

Honeywell

Galaxy

3-48C, 3-144, 3-144C, 3-520, 3-520C

Installation Manual

Contents

Introduction 1-1

 Variants 1-1

Section 1: Quick Setup 1-3

Section 2: System Architecture 2-1

 PCB Layout 2-4

 RS485 Expansion Module (G3-520 only) 2-5

 System Installation and Wiring 2-6

 Connecting the Galaxy 3 Series to the PSTN 2-7

 Connecting Additional Telecom Apparatus 2-8

 Line Monitoring 2-8

 Stand-by Battery 2-9

 Battery Start-up 2-9

 On-Board Power Supply Unit 2-9

 Memory 2-10

 RS485 Data Communication Bus (AB Lines) 2-10

 RS485 Wiring Configurations 2-10

 RS485 Wiring Recommendations 2-11

 Zones 2-13

 Zone Addresses 2-13

 Zone Addressing with Onboard RIO Switch 2-14

 Wiring Zones 2-14

 Wiring Multiple Zones 2-15

 Wiring Keyswitches 2-15

 Wiring Terminator Buttons 2-16

 Outputs 2-16

 Output Applications 2-17

 SPI Header 2-18

Section 3: Optional Modules and Facilities 3-1

 Remote Input Output (RIO) Modules – C072 3-1

 Addressing 3-1

 Connecting the RIO 3-2

 Configuring the RIO 3-2

 Outputs 3-3

Entry/Exit RIO	3-3
Entry/Exit RIO Zone Programming	3-4
Entry/Exit RIO Zone Operation	3-4
Slave RIO	3-4
RF RIO – C076	3-5
Connecting the RF RIO	3-5
Addressing the RF RIO	3-6
Address Ranges	3-6
RF RIO Programming	3-7
Configuring the RF RIO	3-7
Output Module – C078	3-8
Addressing	3-8
Connecting the Output Module	3-9
Configuring the Output Module	3-9
Outputs	3-9
Configuration Jumpers	3-10
Relay Module	3-11
Technical Specification - Output Module	3-11
Technical Specification - Relay Module	3-11
Power Supply Unit	3-12
Configuration	3-12
Installation Instructions	3-13
Battery	3-14
Battery Test	3-14
Specifications	3-14
EN50131 Compliance	3-14
Printer Interface Module-A134/A161	3-15
Telecom Module – E062	3-16
Connection to the PSTN	3-16
Programming the Telecom Module	3-16
RS232 Interface Module - E054	3-17
Interface with a PC	3-17
Serial Printer Interface	3-18
ISDN Module – E077	3-19
Programming the ISDN Module	3-19
Ethernet Module - E080	3-20
Configuring the Ethernet Module	3-20
Ethernet Communication	3-20
Remote Servicing Suite	3-21
Event Monitoring	3-21
Galaxy Gold	3-21
User Management Suite	3-21

Section 4: The Galaxy Mk7 Keypad/KeyProx	4-1
General.....	4-1
Power Consumption	4-1
Wiring the Keypad/KeyProx.....	4-2
Addressing	4-2
Keypad/KeyProx Installation Procedure	4-2
Volume Control	4-4
Adding a Keypad/KeyProx to the System.....	4-4
Removing a Keypad/KeyProx from the System	4-4
Self Diagnostics	4-5
Keypad/KeyProx Operation	4-5
Number Keys	4-5
View Keys	4-5
Enter Key	4-5
Escape Key.....	4-6
Hash Key	4-6
Star Key	4-6
Power LED	4-7
Display	4-7
The Galaxy KeyProx	4-8
General	4-8
Addressing	4-8
Operation.....	4-8
Card Types	4-8
Section 5: Door Control Module - MAX3	5-1
Introduction.....	5-1
Standalone	5-1
On-line	5-1
Installing the MAX3	5-1
MAX3 Pack	5-1
Mounting the MAX3.....	5-1
Wiring the MAX3	5-2
Configuring a MAX3 Reader into the System	5-3
Configuring as On-Line MAX3.....	5-3
Configuring as a Stand-Alone MAX3	5-4
Removing a MAX3 Reader from the System.....	5-5
On-Line Mode.....	5-5
Operating Instructions	5-5
Card-Held Function.....	5-5
Card-Held System Setting	5-5
MAX3 Log	5-6
Downloading the MAX3 Log.....	5-6

Dual Access Cards	5-7
Dual Focus (Card Held)	5-7
Timed Anti-Passback	5-7
Appendix A : Door Control - MAX (MX01)	A-1
Installation Instructions	A-1
Wiring the MAX	A-1
Mounting the MAX	A-2
Surface Mounting the MAX	A-2
Flush Mounting the MAX	A-2
Configuring a MAX Reader into the System	A-3
Configuring as a Stand-Alone MAX	A-3
Configuring as On-Line MAX	A-4
Removing a MAX Reader from the System	A-5
Stand Alone Mode	A-5
On-Line Mode	A-5
Programming Instructions for On-Line Readers	A-5
Operating Instructions (On-Line Modes)	A-6
Gaining Access	A-6
Card-Held Function	A-6
Max Log	A-7
Max Events Print-Out	A-7
Appendix B: 3 Ampere Smart PSU - P015	B-1
Grounding	B-1
Appendix C: Panel Comparisons	C-1
Appendix D: Declaration of Conformity	D-1
Compliance and Approvals	D-1
EN50131 Compliance	D-2
PD6662 Compliance	D-2
Public Switched Telephone Network (PSTN) approval	D-2
Appendix E: Specifications	E-1
Panel Specifications	E-1
Appendix F: Parts List Index	F-1
Index	1

Introduction

This manual gives full instructions required to install a Galaxy 3 Series control panel and associated peripherals.

Throughout this Installation Manual, references to menu options, unless otherwise indicated, are found in the **Galaxy 3 Series Programming Manual**, part number **IP1-0033**.

Variants

The Galaxy 3 Series is available in five variants: 3-48C; 3-144; 3-144C; 3-520; 3-520C. The differences between each variant are shown in the following table:

VARIANT	ON-BOARD COMMS	RS485 EXPANSION MODULE	RS485 LINES
3-48C	YES	NO	1
3-144	NO	NO	2
3-144C	YES	NO	2
3-520	NO	YES	4
3-520C	YES	YES	4

Table 1-1. Galaxy 3 Series Variants

NOTE: The RS485 Expansion module gives two extra lines (lines 3 and 4) on the 3-520 only.

Section 1: Quick Setup

To quickly set up a Galaxy 3 Series control panel for programming follow these simple steps:

- 1. Connect a 1k Ω (1%) resistor across each of the zones on the panel and any RIO's (if connected).
- 2. Ensure that the tamper return loop — the terminal marked as **AUX TAMP** on the PCB — is a complete loop.
NOTE: This is factory set as a completed loop with a 0 V return.
- 3. Connect one of the keypads to the **AB LINE** terminals on the control panel. The Galaxy 3-48 has one AB line; the Galaxy 3-144 has two AB lines; the Galaxy 3-520 has four AB lines (when an RS485 Expansion Module is fitted).

NOTE: G3-48 - There is one AB LINE terminal on the control panel PCB.
NOTE: G3-144/G3-520 - There are two AB LINE terminals on the control panel PCB.

Control Panel (Line 1)	Keypad
B1	B
A1	A
-	-
+	+

Table 1-2. Terminal Connections

- 4. Connect a 680 Ω End Of Line (EOL) resistor across the **A** and **B** terminals of the keypad.
- 5. Ensure that the keypad is fitted to the wall (see **Keypad Installation Procedure, Section 4**).
- 6. Connect the battery before replacing the control panel lid.
- 7. Connect the mains wiring to the control panel. **Do not** switch the mains ON.
- 8. Replace the control panel lid and secure the fastening screws.
- 9. Switch on the mains voltage (230 V a.c. / 50 Hz).
- 10. The following sequence of events occur:
 - the keypad buzzer and control panel horn (if fitted) activate for 10 - 20 seconds,
 - flashing ***** is displayed on the keypad,
 - the sounders stop and the keypad displays become blank,
 - the green power LED lights and the following displays on the keypad

Configuring
Please Wait

- the default banner is then displayed on the keypad.

GALAXY <XXX> <VY. YY>
01: 01 SUN 01 JAN

where: XXX is the panel type
 Y.YY is the panel software revision

- 11. The system is now ready to be programmed. Refer to **Galaxy 3 Series Programming Manual: IP1-0033** for programming details.

