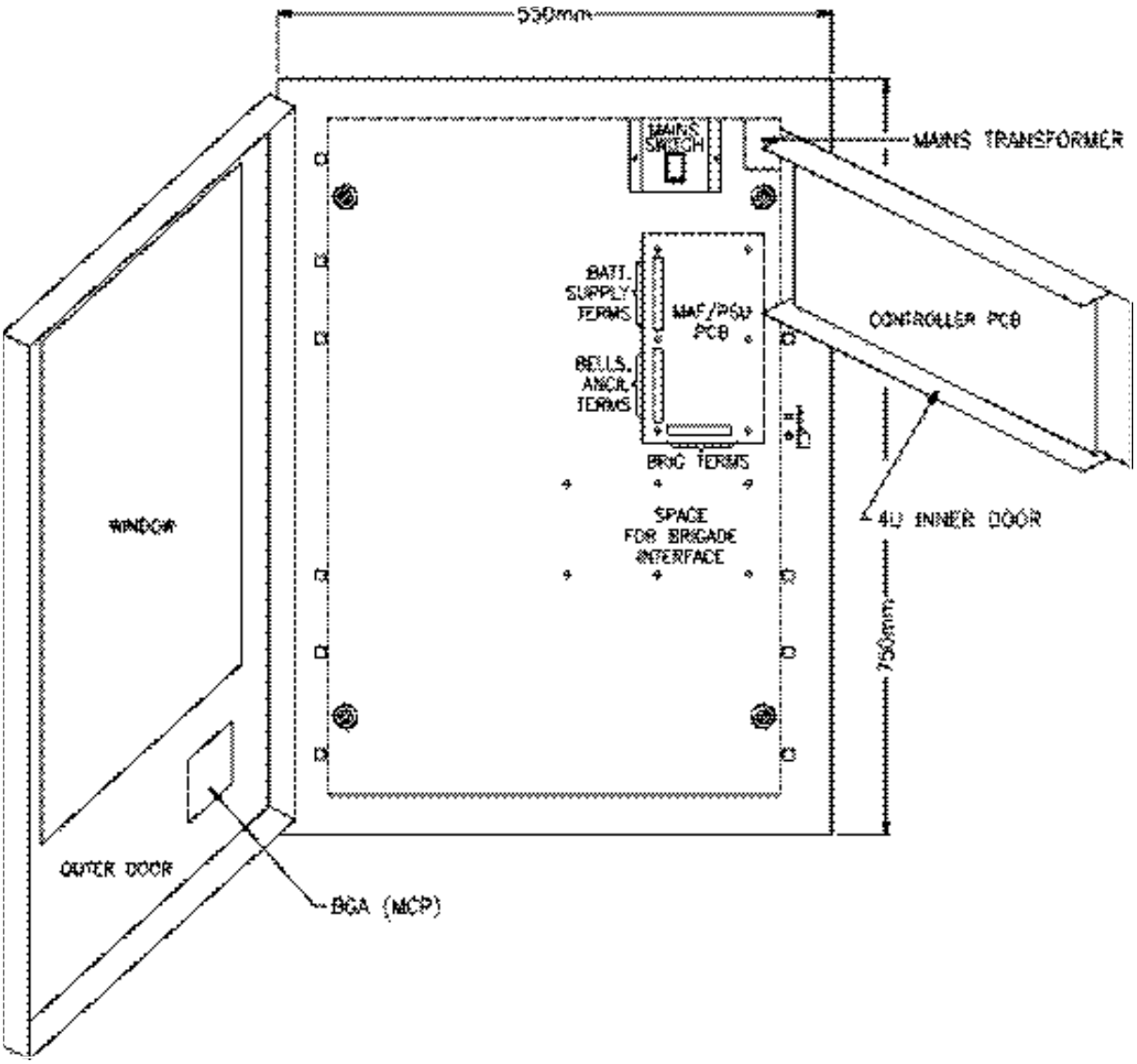


FIG 2.2.2.
FP0785 - INTERNAL LAYOUT

2.3.3 PCB MODULES: SLIMLINE RDU

The printed circuit boards which are used in a slimline RDU are as follows:

- **Controller** as described in Section 2.3.1.

- **Remote Termination Board** for connection of power and communications from the FIP.

- Optional external connection of **16 Zone LED Display Boards** providing a suitable cabinet and PSU can be arranged.

- **Display extender board (optional)**
  This is used in New Zealand mode only.

2.3.4 STRUCTURE & INTER-CONNECTION : SLIMLINE RDU

A basic slimline RDU has one Controller and one remote termination board interconnected by Flat Ribbon Cable (FRC).

16 Zone Display/Relay driver boards can be driven off the "LED OUT" connector on the Controller. An extender cabinet will need to be used to mount the boards. An external PSU would also be required. The mapping of zones to LEDs is as described in Section 2.3.2.

2.3.5 CONFIGURATION

At installation time, an RDU is configured by:

- Fitting and connecting the required modules (eg. MAF/PSU module, 16 Zone display/relay driver boards if any).
- Adjusting or removing links on the PCBs.
- Programming the RDU using the keypad or Smart Config.

The manual call points (MCPs), warning devices, ancillary equipment and field wiring that are connected to the RDU must match the programmed configuration.

It is not expected that the operator should program the RDU.
The operator should not alter the links or system configuration.

** PLEASE NOTE **

If your building or occupancy requirements change, then the RDU or FIP may require reprogramming, so please consult your installation or maintenance company.

2.3.6 NEW ZEALAND MODE OPERATION

The RDU may operate in either Australian or New Zealand mode as selected by a programmable parameter. The differences for New Zealand mode operation are listed here.

1. Display extender board.

This is an optional board (PA0742) which may be used in NZ mode and provides some outputs and inputs as follows.

Outputs
- common normal, fire and defect LEDs
- ancillary fire and ancillary defect outputs

Inputs
- silence alarms
- trial evac
- building services restore
- lamp test
- external defect

2. MAF board manual callpoint.

The "MCP" (manual call point) input on the MAF board cannot be used when in New Zealand mode and is ignored.

3. Bells isolate and Silence Alarms operation.

The Silence Alarms input on the display extender board is normally connected to a keyswitch which can be used to silence the bells, i.e., de-energise the bells relay at either or both the RDU and the FIP. This is dependent on programming. Refer to the RDU Installation and Programming Manual.

4. Trial evacuation input.

The trial evac keyswitch connected to the display extender board can be used to energise the bells relay at the FIP or RDU if programmed to. Refer to the RDU Installation and Programming Manual. Trial evac overrides bells isolate and the Silence Alarms keyswitch and operates the bells even if the bells are isolated.

5. Building services restore input.

The BSR keyswitch connected to the display extender board is used to isolate ancillary outputs at the FIP and/or RDU depending on programming. Refer to the RDU Installation and Programming Manual.

CHAPTER 3
SYSTEM SPECIFICATIONS

3.1 GENERAL

3.1.1 PART NUMBERS

FP0785, FP, RDU AS4428, 15U FULL CABINET & MAF/PSU
Full size cabinet complete with MCP mounted on the outer door, Controller/Display with FF LCD & Keypad, MAF/PSU (includes 7 relays, 3A PSU), Blanking plate covering lower 9U of 15U height cabinet.

FP0786, FP, REMOTE DISPLAY UNIT (RDU), SMALL CABINET, C/W MAF/PSU
8U, 19" cabinet containing RDU Controller and MAF/PSU. Bottom 4U of rack space can house up to 80 zones of LEDs using the 2 column LED boards.

FP0787, FP, RDU AS4428, SLIMLINE, WALL MOUNT
Wall mount, low profile cabinet with Controller/Display with FF LCD & Keypad. No MAF/PSU.

FP0788, FP, REMOTE DISPLAY UNIT (RDU), SLIMLINE, FLUSH MOUNT
Flush mounting slimline cabinet containing RDU Controller, no MAF/PSU.

FP0789, FP, REMOTE DISPLAY UNIT (RDU), 4U 19" RAC
4U, 19" rack mounting RDU Controller for mounting in a 19" rack cabinet. May have a MAF/PSU added.

3.1.2 CONTROLS

KEYPAD

Type	: Polyester Membrane
Keypress	: Buzzer gives short "beep" for valid keypress
Number of keys	: 35
FF Keys	: EXTERNAL BELL ISOLATE.; WARNING SYSTEM ISOLATE; PREV; NEXT; ACK; RESET; ISOLATE
4x4 Keypad	: Digits 0-9; Clear/Esc; Enter; 4 x Logic Keys

KEYPAD FUNCTIONS

Zone Functions	-	Acknowledge, Reset, Isolate, Recall, Alarm test, Fault test
Relay Functions	-	Acknowledge, Reset, Isolate, Recall
Ancillary Functions	-	Test, Isolate, Reset, Recall (requires MAF/PSU)
System Functions	-	Buzzer Test, Display Test
	-	System Test
	-	Recall : Alarms, Faults, Isolates, System Faults, History, Database and Firmware memory checksums.
	-	Set time and date
	-	Program and view configuration settings.
	-	Print, save and verify the database
	-	Battery Test, Operate Tests, Output Isolate
	-	PSU fault inhibit for 24 hours
Brigade Functions	-	Acknowledge Alarms
	-	View alarms and isolated alarms (Next & Prev)
	-	Reset alarm
	-	Isolate alarm
	-	Warning System Isolate
	-	External Bell Isolate

BUZZER (INTERNAL SOUNDER)
Mounted on Controller/Display PCB

Tone Steady	:	Non-isolated zone fault Non-isolated ancillary relay supervision fault System Fault
Pulsing 2Hz	:	Non-isolated zone alarm.
Slow Pulse	:	Door closed (MAF-configured) or keyswitch not operated (slimline) with the database write enabled (Lk7) or RDU left in program mode. For New Zealand operation - door closed or keyswitch not operated when an off normal condition exists (see definition of common normal led for list of off normal conditions.)
Cadence	:	System-Test failed. Cadence is fast pulses with a pause.
Short Pulse	:	Valid keypress
Long Pulse	:	Invalid keypress

3.1.3 DISPLAYS

Standard Operator Display

Includes	:	LCD; FF LEDs; System Status LEDs
Panel Size	:	19", 4U
Standard	:	Complies with AS4428.1
LCD Size	:	2 Lines of 40 characters - 5.5mm (H) x 3.2mm (W) per character
Site Name	:	40 Characters max.
Zone Name	:	30 Characters max.
Relay Name	:	30 Characters max.
FF LEDs	:	ALARM (red); ISOLATED (yellow); FAULT (yellow); EXTERNAL BELL ISOLATE (yellow); WARNING SYSTEM ISOLATE (yellow)
System Status LEDs	:	MAINS ON (green); CHGR/BATT FAULT (yellow); SYSTEM FAULT (yellow); AIF ATTENDED (yellow);

Optional Additional LED Display (3 columns of LEDs)
Requires 1 x ME0060 plus 1 x FZ3031 plus 1-3 x FP0475 as required.
ME0060, MECH ASSY, 1901-79, F4000 RAC, EXT INNER DOOR
(19", 7U, mounts up to 4 of 16 LED Display Bd)
FZ3031 KIT, F3200, 16 ZONE LED DISPLAY, LHS POSITION
FP0475 FP, F4000 DISPLAY EXTENDER KIT, 1901-26

Includes	:	1 x 16 LED Display Bd (16 zone parallel LED display); FRC; Power leads; zone name label.
Format	:	7U Parallel LED display mounts directly below the standard 4U LCD.
Zone LEDs	:	ALARM (red); FAULT (yellow); ISOLATED (yellow)
Name Space	:	10mm x 60mm per zone on paper label. E.g. 2 lines of 23 characters at 10 per inch.

Optional Additional LED Display (2 columns of LEDs)

Requires:	1 x ME0457 4U Ext Inner Door 1 to 5 x FP1002 16 Zone LED Board (includes 200mm FRC) 1 x LM0092 Controller to First Display 1 x LM0295 (FRC 26W 700mm) is required for each additional door
Format:	4U Door – capacity 80 zones, parallel LED display
Zone LEDs:	Alarm (red); Fault/Isolate (amber)
Name Space:	9mm by 44mm per zone on paper label (use LT0369 from Web site)

Optional NZ Display Extender Board
Status LEDs: NORMAL (green), DEFECT (yellow), FIRE (Red)
This is used in New Zealand mode only. Requires ME0060 or similar large format display board mounting.

3.1.4 ENVIRONMENTAL

Operating Temperature	:	-5°C to 45°C (Ambient)
Relative Humidity	:	95% maximum @ 40°C (non-condensing)

3.2 MECHANICAL SPECIFICATIONS

3.2.1 FP0785 / FP0786 RACK CABINET RDU WITH MAF

Style	:	Wall mounting Hinged outer door with large window (hinges to left) Accepts 19" rack mounting equipment 4U Display on hinged inner door (hinges to right)
Construction	:	Welded steel
Material	:	1.2mm and 1.6mm mild steel
Size	:	750mm (H) [442mm FP0786] x 550mm (W) x 210mm (D) * MCP is an additional 20mm.
Finish	:	Powdercoat BFF-998-CW Cream Wrinkle (Iron Phosphate pre-treat)
Weight	:	22kg (Packaged); [18 kg FP0786]

3.2.2 FP0787 WALL MOUNT SLIMLINE RDU

Style	:	Wall mounting low profile 4U Display mounted on hinged door door hinges left (003 key lock).
Construction	:	Welded steel
Material	:	1.2mm mild steel
Size	:	177mm (H) x 450mm (W) x 50mm (D)
Finish	:	Powdercoat PR12/816C Grey (Iron Phosphate pre-treat)
Weight	:	2.8kg (Unpackaged); 3kg (Packaged)

3.2.3 FP0788 FLUSH MOUNT SLIMLINE RDU

Style	:	Flush mounting 4U Display mounted on hinged door Door hinges left 003 key lock
Construction	:	Welded steel
Material	:	1.2mm zinc coated mild steel
Size	:	219mm (H) x 502mm (W) x 75mm (D);
Cavity	:	187mm (H) x 470mm (W) x 75mm (D)
Finish	:	Powdercoat PR12/816C Grey (Iron Phosphate pre-treat)
Weight	:	4.6kg (Unpackaged); 4.8kg (Packaged)

3.3 ELECTRICAL SPECIFICATIONS

3.3.1 FP0785/FP0786 MAF-CONFIGURED RDU

3.3.1.1 Mains Supply

Voltage	:	240Vac +6% -10%
Current	:	0.5A
Frequency	:	50Hz
Termination	:	2.5sq mm TPS with wire protectors.