Section 2: System Architecture

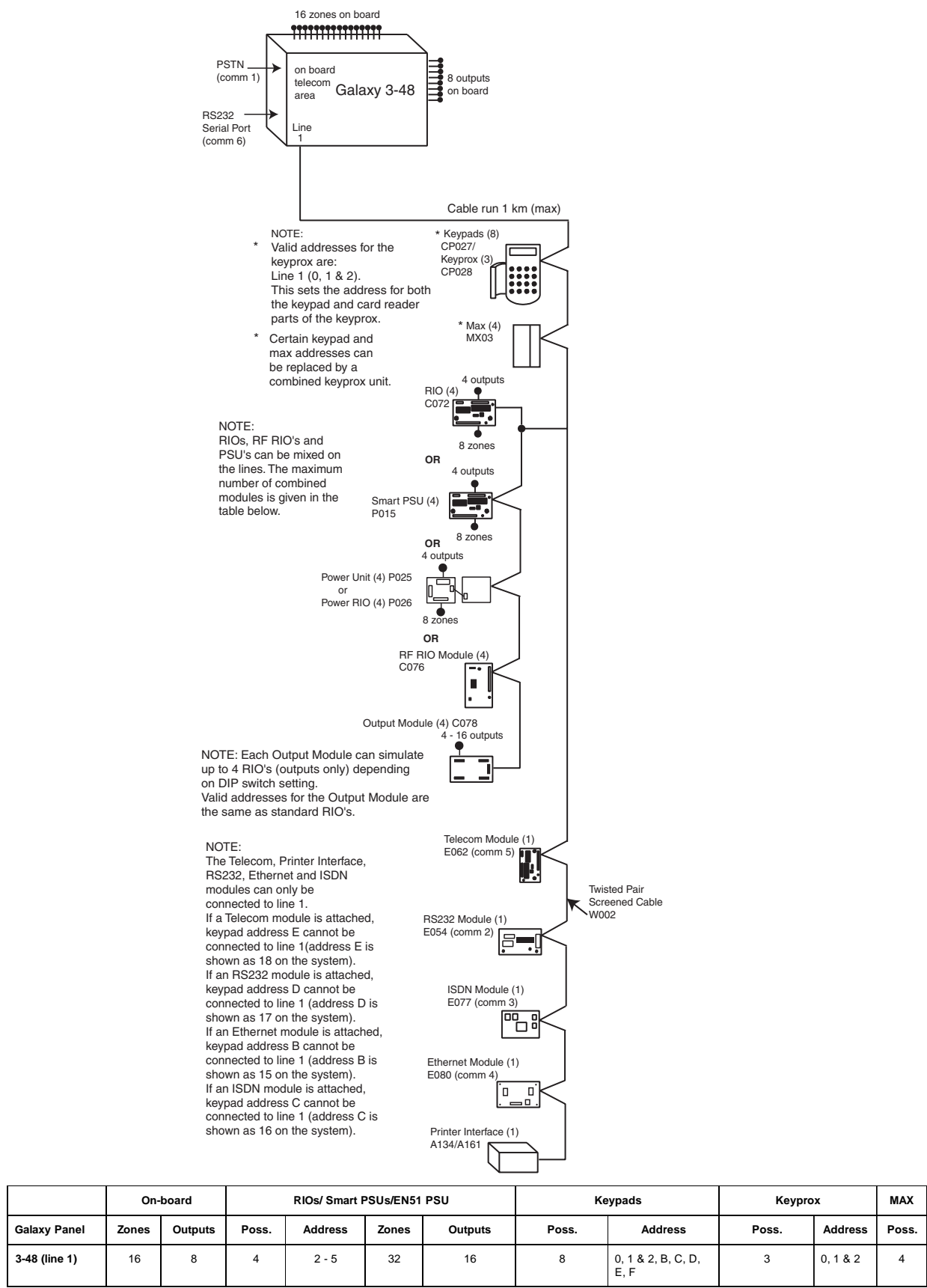


Figure 2-1. Galaxy 3-48 System Configuration

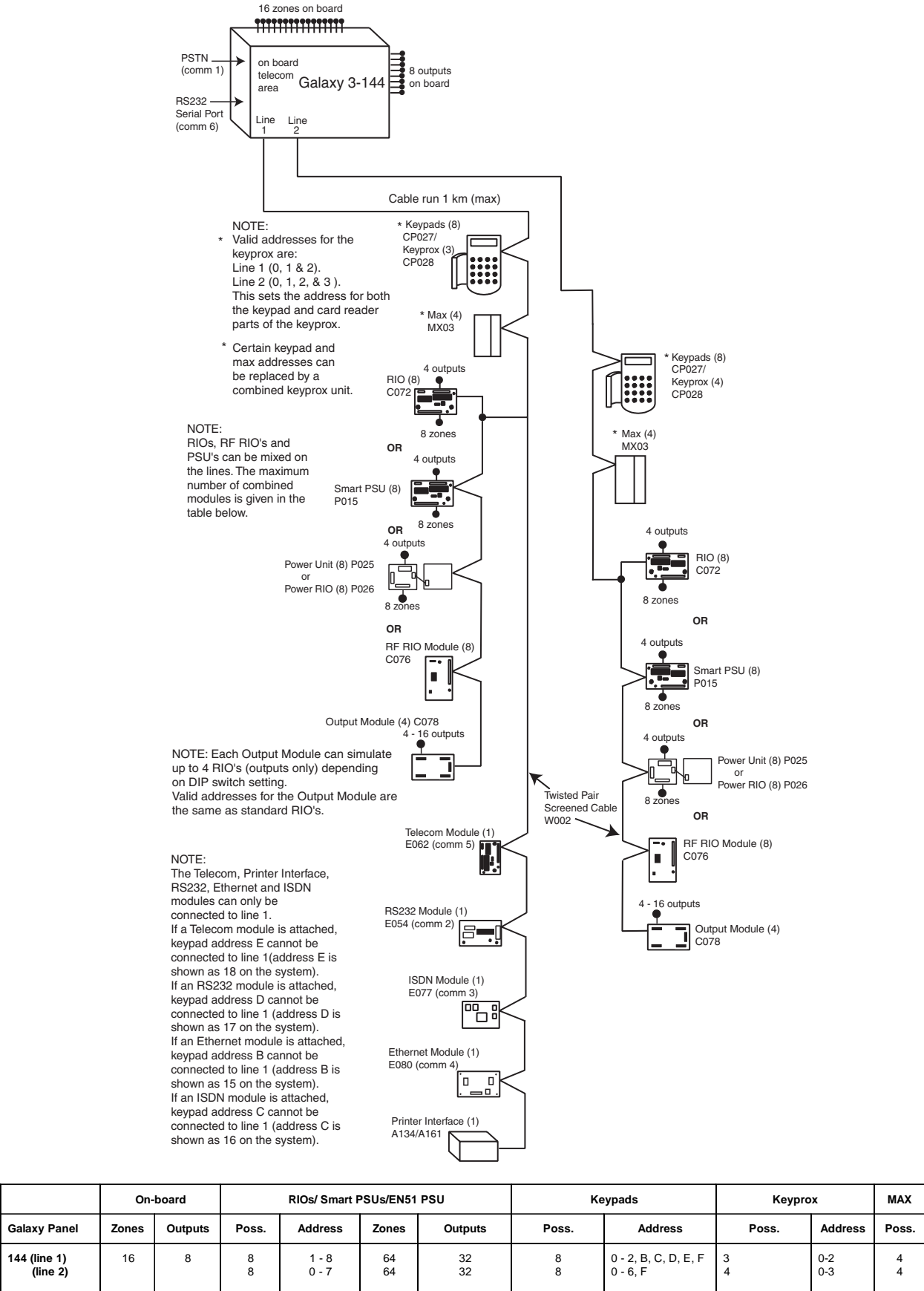
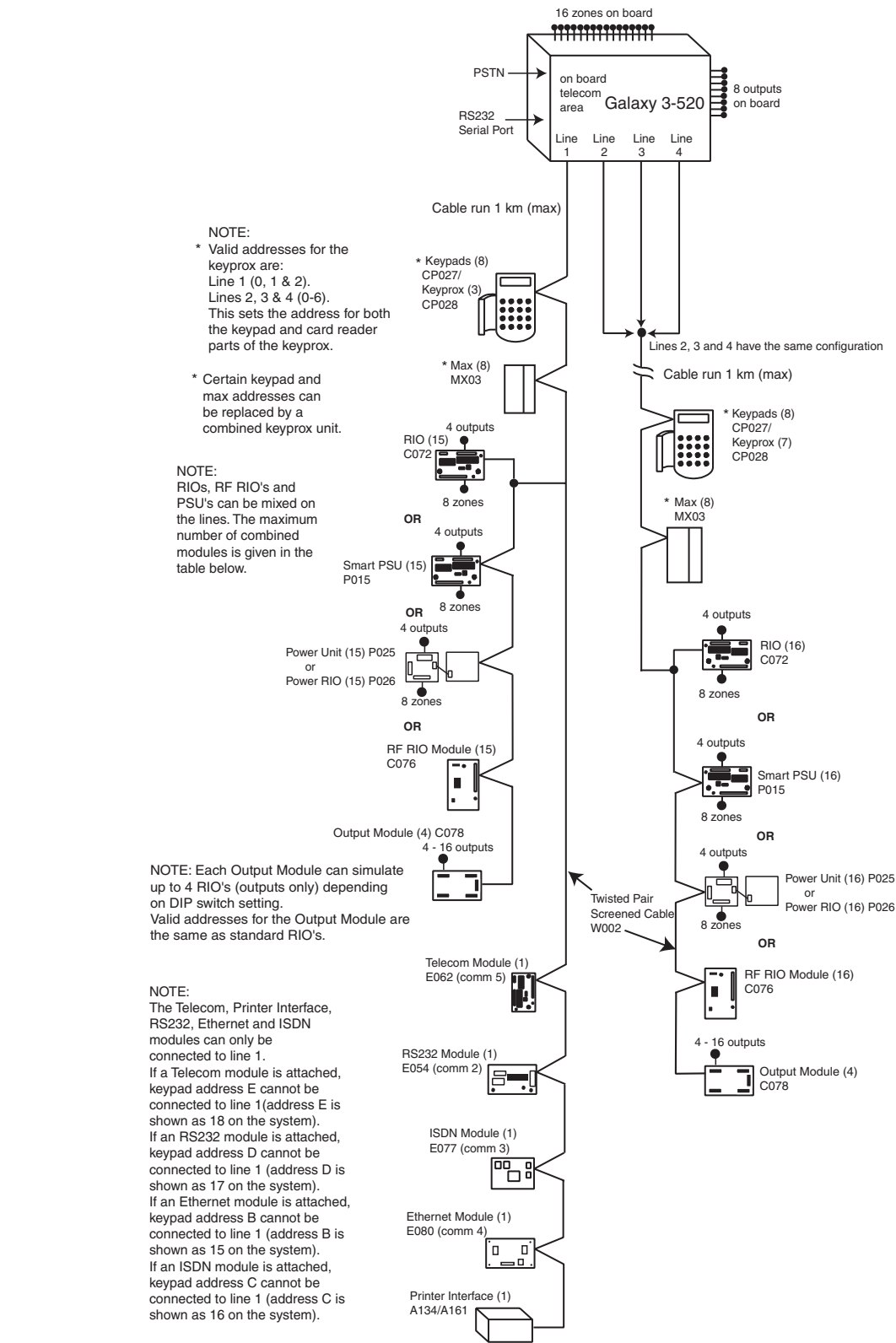


Figure 2-2. Galaxy 3-144 System Configuration



	On-board		RIOs/ Smart PSUs/EN51 PSU				Keypads		Keyprox		MAX
Galaxy Panel	Zones	Outputs	Poss.	Address	Zones	Outputs	Poss.	Address	Poss.	Address	Poss.
520 (line 1) (lines 2, 3, 4)	16	8	15 16	1 - 9, A - F 0 - 9, A - F	120 384	60 64	8 8	0 - 2, B, C, D, E, F 0 - 6, F	3 7	0-2 0-6	8 8

Figure 2-3. Galaxy 3-520 System Configuration

PCB Layout

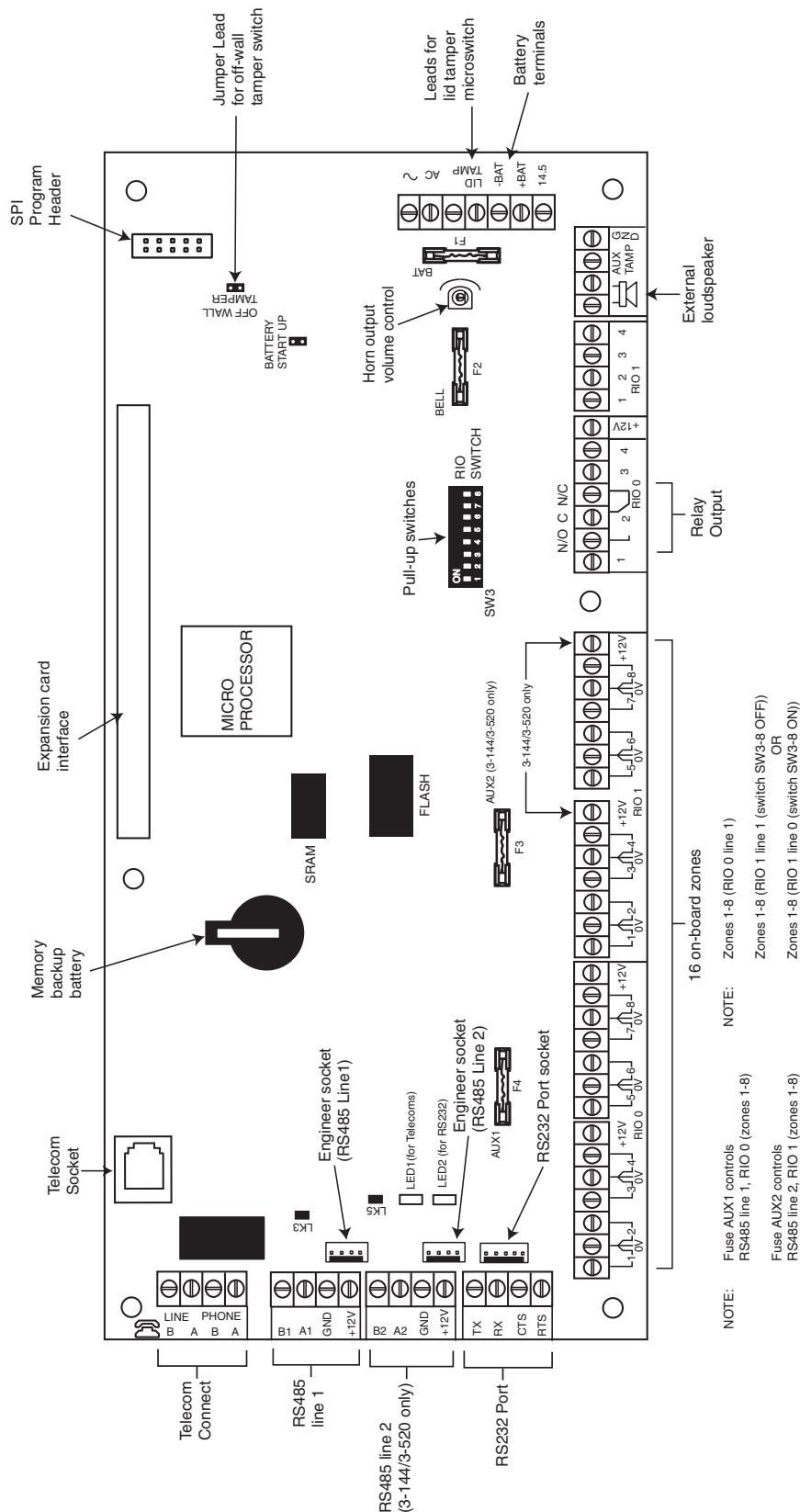


Figure 2-4. PCB Layout

The 7 transistorised outputs on the Galaxy 3 Series can be configured to open collectors by setting the dip switch SW3 to the OFF position.

NOTE: Output 2 on RIO 0 (relay output) is not affected.

The following table shows which outputs are controlled by which switches.

(SW3)	RIO	Output
1	0	1
2	0	3
3	0	4
4	1	1
5	1	2
6	1	3
7	1	4

Table 2-1. SW3 Transistorised Outputs Control

RS485 Expansion Module (G3-520 only)

The RS485 Expansion Module can be attached to the G3-520 to give 2 extra RS485 (AB) lines. The Expansion module must be wired in a daisy-chain configuration. That is, the **A** line from the previous module is connected to the A3 or A4 terminal of the Expansion Module. The RS485 (**AB**) line must have a 680 ohm resistor fitted across the **A** and **B** terminals of the last module on the line. If two lines are connected, both ends must be terminated with a 680 ohm resistor and the appropriate link (LK1 or LK2) removed.

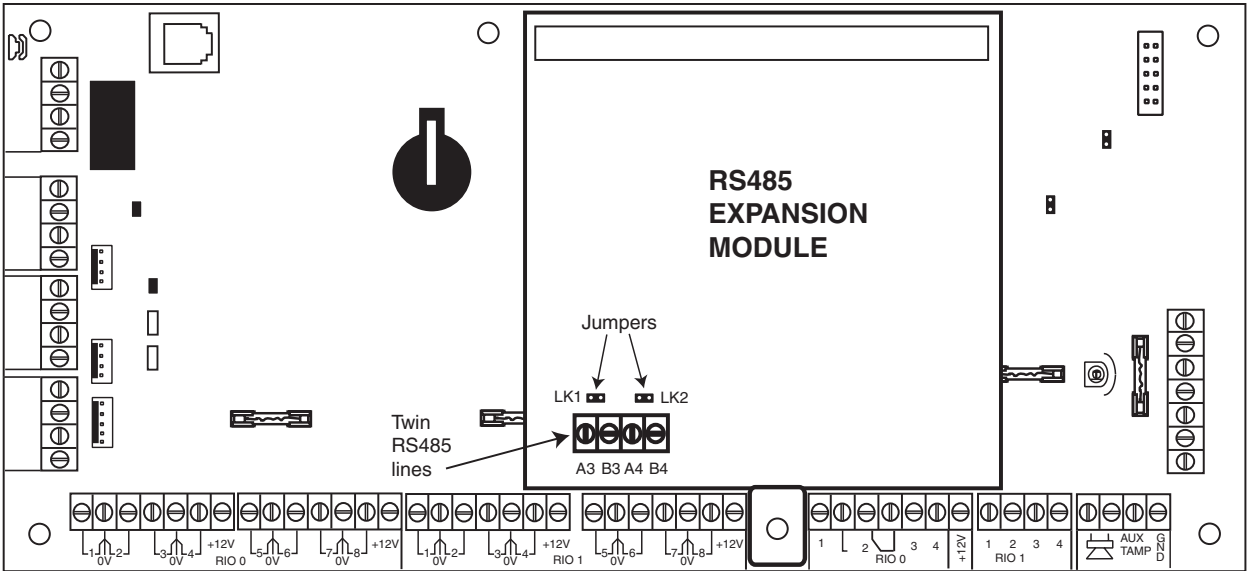


Figure 2-5. RS485 Expansion Module

System Installation and Wiring

The installation and wiring must be performed by a competent engineer. For permanently connected equipment, a readily accessible disconnect device must be incorporated in the fixed wiring having contact separation of at least 3 mm on each pole. The Galaxy 3 Series control panel must be connected to the a.c. mains supply (230/240 Va.c. 50 Hz) via a fused connection outlet.

The fuse in the mains outlet must not exceed 3A.

WARNING: A means of isolation from the mains supply must be provided within 2 metres of the control panel. Where live and neutral supplies can be identified, a fused spur with a 3 amp fuse, must be fitted on the live circuit. Where live and neutral circuits cannot be reliably identified, 3 amp fuses must be fitted to both circuits.

Route the mains cable through the hole on the right hand side of the enclosure base. Securely anchor the cable to the box using the tie-wrap as shown in the following Figure:

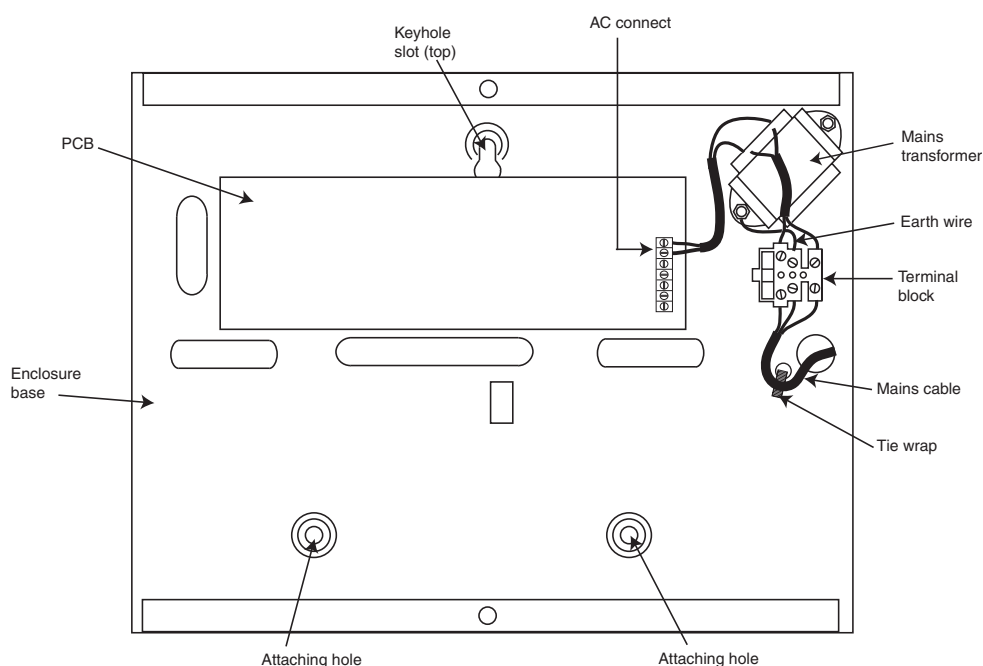


Figure 2-6. Securing the Mains Cable to the Enclosure Base

Secure the panel base to the wall using three 1.5" No. 8 round head steel screws through the holes provided.

The mains cable used must be a three core type (with green/yellow earth insulation) of adequate current carrying capacity.

NOTE: The mains cable must satisfy the requirements stated in BS6500.

Connect the mains cable to the mains terminal block as follows:

- blue wire to the terminal marked N (Neutral)
- green/yellow wire to the terminal marked (Earth)
- brown wire to the terminal marked L (Live)

NOTE: No other connections to the mains connector are permitted.

All wiring must be in accordance with the latest edition of the IEE Wiring Regulations, BS7671 (Requirements for Electrical Installations).

Connecting the Galaxy 3 Series to the PSTN

The Telecommunications Network Voltage (TNV) port (terminals A and B on PCB) must be permanently connected (hard-wired) to the PSTN via a BT master socket, refer to Figure 2-7.

Note: If the BT master socket is the newer type (NTE5/CTE5), then the connection can be carried out by the installation engineer. If the BT master socket is not an NTE5/CTE5, then the network operator must make the connection.

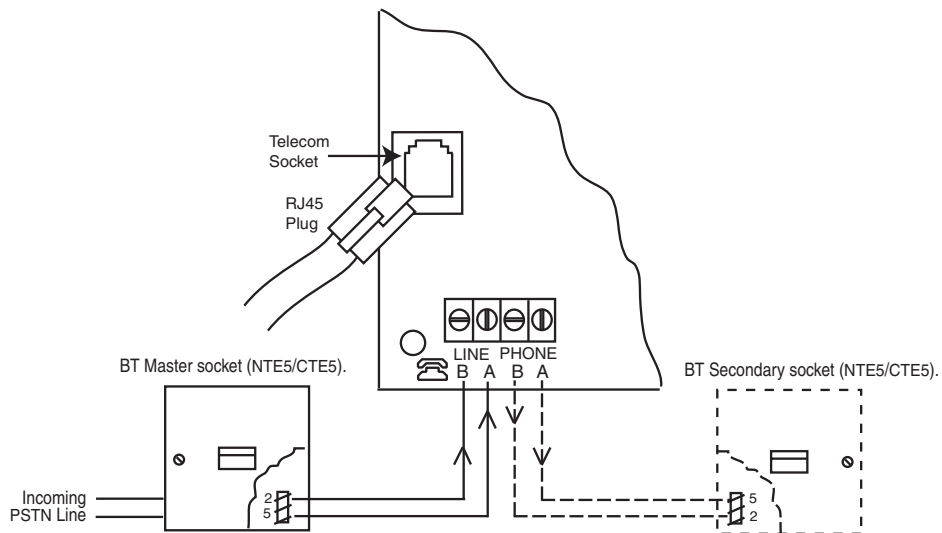


Figure 2-7. Connecting the Galaxy 3 Series to the PSTN

- NOTES:**
1. Terminals 2 and 5 on the BT Master Socket must be hard-wired to LINE A and B terminals on the Galaxy 3 Series PCB. The connection is polarity independent.
 2. It is strongly recommended that the Galaxy 3 Series panel is the only device on the line.
 3. If another device is to be connected to the line, connect the PHONE terminals on the PCB to terminals 2 and 5 on a second BT Master Socket.

There are two methods of connecting the on-board Telecom Module to the PSTN:

Method 1

Using cable suitable for connection to 2.8 mm diameter screw terminals, strip back approximately 20 mm of the outer sheath and then remove approximately 4 mm of the insulation from the wires to be connected to the Galaxy 3 Series PCB.

Connect terminals 2 and 5 on the BT Master socket across the LINE A and B terminals on the Galaxy 3 Series PCB, see Figure 2-7.

Method 2

Use a standard cable with RJ45 plug on one end and plug into the telecom socket on the Galaxy 3 Series PCB. Connect the other end of the cable to the BT Master socket as described in Method 1.

Connecting Additional Telecom Apparatus

A BT secondary socket, allows additional telecom apparatus to be connected in series with the on-board telecom module. Connect the PHONE terminals A and B on the PCB to the terminals on the BT secondary socket. See Figure 2-7.

Line Monitoring

Under normal idle state conditions, the on-board Telecom Module monitors the RS485 line. The communication status is indicated by the state of the red LED (LED1) as shown in the following table:

LED STATE	INDICATION
LED OFF	No d.c. supply to module
ON - 0.1s, OFF - 0.9s	Normal communication
Single pulse at end of call	Normal communication
Flashing at end of alarm call	Failed Communication
On during alarm monitoring, galaxy gold and SMS	Normal Communication
Flickering during alarm monitoring, galaxy gold and SMS	Poor communication
Flashes in time with ringing signal	Line Ringing
Pulses as each digit is dialled	Normal indication when making call

Table 2-2. Comms Status

Stand-by Battery

The Galaxy 3 Series control panels can accommodate up to 2 x 17 Ahr batteries. Ensure that the battery connector leads on the control panel Powers Supply Unit (PSU) are connected to the correct terminals on the battery.

CAUTION: There is a risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

Control Panel	Battery
-BAT	-ve terminal
+BAT	+ve terminal

Table 2-3. Battery/Control Panel connections

Battery Start-up

The system can be powered up via the **Battery Start-up** jumper if there is no AC power. To do this, short out the Battery Start-up jumper for the duration of the configuration process only. Never leave the Battery Start-up connected or else deep discharge of the Stand-by Battery will occur.

On-Board Power Supply Unit

The on-board Power Supply Unit (PSU) supplies and monitors power to the system and peripherals. The following table shows the fuse name and value in amps.

G3-144/G3-520: The Galaxy 3 Series control panel contains four fuses. Details are given in the table below.

NOTE: The G3-48 does not require fuse AUX2.

FUSE NAME	VALUE (AMPS)	MONITORS	TYPE
AUX1	1.0	RS485 Line 1, RIO 0, Zones 1-8: +12V, on-board comms	20 mm, anti-surge
AUX2	1.0	RS485 Line 2, RIO 1, zones 1-8 +12V	20 mm, anti-surge
BATT	1.6	Battery	20 mm, anti-surge
BELL	1.0	Outputs RIO 0 1-4, RIO 1 1-4, Horn output	20 mm, anti-surge

Table 2-4. On-board PSU Fuses

Power Monitoring Characteristics:

- Low battery level: 11.2V
- Deep discharge protection: 10.5V
- Overvoltage protection: 14.7V

G3-48

The PSU total capacity is 1.5A. Internally the PSU is split in two in order to ensure sufficient current is always available for stand-by battery recharge. The PSU capacity is broken down as follows:

- Battery: 0.75A
- Control PCB: 0.25A
- AUX +12V: 0.5A

G3-144/520

The PSU total capacity is 2.5A. Internally the PSU is split in two in order to ensure sufficient current is always available for stand-by battery recharge. The PSU capacity is broken down as follows:

- Battery: 1.25A
- Control PCB: 0.25A
- AUX +12V: 1.00A

The PSU is available for zones/outputs and peripherals.

Memory

The Galaxy 3 Series control panel is fitted with a memory chip with its own battery backup on the main PCB. This allows the panel to retain the system configuration, programming details and the event log for up to a year when both the mains power and standby battery have been disconnected. The memory backup battery must be kept in place to retain the memory during a mains failure. Re-apply power, this is known as a **warm start**.

To completely erase the system memory and return to the default settings, place a piece of thin card between the retaining clip and the memory backup battery then remove all power to the PCB for one minute. Re-apply power and remove the card. This is known as a **cold start**.

The memory backup battery should be replaced every 5 years.

CAUTION: There is a risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

CAUTION: Do not overstress the retaining clip when removing and installing the backup battery. The clip must maintain a firm pressure on the backup battery at all times.

RS485 Data Communication Bus (AB Lines)

Communication between the Galaxy control panels and the modules attached to the system takes place on the AB lines. The communication protocol is RS 485 format. The control panel constantly monitors the modules attached to it. A break in the communication from any of the modules generates a module tamper alarm

RS485 Wiring Configurations

The system **must** be wired in a daisy-chain configuration. That is the **A** line from the previous module is connected to the **A** terminal of the current module and then on to the **A** line of the next module.

The RS485 (**AB**) line must have a 680 Ω resistor fitted across the **A** and **B** terminals of the last module on the line. If two lines are connected, both ends must be terminated with 680 Ω resistors and the appropriate link (LK3 or LK5) removed.

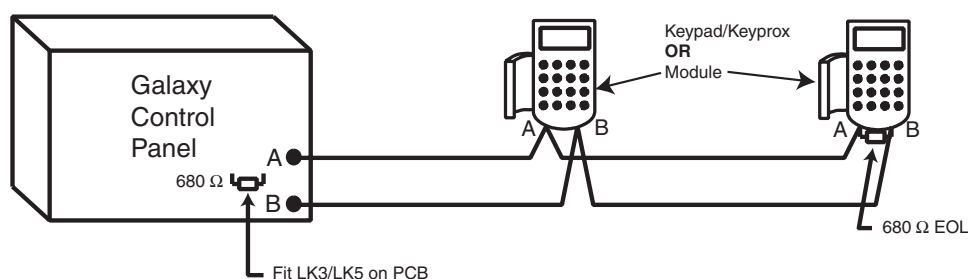


Figure 2-8. Daisy Chain Configuration

Each **AB** line can run in two directions from the control panel.

- Remove link LK3 (RS485 line1) or link LK5 (RS485 line2).
- Run two lines from the A and B terminals of the line.
- Terminate both Ends of Line (EOL) with a 680 ohm resistor.

NOTE: It is permissible to have different configurations on each line. For example, line 1 - Daisy chain; line 2 - twin AB daisy chain.

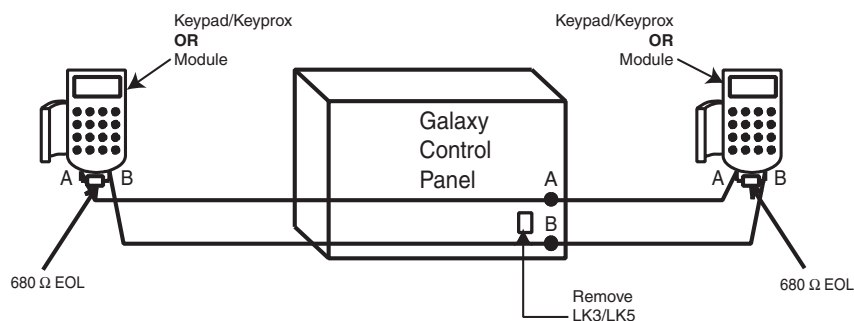


Figure 2-9. Twin AB Line Daisy-Chain configuration

RS485 Wiring Recommendations

To ensure that the system communicates at the maximum level of efficiency, the following recommendations **must** be adhered to:

- Each communication line can support 32 devices. The maximum number of devices on each line are:

	Galaxy 3-48 (Line 1 only)	Galaxy 3-144 (Lines 1-2)	Galaxy 3-520 (Lines 1-4)
Keypads	8	8 per line	8 per line
Keyprox	3	3 (line 1) 4 (line 2)	3 (line 1) 7 (lines 2, 3, 4)
RIO's/SPSU's	4	8 per line	15 (line 1) 16 (lines 2, 3, 4)
Output Module	4	4 per line	4 per line
RF RIO	4	8 per line	15 (line 1) 16 (lines 2, 3, 4)
MAX	4	4 per line	8 per line
RS232	1	1 (line 1 only)	1 (line 1 only)
Telecoms	1	1 (line 1 only)	1 (line 1 only)
Printer	1	1 (line 1 only)	1 (line 1 only)
ISDN	1	1 (line 1 only)	1 (line 1 only)
Ethernet	1	1 (line 1 only)	1 (line 1 only)

Table 2-5. Communication Devices

- The system **must** be wired in a daisy-chain configuration. Spur and star configurations **must not** be used as they reduce the immunity to electrical interference.
- The cable used to connect the RS485 (AB) line **must** be screened twisted pair (Part No. **W002**) or Belden 8723 equivalent.
- Shielded twisted pair cable, where used, is connected to the earthing pillar on the Galaxy control panel using the P-clip and nut supplied (refer to Figure 2-10).
- The RS485 (AB) line must have a 680 Ω resistor fitted across the A and B terminals of the last module on the line. If twin lines are connected, both ends must be terminated with 680 Ω resistors and the appropriate link on the control panel PCB must be removed (refer to figure 2-9).