3.3.1.2 Battery Charger & PSU

Input Voltage	:	31Vac rms (Transformer sec)
PSU Voltage	:	27.3Vdc (nominal at 20°C)
Temperature Comp.	:	-36mV per °C nominal
Non-Battery Backed	:	28.0V dc nominal
Supervision	:	Charger High 28.1V nominal Charger Low 26.6V nominal
Max Charger Current	:	3Adc (FP0785/786)
Max Total Load (Continuous - exclude charging)	:	2.8Adc (FP0785/786)

3.3.1.3 Battery

Battery Voltage	:	24Vdc nominal (2 x 12Vdc)
Compatible Makes	:	Sonnenschein A200 series Sonnenschein A300 series Powersonic PS12 series Yuasa NP series
Capacity	:	6 to 50 Ahr (dependent on configuration)
Space	:	Up to 220H x 520W x 175D (i.e. 2 of 220 x 260 x 175)

3.3.1.4 Fuses

Location : MAF/PSU Module

Number	Name	Size	Rating Type
F1	+VBF1	5 x 20mm 2A	Glass Cartridge, Std
F2	+VBF2	5 x 20mm 6A	Glass Cartridge, Std
F3	+VNBF	5 x 20mm 2A	Glass Cartridge, Std
F4	+VE	5 x 20mm 2A	Glass Cartridge, Std
F5	Mains In	5 x 20mm 6A	Glass Cartridge, Std
F7	+VBELLS	5 x 20mm 2A	Glass Cartridge, Std

3.3.1.5 Quiescent & Alarm Currents

	Quiescent	Alarm
FP0785/FP0786 (notes 1,2) (includes 16ma for energised standby relay)	53mA	180mA
MAF/PSU		
- all relays off	9mA	
Current per Ancillary Relay (includes bells)	11mA	11mA
Current per Brigade Relay	16mA	16mA
Controller/Display		
- LCD backlight off, status LEDs off	29mA	
- LCD backlight on, status LEDs off	85mA	
Current per status LED on	3mA	
16 Zone LED Display (2 or 3 column) (optional)	0mA	5.5mA/LED (steady)
16 Zone Relay Driver and Relay Bd (optional)	0mA	11.5mA/relay (operated)
NZ Display Extender	16mA	16mA

Notes
1. FP0785/FP0786 current includes Controller/Display and MAF/PSU but no 16 Zone LED Display or Relay Driver boards and is at 24Vdc battery supply.
2. Quiescent and alarm currents do not include external loads, e.g., door holders, bells, etc., but do include the common normal LED on the NZ Display extender board.

3.3.2 FP0787/FP0788/FP0789 SLIMLINE RDUS

3.3.2.1 DC Supply

Voltage : 24Vdc (22 - 28V)
Termination : 2.5sq mm TPS 4 Way block with wire protectors.

3.3.2.2 Fuses

Location : Remote Termination PCB

Number	Size	Rating	Type
F1	5 x 20mm	2A	Glass Cartridge, Std

3.3.2.3 Quiescent & Alarm Currents

	Quiescent	Alarm
FP0787/FP0788/FP0789 (excludes any Zone LEDs)	29mA	85mA

3.4 INPUT SPECIFICATIONS

3.4.1 FP0785/FP0786 INPUTS

Terminations On MAF/PSU module:
- RZDU communications input/output
- Battery Termination, AC Input, Door Switch, MCP and spare inputs.

3.4.1.1 MAF/PSU Inputs

Battery Termination	One pair screw terminals (4sq mm max cable)
AC Input	31V rms, 3.6A rms, 2.8mm tab terminals
Door Switch	5V, 0.5mA, Unsupervised, 4 Way .1" pcb header, J6
MCP	5V, 1mA, Supervised, 2k7 EOLR, 4 Way .1" pcb header, J6

3.4.1.2 REMOTE TERMINATION BOARD INPUTS

Key switch Input	-	Termination via 4 Way .1" male molex (J7) Routes via J6 FRC header to 5V, 15K Ohm pull up resistor "IDAT" input on the MAF board.
RDU Comms	-	Termination to TX, RX, 0V, +24V screw terminals.

3.4.1.3 CONTROLLER/DISPLAY INPUTS

Spare Input	RDU MCP (where fitted) 10k Ohm EOL resistor

3.4.3 NZ DISPLAY EXTENDER BOARD INPUTS

All inputs except (Evac Defect-)	Closure below 1.5V @ 0.35mA required to activate Open voltage = 5V
Evac Defect-	Closure below 4.5V @ 1mA required to activate Open voltage = 24V

3.5 OUTPUT SPECIFICATIONS

3.5.1 CONTROLLER PRINTER/PROGRAMMER

Printer/Programmer Port

Form	Pseudo RS232 Rx, Tx, 0V signals only
Transient Protection	Allows external wiring
Transmission Rate	9600 Baud (programmable) ASCII Xon, Xoff Protocol
Termination	4 Way .156" male molex (J1), DB9 male DTE (J27)

3.5.2 16 LED DISPLAY (3 COLUMN TYPE)/ RELAY DRIVER BD

The most common use for the open collector outputs will be to switch LEDs on "mimic" displays. The mimic outputs can also be used to drive the 16 way Relay Bd PA0470.

Output Type : 16 * Open Collector driven by alarm status
Output Rating : 200mA (max) current sink capability @ 30V

3.5.3 MAF/PSU OUTPUTS

MAF/PSU OUTPUTS

Brigade Relays

Number/Type	4 relays, 1 pole changeover contacts
Standby	Normally energised De-energises on battery fail or panel fail or in program mode.
Alarm, Fault, Isolate	Normally de-energised. Energise on active state.
Rating	ELV only 30V, 5Adc resistive 30V, 3Adc inductive
Isolation	1500V rms contact to coil.
Anc 1, Anc 2	1 Pole changeover contacts Voltage-free
Rating	ELV only 30V, 2Adc resistive 30V, 1Adc inductive
Operation	Programmable
Default	Active on any unisolated Zone Alarm.
Supervision	Separate terminal, 2 modes, programmable (refer to Installation & Programming manual)

Anc 3	1 relay, 2 pole Link selectable function
Standard Format	Bells, Switched 24Vdc output 2 terminals, Bells +, -
Rating	24V, 1.5A Inductive Bells
Supervision	Programmable, requires diode at each device

Number of Branches	Resistor End of Line (each branch)
1	3k3
2	6k8
3	10k

RZDU Comms

Tx, Rx, 0V	3 Wire (+VBF2 also available)
Transmission Rate	1200 Baud
Protocol	Vigilant RZDU, Non-LCD, LCD Type A

3.5.4 NZ DISPLAY EXTENDER BOARD OUTPUTS

Open Collector pulling down to 0V

All outputs except Lamp +, Lamp -	Off Voltage = 30V max On Voltage = 1.1V @ 100mA (max)
Lamp + (Open Collector) Pull up to VBATT	Off Voltage = 0V On Voltage = VBATT -1V @ 400mA (max)
Lamp -	Connected to Batt –

THIS PAGE LEFT INTENTIONALLY BLANK

CHAPTER 4
GENERAL DISPLAY & KEYPAD OPERATION

4.1 INTERPRETING THE LEDS

4.1.1 OPERATOR DISPLAY LEDS

The 8 LEDs on the Operator Display Panel indicate status as follows. All LEDs (except MAINS ON) flash rapidly for 2 seconds on FIP power up, and at 1Hz for LED display test.

LED	State	Interpretation
ALARM	Flashing (2Hz)	Unacknowledged alarm in FF alarm queue.
	Steady	No unacknowledged alarms but one or more zones are in alarm (includes isolated zones). If the RDU is mimicking the FIP alarm LED, then the RDU alarm LED will also be on steady if the FIP alarm LED is on and there are no unacknowledged alarms.
ISOLATED	Steady	One or more zones or outputs is isolated.
FAULT	Steady	One or more zones or outputs is in fault (includes isolated zones).
WARNING SYSTEM ISOLATE	Slow flash (1 sec on, 1 sec off)	Slow flash indicates the warning system is isolated at the FIP. The RDU warning system output (if any) is also isolated.
	Steady	The warning system is isolated locally at the RDU.
	Flashing (2Hz)	This applies to New Zealand operation only and indicates a Silence Alarms keyswitch is activated and the warning system output is de-activated (unless trial evac is active).
EXTERNAL BELL ISOLATE	Slow flash (1 sec on, 1 sec off)	Slow flash indicates the external bell is isolated at the FIP. The RDU external bell output (if any) is also isolated.
	Steady	The external bell is isolated locally at the RDU.
MAINS ON	Steady	Mains power is present.
SYSTEM FAULT	Steady	Turns on for hardware faults including keypad or module disconnected, supply failed, memory checksum failure, communications (scan) fail and all zones isolated.
CHARGER BATTERY FAULT	Flashing	This indicates one of battery low, battery disconnected, battery capacity fault, or mains fault.
	Steady	Battery charger voltage is too high or too low. This applies only to mains powered RDUs with MAF board.

Table 4.1
Operator Display LEDs

4.1.2 16 ZONE LED DISPLAY BOARD LEDS

When these boards are fitted they provide either 2 or 3 LEDs per zone. If a mimic relay board is connected to the display board, then the board is programmed as being "relay type" and the alarm LEDs never flash. The LEDs indicate the status of either alarm zones or output (relay / AZC) zones. For an output zone, the alarm LED indicates when the output/relay is activated and never flashes.

There are two types of LED display boards. One type has two columns of LEDs (red and amber) and the other has three columns of LEDs (one red column and two amber columns). On the three column board, the red column is used to display alarm states, the middle amber column displays fault states and the right-hand amber column displays isolate states. On a two column board, the amber LED can be configured to show isolate states only, or the amber LED can be shared by fault and isolate.

As multiple zones can be mapped to one set of LEDs, the RDU combines the status of the zones to show on the LEDs. Alarm and fault are shown when any zone is in alarm or fault and not isolated. Partial isolate is shown when 1 or more, but not all zones, mapped to the LED set are isolated. Isolate is shown when all zones mapped to the LED set are isolated. Auto-Reset mode is shown when the FIP indicates a zone is in Auto-Reset Test mode (by flashing its isolate LED).

<u>Three column board LED cadences</u>

1. Unacknowledged alarm - alarm LED 2 Hz flash
2. Acknowledged alarm - alarm LED on steady
3. Fault - middle amber LED on steady
4. Isolate - outer amber LED on steady
5. Partial isolate - outer amber LED 2.5 seconds on, 0.5 seconds off
6. Auto-reset mode (in-situ) - outer amber LED flashes at 2 Hz

<u>Two column board LED cadences</u>

1. Unacknowledged alarm - alarm LED 2 Hz flash
2. Acknowledged alarm - alarm LED on steady
3. Fault - amber LED 2 Hz flash
4. Isolate - amber LED on steady
5. Fault and isolate - amber LED 2 Hz for 1 second then 1.5 on, 0.5 off (2 short, one long)
6. Fault and partial isolate - amber LED 2 Hz for 1 second then 1 Hz for 2 seconds (2 short, 2 long)
7. Partial isolate - amber LED 2.5 seconds on, 0.5 seconds off
8. Auto-reset mode (in-situ) - amber LED flashes at 2 Hz

4.1.3 NEW ZEALAND COMMON BRIGADE LEDS

NORMAL	Steady	There are no off normal conditions at the RDU or FIP.
	Off	There is an off normal condition at the RDU or FIP.
FIRE	Flashing	There is a fire alarm condition at the FIP.
DEFECT	Flashing	There is a defect condition at the FIP.

4.2 LCD BASE DISPLAY & MENU STRUCTURE

4.2.1 GENERAL

The keypad and LCD are used to display information and issue commands. The LCD will often display a menu as a list of numbered choices. The numeric keypad is used to select an option from the menu or the CLEAR/ ESC (escape) key can be used to cancel and exit the menu. Sometimes there is more than one way to do something. For example, pressing RECALL -> 1 -> 2 shows system faults but you can also use RECALL -> SYSTEM or SYSTEM -> RECALL. In some cases, there are too many menu options to fit on the display. When this happens, a "right arrow" (>) is shown at the right hand end of the display. Pressing the right arrow key (ALARM TEST / >) will show the next set of menu options, after which, the left arrow key (TEST / <) will take you back.

Pressing the CLEAR/ ESC key repeatedly will return you to the "top" of the menu tree and show the base display. When the LCD is at the base display, pressing most keys (except the ACK, WARNING SYSTEM ISOLATE and EXTERNAL BELL ISOLATE keys) results in a menu appearing.

Pressing the ACK key at the base display sends a global ack command to the FIP without any further prompt (if this is enabled with programming).

Pressing the WARNING SYSTEM ISOLATE or EXTERNAL BELL ISOLATE keys will isolate/ de-isolate the respective output irrespective of what menu is showing on the LCD.

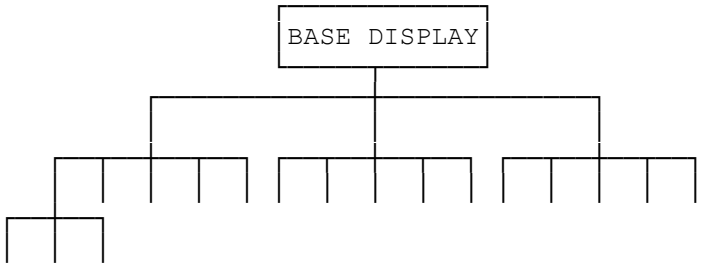


FIG 4.2.1
MENU STRUCTURE

4.2.2 BASE DISPLAY

When the system is normal (no faults, alarms or isolates) then the base display has the site name on the top line, with the software version, date and time on the bottom line. For example:

```
ADMINISTRATION BUILDING
RDU V5.00                    23/05/08 2:09:36
```

When the RDU is in an off-normal state, the base display shows the totals of the off-normal conditions under 4 headings. An example of a system with one zone or supervision fault, and two isolated zones is below.

```
Alarms : 0      Isol : 2      Fault : 1      Other : 0
Press the RECALL key to view
```

The off-normal conditions can be viewed by pressing the "RECALL" key followed by the desired option (refer to Chapter 6). Once the condition is displayed, control functions such as ISOL (Isolate) and RESET can be performed.