6. There must only be a single **AB** pair of wires in each of the cables.
7. The minimum voltage level is 10.5 Vd.c. with 12.5 Vd.c. being the recommended working minimum.
8. The power supply in the Galaxy control panel and remote power supplies **must not** be connected in parallel.
9. The 0 V of all remote power supplies should be connected in common to the 0 V of the Galaxy control panel.
10. Ensure that any extension loudspeakers are not wired in the same cable as an **AB** pair of wires.
11. Where possible, ensure that the **AB** cable is at least 30 centimetres away from any other cables.
12. Where possible, ensure that the **AB** cable does not run parallel to other cables for extended distances (maximum 5 metres).

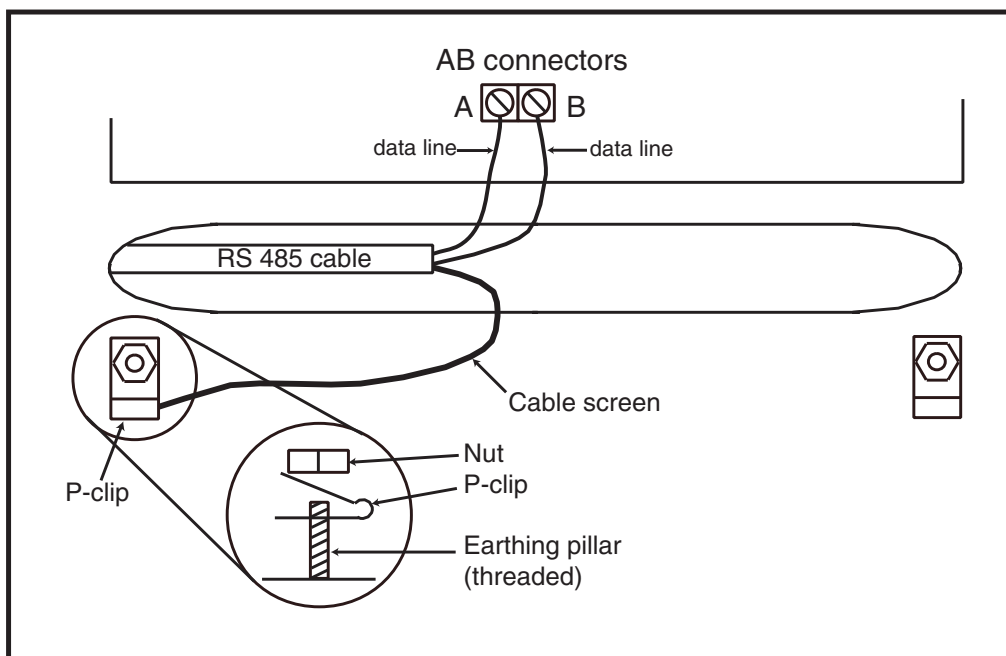


Figure 2-10. Connection of cable screen using P-Clip

Zones

The default setting for the zones on the Galaxy 3 Series are shown in the following table:

Galaxy Panel	Zone 1001	Zone 1002	Remaining Zones
3-48	Final	Exit	Intruder
3-144	Final	Exit	Intruder
3-520	Final	Exit	Intruder

Table 2-6. Default Zone Functions

Zone Addresses

Each zone has a four digit address; **1004, 4136**. The address is made up of three reference numbers as shown in the following figure:

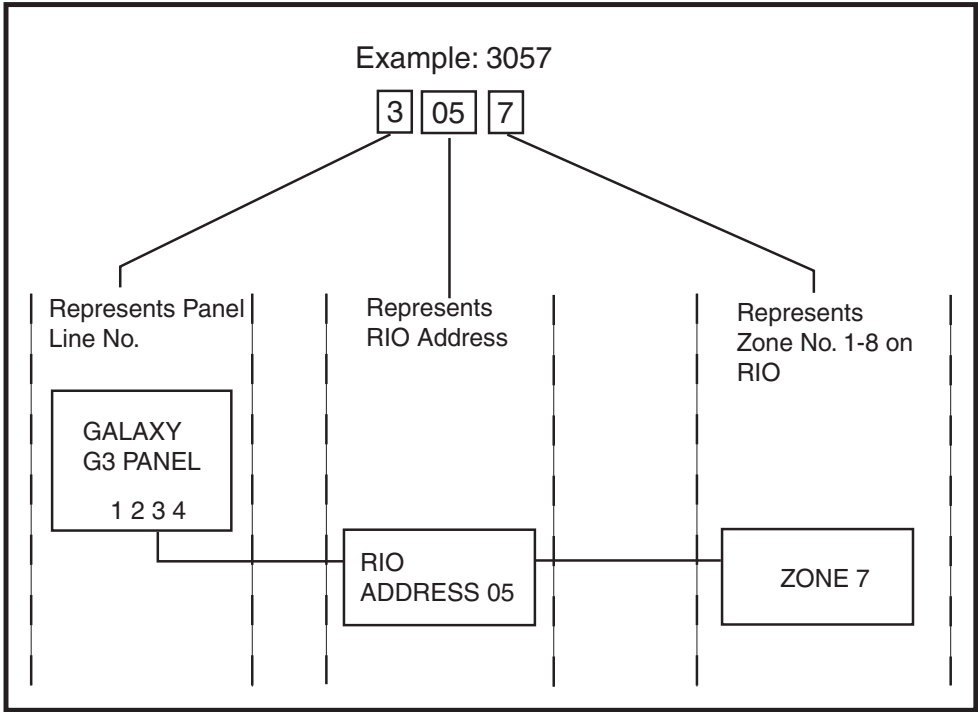


Figure 2-11. Zone Addresses

For example, zone **3057** is the detector connected to line **3**, RIO **05**, zone **7**.

Zone Addressing with Onboard RIO Switch

The RIO switch (SW3, dipswitch 8) controls the ordering of the on-board RIO's. This dipswitch must be set before powering up the panel.

NOTE: The RIO switch is not functional on the 3-48. It defaults to the **Switch off** configuration.

Switch off (default)

When the switch is set to this mode, the onboard RIO's configure to the following addresses:

Onboard RIO0	Zone address range:	1001-1008	Outputs:	1001-1004
Onboard RIO1	Zone address range:	1011-1018	Outputs:	1011-1014

Switch on

When the switch is set to this mode, the onboard RIO's configure to the following addresses:

Onboard RIO0	Zone address range:	1001-1008	Outputs:	1011-1014
Onboard RIO1	Zone address range:	0011-0018	Outputs:	0011-0014

PANEL	ON-BOARD RIO RANGE	TOTAL	RIO's	TOTAL
3-48	1001 - 1008, 1011 - 1018	16	Line 1 (4)	48
3-144	1001 - 1008, 1011 - 1018, 0011 - 0018 (switch on)	16	Line 1 (8) Line 2 (8)	144
3-520	1001 - 1008, 1011 - 1018, 0011 - 0018 (switch on)	16	Line 1 (15) Line 2 (16) Line 3 (16) Line 4 (16)	520

Table 2-7. Zone Address Ranges

Wiring Zones

The zones on Galaxy 3 Series panels can be Double Balanced (default) or End of Line. Zones can be programmed with different resistance ranges for zone status activation (see **Galaxy 3 Series Programming Manual, IP1-0033, parameter 51.46 = Parameters.Zone Resistance**). Refer to Table 2-8 (Double Balanced) or Table 2-9 (End of Line) for details of the zone resistance and resulting conditions.

NOTE: The circuit debounce time (the period the zone must remain in a state to register a change in condition) is 300 milliseconds by default.

	Preset 1 - 1k	Preset 2 - 2k2	Preset 3 - 4k7
Tamper S/C	0 - 800	0 - 1800	0 - 3700
Low Res	800 - 900	1800 - 2000	3700 - 4200
Normal	900 - 1200	2000 - 2500	4200 - 5500
High Res	1200 - 1300	2500 - 2700	5500 - 6500
Open	1300 - 12000	2700 - 12000	6500 - 19000
Masked	12000 - 15000	12000 - 15000	19000 - 22000
Tamper O/C	15000 - infinity	15000 - infinity	22000 - infinity

Table 2-8. Double Balanced Zone Resistance and Conditions

	Preset 1 - 1k	Preset 2 - 2k2	Preset 3 - 4k7
Tamper S/C	0 - 800	0 - 1800	0 - 3700
Low Res	800 - 900	1800 - 2000	3700 - 4200
Normal	900 - 1200	2000 - 2500	4200 - 5500
High Res	1200 - 1300	2500 - 2700	5500 - 6500
Masked	1300 - 12000	2700 - 12000	6500 - 19000
Open	12000 - infinity	12000 - infinity	19000 - infinity

Table 2-9. End of Line Zone Resistance and Conditions

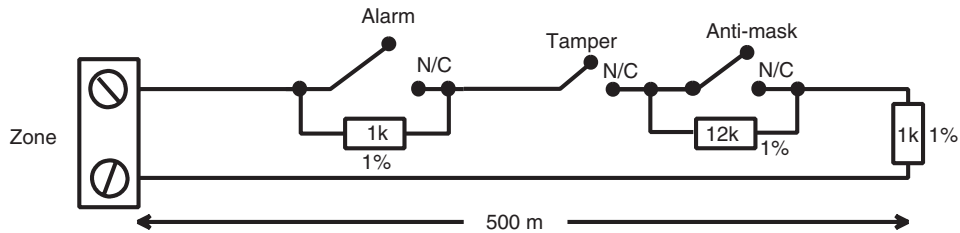


Figure 2-12. Preset 1 - Double balanced Zone/Detector wiring

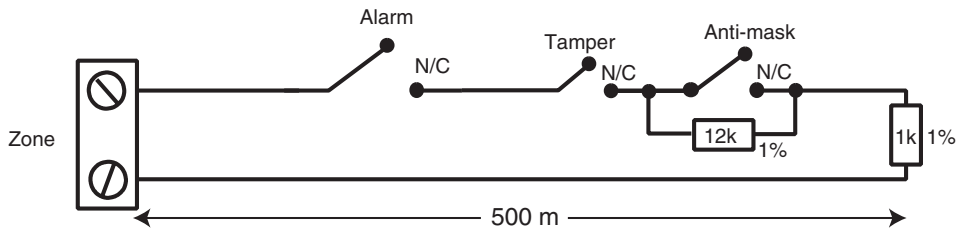


Figure 2-13. Preset 1 - End of Line Zone/Detector wiring

NOTE: N/C = Normally Closed

NOTE: The recommended maximum cable run from a zone to a detector is 500 metres.

Wiring Multiple Zones

Multiple detectors can be wired into a single zone as shown in the following Figure. The maximum number of detectors that can be connected to a single zone is ten.

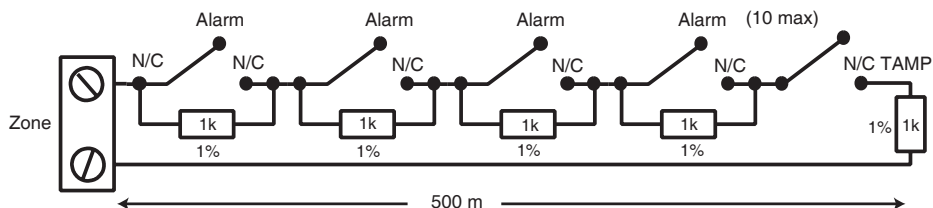


Figure 2-14. Zone to Multiple Detector Wiring

Wiring Keyswitches

Latching or spring loaded keyswitches can be used to set and unset the Galaxy panels; option **52 = PROGRAM ZONES** has provision to accommodate both types of transition.

If the keyswitch latches, the transition from 1 kΩ to 2 kΩ initiates the setting procedure of an unset system, the transition from 2 kΩ to 1 kΩ instantly unsets a set system. If the system is already set, then the transition from 1 kΩ to 2 kΩ has no effect. If the system is unset, the transition from 2 kΩ to 1 kΩ has no effect. This is programmed as a * **Keyswitch** in the **PROGRAM ZONES** option.

If the keyswitch is spring-loaded (returns to its normal position), the transition from 1 kΩ to 2 kΩ initiates the setting procedure of an unset system and instantly unsets a set system, the transition from 2 kΩ to 1 kΩ - the return to the normal position - has no effect. This is programmed as a **Keyswitch** in the **PROGRAM ZONES** option.

Wiring Terminator Buttons

Zones programmed as **Push-Set** (terminator) buttons can be open going closed (2 kΩ to 1 kΩ) or closed going open (1 kΩ to 2 kΩ). The first activation of the terminator button initialises its status to the system.

NOTE: The first activation of a terminator may not set the system as this can be the initialisation routine. If the system continues setting, push the button again. The system will set on the second push. This initialisation only occurs on the first setting. All subsequent setting routines set on the first push of the terminator.

The wiring of the terminator and keyswitch zone type is shown in the following figure:

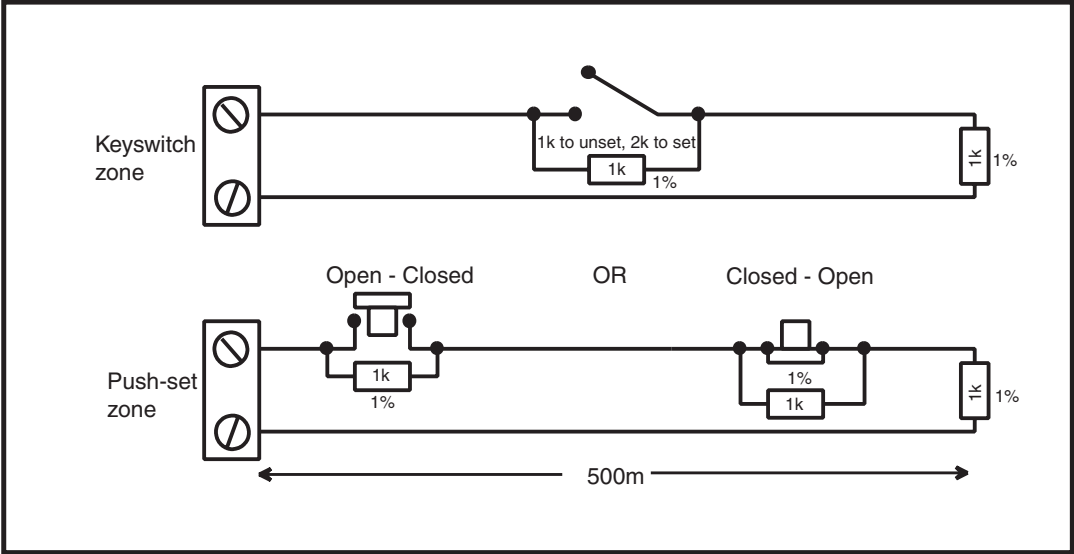


Figure 2-15. Terminator and Keyswitch Zone Wiring

Outputs

The Galaxy 3 Series control panel on-board outputs are detailed in the following table:

Output Address		Default Function	Type	Rating	Normal State (with 3k3 pull-up)
Default	Line 0 Enable				
1001	1001	Bells	Transistorised	12V, 400mA	Positive
1002	1002	Strobe	Single Pole Change Over Relay (SPCO)	30V, 1A	De-energised
1003	1003	PA	Transistorised	12V, 400mA	Positive
1004	1004	Reset	Transistorised	12V, 400mA	Positive
1011	0011	Set	Transistorised	12V, 400mA	Positive
1012	0012	Intruder	Transistorised	12V, 400mA	Positive
1013	0013	Confirm	Transistorised	12V, 400mA	Positive
1014	0014	Reset	Transistorised	12V, 400mA	Positive

Table 2-10. Outputs

Output Applications

The outputs on the Galaxy panels, with the exception of the SPCO relay output, are transistorised outputs; negative applied (positive removed) by default. These supply up to 400 mA and can be used to drive the necessary output devices.

NOTE: The polarity of each output can be changed using option **53 = PROGRAM OUTPUTS**

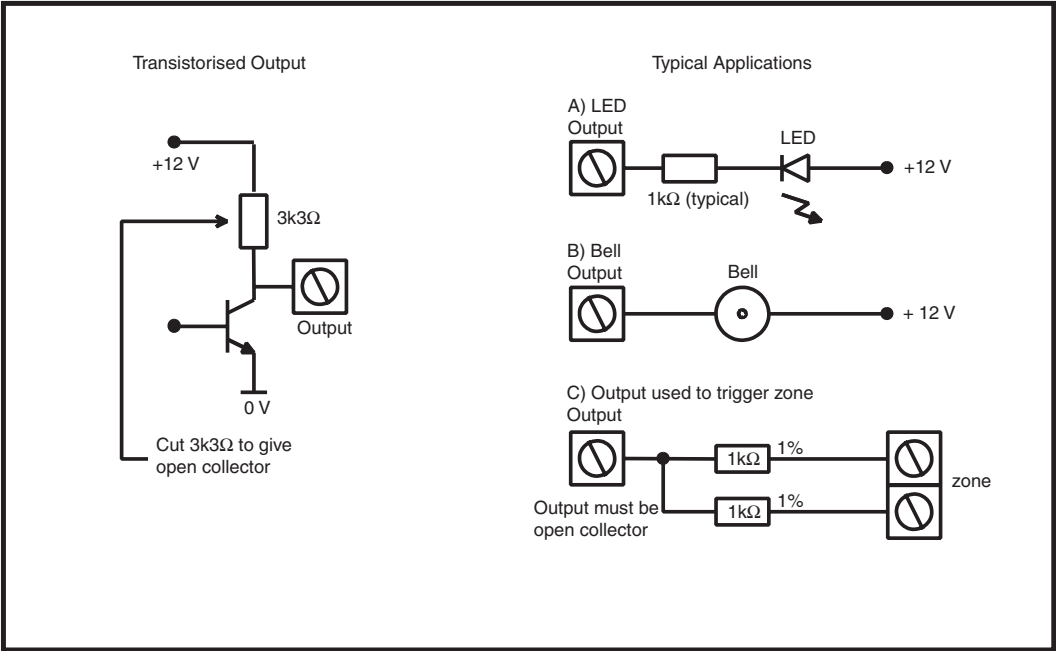


Figure 2-16. Output Configuration and Typical Applications

Note: For the appropriate 3k3Ω pull-up resistor refer to DIP switch SW3 (Table 2-1).

The relay output is a single pole change over; this can be used to drive output devices that require a clean set of contacts, isolated from the output voltage.

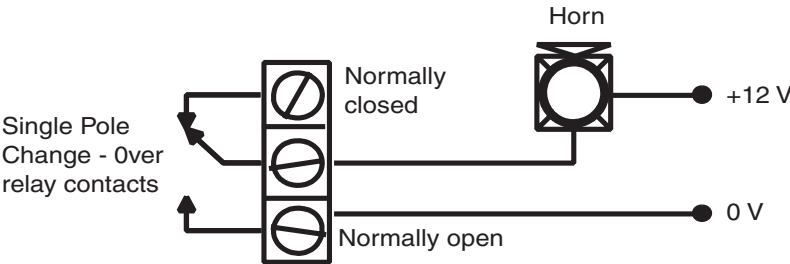


Figure 2-17. Single Pole Change–Over Relay Output Configuration and Typical application

SPI Header

The Serial Peripheral Interface (SPI) header on the Galaxy 3 Series PCB allows copying and overwriting of programming information between panels using the SPI key.

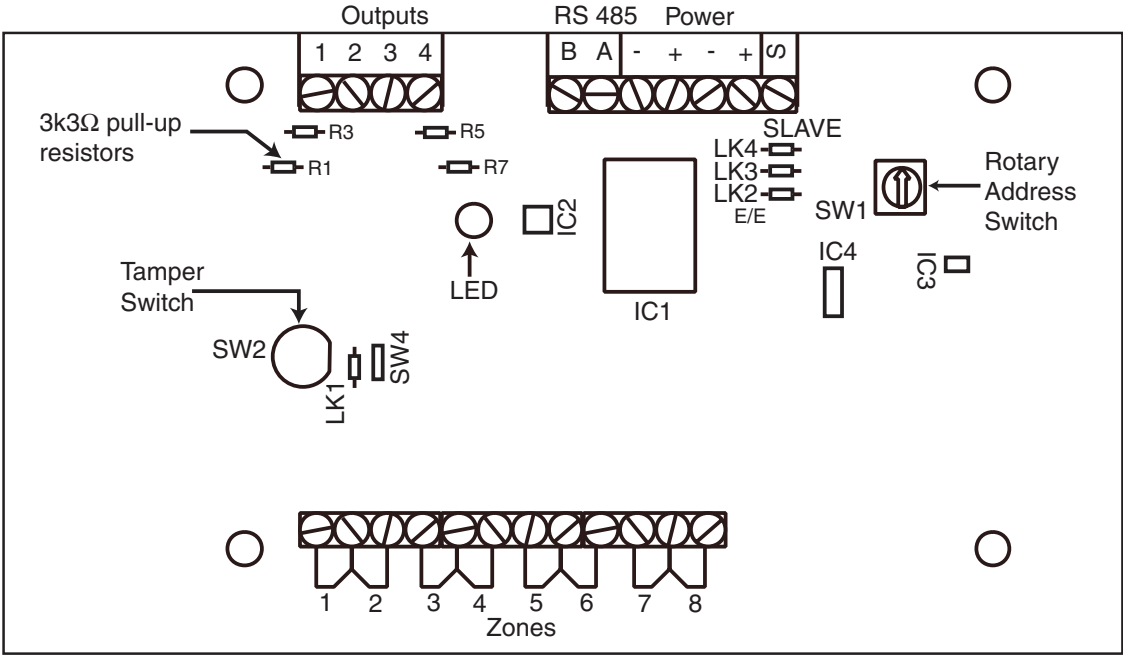
The information is stored in a version independent format which allows panels of different versions to share configuration information.

The panel software can also be updated using the SPI key using the menu structure, see **Galaxy 3 Series Programming Manual (IP1-0033), Option 71 = SPI Key**.

Section 3: Optional Modules and Facilities

Remote Input Output (RIO) Modules – C072

Galaxy RIO’s can be added to the Galaxy 3-144 and 3-520 control panels. Each additional RIO expands the system by eight zones and four outputs.



Rev 0.3

Figure 3-1. Galaxy RIO

Addressing

The Galaxy RIO **must** be given a unique address **before** it is connected to a power supply. This address is selected using the 16-way Rotary Address Switch (SW1). Refer to **Figure 3-1**.

Galaxy Panel	No of RIO's (MAX)	Valid Addresses
3-48	4	2, 3, 4, 5
3-144	8 (line 1) 8 (line 2)	1-8 (line 1) 0-7 (line 2)
3-520	15 (line 1) 16 (lines 2-4)	1-9, A-F (line 1) 0-9, A-F (lines 2, 3, 4)

Table 3-1. Valid RIO Addresses

Connecting the RIO

The RIO can only be connected to the system while engineer mode is accessed. The RS485 (**AB**) line of the Galaxy RIO **must** be wired in parallel (daisy-chain configuration) with the RS485 (**AB**) line of any keypads connected to the system. The RIO requires 12 Vd.c. (range 10.5 to 16.0 V) and 40 mA. This can be supplied from the control panel power supply or from a remote power supply if the distance causes a large voltage drop on the cable.

NOTE: A 3 Ampere Smart PSU (part no. P015) can be fitted in place of a RIO.

Connect the RIO terminals as follows:

+12 V (either control panel, keypad or remote power supply);

–0 V or ground (either control panel, keypad or remote power supply);

A to the **A** terminal of the previous module (or control panel if RIO is the first on the line);

B to the **B** terminal of the previous module (or control panel if RIO is the first on the line).

NOTE: If the RIO is the last module on the line, connect a 680 Ω EOL resistor across the **A** and **B** terminals.

Configuring the RIO

The added RIO is configured into the system on exiting from engineer mode. If the message **XX Mod Added** [**<**],[**>**] **To View** is displayed, the system has recognised that a new module is present. Press the **A** or **B** keys to confirm that the RIO has been added. If this message is not displayed or the RIO is not on the list of added modules, then the RIO is not communicating with the control panel or has been set to the same address as the RIO already connected to the system.

The flash rate of the red LED (LED1) on the RIO indicates the status of the communication with the control panel - refer to the following **Table:**

Flash Rate	Meaning
0.1 ON / 0.9 OFF	Normal communications
OFF	No d.c. supply
1.5 ON / 1.5 OFF	RIO has not been configured into system
0.2 ON / 0.2 OFF	RIO has lost communication with system
0.9 ON / 0.1 OFF	Very poor communications

Table 3-2. RIO LED Flash Rates

Zones

The Galaxy RIO has eight programmable zones. These default to **INTRUDER**. Each zone is Double Balance monitored with a 1 k Ω resistor in series with the zone detector and a 1 k Ω (1%) resistor in parallel across the detector switch. The change to 2 k Ω (1%) resistance registers the zone as open/alarm.

Outputs

The RIO has four transistorised outputs. Each output is connected to +12 V via a 3k3Ω pull-up resistor (refer to Table 3-3). When an output is activated, the load is switched to the negative supply voltage (ground or 0 V) of the RIO. The current available from each output is 400 mA.

The default functions and pull-up resistors of each RIO output, when connected to a Galaxy are shown in the following **Table**:

Output No.	Function	Pull-up Resistor
1	Bells	R1
2	Strobe	R3
3	PA	R5
4	Reset	R7

Table 3-3. RIO Output Default Functions

There are several links on the RIO which, if altered when the module is powered down, modify the RIO operation:

- LK1 - short circuit this to by-pass the RIO lid tamper switch SW2
- LK2 - cut this to configure the module as an **Entry/Exit RIO**
- LK4 - cut this to configure the module as a **Slave** or **Shunt RIO** (If LK2 is already cut this modifies the exit time on the **Entry/Exit RIO** from 30 to 90 seconds).

For further information refer to **Galaxy Remote Input Output (RIO) Installer's Guide** (Part Number: L/051 supplied with the RIO).

Entry/Exit RIO

A RIO is configured as an **Entry/Exit RIO** if resistor LK2 is cut, this allows a further sub-system to be added to the Galaxy. The **Entry/Exit RIO** can be armed while the main system is unset, allowing protection of specific areas; or disarmed when the main system is set allowing access to particular areas without unsetting a group (shunting of zones). If the main system is set and the **Entry/Exit RIO** is not shunted, an activation on the RIO will cause a full alarm on the main system. The **Entry/Exit RIO** configuration is shown in the following **Table**:

Zone	Default Function	Programmed Function	Output	Default Function (Fixed)
1	Intruder	Any function	1	Ready
2	Intruder	Any function	2	Entry/Exit Horn
3	Intruder	Any function	3	Set
4	Intruder	Any function	4	Alarm
5	Intruder	Any function		
6	Exit	Non-Programmable		
7	Final	Log		
8	Keyswitch	Log		

Table 3-4. Entry/Exit RIO Configurations

Entry/Exit RIO Zone Programming

Zones 1 – 5 operate as normal zones. If a zone is programmed as **Security**, any activation - whether the **Entry/Exit RIO** is armed or disarmed and the Galaxy is set or unset - results in the appropriate alarm condition being generated on the control panel.