The totals are as follows:

Alarms Total number of zone alarms, including isolated zones in alarm.

Isol Total number of isolated zones or ancillaries.

Faults Total number of zone or ancillary faults.

Others Total number of system faults and off-normal conditions that aren't included in one of the other totals.

NOTE : zones can be blocked from mapping to totals using programming. The totals shown include only zones that map to totals.

If an alarm occurs on any non-isolated alarm type zone which is mapped to the LCD then the display will switch from the base display (or wherever it was) to FF mode and display the alarm. Refer to Section 5.1. regarding FF mode.

When in FF mode, if all alarms are acknowledged, then the display can be returned to the base display by pressing "CLEAR ESC".

4.2.3 SELECTIVE FUNCTIONS

The following functions can be selected from the Base Display:

System Functions
Menus for system functions can be selected by pressing "SYSTEM", "RECALL", or "SET". Refer to Chapter 6.

Zone Functions
Zone functions can be selected directly by pressing "ZONE", or indirectly by pressing "RESET", "ISOL", "ALARM TEST" or "FAULT TEST". Refer to Chapter 7.

Relay Functions (MAF-Configured RDUs only)
Relay functions can be selected directly by pressing "RELAY", or indirectly by pressing "RESET", "ISOLATE" or "TEST". Refer to Chapter 8.

Test Functions
Test functions can be selected directly by pressing "TEST" or indirectly by pressing "SYSTEM", or "RELAY". Zone tests can be initiated with "ALARM TEST" or "FAULT TEST". Refer to Chapter 9.
Direct acting (non-menu) test functions include "BATT TEST" (MAF-Configured PRDs only).

Print Functions
Print functions can be selected pressing "PRINT". Refer to Section 6.7.

Isolate Functions
WARNING SYSTEM ISOLATE and EXTERNAL BELL ISOLATE can be used at any time to isolate or de-isolate the warning system or external bell.

With a MAF-configured RDU, the ANCIL ISOL key may be used to isolate one of the three ancillary relays. The ANCIL ISOL key may be used at only the base display. Refer to Chapter 8 Relay Functions.

New Zealand Mode Keyswitch Functions
For New Zealand operation, three keyswitches may be connected to the display extender board. The operation of these depends on programming.

Silence Alarms keyswitch.
This is used to silence the bells, either system wide or locally.

Building Services Restore.
This is used to isolate ancillary outputs, either system wide or locally.

Trial evacuation.
This is used to activate the bells, either system wide or locally, and overrides the silence alarms keyswitch and any bells isolation.

4.3 RESPONDING TO ALARMS

WHEN THE FF ALARM LED INDICATOR IS FLASHING AND THE LCD IS DISPLAYING AN UNACKNOWLEDGED ALARM, PROCEED AS FOLLOWS:

STEP 1 **DO NOT PRESS "ACK", "RESET", "ISOLATE", "EXT BELL ISOL", OR "WARNING SYSTEM ISOL" KEYS ON THE PANEL** until the Fire Brigade arrives. The "NEXT" key can be pressed to view the next alarm in the list if there is more than one alarm present. If the "NEXT" key is pressed, the internal sounder will silence, but the External Bell and Warning System will continue to sound.

STEP 2 **INVESTIGATE THE ALARM** (if possible by fire safety personnel), and implement appropriate fire control and extinguishing measures.
The **FIRE SEARCH AREA** (zone) will be indicated by the zone text displayed on the LCD and by a flashing zone alarm LED where an LED display is fitted.

STEP 3 **EVACUATE IF NECESSARY**.

STEP 4 **ADVISE THE BRIGADE** of both real fires and false alarms.

STEP 5 **KEEP A MEMBER OF THE FIRE SAFETY CREW ON STANDBY** to direct fire fighters to the source(s) of alarm and inform them of measures already taken.

STEP 6 **RECORD ALL EVENTS IN THE LOG BOOK PROVIDED.**

** PLEASE NOTE **

The above procedure should be executed by a trained fire officer, and may need to be modified in accordance with any special conditions applying to the particular installation.

4.4 DEALING WITH FAULTS

4.4.1 WHAT IS A FAULT?

A fault is any situation which prevents the fire alarm system from performing its functions correctly. Possible faults at the FIP could include defects in wiring to the detectors, faulty detectors, or faults detected from supervision of relay input modules. This information would be sent to the RDU as zone status information. System Faults can also occur at the RDU. Eg. communications loss between the FIP and the RDU (i.e., scan fail), or detection of battery very low voltage.

When there are no faults present, the system fault, FF fault and charger/batt fault LEDs should all be off and the green "MAINS ON" LED indicator should be on.

For New Zealand operation, the common normal LED on the display extender board will be on steady if there are no off normal conditions at the FIP or the RDU.

4.4.2 RESPONDING TO FAULT SIGNALS

When a fault occurs, the fault sounder operates (steady tone) if programmed to, and the MAF fault LED on the front panel will turn on. If a system fault is present, the "SYSTEM FAULT" LED will be on. If a Battery/Charger fault exists, the "CHGR/BATT FAULT" LED will be on or flashing.

If a fault or other off-normal condition exists, the LCD will display the number of Alarms, Faults, Isolates and Other off-normal conditions.

The "CLEAR ESC" key may be pressed to silence the panel fault sounder until a service technician arrives.

To determine the source of the fault conditions, use the following keypad commands (Refer to chapters 6 and 7):

Recall Faults	Press RECALL 6
Recall Other	Press RECALL 7
Recall All Off Normal	Press RECALL RECALL RECALL 1
Recall System Faults	Press RECALL SYSTEM
Recall History	Press RECALL 2

The Recall History command can help to determine the sequence of fault conditions as the events are displayed chronologically.

Once the source of the fault has been determined, call the service company to rectify it.

**** PLEASE NOTE ****

(a) Subsequent faults will re-start the fault sounder.
(b) RECORD ALL EVENTS IN THE LOG BOOK PROVIDED.

THIS PAGE INTENTIONALLY LEFT BLANK

CHAPTER 5
OPERATING INSTRUCTIONS
- BRIGADE FUNCTIONS

5.1 INTRODUCTION TO LCD BRIGADE FUNCTIONS

5.1.1 GENERAL OPERATION & DISPLAY

When an alarm occurs, the RDU switches automatically from the base (or other) display to FF mode and displays the alarm. The keys that can be used are then limited to those within the Firefighter's Facility (FF). The FF is the area of the keypad within the red border, as shown in Figure 5.1.

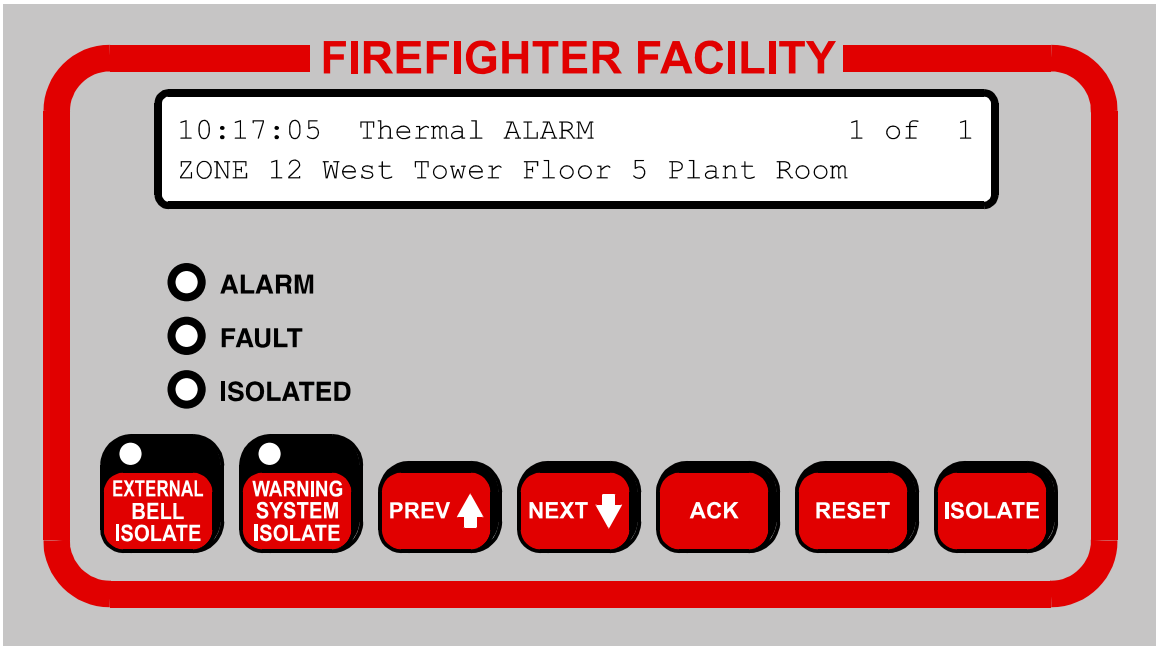


FIG 5.1
FIREFIGHTER'S FACILITY (FF)

The FF operates as follows. Each zone alarm is displayed (one at a time) on the LCD and must be individually acknowledged by pressing the "ACK" key when the alarm is displayed. Each alarm can then be reset or isolated by pressing the "RESET" or "ISOLATE" keys respectively, followed by the “ACK” key.

If multiple ararms are present, the “NEXT” and “PREV” keys can be used to step through them. All alarms must be acknowledged before the display can exit from the FF mode.

The "EXTERNAL BELL ISOLATE" key may be used at any time to isolate or de-isolate the External Bell.

The “ WARNING SYSTEM ISOLATE” key may be used at any time to isolate or de-isolate the Warning System.

5.1.2 FF OPERATION

When the RDU is displaying an alarm the LCD shows the following information:

(i) The time at which the alarm occurred.
(ii) The zone alarm type.
(iii) Whether the alarm is acknowledged or not (Figure 5.1 shows an unacknowledged alarm).

(iv) The total number of alarms and the sequence number of the currently displayed alarm.
(v) The zone number and location.

The RDU maintains a list of alarms in the order in which they occurred. In the absence of operator intervention, the LCD display will show the first alarm. All alarms in the list can be viewed, one by one, by pressing the "NEXT" or "PREV" keys.

Each alarm can be individually acknowledged when it is displayed by pressing the "ACK" key. The text "ACKD" appears on the display whenever an acknowledged alarm is viewed.

Once an alarm has been acknowledged, it can be removed from the alarms list by:

(i) Pressing the "RESET" key and then the “ACK” key within 10 seconds. The indicated alarm is RESET and removed from the list; or
(ii) Pressing the "ISOLATE" key and then the “ACK” key within 10 seconds. The indicated alarm is ISOLATED and removed from the list; or
(iii) The alarm condition being cleared from a non-latching detector on a non-latching zone.

Once all alarms have been acknowledged, stepping past the end (or the beginning) of the alarm list will include any isolated alarms. On pressing “NEXT” at the most recent alarm, or “PREV” at the oldest alarm, the display will show the number of isolated alarms present and a prompt to search for these. Pressing “NEXT” will start a recall of isolated alarms from the beginning (these are shown in numerical order), while “PREV” will start from the end. Pressing “CLEAR/ESC” at this prompt will go back to the first alarm in the alarm list.

After all alarms have been acknowledged, pressing the "CLEAR ESC" key will exit from the FF alarm list display even if there are still zones in alarm. After exiting, the FF alarm list display can be recalled by using the RECALL FF command from the base display.

5.2 SILENCING THE INTERNAL SOUNDER

5.2.1 FUNCTION

Pressing any key will silence the internal sounder, i.e., cancel the pulsing alarm tone, steady fault tone, or rapid pulsing test fail tone.

Note that the key pressed will be processed as it would if the sounder was not on. Therefore, it is safest to use the "CLEAR ESC" key to silence the sounder.

5.2.2 OPERATING SEQUENCE

Press "CLEAR ESC" key once.
- The internal sounder silences.

NOTE: If a key sequence was being entered, it may be necessary to re-enter number information or the last command as the "CLEAR ESC" key will, in addition to silencing the buzzer, either step back through the menu or clear any number entry sequence that had been started.

If all zone alarms are acknowledged, pressing the "CLEAR ESC" key will result in the LCD exiting FF mode. FF mode can be re-entered using the recall command. Press the "RECALL" key at the base display and select the "Alarms List" option (option 1).

5.3 ACKNOWLEDGE ZONE IN ALARM

5.3.1 FUNCTION

In FF mode, pressing the "ACK" key may perform the following functions (depending on programming):

(a) The displayed alarm is acknowledged.

(b) The pulsing internal sounder is silenced.

(c) An alarm acknowledge command may be sent to the FIP to acknowledge the alarm at the FIP.

5.3.2 OPERATING SEQUENCE

Press "ACK" key once:

- Internal sounder will be silenced.
- LCD displays "ACKD" for the currently displayed alarm.
- If there are no more unacknowledged alarms in the system, the ALARM LED goes steady.
- Where fitted, the flashing red ALARM LED indicator for the zone goes steady.

NOTE: Subsequent non-isolated zone ALARMS or FAULTS on the system will re-operate the indicators, and sounder, as appropriate.

5.4 RESET ZONE IN ALARM

In FF mode, pressing the "RESET" and then the “ACK” key within 10 seconds performs the following:

(a) Issues a reset command for the indicated zone.
(b) Silences the internal sounder.
(c) The acknowledged zone alarm is removed from the alarm list (if the alarm is cleared).
(d) If no more un-isolated alarms exist, the External Bell, warning system, ancillary relays and Brigade Alarm relay turn OFF, if they were ON.

5.4.1 OPERATING SEQUENCE

Press "RESET" key once:

- LCD displays "Press acknowledge to confirm reset".
- Press the “ACK” key within 10 seconds.
- The command will be transmitted to the FIP to reset the zone.
- The internal sounder will be silenced.
- If there are no more unisolated zones in alarm, then the External Bell, Warning System and Brigade alarm relay will be turned off.

NOTES:

(a) If the alarm condition on the zone input has not been removed, then a new alarm will be generated after the appropriate filtering time delay.

(b) If a fault condition exists in a zone that also has an alarm condition, FF Reset will not clear the fault. To reset the fault condition, the operator must first exit FF mode. (Refer to Sections 5.8 and 7.4).