If zones 1 – 5 are programmed as **Intruder**, then an alarm condition can be generated on the **Entry/Exit RIO** when it is armed and the Galaxy is unset.

Zones 6 and 7 behave as an **Exit** and **Final** zone respectively. The functioning of these zones is fixed and is independent of the programming of the Galaxy. Zone 7 can be programmed as **Log** in order to report and record its activation in the Galaxy event log.

The function of zone 8 is fixed as a **Keyswitch**. This should also be programmed as **Log** in order to report and record its activation in the Galaxy event log.

Entry/Exit RIO Zone Operation

The **Entry/Exit RIO** is armed by the transition of zone 8 (the keyswitch zone) from 2 k Ω to 1 k Ω (reverse to normal operation). This starts an exit/entry time of 30 seconds. Closing the contact on zone 7 (the Final zone) or expiry of the exit time set the RIO. Any activation of zones 1 – 5 when the **Entry/Exit RIO** is armed activates the Alarm output (output 4).

The **Entry/Exit RIO** is disarmed by the transition of the keyswitch zone (zone 8) from 1 k Ω to 2 k Ω . The disarming procedure can be started by activating the final zone, (zone 7), and gaining access to the keyswitch zone via the exit zone (zone 6). Activating zones 1–5 during the disarming period result in an alarm condition being generated. If the **Entry/Exit RIO** is disarmed while the main Galaxy is set, then activation of any of its zones programmed as **Intruder** does not generated an alarm condition on the RIO or the control panel; the zones are **shunted**.

The exit/entry time can be changed from 30 seconds to 90 seconds by cutting resistor LK4.

Slave RIO

A RIO is configured as a **Slave** or **Shunt RIO** if resistor LK4 is cut, this allows a further sub-system to be added to the Galaxy.

The programming and operation of the **Slave RIO** is identical to that of the **Entry/Exit RIO** except for zones 6 and 7, which are **Intruder** type zones by default. **Slave RIOs** do not have an **Exit** or **Final** zone, or an exit time; they are instantly unset and reset by the transition from 1 to 2 k Ω of zone 8.

Zone	Default Function	Programmed Function	Output	Default Function (Fixed)
1	Intruder	Any function	1	Ready
2	Intruder	Any function	2	Fail to Set
3	Intruder	Any function	3	Set
4	Intruder	Any function	4	Alarm
5	Intruder	Any function		
6	Intruder	Any function		
7	Intruder	Any function		
8	Keyswitch	Log		

Table 3-5. Slave RIO Configuration

RF RIO – C076

The Galaxy Radio Frequency (RF) RIO module is an optional add-on to the existing Galaxy product range. The module acts as an RF receiver for the Ademco 868MHz transmitter range.

Features

The RF RIO contains the following features:

- Support for up to 32 RF zones (dependent upon panel type)
- Support for up to 30 RF keyfobs
- 4 transistorised outputs

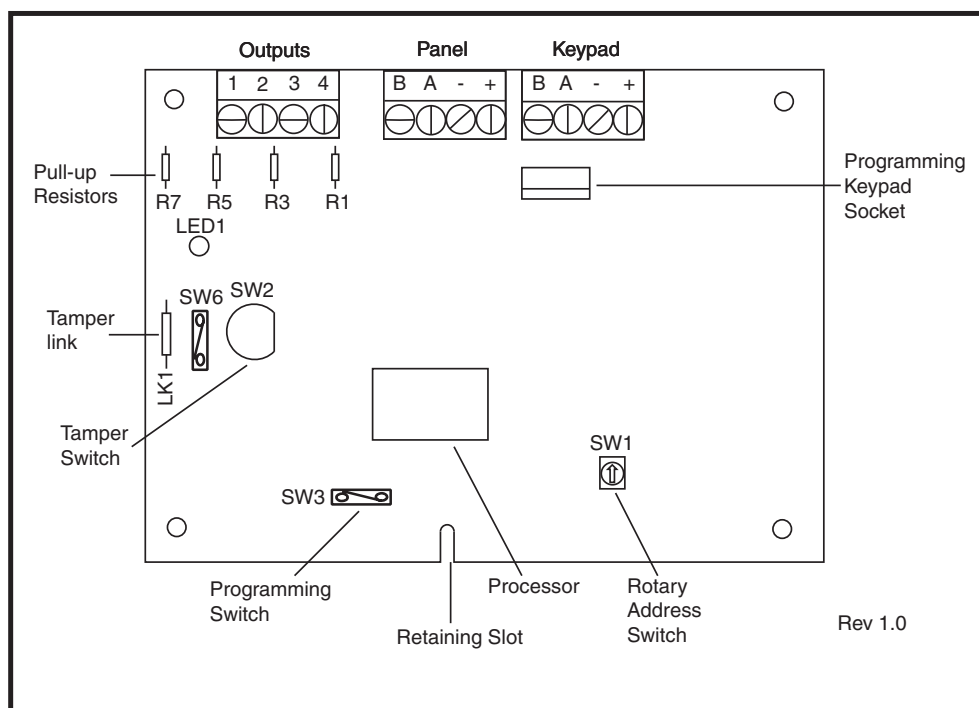


Figure 3-2. RF RIO PCB Layout

Compatibility

The RF RIO is compatible with Galaxy Control Panels 3-144 and 3-520.

Connecting the RF RIO

The RS 485 (AB) line of the RF RIO **must** be wired in parallel (daisy chain configuration) with the RS 485 (AB) line of the keypad connected to it. The RF RIO requires 12 V d.c. (range 10.5 to 16.0 V) and 55 mA. This can be supplied from the control panel power supply or from a remote power supply if the distance causes a large voltage drop on the cable.

Connect the RF RIO terminals in accordance with the following **Table**:

RF RIO Terminal	Connected to...
+	+12 V (at control panel, keypad or remote power supply)
-	0V or ground (at control panel, keypad or remote power supply)
A	To the A terminal of the previous module on the line (or the control panel if the RF RIO is the first module on the line)
B	To the B terminal of the previous module on the line (or the control panel if the RF RIO is the first module on the line)

Table 3-6. RF RIO Connections

Note: If the RF RIO is the last Module on the line, connect a 680 Ω resistor across the A and B terminals.

Outputs

The RF RIO has four transistorised outputs. Each output is connected to +12 V via a 3k3 Ω pull-up resistor (refer to **Table 3-6 RF RIO Connections**). When an output is activated, the load is switched to the negative supply voltage (ground or 0 V) of the RF RIO. Each output is capable of supplying 400 mA.

The default functions and pull-up resistors of each RF RIO output, when connected to a Galaxy are shown in the following **Table**:

Output No.	Default Function	Pull-up Resistor
1	Bells	R43
2	Strobe	R37
3	PA	R33
4	Reset	R23

Table 3-7. Output Functions

NOTE: The number of pull-up resistors may vary with different hardware revisions.

RF RIO Tamper

Switch SW2 on the RF RIO acts as a tamper if the Tamper Link (LK1) is missing. Removing the lid from the RF RIO enclosure activates the RF RIO tamper alarm if the system is not in Engineer Mode. The tamper switch can be bypassed by fitting a 0 Ω link to LK1.

Addressing the RF RIO

The Galaxy RF RIO must be given unique addresses before it is connected to a power supply. This unique address is selected using the 16-way Rotary Address Switch (SW1). The address selected will act as the base address for the RF RIO. Subsequent addresses will be base address + 1, base address + 2, base address + 3. For example:
Base address = 2 followed by 3, 4 and 5.

Address Ranges

This option allows the programming of the RIO addresses, which are to be simulated by the RF RIO. For example, if the RF RIO being programmed supports 32 zones (4 RIO addresses), and the base address, programmed at the hexi-decimal rotary switch is 02, the available addresses would be 02, 03, 04, 05. However, you may want to only respond as RIO addresses 02, 04. The remaining addresses should be disabled and will not respond to commands from the control panel. The base address is enabled by default. All other

addresses are disabled by default.

Module status on the RF RIO such as lid tamper, will be reported to the panel using the address set on the rotary switch.

RF RIO Programming

Programming of the RF RIO is achieved by connecting a Galaxy Mk7 keypad directly to the RF RIO at the Programming Keypad Socket or the Keypad Connector Block. The Keypad is not part of the Galaxy network and must be addressed as 0.

Note: To program RF devices, please refer to **RF RIO Module, Installation and Programming Instructions, (II1-0076)** supplied with the RF RIO.

Configuring the RF RIO

The RF RIO is configured into the system on exiting from engineer mode. If the message **XX Mod Added [<],[>] To View** is displayed, the system has recognised that a new module is present. Press the **A** or **B** keys to confirm that the RF RIO has been added. If this message is not displayed or the RF RIO is not on the list of added modules, then the RF RIO is not communicating with the control panel. The flash rate of the red LED (LED1) on the RF RIO indicates the status of the communication with the control panel — refer to **Table 3-8**.

FLASH RATE	MEANING
0.1 ON/- .9 OFF	Normal communications
OFF	No d.c. supply
1.5 ON/1.5 OFF	RF RIO has not been configured into system
0.2 ON/0.1 OFF	RF RIO has lost communication with system
0.9 ON/0.1 OFF	Very poor communications

Table 3-8. RF RIO LED flash rates

Output Module – C078

Galaxy Output Modules can be added to the Galaxy 3 Series control panels. Each additional Output Module expands the system up to 16 outputs by simulating the outputs of four RIO's

The following figure shows the main components of the Output Module.

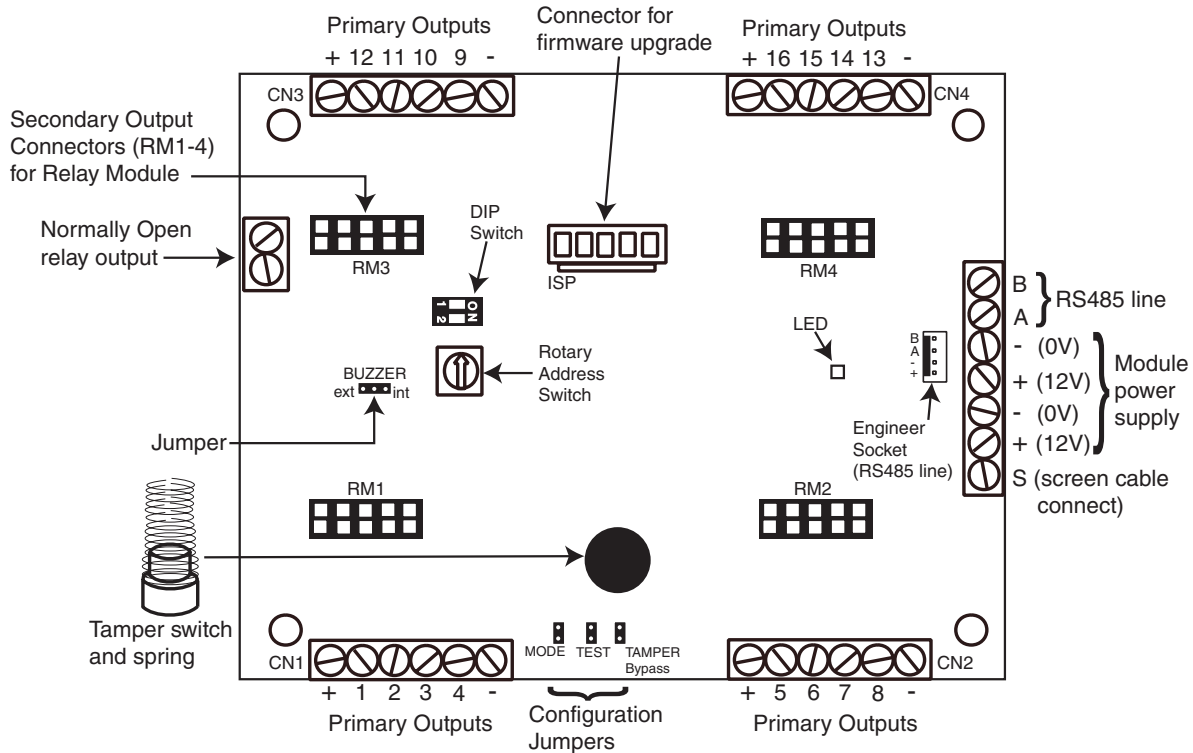


Figure 3.3. Galaxy Output Module

Addressing

The Galaxy Output Module must be given a unique address **before** it is connected to a power supply. This base address is selected using the Rotary Address Switch. Valid addresses are shown in the following table.

NOTE: The zones represented by the Output Module addresses can be viewed on the panel, however they are not used.

Galaxy Panel	No of Output Modules (Maximum)	Valid Addresses
3-48	4	2, 3, 4, 5
3-144	8 (line 1) 8 (line 2)	1-8 (line 1) 0-7 (line 2)
3-520	15 (line 1) 16 (lines 2-4)	1-9, A-F (line 1) 0-9, A-F (lines 2, 3, 4)

Table 3-9. Valid Output Module Addresses

Connecting the Output Module

The Output Module can only be connected to the system while engineer mode is accessed. The RS485 (**AB**) line of the Output Module **must** be wired in parallel (daisy-chain configuration) with the RS485 (**AB**) line of any keypads connected to the system. The Output Module requires 12 Vd.c. (range 10.5 to 15.0 V) and 250 mA. This can be supplied from the control panel power supply or from a remote power supply if the distance causes a large voltage drop on the cable.

Connect the Output Module terminals as follows:

+ (12 V) - either control panel, keypad or remote power supply;

– (0 V) - either control panel, keypad or remote power supply;

S (Screen cable connect) - to control panel

A to the **A** terminal of the previous module (or control panel if Output module is the first on the line);

B to the **B** terminal of the previous module (or control panel if Output Module is the first on the line).

NOTE: If the Output Module is the last module on the line, connect a 680 Ω EOL resistor across the **A** and **B** terminals.

Configuring the Output Module

The Output Module is configured into the system on exiting from engineering mode. The procedure is identical to that for Galaxy RIO's (see **Configuring the RIO**).

Outputs

Connecting Outputs

The Output Module has two types of outputs:

Primary outputs are taken out on contacts CN1 to CN4. The maximum current load of outputs is 400 mA. The outputs are in open collector mode.

Secondary outputs are designed for connection of up to four external Relay Modules at connectors RM1-4 (see figure 3.4). This ensures that the maximum current load will increase up to 4 A/230 V ac per output. The Relay Module does not require an external power supply.

NOTE: When connecting external comms devices, the secondary outputs must be used. The Relay Module has to be used in the NC mode with a pull-up link from the +12V line to one of the relay contacts.

Number of Outputs

The number of active primary outputs are determined by setting the DIP switch. Each Output Module can simulate up to four RIO's depending on the DIP switch setting. It is therefore possible to program one Output Module to have 16 active primary outputs. The following table shows the DIP switch settings.

DIP Switch Settings		Number of active outputs
Switch 1	Switch 2	
OFF	OFF	4
ON	OFF	8
OFF	ON	12
ON	ON	16

Table 3-10. Output Module DIP Switch Settings

Assigning Outputs

Outputs are specified as follows: Example base address = 2.

Output Module Address	Connector	Outputs
Base = 2	CN1	1, 2, 3, 4
Base + 1 = 3	CN2	5, 6, 7, 8
Base + 2 = 4	CN3	9, 10, 11, 12
Base + 3 = 5	CN4	13, 14, 15, 16

Table 3.11 Output Assigning

Output Signal Change

The Output Module has one output which is used for warning about a change of state of any output. This is controlled by the BUZZER jumper. The following table shows the possible settings.

Jumper Setting	Output Function
1 - 2 (int setting)	Active internal buzzer
2 - 3 (ext setting)	Active relay output
Disconnected (no jumper)	OFF

Table 3-12. BUZZER Jumper Settings

Configuration Jumpers

The Output Module has three configuration jumpers, MODE, TEST and TAMPER Bypass.

MODE

By disconnecting (removing) the MODE jumper, the Output Module is switched to a mode that reflects output types **17=Horn** and **18=E/E Horn**. This mode is not recommended when the Output Module is fitted with Relay Modules as the relay contacts wear faster.

TEST

By connecting the TEST jumper all outputs become activated. Performing this test is recommended to verify correct function of the Output Module and LED's that are connected to outputs.

TAMPER Bypass

Connecting the TAMPER Bypass jumper deactivates the tamper function.

Relay Module

Up to four Relay Modules can be connected to the Output Module at connectors RM1 to RM4. The Relay Module increases the maximum current load of one output up to 4 A.

Jumpers JP1 to JP4 are used for setting up the output mode. These can either be set to NO (Normally Open) when the jumper is on the left and middle pin, or NC (Normally Closed) when the jumper is on the right and middle pin.

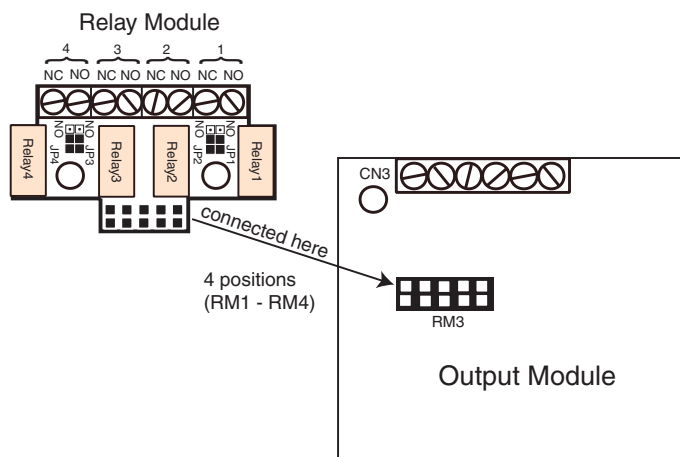


Figure 3.4. Location of Relay Module

Technical Specification - Output Module

Output Module (boxed)

Dimensions:

Breadth: 162 mm

Length: 150 mm

Height: 39 mm

Operating temperature: -10 deg. C to +40 deg. C

Operating voltage: 10.5V dc to 15V dc

Current consumption: Quiescent: 45mA
Maximum: 250mA (with LED's and relay modules)

Maximum current load: 400mA

Technical Specification - Relay Module

Dimensions:

Breadth: 50 mm

Length: 30 mm

Height: 20 mm

Power supply: Through Output Module (12V)

Operating temperature: -40 deg. C to +85 deg. C

Current consumption: 15mA

Output load: 4A/230Vac

Power Supply Unit

The Galaxy 3 Series Power Supply Unit is available in 2 variants.

The **Galaxy Power Unit** is a 3 ampere power supply. The **Galaxy Power RIO** is a Power Unit plus an on-board Remote Input Output (RIO) module. Each variant can be integrated with all Galaxy control panels, with the exception of the Galaxy 8. The number of Power Units or Power RIO's that can be used on a system is limited by the number of RIO's that can be added to each panel.

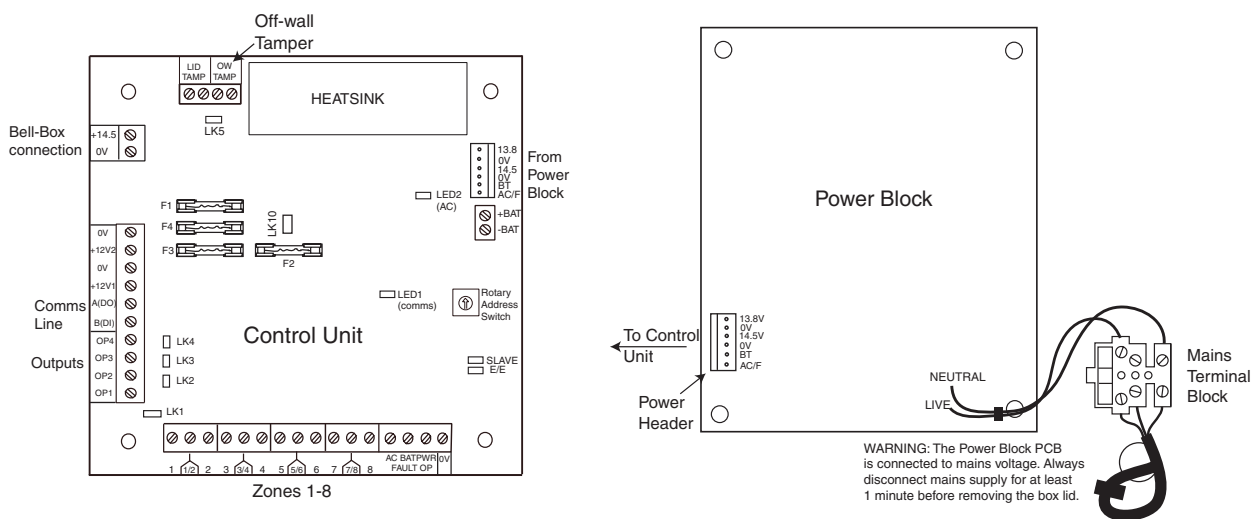


Figure 3-5. Power Supply Unit

Configuration

The Galaxy Power Supply Unit (PSU) consists of 2 modules, the Power Block and the Control Unit. The PSU can be connected to the Galaxy 3 Series control panel via the RS485 (AB) line. The PSU can be used in place of a standard RIO to overcome power problems that arise when the additional RIO is fitted distant to the control panel.

A 6-way jumper lead connects the Power Block to the Control Unit.

The PSU has 8 zones and 4 outputs. Each PSU takes one of the 4 RIO address (2 - 5). Addressing is identical to that described for RIO Modules.

The 4 outputs are switched 0V (0V active). Without the jumper links (LK1-4) fitted, the outputs will float in the OFF state. They can apply a +12V signal, if required, by fitting the appropriate pull-up jumper supplied. LK5 will short out the off-wall tamper if it is not used.

The SLAVE and E/E links must be in place for normal operation.

FAULTOPAC: This is an open collector transistor which is normally off. The output is activated by an AC failure.

FAULTOPBAT: This is an open collector transistor which is normally off. The output is activated by a Battery Low or Battery Fail condition.

FAULTOPPOWER: This is an open collector transistor which is normally off. The output is activated by low voltage present in +12V1, +12V2 or +14.5V.

Installation Instructions

The installation and wiring must be performed by a competent engineer. The Galaxy 3 Series Power Supply Unit must be connected to the a.c. mains supply (230/240 Va.c. 50Hz) via a fused connection outlet. The fuse in the mains outlet must not exceed 3A.

The Galaxy 3 Series Power Supply Unit comes installed in the metal enclosure base. The installation procedure of the panel base is as follows:

1. Route the mains cable through the hole on the right hand side of the enclosure base. Securely anchor the cable to the box using the tie-wrap as shown in the following Figure:

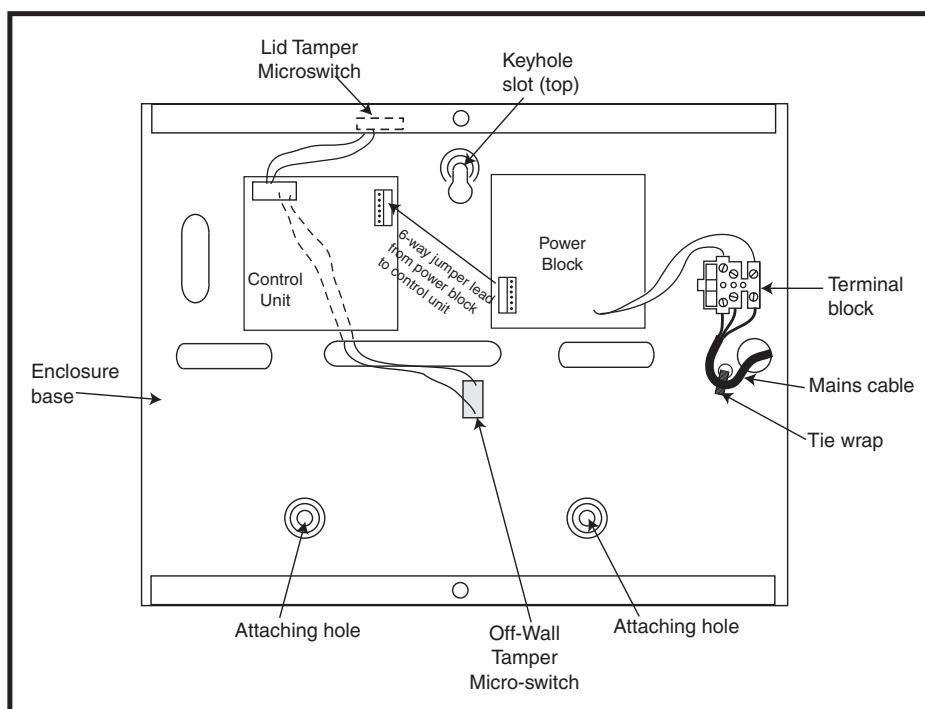


Figure 3-6. Enclosure Base

2. Secure the panel base to the wall using three 1.5" No. 8 round head steel screws through the holes provided.

The mains cable used must be a three core type (with green/yellow earth insulation) of adequate current carrying capacity.

NOTE: The mains cable must satisfy the requirements stated in BS6500.

3. Connect the mains cable to the mains terminal block as follows:

- blue wire to the terminal marked N (Neutral)
- green/yellow wire to the terminal marked (Earth)
- brown wire to the terminal marked L (Live)

NOTE: No other connections to the mains connector are permitted.

All wiring must be in accordance with the latest edition of the IEE Wiring Regulations, BS7671 (Requirements for Electrical Installations).

4. Power up by applying mains first. This unit can be powered up from the battery by momentarily shorting LK10. Never leave LK10 connected, as deep discharge of the battery will occur. LK10 is for start-up only.

Battery

The minimum capacity battery to supply the PSU is 1 x 7Ah. The maximum capacity battery to supply the PSU is 2 x 17Ah.

Battery Test

A battery test on full load is automatically performed once an hour and during the Engineer Mode exiting procedure. If the battery voltage falls to 10 V while the Power Supply Unit is running on the battery, then it is automatically disconnected to prevent deep discharge of the battery.

Specifications

Electrical (based on 34 Ah battery and UK grade 3 compliance)

Input voltage:	230V a.c. (+10%/-15%) @50Hz
Output voltage (nominal):	13.8V & 14.5V
Output current (max):	3.0A
Operating temperature:	-10 deg C to +40 deg C

Aux1 & Aux2

Output voltage (nominal):	13.8V
Output current (max):	0.75A each

14.5V Output (not for EN50131: grade 3 use)

Output voltage (nominal):	14.5V
Output current (max):	0.15A (when using this current, the AUX1 & AUX2 currents will be reduced by an equivalent amount).

Battery charge current (max):	1.4A
Maximum ripple voltage:	less than 100mV

Fuses

F1 (14.5V)	500mA - 20mm anti-surge
F2 (Battery)	1.6A - 20mm anti-surge
F3 (12V Aux1)	1.0A - 20mm anti-surge
F4 (12V Aux2)	1.0A - 20mm anti-surge

EN50131 Compliance

This product is suitable for use in systems designed to comply with EN50131-1:2004/PD6662:2004.

Security Grade - 3
Environmental Class - II
Power Supply Type - A

Printer Interface Module-A134/A161

The Printer Interface module allows the Galaxy to be connected to a serial printer and the contents of the event log and the programming details of the system to be printed out. The module is available with either a:

- 25 way sub D type RS232 serial connector (part number **A161**)

OR

- 6 pin DIN plug (part number **A134**)

The printer **must** have a serial interface port. The printer protocol **must** be set to:

Protocol	Setting
Start Bit	ON
Stop Bit	ON
Word Length	8 Data Bits
Parity	None
Baud Rate	1200

Table 3-13. Printer Protocol Settings

Telecom Module – E062

The Galaxy Telecom module is an optional add-on to the existing Galaxy product range. It is a highly intelligent and compact module, combining both digital communication capabilities and remote servicing facilities.