5.5 ISOLATE ZONE IN ALARM

5.5.1 FUNCTION

In FF mode, pressing the "ISOLATE" key and then the “ACK” key within 10 seconds performs the following:

(a) An isolate command is sent to the FIP to isolate the zone.
(b) Silences any internal sounder condition.
(c) The zone alarm is removed from the alarm list when the RDU receives the isolate indication from the FIP.
(d) If all alarms are isolated, then the External Bell, Warning System, Brigade alarm relay and any ancillary relays turn off.

5.5.2 OPERATING SEQUENCE

Press "ISOLATE" key once:

- The LCD displays “Press acknowledge to confirm isolate”.
- Press “ACK” within 10 seconds.
- An isolate command will be issued for the zone.
- The internal sounder, if on, will be silenced.
- If all alarms are isolated then the External Bell, Warning System, Brigade Alarm relay and any ancillary relays will turn off.

NOTES:

(a) Subsequent non-isolated zone ALARMS on the system will re-operate the alarm indications, alarm sounder and local bells.

(b) Subsequent non-isolated zone FAULTS on the system will operate the fault indication and steady fault sounder.

5.6 ISOLATING/DE-ISOLATING EXTERNAL BELL

5.6.1 FUNCTION

The isolate status of the External Bell can be changed at any time by pressing the "EXTERNAL BELL ISOLATE" key. The isolate status of the EXTERNAL BELL is shown on the " EXTERNAL BELL ISOLATE" LED. If it is on or flashing, the bell is isolated and will not operate. If the LED is OFF the bell will operate when an un-isolated alarm is present on any zone which is programmed (mapped) to operate the external bell.

Isolating the External Bell can serve as a method to silence the bell when un-isolated alarms are present.

De-isolating the External Bell allows the bell to turn on for subsequent alarms occurring, and can serve to immediately turn the bell on again if any un-isolated zone alarm condition exists for zones which are mapped to the bell.

The behaviour of the External Bell Isolate command and LED depends on programming. If enabled to, the RDU will send an External Bell Isolate/ De-isolate command to the FIP or isolate/ de-isolate the External Bell locally when the External Bell Isolate key is pressed.

EXTERNAL BELL ISOLATED LED	Slow flash (1 sec on, 1 sec off)	Slow flash indicates the external bell is isolated at the FIP. The RDU external bell output (if any) is also isolated.
	On steady	The external bell is isolated locally at the RDU.

NOTE: The External Bell may be a strobe light in some systems.

5.6.2 OPERATING SEQUENCE

Press the "EXTERNAL BELL ISOLATE" key once:

- If the external bell was de-isolated:
  - The EXTERNAL BELL ISOLATE LED turns on steady or flashing.
  - The external bell, if on, turns off.

- If the external bell was isolated:
  - The EXTERNAL BELL ISOLATE LED may turn off.
  - If any un-isolated alarm condition exists on a zone mapped to the External Bell, then the External Bell may turn on.

NOTE: If any subsequent alarm occurs, the External Bell will turn on only if the External Bell is un-isolated.

5.7 ISOLATING/DE-ISOLATING WARNING SYSTEM

The isolate status of the Warning System can be changed at any time by pressing the WARNING SYSTEM ISOLATE key. The isolate status of the Warning System is shown on the WARNING SYSTEM ISOLATE LED. If it is on or flashing, the Warning System is isolated and will not sound. If the LED is off, the Warning System will sound when an un-isolated alarm is present on any zone which is programmed (mapped) to operate the Warning System.

Isolating the Warning System can serve as a method to silence the Warning System when un-isolated alarms are present.

De-isolating the Warning System allows the Warning System to turn on for subsequent alarms occurring, and can serve to immediately turn the Warning System on again if any un-isolated zone alarm condition exists for zones which are mapped to the Warning System.

WARNING SYSTEM ISOLATE LED	Slow flash (1 sec on, 1 sec off)	Slow flash indicates the warning system is isolated at the FIP. The RDU warning system output (if any) is also isolated.
	Steady	The warning system is isolated locally at the RDU.
	Flashing (2Hz)	This applies to New Zealand operation only and indicates a Silence Alarms keyswitch is activated and the warning system output is de-activated (unless trial evac is active).

5.7.1 OPERATING SEQUENCE

Press the WARNING SYSTEM ISOLATE key once:

- If the Warning System was de-isolated:
  - The WARNING SYSTEM ISOLATE LED turns on steady or flashes.
  - The Warning System, if on, turns off.

- If the Warning System was isolated:
  - The WARNING SYSTEM ISOLATE LED either turns off or flashes.
  - If the Warning System Isolate LED is now off, if any un-isolated alarm condition exists on a zone mapped to the Warning System, then the Warning System turns on.

NOTE: If a subsequent alarm occurs, the Warning System will turn on only if the Warning System is de-isolated.

5.8 EXITING FF MODE

5.8.1 FUNCTION

While in FF mode, access to recalls and other functions is not available. On occasion it may be necessary to perform other functions such as recall off normal zones to check for faults. To do so, FF mode must be exited. FF mode can be exited only when ALL alarms in the list have been acknowledged. When FF mode is exited, the LCD reverts to showing the base display.

5.8.2 OPERATING SEQUENCE

Press the "CLEAR ESC" key once:

- If all alarms are acknowledged, FF mode is exited.

NOTE: To re-enter FF mode to view the list of alarms, use the Recall Alarm List command sequence. Refer to section 5.9 Recalling Alarms.

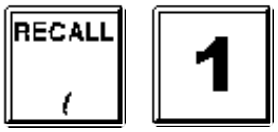
5.9 RECALLING ALARMS

5.9.1 FUNCTION

It is possible for there to be un-isolated, acknowledged alarms present in the FF alarm list, but the display NOT be in FF mode. The FF alarm list display can be recalled at any time as shown below. For some types of zones, an alarm on the zone does not add the zone to the FF alarm list. Low priority alarms of this type can be recalled using the recall command from the base display (press the RECALL key), and select option 4 : Alarms.

5.9.2 OPERATING SEQUENCES

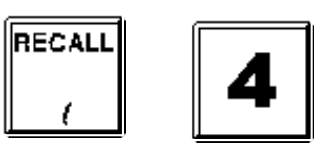
Press the CLEAR/ ESC key until the base display is shown.
Press the RECALL key followed by the 1 key to select Alarms List.



to display the FF Alarm List.

If there are no alarms in the FF alarm list, the LCD will briefly display "Alarm queue is empty" and revert to the base display.

Alternatively, from the base display, press the "RECALL" key followed by the "4" key to recall all alarms.



CHAPTER 6
OPERATING INSTRUCTIONS - SYSTEM FUNCTIONS

6.1 RECALL HISTORY

6.1.1 FUNCTION

The RDU keeps a list of the last 1000 events in chronological order. The RECALL HISTORY command allows an operator to view the most recent event stored, and to move forwards and backwards through the list. When the start or end of the list is reached, the LCD automatically shifts to the other end of the list and displays whether the event is the newest (latest) or oldest (earliest).

6.1.2 OPERATING SEQUENCE

From the base display, press:

The display will show the most recent history event.

To access the event that occurred immediately before the event being shown, press:

If the "PREV" key is pressed when the event displayed is the oldest event, the LCD will briefly display a message indicating that the event to be displayed is the most recent event before showing it.

To access the event that occurred immediately after the event being shown, press:

If the "NEXT" key is pressed when the event displayed is the most recent event, the LCD will briefly display a message indicating that the event to be displayed is the oldest event before showing it.

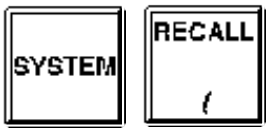
6.2 RECALL SYSTEM FAULTS

6.2.1 FUNCTION

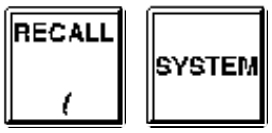
Allows an operator to view on the LCD the current causes of a "SYSTEM FAULT" indication.

6.2.2 OPERATING SEQUENCE

From the base display, press:



OR



If there are no system faults, a brief message is shown indicating there are no system faults.

If one or more system faults are present, the first fault will be shown on the display. To view the next fault, press:

To view the previous fault, press:

6.2.3 LIST OF SYSTEM FAULTS

The complete list of faults which can be displayed by a system fault recall is as follows. This list includes some faults that normally occur only at startup of the RDU.

1. **MAF installed configuration mismatch.**
   This fault indicates that the MAF board is not installed when it is required by programming to be present or that the MAF board is installed when it is not programmed to be.

2. **Display/Relay Board configuration mismatch.**
   This fault occurs when the programmed number of 16 Zone LED Display or Relay Driver boards is different from that physically present. This System fault will remain until the correct number of modules is installed or the database is re-programmed with the actual number present.

3. **Flash database checksum error.**
   The panel is inoperational if this fault is present. This can occur if the database is corrupt or if a hardware or memory fault is present. It may be possible to clear the fault by powering the panel off and on. If the fault appears to clear, the checksum of the database should be verified (use RECALL RECALL 1(CRCs), then option 1(database CRC). If possible, also verify the database using the database verify command (use SET >(right arrow) then option 1 (database verify) and send the database to the RDU via the serial port.

4. **Flash database version error.**
   This fault condition means that the flash database checksum is correct but the database is an old or unknown version with a format which cannot be used. All zone status processing is disabled when this fault is present and the panel is inoperational.

5. **Zone names database CRC error.**
   This indicates a checksum error has occurred with the database that holds the RDU zone names. The RDU keeps zone names in a database separate from the main database so that zone names can be updated at "runtime" when the FIP sends them via the RZDU bus. The panel is still operational when this fault is present but it may not show the correct text for zone names. As with system fault number 3 (main database checksum error), this can occur if the database is corrupt or if a hardware or memory fault is present. If the fault cannot be cleared by powering the panel off and on, then the entire database should be re-loaded or all zone names should be re-sent from the FIP. Entering program mode, then immediately exiting and selecting to save the database may clear the fault but the zone names database may not be correct.

6. **Zone names database version error.**
   This indicates the zone names database is unusable because it is an unknown or old format.

7. **Ram database reloaded after corruption.**
   This error occurs if the runtime database in RAM is corrupted and has been reloaded from the flash database. This indicates either a hardware fault or an electromagnetic disturbance has occurred.

8. **Comms fail**.
   Communications with the FIP has failed. This can occur if the FIP is powered down or is off-line or if the physical connection to the FIP is broken.

9. **All MAF zones isolated.**
   This fault will occur if all zones (mapped to MAF) are isolated. This can be inhibited with an option in programming.

10. **Keypad disconnected.**
    The internal loom between the keypad and Controller is disconnected/faulty.

11. **Supply failed.**
    This fault means that the DC supply has fallen to 21 volts or below. Either both mains and the battery voltage have failed or the DC line power from the FIP has fallen to 21 volts or below. When this system fault is present the Charger/Batt fault LED comes on and MAF configured RDUs de-energise the standby relay and processing of all MAF board inputs stops and relay outputs are held in their current state.

12. **RAM write read fault.**
    A read/write test of main RAM has failed. This can occur during System and Remote Test. If the fault still occurs when the test is repeated and no obvious cause can be found, the controller board should be replaced.

13. **EPROM CRC error.**
    A checksum calculation of firmware memory has failed. This can occur during System and Auto Test. If repeating the test or rebooting the RDU does not clear the fault then the firmware may need replacing or the entire controller board may need replacing.

14. **LED display board fault.**
    There is a fault with a LED Display or Relay Driver board. This can occur if either the wrong number of boards are installed or there is a break in the cabling between boards or the "termination" link on the last board is not installed.

15. LCD display fault.
A fault has occurred with the LCD. This can occur at startup or during a display test. Powering the system off and on might be a solution or repeating the display test might clear the fault.

16. Shift register bus fault.
This error indicates a fault with the bus connecting the Controller with the MAF/PSU. It may be caused by a break or short in the flat ribbon cable (e.g., unplugged) or by temporary noise or by a circuit board fault. When this fault occurs, all outputs will be held in their current state and all processing of inputs will stop until the fault clears. If the fault does clear, processing of outputs and inputs will resume automatically.

17. Battery low.
This occurs in New Zealand mode operation only. It indicates that the supply voltage has fallen below 24.4 volts to warn that the battery is losing charge. A battery fail event will occur at 21 volts.

18. Clock crystal timebase check fail.
This error message occurs only at startup and indicates the frequency of the clock chip on the Controller is out of tolerance to the microprocessor. The Controller will restart and try the test again.

19. Clock register write read fail.
This error message occurs only at startup and indicates a write/read test of the Controller time/date clock registers has failed. The Controller will restart and try the test again.

20. Shift reg clocking fault
Shift reg driver fault
Invalid # shift regs
These faults occur only at startup and indicate a hardware fault with the shift register bus that connects the MAF board or a fault on the MAF board itself. This can also occur if the RDU has AZC modules or relay modules connected. These modules cannot be used with an RDU.

21. Fuse blown.
One of the fuses on the MAF board has blown.

22. Charger fault.
A battery charger fault has occurred. A charger low fault can occur when the battery is very flat. If this is the case, the "inhibit PSU faults for 24 hours" command can be used. If a charger high fault occurs the battery may be damaged. A hardware fault might be present or the charger voltage might need adjusting.

23. Mains fail.
This indicates that mains is currently failed. When mains has been failed continuously for 8 hours, a system fault may be generated, depending on programming.

24. Clock chip RAM fault.
The clock chip RAM content has failed to verify or has a checksum error. Clock chip RAM is used to hold relay/output isolate data and other things, so failure of this RAM can result in all zones being isolated when the panel is started. If isolating and de-isolating a relay/output does not clear the fault or if it still occurs when the RDU is restarted, the controller board should be replaced.

25. Battery is low.
The battery voltage is low. When PSU faults are inhibited for 24 hours, this error message will still appear in a system fault recall (for information), even though a system fault is not being signalled/ indicated.

26. Battery connection fail.
This message indicates the battery is not connected or the battery is faulty or has a low charge. When PSU faults are inhibited for 24 hours, this message will still appear in a system fault recall if the battery appears to be not connected even though a system fault is not being signalled/ indicated.

27. Battery capacity low.
This message indicates an automatic battery test has failed, i.e., the battery has a low charge.

28. External defect.
This fault occurs only in New Zealand mode and indicates the External Defect input on the N.Z. Display Extender board is active.

29. External evac defect.
This message indicates the External Evac defect input on the N.Z. Display Extender board is active.

30. Silence alarms.
This message indicates the Silence Alarms input on the N.Z. Display Extender board is active.

31. Trial evac.
This message indicates the Trial Evac input on the N.Z. Display Extender board is active.

32. Services restore.
This message indicates the Services Restore input on the N.Z. Display Extender board is active.

33. Brigade isol/test.
This message indicates the Brigade Isol/Test input (dual purpose) on the N.Z. Display Extender board is active.

34. Output logic error nn.
An error has occurred with output logic execution. The error number nn has the following meaning:

1. **No equations have been found but some were expected.**
   This indicates a corrupt database. This fault is normally never seen because a database checksum error would be detected before this happens. When a database checksum error is present, output logic execution is suspended.

2. **Invalid op code.**
   An invalid logic token has been found. This indicates a corrupt database or memory/ processor fault.

3. **Range error.**
   This occurs when an out of range logic token value is found such as a timer number greater than 64 or an ancillary relay number greater than 3. This can be fixed by re-programming the output logic.

4. **Stack error.**
   The output logic execution stack in RAM has overflowed or underflowed. This error should never occur because the condition causing it is normally detected during programming of the output logic rather than at "runtime".

5. **Link error.**
   An invalid value has been found in a link field in a logic equation. This indicates a corrupt database or memory/ processor fault.

6. **Invalid MAF output.**
   This indicates a conflict in the output logic information in the database. An equation that controls an ancillary or MAF relay is present but the relay is also programmed to be under system control. This indicates a corrupt database or memory/ processor fault.

7. **NA (New Alarm) function RAM limit exceeded.**
   This indicates too many NA functions have been used in the output logic. This error should never occur because the condition causing it is normally detected during programming of the output logic rather than at "runtime".

8. **Netvar SID not present.**
   This error does not normally occur in the RDU. If it does occur, it indicates the output logic is accessing a network variable. Network variables are not supported in the RDU.

9. **Zone command range error.**
   A logic equation to isolate/deisolate or reset a zone or range of zones has an invalid zone number. This can be fixed by re-programming the output logic.

10. **BEL/BLI logic token present.**
    This error does not occur in the RDU.

11. **Unsupported function.**
    This indicates the logic equations contain a logic token for an operation that is unsupported for the current mode of the system. Currently this doesn't occur in an RDU.

12. **Wrong mode.**
    This doesn't occur in an RDU.

35. U3 Flash Memory Fail Addr = xxxx

This error occurs when the non-volatile history process attempts to write or erase the flash memory used to store the history and it fails. This most likely indicates a fault on the Controller board, requiring a board replacement. It is possible that replacing the flash chip in the U3 socket will fix this error. Re-starting the RDU may also fix this fault. After re-starting the RDU, check that non-volatile history is enabled as follows. From the base display press RECALL 2 (history) then press the SET key and check that the display shows “non-volatile history is enabled”. If there is no flash memory installed in the U3 socket then the RDU will store its history in RAM and the history will be lost if the RDU is powered down.

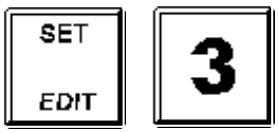
6.3 RECALL SYSTEM CONFIGURATION

6.3.1 FUNCTION

The configuration database can be recalled/ viewed on the display without entering program mode. A prompt will appear asking for the access password. The panel remains fully operational while the configuration database is being viewed and the database cannot be changed in this mode.

6.3.2 OPERATING SEQUENCE

From the base display, press:



Enter a password when asked.

6.4 RECALL MANUAL CALL POINT (MCP)

6.4.1 FUNCTION

To view the MCP input state if an MCP is installed at this RDU.

When the status of the RDU callpoint is received at the FIP, it is mapped to a specific zone. The information is then transmitted as zone status to all RDUs. The status of the MCP can be recalled at the RDU irrespective of any subsequent zone mapping at the FIP. The MCP recall option will not be available if the MCP has not been enabled with programming.

The MCP input cannot be used with New Zealand operation and is ignored.

6.4.2 OPERATING SEQUENCE

Press the "CLEAR ESC" key until the base display is shown.

Press "RECALL" "RECALL" "RECALL" followed by the "2" key to select the “MCP” option.

The MCP status shown will be one of the following conditions:

normal	-	the MCP is not in alarm or fault.
alarm	-	the MCP is in alarm.
fault	-	the MCP is in fault.

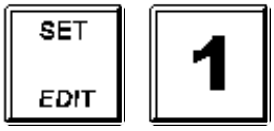
6.5 SET SYSTEM TIME

6.5.1 FUNCTION

Allows an operator to set the time in the real-time clock within the RDU.

6.5.2 OPERATING SEQUENCE

To set the time, press:



The current time is displayed. Enter the new time, in 24 hour format, i.e. the hours value is 00 to 23 where 01 is 1am and 23 is 11pm. Hours, minutes and seconds may be entered. E.g. to set the time to 1:52:40pm, press: "135240 ENTER".

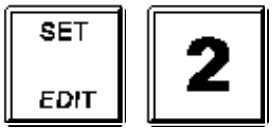
6.6 SET SYSTEM DATE

6.6.1 FUNCTION

Allows an operator to set the date in the real-time clock within the RDU.

6.6.2 OPERATING SEQUENCE

To set the date, press:



The current date is displayed. Enter the new date. E.g. To set the date to 14/07/10, press: "140710 ENTER".

6.7 PRINT OPTIONS

6.7.1 FUNCTION

To initiate a printout of the history, system status or programmed database to the printer.

6.7.2 OPERATING SEQUENCE

From the base display press:

A menu with 3 (or more) options will be shown. Press a numeric key "1", "2", "3" to select the appropriate option or press the "CLEAR ESC" key to return to the base display. After a printout has been initiated it can be cancelled by pressing the RESET key.

The printer serial port is normally used for printing events. While an operator requested printout is in progress, event printing will be suspended and events will be held in a queue until the operator printout completes.

The options are:

1. **History**
   The content of the history log is output to the printer port, in order from newest to oldest. The history log can contain 1000 or more events so it may be useful to use the RESET key to cancel the printout when the desired number of events has been printed.
2. **System Status**
   A system status printout shows the status of all off normal zones and relays plus any system faults that are present.
3. **Print Database**
   The RDU configuration database will be printed/ output. An access password must be entered.

6.8 RECALL CRCS OR SOFTWARE VERSION

To check the validity of the RDU database or the software version, from the base display, press the SYSTEM key then select option 3 "View system CRCs". Select one of options 1,2 or 3 according to the information you wish to recall.

Option 1:Database CRC shows the database checksum and also performs a check of the database checksum. It also shows the last saved time/date of the database and the software version number. The database CRC is shown as 8 hex digits preceded by a $ (dollar) sign.

Option 2:Firmware CRC, shows both the software version number and the firmware checksum.

These can be done as part of monthly system inspection to check that the database has not been modified without authorisation. I.e. after an RDU has been completely programmed and commissioned, the recall CRC function should be done and the CRC and time and date should be recorded for future checking. This record should be updated every time the database is modified by an authorised user.

6.9 INHIBIT PSU FAULTS

This operation applies to only a mains powered RDU with a MAF board connected. If the battery becomes very flat (e.g., due to extended mains fail), when mains is restored and the battery begins recharging, a charger low fault may occur and battery tests may fail. To allow the system to be left in a normalised state, the "inhibit PSU faults" command may be used to inhibit charger and battery faults for 24 hours, to allow the battery to be recharged.

This command can also be used to inspect or cancel the 24 hour inhibit period.

From the base display, press

6.10 ERROR AND EVENT MESSAGES

6.10.1 ERROR MESSAGES ON STARTUP

The following error messages can be shown on the display during start up.

1. **"Main RAM write read fail"**
   This message is shown on the display at startup if the RAM test fails. The Controller will attempt to restart after five seconds. No events are logged. If this problem occurs repeatedly, the Controller board should be replaced.

2. **"Firmware checksum fail"**
   This message is shown on the display at startup if the firmware (software in flash memory) CRC/ checksum test fails. The Controller will attempt to restart after five seconds. An "**EPROM CRC TEST FAIL**" event will be logged to the printer and history. If this problem occurs repeatedly, the Controller board should be replaced.

3. **"Clock crystal timebase check fail", "Clock register write read fail", "Clock startup fault"**
   These messages occur only at startup and indicate a hardware fault on the Controller board. The Controller will attempt to restart after five seconds and will also log a "CLOCK CHIP FAULT" event to the printer and history. If this problem occurs repeatedly, the Controller board should be replaced.

4. **"Clock chip ram write read fail"**
   This message is shown on the display at startup and indicates that the clock chip is faulty because its initialization failed. It was found to have no valid data and an attempt to write valid data to it failed. An "**ISOLATE DATA LOST**" event will be logged to the printer and history. The Controller will attempt to restart after 5 seconds. If this problem occurs repeatedly, the Controller board should be replaced.

5. **"Isolate Data Lost"**
   "Isolate data lost" is an event that is logged at startup when the isolate data cannot be successfully read from the clock chip. "Isolate data" refers to zone and relay isolate states. At startup, the message "**Reading clock chip ram**" may or may not appear on the display. Normally, this message doesn't appear but if the data in the clock chip is invalid, the "**Reading clock chip ram**" message will be shown and the Controller will try repeatedly to read the isolate data from RAM. If the isolate data cannot be read successfully then the "**ISOLATE DATA LOST"** event is logged to the printer and history and zones and relays are set to "all isolated". If the "all zones isolated signals fault" option is enabled in programming, then the panel will signal Brigade Fault when this occurs. The Controller does not restart for this condition.

6. **"LCD ram read test fail."**
   This fault can occur at startup or during a "display test". It indicates a fault on the LCD module. The panel is still operational but the LCD display may not be readable. The event logged for this is **"LCD DDRAM READ FAIL"**.

7. **"Shift reg clocking fault"**
   "Invalid # shift regs.Total # regs=xxx # input regs=xxx"
   These messages indicate a hardware fault with the shift register bus that connects the Controller and MAF/PSU. The fault could be on the Controller, the interconnecting FRCs or any of the connected boards. Try changing the cable connecting the MAF/PSU with the controller. If this fault occurs during startup, the Controller attempts to restart after 5 seconds. If this fault occurs on exit from program mode, the Controller signals a fault but doesn't restart. An event **"SHIFT REG BUS FLT"** is logged to the printer and history.

8. **"Shift reg driver fault"**
   This message indicates a problem with the software driver for the shift register bus. It is unlikely this fault will ever occur but it could be caused by a fault in the firmware flash memory or RAM and is probably not a fault with the shift register bus itself. If this fault occurs during startup, the Controller attempts to restart after 5 seconds.

9. **"Database checksum fault. No processing."**
   If the database checksum is invalid at startup, this message will appear for 2 to 3 seconds on the display and an event "**DBASE CHKSUM ERROR"** is logged.

10. **"MAF module mismatch"**
    This message can appear for 2 to 3 seconds on the display during startup if the number of zone and relay modules that are connected does not match the values assigned in the database. An event **MAF CONFIG ERROR** is logged and a fault is signalled.

11. "**Incorrect display boards"**
    This message can appear for 2 to 3 seconds at startup and indicates that the number of connected display boards is incorrect. An event **LED DISPLAY BDS FLT** is logged and a fault is signalled.

6.10.2 ERROR MESSAGES THAT CAN OCCUR ON ENTRY TO PROGRAM MODE

1. **"Flash database version error Must reinit or reload database."**
   This message appears on entry to program mode and indicates that the database was created with a different version of software and cannot be used. This message does not appear if the database checksum is incorrect so it indicates the database is valid but incompatible with this software version.

2. **"WARNING-the database in flash is invalid. Recommend save->PC before save to flash"**
   This message appears on entry to program mode if the database checksum is incorrect.

6.10.3 ERROR MESSAGES THAT CAN OCCUR ON EXIT FROM PROGRAM MODE

1. **"Flash database checksum fail. Processing is disabled."** This indicates the database checksum is invalid and the panel is non-operational. A **"DBASE CHKSUM ERROR"** is also logged.

2. **"History queue is being cleared"** This indicates that the size of the history queue has been decreased to enable the print queue. This occurs when the programmable option to enable or disable event printing is changed from disable to enable. When event printing is disabled, the history queue uses the memory normally used for event printing.

3. **"Shift reg clocking fault"**
   "Invalid # shift regs.Total # regs=xxx # input regs=xxx"
   "Shift reg driver fault" This indicates a hardware fault of some kind. Refer to the information for these messages in the earlier section on startup faults.

4. **"Processing disabled."** If a shift register fault occurs (as listed above), then this message will also appear to indicate the RDU is non-operational.

5. **"Display module mismatch."** This indicates the number of connected display boards does not match the database configuration. A fault is signalled.

6.10.4 HISTORY OR PRINTER EVENTS

The following additional fault events can be logged to the history or event printer. Refer also to section 6.2.3. system faults.

1. **LED DISPLAY BDS FAULT**
   This indicates the wrong number of LED display boards are installed, there is a hardware problem associated with the LED display board bus, or there is no "termination link" fitted on the last display board.

2. **SHIFT REG BUS FAULT**
   This event indicates there is a hardware fault associated with the bus that connects the Controller to the MAF module. It may be caused by a break or short in the flat ribbon cable (e.g., unplugged), by temporary noise, or by a circuit board fault. Check cables, connections, and for faulty boards.

3. **ISOLATE DATA LOST**
   "Isolate data lost" is an event that is logged at startup when the isolate data cannot be successfully read from the clock chip.

4. **LCD DDRAM READ FAIL**
   There is a fault with the RAM on the LCD module. If the fault is persistent, the LCD module may need replacing. A display test using the TEST key from the base display) may be able to clear the fault.

5. **DBASE CHKSUM ERROR**
   The checksum of the database is invalid and the panel is non-operational. The preferred method of fixing this fault is to re-load the database or to re-initialize and re-program.

6. ISOLATE RAM FAIL
This indicates the RAM in the clock chip that holds the local isolate states is failing to verify the data that has been written to it. If this occurs at startup, all MAF relays (if any) are set to the isolated state.

7. KEYPAD DISCONNECT
The keypad has been disconnected or there is a hardware fault associated with the two keypad membranes connected to the Controller board.

8. SUPPLY FAILED
This fault means that both mains has failed and the battery voltage has fallen to 21 volts or below. The standby relay is de-energised.

9. PSU FAULTS INHIBITED
This event is logged when an operator initiates the 24 hour PSU faults inhibit period using the keypad command accessed through the SET key menu.

10. EPROM CRC TEST FAIL
System or auto test has failed because the firmware checksum check failed. If this fault was caused by a temporary electrical disturbance then it may clear automatically, or it may be cleared by turning the panel off and back on. Ideally, the Controller board should be replaced if there is no obvious explanation for this fault.

11. PROCESSING STOPPED
This event occurs on entry to program mode because normal processing is suspended while in program mode.

12. DBASE REINITIALIZE
This event occurs when the database is re-initialized at startup.

13. OUTPUT LOGIC ERROR nn
An error has occurred in the execution of output logic and the error number is nn. A list of these errors is given in section 6.2.3. system faults.

14. CLOCK CHIP FAULT
This event occurs only at startup and indicates a problem with the clock chip. The Controller may need replacing.

15. MAF CONFIG ERROR
This error indicates that the software was unable to shift a sequence of data around the shift register bus and thus determine what modules (MAF/PSU) were present.

16. RAM DATABASE CORRUPT
This event occurs if the database in RAM is corrupted or fails to verify. The database is stored in both flash memory and RAM and is copied from flash to RAM at startup. The Controller continually checks that the database in RAM is identical to the copy in flash. If a mismatch is detected, and the checksum of the database in flash is correct, then the database is re-loaded into RAM, which may result in this fault self-clearing a short time later.

17. U3 FLASH MEM FAIL
Non-volatile history flash memory has failed. Refer to system faults Section 6.2.3.

18. STACK ERROR

This indicates the CPU stack has overflowed or underflowed or memory corruption has occurred. The controller restarts 5 seconds after detecting this condition.

19. TAP LOGIN

This event is logged when the temporary access password is used to access the database.

20. SCAN FAIL - RX COMMS

This error occurs if the RDU stops receiving messages from the FIP.

21. ZONE NAMES CHANGING

This event occurs when the RDU has received one or more new zone names from the FIP via the RZDU comms and is waiting to update flash database memory. The database in flash will be updated 60 seconds after the last new name is received.

22. ZONE NAMES UPDATED

This event occurs when new zone names that have been received from the FIP have been written to the database in flash memory.

THIS PAGE INTENTIONALLY LEFT BLANK

CHAPTER 7
OPERATING INSTRUCTIONS
- ZONE FUNCTIONS

7.1 GLOBAL ZONE ISOLATE

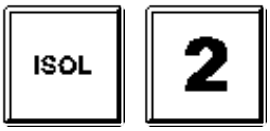
7.1.1 FUNCTION

To isolate all zones in alarm.

This operation sends a global isolate command to the FIP and the FIP determines which zones to isolate using its own programming.

7.1.2 OPERATING SEQUENCE - GLOBAL ZONE ISOLATE

From the base display, press



Notes:

1. Some types of FIP will apply the isolate command to only zones that are programmed to be of interest to the particular RDU sending the command.

2. A zone will be isolated only if it is currently in alarm. A zone which is in fault and not in alarm will not be isolated.

3. There is no global de-isolate command at an RDU.

7.2 ZONE ISOLATE OR DE-ISOLATE

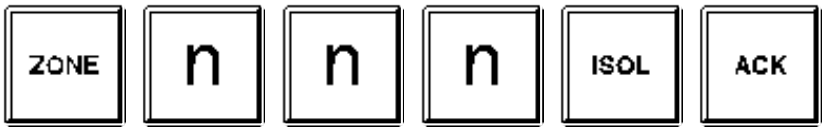
7.2.1 FUNCTION

To isolate or de-isolate a selected zone or group of zones.

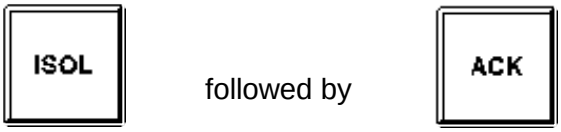
The availability of this command depends on programming in the RDU. Zones can be individually configured for whether they can be isolated by an operator at the RDU or not. Zone commands cannot be done on an RDU configured as a mimic or when the FIP does not support the necessary protocol or command.

7.2.2 OPERATING SEQUENCE - SINGLE ZONE

From the base display, to isolate or de-isolate zone nnn press:



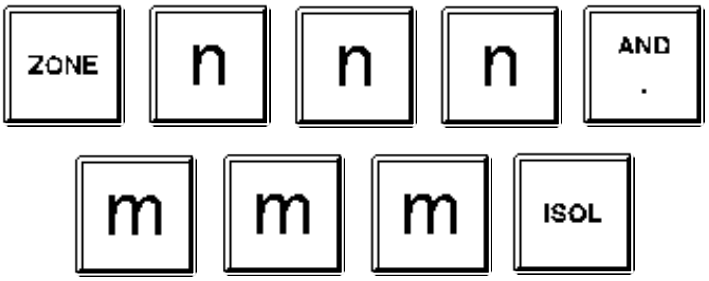
To isolate the zone shown on a zone status recall display, press:



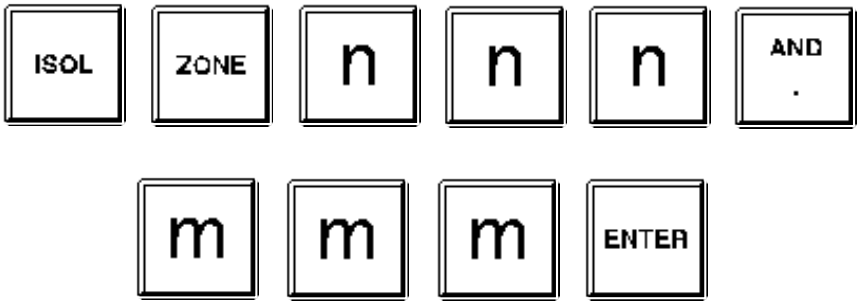
The LCD displays the current isolate status of the zone. Pressing the "ACK" key changes the isolate state. Pressing the "CLEAR ESC" key aborts the Isolate command.

7.2.3 OPERATING SEQUENCE - ZONE RANGE

To isolate or de-isolate a range of zones from the base display, press:



Or



The LCD will display the selected range of zones, i.e., zone nnn to zone mmm inclusive, plus the options to isolate or de-isolate the range.

To isolate the range of zones, press:

To de-isolate the range of zones, press:

7.2.4 NOTES

1. An alarm (or fault) on an isolated zone is indicated on the LCD and on LEDs but the zone is not entered in the FF alarm list and does not cause outputs to operate.

2. If the zone is in Auto-Reset mode, the effect of an isolate or de-isolate command at an RDU depends on the type of FIP. For an F4000 type FIP, de-isolating a zone in auto reset mode will take the zone out of auto reset mode and leave it isolated. For an F3200 FIP, zone isolate or de-isolate commands do not take the zone out of auto reset mode.

3. De-isolating a zone which is currently in alarm will be treated as if it were a new alarm on the zone.

4. De-isolating a zone which is currently in fault will not turn the buzzer on but will operate the brigade fault relay if the zone is mapped to the MAF.

7.3 GLOBAL ZONE RESET

7.3.1 FUNCTION

To reset all zones in alarm.

This operation sends a global reset command to the FIP and the FIP determines which zones to reset using its own programming.

7.3.2 OPERATING SEQUENCE - GLOBAL ZONE RESET

From the base display, press

7.3.3 NOTES:

1. Some types of FIP will apply the reset command to only zones that are programmed to be of interest to the particular RDU sending the command.

2. A zone will be reset only if it is currently in alarm. Any latched fault on the zone will not be cleared. A zone which is in fault and not in alarm will not be reset.

7.4 ZONE RESET

7.4.1 FUNCTION

To reset a selected zone or range of zones.

When a zone is reset the following occurs.

1. The FIP applies an electronic reset to the circuit to physically reset detectors.
2. Latched alarms and faults are un-latched.
3. The sounder is silenced and alarm and fault indications are cleared.
4. Any zone test or auto-reset (in-situ) test on the zone is cancelled.

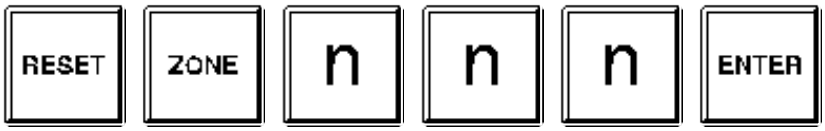
The availability of this command depends on programming in the RDU. Zones can be individually configured for whether they can be reset by an operator at the RDU or not. Zone commands cannot be done on an RDU configured as a mimic or when the FIP does not support the necessary protocol or command.

7.4.2 OPERATING SEQUENCE

To reset one zone only:

To reset zone number nnn from the base display press:

Or:

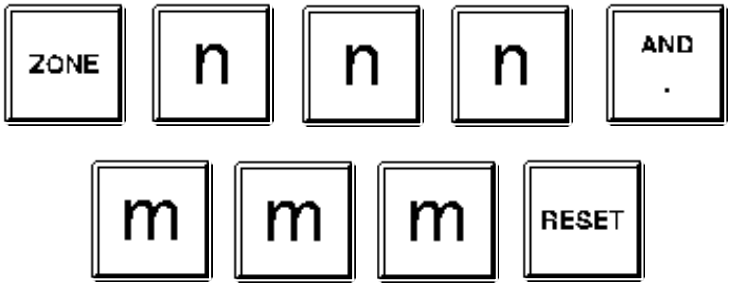


From a zone status display, to reset the displayed zone, press:

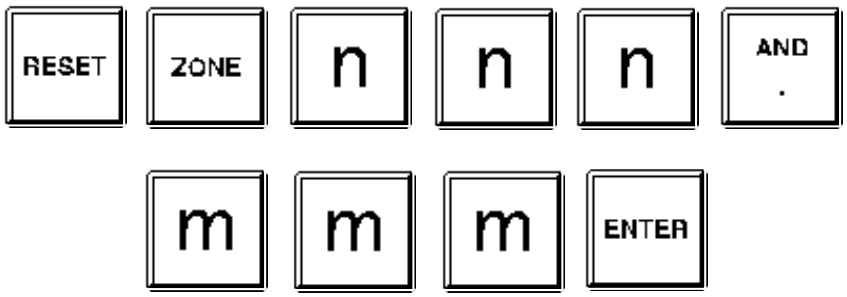
- The LCD will query if this is the zone to be RESET. Press "ACK" to reset, or "CLEAR ESC" to abort.
- The red zone alarm LEDs (if fitted) will be turned OFF and the alarm circuit reset.
- The amber fault LEDs (if fitted) will be turned OFF.
- The common alarm and fault LEDs will turn off if there are no other zones (mapped to the MAF) in alarm or fault respectively.

To reset a range of zones:

From the base display, press:



Or:



The LCD will display the range of zones selected. Press the "ACK" key to initiate the reset of zones nnn to mmm inclusive or press the "CLEAR ESC" key to abort with no reset.

7.5 ZONE TEST

7.5.1 FUNCTION

To perform an alarm test or fault test on a selected zone or range of zones.

When possible, the FIP will apply an electronic test condition to all circuits mapped to the zone(s) to generate the alarm or fault.

The availability of this command depends on programming in the RDU. Zones can be individually programmed for whether they can be alarm tested or fault tested by an operator at the RDU or not. Zone commands cannot be done on an RDU configured as a mimic or when the FIP does not support the necessary protocol or command.

Either a single zone at a time or a range of zones may be simultaneously tested. When a range of zones is tested, only zones of interest to the RDU will be tested. The FIP will not carry out the zone test if it currently has a system or auto test running or if the zone is already under test. If the test passes, a fault or alarm will occur on the zone and be indicated at the RDU.

There is no indication at the RDU that a zone test is active on any zone. Also there is no indication at the RDU of any test failure which may occur, other than the failure of the zone to go into alarm or fault. The FIP will perform the zone test as if the test had been initiated at the FIP keypad and will log any test fail which occurs. The test may be terminated at any time with a zone reset command at either the FIP or RDU. The FIP will terminate the test automatically after approximately three minutes from the start of the test.

Not all types and versions of FIP are able to process and execute zone test commands from an RDU. F4000 panels are not able to test a range of zones - they can test only one zone at a time, but the zone may have multiple circuits mapped to it. FIPs which currently support zone test commands are as follows:

1. F4000 V2.21 onwards
2. F3200 V2.00 onwards
3. MX4428 (all versions)
4. MX1 (all versions)

7.5.2 OPERATING SEQUENCE

To test one zone only:

To alarm test zone number nnn from the base display press:

Or:

To fault test zone number nnn from the base display press:

Or:

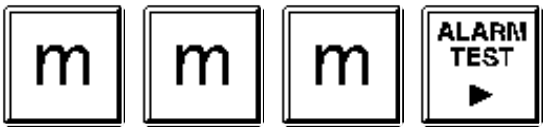
From a zone status display, to alarm test the displayed zone, press:

From a zone status display, to fault test the displayed zone, press:

- The LCD will prompt to confirm the command. Press "ACK" to initiate the test, or "CLEAR ESC" to abort. There is no indication on the RDU display that a test is active on any zone, however, the zone status display will indicate when a test is active.

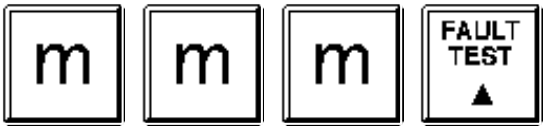
To alarm test a range of zones:

From the base display, press:



To fault test a range of zones:

From the base display, press:



The LCD will display the range of zones selected. Press the "ACK" key to initiate the alarm test or fault test of zones nnn to mmm inclusive or press the "CLEAR ESC" key to abort. The RDU will not initiate a test on any zones within the range that do not have this command enabled.

7.6 ZONE STATUS RECALLS

7.6.1 FUNCTION

To recall the status of a specific zone, or search for zones meeting a specified criteria, e.g., in fault, alarm, etc.

7.6.2 OPERATING SEQUENCE - ZONE STATUS

To recall the status of a specific zone.
From the base display or from a zone status display press:

where nnn is the zone number (leading zeros need not be entered).

To view the status of other zones, press:

to view the status of the next zone.

to view the status of the previous zone.

Press the "ZONE" key and enter a new zone number to select a different zone.
Press "CLEAR ESC" to return to the base display.

The first line of the LCD displays the zone number and any zone name programmed for that zone. The second line displays the status of the zone.

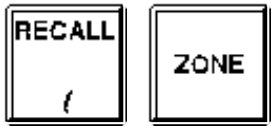
The status consists of any of the following:

normal	-	the zone is not in alarm or fault
alarm	-	the zone is in alarm.
fault	-	the zone is in fault.
isolated	-	the zone is isolated (or disabled).
deisolated deiso	-	the zone is de-isolated (or enabled).

7.6.3 OPERATING SEQUENCE - ZONE SEARCHES

The zone search functions allow an operator to find zones of a particular condition.

To start a search from the base display, press:



Then select the desired option. Relay type zones appear in the activated, faults and isolate recalls but not in alarm recalls. The choices available are as follows :

"1"	All off normal	-	Searches for any zones in alarm, fault, isolated, zone test, or Auto Reset mode.
"2"	Alarms	-	Searches for any zones in alarm, whether or not they are isolated or mapped to the MAF.
"3"	Faults	-	Searches for any zones in fault, whether or not they are isolated or mapped to the MAF.
"4"	Isolated	-	Searches for any zones that are isolated or in Auto-Reset mode, whether or not they are mapped to the MAF.
"5"	Operated	-	Searches for any relay zones in the activated state.
"6"	Status	-	Prompts for a zone number and displays the status of that zone as described in the previous section.

When an option has been selected, the RDU searches for a zone starting from zone 1 up to the last zone that meets the specified criteria.

Once a zone is found, the display shows the status of that zone. When the "NEXT" or "PREV" key is pressed, the search continues for the next or previous zone respectively, that meets the original search criteria.

If no zones matching the criteria are found, the display shows "There are no zones of this status to recall".

CHAPTER 8
OPERATING INSTRUCTIONS
- RELAY/OUTPUT FUNCTIONS

8.1 INTRODUCTION

For MAF configured RDUs, the functions which can be applied to ancillary relays are : isolate/de-isolate, reset and test. For both MAF and non-MAF RDUs, chapter 5 of this manual describes how to isolate and de-isolate the Warning System and External Bell.

For a MAF RDU, the ancillary 2 relay is dedicated as the External Bell output and the ancillary 3 relay is dedicated as the Warning System output. There is a logical distinction between the ancillary 2 relay and the External Bell and there is a separate isolate/ de-isolate command for each. Similarly for the Warning System, there are separate isolate/ de-isolate commands for the ancillary 3 relay and the Warning System. The Warning System and External Bell are logical entities (not physical) whereas the Ancillary 2 and 3 relays are physical. Refer to chapter 5 for the isolate / de-isolate commands that apply to the Warning System and External Bell. Refer to the following section for commands that isolate/ de-isolate the physical ancillary relays themselves.

Normally, the ancillary 2 and 3 relays are never isolated, instead, the Warning System and External Bell are isolated when they need to be silenced. Isolation of the ancillary relays 1, 2 and 3 is always applied locally at the RDU and has no effect on the Warning System and External Bell at the FIP, whereas isolation of the Warning System and External Bell at the RDU can affect the Warning System and External Bell at the FIP and vice versa (depending on programming). If a supervision fault occurs on one of the ancillary relays, it may be useful to isolate the ancillary relay rather than the Warning System or External Bell, but normally the fault would be fixed without requiring isolation.

The status of the ancillary relays can be viewed on the LCD display. The status of MAF relays (Alarm, Fault, Isolate and Standby) cannot be viewed, and MAF relays cannot be tested directly.

8.1.1 ANCILLARY RELAYS

On a MAF RDU, the Ancillary 1, 2 and 3 relays are activated by an alarm on any non-isolated zone which is programmed (mapped) to operate that particular relay. The ancillary 2 relay is dedicated as the External Bell output and the ancillary 3 relay is dedicated as the Warning System output. Each zone may be individually programmed to operate any of Ancillary 1, External Bell or Warning System when an alarm occurs.

8.1.2 ISOLATION

A specific ancillary relay can be isolated or de-isolated using the ISOLATE RELAY key sequence. The ancillary relays can also be isolated or de-isolated using the "Isolate" key from the relay status display.

The Ancillary 1 relay may be programmed to follow an ancillary isolate state received from the FIP or it may be isolated or deisolated locally (depending on programming).

For New Zealand operation, activation of the Services Restore (BSR) keyswitch (depending on programming), may result in the ancillary 1, 2 and 3 relays and the ancillary fire and defect outputs at the RDU being de-activated. When a relay is de-activated due to an activated BSR keyswitch, the keypad commands at the RDU for isolate and deisolate do not work. Similarly, when the NZ Silence Alarms keyswitch is activated, the Warning System isolate/deisolate command on the keypad is disabled.

8.2 ANCILLARY RELAY ISOLATE, DE-ISOLATE

8.2.1 INDIVIDUAL ANCILLARY RELAY ISOLATE / DEISOLATE

8.2.1.1 FUNCTION

To individually isolate or de-isolate ancillary 1, 2 or 3 relays.

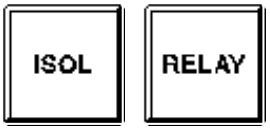
Deisolating an ancillary relay may cause the relay to turn on and isolating a relay will cause the relay to turn off if it was on. Deisolating a relay may cause the Brigade Fault relay to turn on if there is a latched supervision fault on the ancillary relay and the ancillary relay is mapped to the MAF.

For New Zealand operation, the building services restore keyswitch at the RDU, FIP, or another RDU, may be used to de-activate ancillary relays 1 and 2 and the ancillary fire and defect outputs at the RDU. When the ancillary outputs at the RDU are de-activated by a building services restore keyswitch, the RDU keypad cannot be used to isolate or deisolate the ancillary relays.

For New Zealand operation, the ancillary fire and defect outputs are also isolated if the ancillary relay 1 is isolated.

8.2.1.2 OPERATING SEQUENCE

From the base display press



and enter the relay number 1,2 or 3. Press the "ACK" key to change the current isolate status of the relay. The action carried out depends which relay and what the programmed setup in the RDU is for that relay.

8.3 ANCILLARY RELAY RESET SUPERVISION FAULT

8.3.1 FUNCTION

To reset a latched supervision fault on an ancillary relay.

8.3.2 OPERATING SEQUENCE

Press

to select ancillary relays, then press numeric key "1", "2" or "3" to select the desired ancillary relay to reset the fault.

Alternatively from the base display press:

Where n is the number of the desired ancillary relay. Then press the "ACK" key to reset the fault.

Note : If the fault is still physically present on the relay wiring then the relay status will remain in fault.

8.4 ANCILLARY RELAY TEST

8.4.1 FUNCTION

To briefly turn on an ancillary relay output for five seconds.

If the relay is isolated the test command will not energise the relay.

If the relay is already energised before the test starts then the test command will have no effect on the relay and will not de-energise it.

8.4.2 OPERATING SEQUENCE

From the base display press:

then press “ACK” to energise relay output n, or press “CLEAR ESC” to abort. The relay will be energised for five seconds or until “ACK” is pressed.

8.5 ANCILLARY RELAY STATUS RECALL

8.5.1 FUNCTION

To display the status of an ancillary relay, or search for those ancillary relays meeting a specified criteria, e.g., activated, isolated, in fault etc.

8.5.2 OPERATING SEQUENCE - RELAY STATUS

From the base display press:

to select ancillary relays, then press numeric key "1", "2" or "3" to select the desired ancillary relay.

Or press:

where “n” is the ancillary relay number 1, 2 or 3.

The display will show the ancillary relay number on the top line.

The status of the relay will be shown on the bottom line of the display as follows:

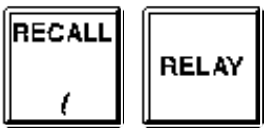
deactivated	- if the relay is de-energised
activated	- if the relay is energised
unsupervised	- if supervision is not enabled
supervised	- if supervision is enabled
normal	- no supervision fault
fault	- supervision fault
open circuit	- supervision fault
short circuit	- supervision fault
isolated	- if relay isolated
deisolated	- if relay de-isolated

The "RESET", "ISOLATE" and "TEST" keys may be used from this display and "NEXT" and "PREV" may be used to step through the three ancillary relays.

8.5.3 OPERATING SEQUENCE - RELAY SEARCHES

The relay search functions allow an operator to search for relays in a particular condition.

To start a search from the base display, press:



Select the option required. Available options are:

"1"	Activated	-	Searches for any ancillary relays in the activated state, whether or not they are isolated or mapped to the MAF.
"2"	Isolated	-	Searches for any relays that are isolated, whether or not they are mapped to the MAF.
"3"	Faults	-	Searches for supervision faults, whether or not they are isolated or mapped to the MAF.
"4"	Status	-	Prompts for a relay number and displays the status of that relay as described in the previous section.

When an option has been selected, the RDU searches for a relay that meets the specified criteria. If a relay is found that meets the specified criteria, the LCD display reverts to a status display for that relay. When the "NEXT" or "PREV" key is pressed, the search continues for the next or previous relay respectively, that meets the original search criteria.

If no relays matching the criteria are found, the LCD briefly displays a message saying so, and reverts to the base display.

8.6 NEW ZEALAND MODE TRIAL EVAC OPERATION

The NZ display extender board can have a trial evac keyswitch connected which can be used to energise the Warning System at either the FIP or the RDU depending on programming at the RDU.

If the RDU is programmed to have trial evac sent to the FIP ("control FIP" enabled) then activating the trial evac keyswitch at the RDU will cause the bells relay at the FIP to be energised and may also cause the bells relay (if any) at the RDU to be energised depending on the type and version of FIP.

If the RDU is programmed to have trial evac take effect locally then activating the trial evac keyswitch at the RDU will cause the Warning System at the RDU to be activated.

CHAPTER 9
OPERATING INSTRUCTIONS - TEST FUNCTIONS

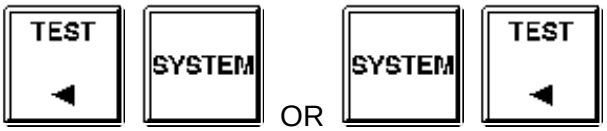
9.1 SYSTEM TEST

9.1.1 FUNCTION

A system test checks the RAM, the firmware checksum and the database checksum.

9.1.2 OPERATING SEQUENCE

From the base display, press:



A system test cannot be initiated if any of the following are present:

(a) Database checksum error.
(b) Battery very low.
(c) Shift register bus fault.
(d) Remote-test currently in progress.

If none of the above are present, a system test will be initiated and the LCD will show "System test in progress - press RESET to abort".

The test may be terminated prematurely by pressing the "RESET" key.

If the test fails for any reason, a test fail cadence will sound on the buzzer and an error message will appear on the display.

9.1.2.1 MEMORY TESTS

If the RAM or firmware checksum tests fail, then the Brigade standby relay is de-energised and the "SYSTEM FAULT" LED turns on, but the RDU remains operational.

If the database checksum test fails then the RDU stops communicating with the FIP and becomes non-operational and the standby relay is de-energised.

If the test fails, there is probably a hardware fault present and the controller board might need replacing. It may be possible to clear the fault by powering the RDU off and on or by repeating the system test.

If a database checksum error is present, a system test cannot be initiated but the database checksum can be re-checked using the Recall CRC command (refer Section 6.8).

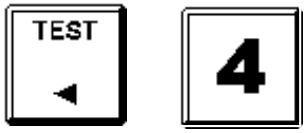
9.2 DISPLAY TEST

9.2.1 FUNCTION

To momentarily flash all LED indicators to visually inspect that they are working correctly, and to test operation of the LCD.

9.2.2 OPERATING SEQUENCE

From the base display, press:



A number of test patterns are displayed on the LCD.

At the same time as the LCD test pattern is shown, the LED indicators on the front panel will be flashed on for half a second, off for half a second, for 5 seconds. The "MAINS ON" LED is not affected by the test. The other front panel LEDs should be on and off simultaneously for the 5 seconds.

After the front panel LEDs and LCD have been tested, the zone (and relay) LED Display boards will be tested, one board (16 zones) at a time. Each Display board will be tested for about 2 seconds and all 32 or 48 LEDs on the board will be turned on for 1.5 seconds and then off for half a second.

The testing of the LED display boards can be terminated by pressing "RESET".

The test can be paused or resumed at a particular display board by using the "ISOL" key. The test can be stepped to the next display board by using the "ACK" key.

9.3 BUZZER TEST

9.3.1 FUNCTION

To test the buzzer for both loud and quiet operation. The buzzer has loud operation for when the RDU door is closed, and quiet for when the door is open.

9.3.2 OPERATING SEQUENCE

From the base display, press:

The buzzer will turn on "loud" for 2-3 seconds, followed by "quiet" for 2-3 seconds.

9.4 BATTERY TEST (MAF-RDU ONLY)

9.4.1 FUNCTION

To initiate a test on the standby battery for MAF configured RDUs for 40 minutes. If Daily Battery test is enabled with programming, a 40 minute battery test is initiated by a command from the FIP at the start of every daily auto test. If enabled with programming, a battery connection test is automatically performed every 30 seconds and a 90 second battery test (capacity test) is performed every hour. The PSU Faults Inhibit command (refer section 6.9) can be used to inhibit faults produced when a flat battery is being re-charged.

9.4.2 OPERATING SEQUENCE

From the base display press the "BATT TEST" key.

- The message "Press ENTER to initiate battery test" will appear.

Press the "ENTER" key to initiate the battery test, or "CLEAR ESC" to exit. When the battery test is initiated the display will show "Battery test in progress - press ACK to abort".

TO STOP THE BATTERY TEST WHEN RUNNING

- Press the "ACK" key.

THE TEST PASSES

- If the battery voltage remains within specification for the duration of the test, the test will terminate and the LCD displays "Battery test passed. Press ACK".
- Press the "ACK" key and the LCD will revert to the base display.

THE TEST FAILS

- If during the test a battery low is detected, the test will terminate and the "CHGR/BATT FAULT" LED indicator will flash.
- The LCD will display "Battery test failed. Press ACK".
- Press the "ACK" key to exit back to the base display.
- Perform another battery test after 24 hours and if this also fails, contact your service company.
- If it is known that the battery needs recharging then battery and power supply faults can be inhibited as described in Section 6.9.

9.5 ANCILLARY RELAY TEST (MAF-RDU ONLY)

The ancillary and bell relay tests apply to only MAF configured RDUs. These tests are described in section 8.4.

CHAPTER 10
PLACING INTO OPERATION

10.1 GENERAL

This chapter describes the procedure to place an RDU into operation. It assumes that the power and other field wiring have been connected, but that the battery has not. Note that all electronic modules were tested and adjusted in the factory and should need no further adjustment.

Customisation will be required by the system installer to program the RDU to set up a number of parameters, including :

- RDU address to match that at the FIP (default = 1);
- type of Display / Relay Driver board(s) fitted (if any);
- and many other parameters.

Please refer to the "RDU Installation and Programming Manual" for more information.

10.2 PLACING INTO OPERATION: MAF-RDU

10.2.1 VISUAL INSPECTION

Before switching on power, inspect the cabinet and internals. Check as follows:

1. Check that all equipment is securely mounted, and that all cables are connected at the appropriate points. The factory checklist is included.

2. Check the 16 Zone LED Displays (if present) are fitted and connected correctly with link LK1 fitted on the last board only. For New Zealand operation, check that the display extender board (if any), is connected correctly and that none of the display boards have link LK1 fitted.

3. Check that the batteries are not connected yet. If the system is a retro-fit or the MAF board is old, check that battery test resistors (R52, R53) on the MAF/PSU are not fitted. **All battery test resistors must be removed otherwise they will burn out when the 40 minute daily auto battery test or a manual battery test is done.**

4. Check that links Lk2-4 on the MAF are fitted (unless Anc3 is being used as a clean contact relay output).

5. Check that a 3 wire comms connection (0Volts, Tx, Rx) has been made to the FIP with Tx & Rx at the FIP routed to Rx & Tx respectively at the RDU. Also check that the FIP has been programmed correctly to send status to/receive commands from the RDU.

The "MAINS ISOLATE SWITCH" is located at the top right hand side of the cabinet rear, to the left of the mains transformer, behind the inner display door. This controls the mains power to the RDU, charger and power supply, and should be left on once the RDU is operational.

10.2.2 POWER UP

NOTE: The Battery is not disconnected by the "MAINS ISOLATE SWITCH".

To place the RDU into operation, perform the following steps:

STEP 1 Ensure that the Mains Isolate Switch is OFF.

STEP 2 Ensure that 240 VAC is connected to the panel from the mains distribution switchboard.

STEP 3 If an E2INIT (database re-initialize) is required, fit Lk7 on the Controller to the DATABASE WRITE ENABLE position and fit minijump SW1. (Refer to the RDU Programming and Installation Manual).

Turn the Mains Isolate switch ON.

STEP 4 Check that the buzzer sounds and all LEDs on the Operator Display panel flash for approx 4 seconds (except Mains On).

STEP 5 Check that the green "MAINS ON" LED indicator is on.
The Controller performs tests on its memory, electronics, and the LCD.

STEP 6 If doing a database re-initialize, remove minijump SW1 and press "ACK" to complete the sequence.

STEP 7 Check that the LCD has good visibility.

STEP 8 Install and connect the batteries.
Take care not to short the battery leads or connect in reverse polarity.

STEP 9 If required, complete programming as per the RDU Programming and Installation Manual and then fit Lk7 on the Controller to the DATABASE PROTECT position. Use the Recall CRC command from the Recall menu (refer section 6.8) and record the database CRC and last changed time/date in the logbook.

STEP 10 Perform a Battery Test. If this fails, check the battery connections, leave for 24 hours and then retest.

STEP 11 Perform a System Test at the RDU and an operate test on all ancillary relays.

STEP 12 Check that zone status conditions at the FIP are received and annunciated correctly at the RDU and that commands issued at the RDU (non-mimic mode) act correctly to acknowledge, reset and isolate zones. A full commissioning test should be carried out as per AS1670.1 or NZS4512.

10.3 PLACING INTO OPERATION: SLIMLINE

10.3.1 VISUAL INSPECTION

Before switching on power (i.e., do not install RDU remote termination board Fuse F1), inspect the cabinet and internals. Check as follows:

1. Check that all equipment is securely mounted, and that all cables are connected at the appropriate points. The factory checklist is included.

2. Check that a 4 wire comms plus power connection has been made to the FIP with Tx & Rx at the FIP routed to Rx & Tx respectively at the RDU. Also check that the FIP has been programmed correctly to send status to/receive commands from the RDU.

3. Double check the FIP PSU and battery ratings to ensure there is sufficient capacity to cope with the extra loading due to connection of the RDU.

10.3.2 POWER UP

To place the RDU into operation, perform the following steps:

STEP 1 If a database re-initialize is required before programming, fit Lk7 on the Controller to the DATABASE WRITE ENABLE position and fit minijump SW1. Install the 2A Fuse supplied into holder F1 on the Remote Termination Board.

STEP 2 Check that the buzzer sounds and all LEDs on the Operator Display panel flash for approx 4 seconds (except Mains On).

STEP 3 The Controller performs tests on its memory, electronics, and the LCD.

STEP 4 If doing a database re-initialize, remove minijump SW1 and press "ACK" to complete the sequence.

STEP 5 Check that the LCD has good visibility.

STEP 6 If required, complete programming and then fit Lk7 on the Controller to the DATABASE PROTECT position.

STEP 7 Perform a System Test at the RDU, then a system test at the FIP (de-isolate all zones first).

STEP 8 Check that zone status conditions at the FIP are received and annunciated correctly at the RDU and that commands issued at the RDU (non-mimic mode) act correctly to acknowledge, reset and isolate zones. A full commissioning test should be carried out as per AS1670.1 or NZS4512.

10.4 COMMISSIONING CHECKLIST: MAF-RDU

The following checklist should be completed and placed with other System Configuration Information. (Note that all pcbs are electronically tested and adjusted before being fitted to the RDU).

1. CABINET & GENERAL

A)	Cabinet colour - Standard Cream Wrinkle (BFF 998 CW)	☐
	- Other:	☐
B)	Cabinet undamaged (Paint OK)	☐
C)	Door aligned correctly	☐
D)	Window undamaged and fitted correctly	☐
E)	MCP fitted and undamaged	☐
F)	Cabinet Door locks firmly, operates microswitch	☐
G)	Lock - 003 Type & two keys supplied	☐
H)	Door seals fitted to top and sides	☐
I)	Display Keypad and 4U door fitted & aligned correctly	☐
J)	Standoffs fitted to cabinet rear (none missing)	☐
K)	Operator Manual, battery leads & MCP key included	☐
L)	VIGILANT RDU label completed	☐

2. PCBS & WIRING

A)	MAF/PSU Fitted securely on standoffs	☐
B)	Controller/Display fitted securely	☐
C)	FRC Looms fitted correctly	☐
D)	MCP & door switch wires fitted to J6 of MAF/PSU, secured	☐
E)	Earth wire fitted to display door	☐
F)	All modules earth to cabinet metal	☐

3. POWER SUPPLY

A)	Mains Wired correctly, MOV, cap fitted	☐
B)	"Mains Isolate Switch" and "NAE" label fitted	☐
C)	Mains Earth wired to stud, good contact	☐
D)	All 6 fuses fitted to MAF/PSU	☐
E)	Mains Switch neon off/on for switch off/on	☐
F)	MAF/PSU Mains On LED on, Fuse Blown LED off	☐
G)	VRECT at DC IN tab 40-42Vdc	☐
H)	Charger Voltage 27.3-27.4V warm, 27.5-27.6V cold	☐

4. OPERATION

A)	LEDs bright through window, "MAINS ON" LED on	☐
B)	Correct modules are configured.	☐
C)	Buzzer louder with microswitch operated (Controller link LK2 “Service Mode” fitted)	☐
D)	Controller link LK7 in "Protect" position	☐
E)	LCD contrast correct for front view	☐
F)	System test pass	☐
G)	Recall -> MCP shows "MCP Alarm" for MCP operation	☐
H)	Acknowledge silences buzzer	☐

SERIAL NUMBER ☐ TEST PASSED ☐

DATE : ……..... SIGNATURE : …….....

10.5 COMMISSIONING CHECKLIST: SLIMLINE

The following checklist should be completed and placed with other System Configuration Information. (Note that all PCBs are electronically tested and adjusted before being fitted to the RDU).

1. CABINET & GENERAL

A) Cabinet colour – Standard APO Grey ☐

- Other: ☐

B) Cabinet undamaged (Paint OK) ☐

C) Door aligned correctly ☐

D) Cabinet Door locks firmly, operates microswitch ☐

E) Lock – 003 Type & two keys supplied ☐

F) Display, Keypad and Status LEDs fitted & aligned correctly ☐

G) Operator Manual included ☐

H) VIGILANT RDU label completed ☐

2. PCBS & WIRING

A) Controller/Display fitted securely ☐

B) Remote Termination Bd fitted securely, Fuse F1 installed ☐

C) FRC Looms fitted correctly ☐

D) Door switch fitted to J7 of Remote Termination Bd ☐

3. OPERATION

A) LEDs bright through window ☐

B) Correct modules are configured. ☐

C) Keypad disabled, Buzzer louder with keyswitch hard clk-wise ☐

D) Controller link LK7 in “Protect” position ☐

E) LCD contrast correct for front view ☐

F) Passes System Test ☐

G) Acknowledge silences buzzer ☐

H) Controller link Lk2 (Service Mode) Fitted ☐

SERIAL NUMBER [ ] TEST PASSED ☐

DATE : ……..... SIGNATURE : …….....

CHAPTER 11
SYSTEM TESTING AND MAINTENANCE

11.1 SYSTEM TESTING AND FAULT FINDING

The RDU has various test and diagnostic facilities to check functionality of the system and assist fault finding.

Self Testing includes checking: FIP to RDU communications; Controller memory; real time clock; I/O bus communications; display/relay driver boards present; LCD module operation; and MAF/PSU module functionality.

Should the RDU discover a fault it will annunciate a System Fault and take appropriate action. For example, if the RDU detects a loss of communications from the FIP the System Fault Buzzer and LED will turn on, processing of zone status will cease, the Standby relay will de-energise (if fitted) and a recall of system faults will show "Scan Fail".

Remote Auto Test operates on a daily basis (holidays excluded) on command from the FIP and checks the RDU memory and configuration database.

Operator controlled tests include LED, LCD display tests, buzzer tests, battery test, and ancillary relay/bells output tests. Refer to Chapter 9 for more detail.

Routine testing should include checking that zone status messages (e.g., alarm, fault) as sent from the FIP are received and annunciated correctly at the RDU. Also check that commands sent from the RDU (Non-Mimic modes of operation only) are received and acted on at the FIP.

The cause of any faults within the system can be found as per Section 4.4.

> Should a fault occur within the RDU electronics or system wiring, the operator should call a service person to check functionality and establish which facilities do not operate.
>
> Only a suitably trained technician should attempt to repair wiring or replace suspect modules.

Once it is established which particular module has a fault, the RDU should be disconnected from all sources of power (both mains and battery) and the module replaced by a trained technician.

> All faults and alarms should be recorded in the system log book, with time and date of occurrence.

11.2 SYSTEM MAINTENANCE

The RDU is designed for high reliability and minimum maintenance. However, in Australia, in order to comply with the requirements of AS1851, the owner/occupier (or a nominated representative) must carry out system tests on a regular basis. In New Zealand, regular testing must be carried out to comply with NZS4512 parts 602 and 603. This is normally carried out by approved fire alarm contractors.

11.3 AS 1851 TESTING REQUIREMENTS

11.3.1 AS 1851 TESTING - GUIDE FOR THE RDU - SPECIFIC TEST METHODS

The RDU and its associated equipment must be tested at regular intervals. Test criteria, service intervals, and record keeping requirements, are specified in the appropriate Standard, AS 1851-2102 (and amendments).

The following sections describe how service persons may perform some of the required inspections and tests, where the method may not be immediately obvious or where special operation or features will be required. The references in the tables to "AS 1851 Item Number" refer to Table 6.4.1.2 through 6.4.1.5 in AS 1851-2012. References to just Section x.y refer to sections in this manual.

Note; this is not intended to be used as a complete list of AS 1851 maintenance requirements, nor as a complete test schedule.

It is strongly recommended that a System Test is performed at the end of each monthly test and at the end of each service call. Refer to Section 9.1 for instructions.

11.3.2 MONTHLY TESTS

Monthly Tests			
AS 1851 Item No	**Description**	**Action required and pass/fail criteria**	**Test Facility, Procedure, Notes**
1.4	Fire alarm	Simulate an alarm condition via an alarm zone and check that all required common visual and audible indications and output controls activate at the RDU. Test multiple zones if necessary, to ensure that all outputs and indications are tested, including MAF relays, if any, and zone display/ relay boards. With some systems, a zone alarm test can be initiated at the RDU, otherwise the test must be initiated at the FIP.	Refer Section 7.5. Failure of the MAF alarm relay should be treated as a critical defect – refer AS 1851, Section 1.5.6.
1.6	Isolate	Initiate an isolate condition and check that all required common visual and audible indications and output controls activate at the RDU.	Refer Section 7.2. Failure of the isolate relay should be treated as a non-critical defect – refer AS 1851, Section 1.5.6.

11.3.3 ANNUAL TESTS

Before proceeding with Annual Tests, check that the installed RDU software is up to date (refer Section 6.8). If it is not, consider installing the current version of software.
Also check the site specific configuration details are up to date and in the log book. Use the Database CRC Recall function – refer to Section 6.8. If these do not match the database most recently commissioned – then ascertain why and correct as necessary.

Additional tests to be done annually.			
AS 1851 Item No	**Description**	**Action required and pass/fail criteria**	**Test Facility, Procedure, Notes**
3.5	Panel Switches	Test the operation of each control.	Refer Section 11.3.5.
3.6	Visual indicators	Test the operation of CIE LED and alphanumeric indicators	Display Test as per Section 9.2.
3.7	Battery	When the battery has not been replaced within the previous two years, ensure the battery capacity is at least equal to the capacity required for quiescent current and alarm current conditions by carrying out a discharge TEST in accordance with the manufacturer's recommendations.	The RDU battery test functions do not meet the requirements of this test. A separate test method must be used. Refer Section 11.3.4.

11.3.4 BATTERY LOAD DISCHARGE TESTING (AS 1851 ITEM 2.15)

The RDU has no provision for load discharge testing of the battery at the levels required for yearly testing to AS 1851-2012.

A load discharge method separate from the panel must be arranged in order to meet this requirement. For example, apply an external test load to the battery and operate the RDU with mains power off for 30 minutes. Check the battery voltage at the end of the test.

11.3.5 KEYPAD TEST

A diagnostic mode is available for testing the keypad. From the base display, press PRINT, BATT TEST, then select option 2 (keypad). Press each key on the keypad in turn and check that a beep is heard for each key. Press and hold down the CLEAR key for a short time to exit the diagnostic mode.