The Telecom Module is connected to the RS485 communication line 1 (AB line) on the Galaxy control panels. This can be connected in addition to the on-board Telecom module.

As a digital communicator (digicom), the Telecom Module transmits alarm signals using the selected format; the factory default setting is DTMF (Dual Tone Multiple Frequency). As a remote servicer the Telecom Module can be used, in conjunction with remote servicing software, to remotely access the Galaxy control panel, allowing copying and overwriting of the program and on-line servicing.

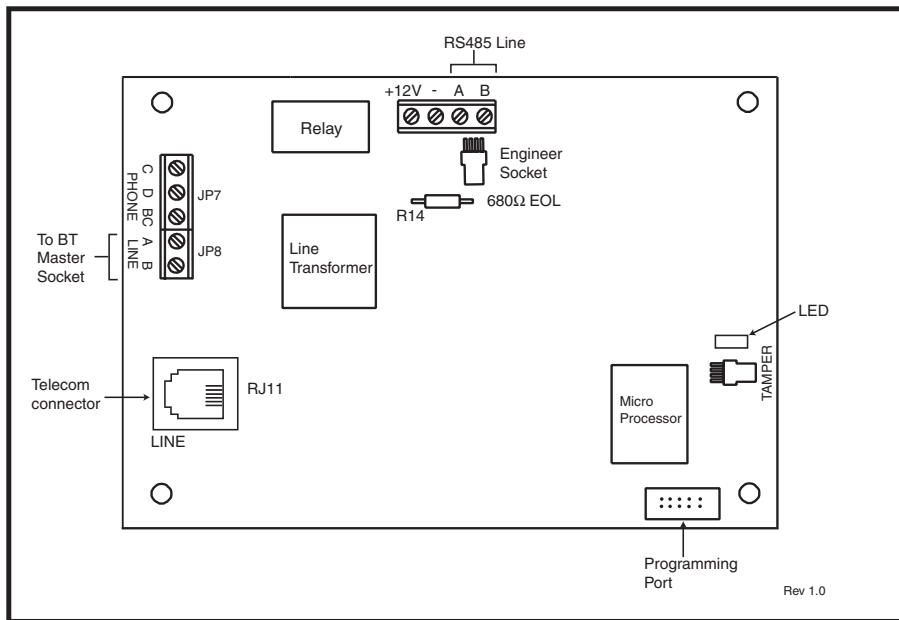


Figure 3-7. Telecom PCB Layout

Connection to the PSTN

The Telecommunications Network Voltage (TNV) port (Line A and B, JP8) on the Module must be permanently connected (hardwired) to the Public Switched Telephone Network (PSTN) via a BT Master Socket.

Note: If the BT Master Socket is the newer type (NTE5), then the connection can be carried out by an installation engineer. If the BT Master Socket is not an NTE5, then the connection must be made by a network operator.

Programming the Telecom Module

The Telecom Module is programmed from the Galaxy control panel using menu option

56 - Communications.

For further information regarding the Galaxy Telecom Module refer to **TELECOM MODULE - INSTALLATION AND OPERATION INSTRUCTIONS (III1-0079)**.

RS232 Interface Module - E054

The Galaxy RS232 module provides full duplex serial communication between Galaxy control panels and PCs or printers.

For further information regarding the Galaxy RS232 Interface Module refer to **RS232 Module, Operating Instructions (IO1-0054)**

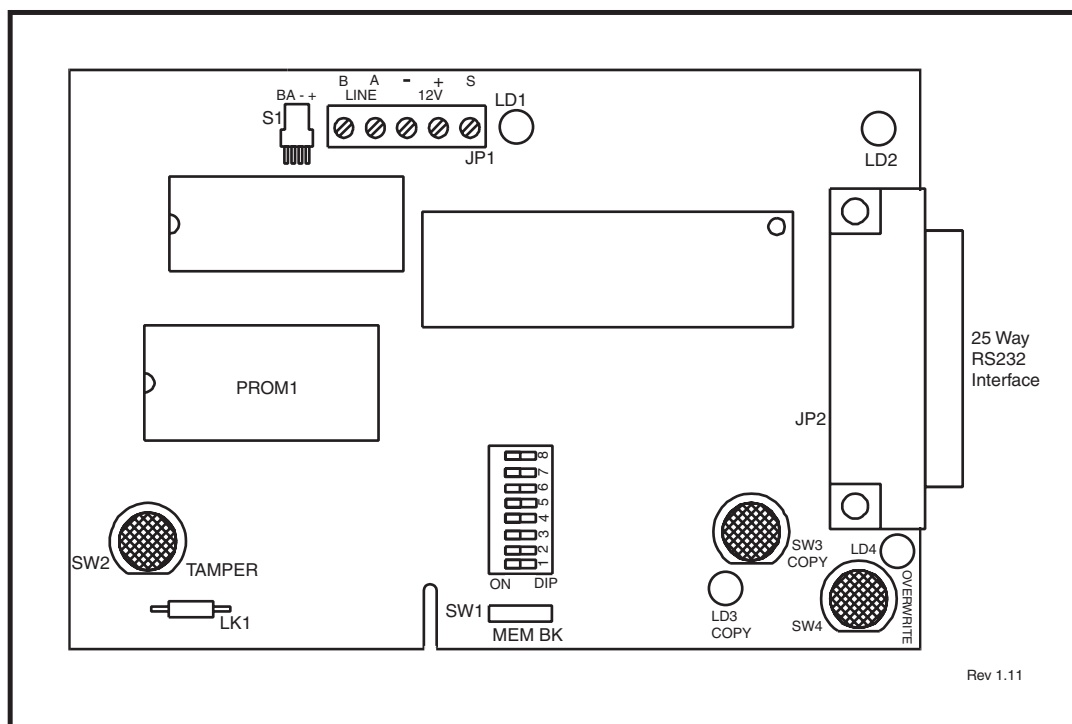


Figure 3-8. RS232 Interface Module

NOTE: The position of components on the RS232 PCB may vary with different hardware revisions.

NOTE: This module cannot be used to copy or overwrite programming from the Galaxy 3-144 or 3-520 panels.

Interface with a PC

The panel can be directly linked to a PC via the RS232 module allowing remote servicing via Galaxy Gold or system supervision via Alarm Monitoring or SIA protocol.

Serial Printer Interface

The module can also operate as an interface to a serial printer. Refer to the following **Tables** for printer protocol settings.

DIP Switch	Function	Setting
1	Printer/PC interface	ON – Printer
2	Stop Bits	OFF – 1
3	Word Length	OFF – 8
4	Even/Odd Parity	N/A
5	Parity ON/OFF	OFF – No Parity
6	BAUD Rate	Must match printer Baud Rate
7		
8		

Table 3-14. RS232 Module Printer Interface Protocol

Baud Rate	DIP Switch Setting		
	6	7	8
300	Off	Off	Off
600	Off	Off	On
1200	Off	On	Off
2400	Off	On	On
4800	On	Off	Off
9600	On	Off	On
19200	On	On	On
38400	On	On	On

Table 3-15. Baud rate DIP Switch Settings

ISDN Module – E077

The ISDN Module is an optional add-on to the existing Galaxy product range. It connects directly to the Galaxy RS485 communication bus, allowing signalling and remote servicing over an ISDN network. The ISDN Module is housed inside the Galaxy enclosure in the same way as the existing Telecom Module.

The ISDN Module supports the following features:

- Full existing Galaxy Telecom Module functionality
- Analogue/digital/X.25 communication
- Support for existing DTMF, SIA, Contact ID and Microtech signalling formats in addition to two receiver specific X.25 protocols
- Hardware and software line snatch
- Comprehensive line fail detection and reporting
- Two-way communication using B-Channel and D-Channel.

The ISDN Module is allocated keypad address C on line 1 of the panel, and reports itself as Comm Mod 3. As a result of the addition of the ISDN Module, keypad address C is not available on line 1. If this keypad is required, the ISDN Module should be removed.

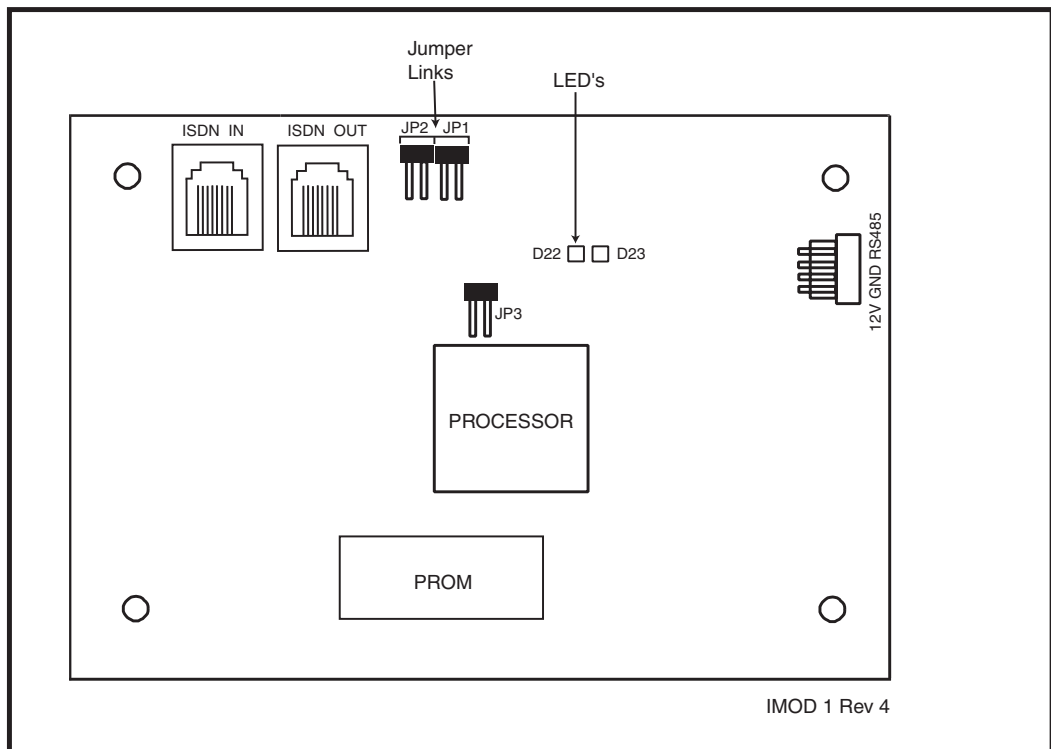


Figure 3-9. ISDN PCB Layout

The position of components on the ISDN PCB may vary with different hardware revisions.

Programming the ISDN Module

The ISDN module is programmed from the Galaxy 3 Series control panel using menu option **56 - Communications**. The menu is allocated as option 3 after the Int. Telecom and Ext. RS232 Modules.

Ethernet Module - E080

The Ethernet Module is an optional add-on to the Galaxy 3-144 and 3-520 panels. It is a highly intelligent and compact module, combining alarm signalling, remote servicing and integrated facilities over Ethernet LAN and/or WAN. The Ethernet Module connects to 10 Base T Ethernet networks both supporting UDP/IP and TCP/IP protocols.

The Ethernet module supports the following features:

- Full alarm signalling on SIA
- Microtech protocol signalling with Alarm Monitoring Software V3.1/3.2
- Remote servicing via remote servicing software

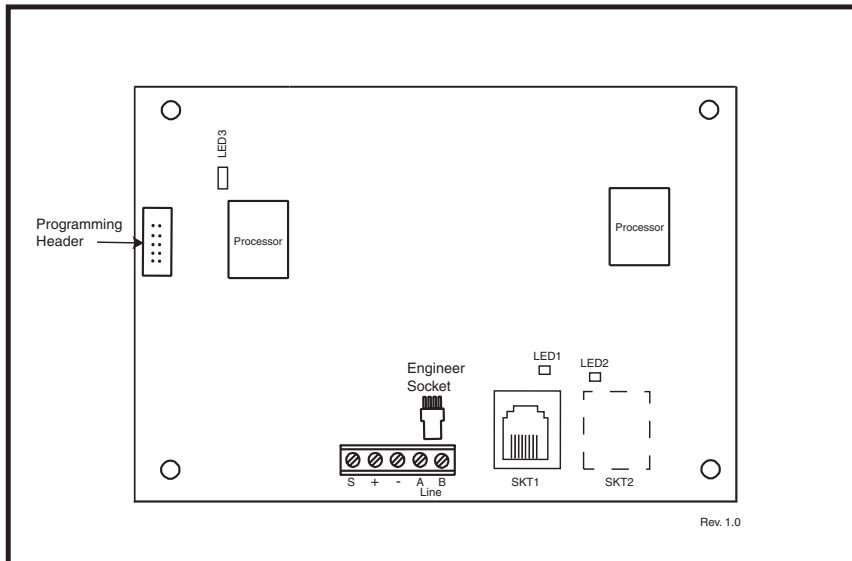


Figure 3-10. Ethernet PCB Layout

NOTE: The position of components on the Ethernet PCB may vary with different hardware revisions

Configuring the Ethernet Module

The added Ethernet Module is configured into the system on exiting from engineer mode and is allocated keypad address 15 (B). If the message **XX Mod Added [<],[>] To View** is displayed, the system has recognised that a new module is present. Press the **A** or **B** keys to confirm that com 4 has been added. If this message is not displayed or the Ethernet Module is not on the list of added modules, then the Ethernet Module is not communicating with the control panel.

The flash rate of the red LED (LED3) on the Ethernet Module indicates the status of the communication with the control.

Ethernet Communication

The green LED (LED1) is illuminated when the Ethernet Module is connected to Ethernet.

The amber LED (LED2) flashes when the Ethernet Module is sending or receiving data.

For further information regarding the Ethernet Module, refer to **Ethernet Module, Installation Instructions (II1-0080)**.

Remote Servicing Suite

The Remote Servicing Suite contains two main applications:

- Event Monitoring Software.
- Galaxy Gold Remote Servicing Software.

Event Monitoring

Alarm Monitoring is an advanced, high performance software program that allows a PC to receive and store detailed event and alarm information from Galaxy control panels.

Galaxy Gold

Galaxy Gold is an advanced, high performance software program that allows a PC to communicate and control the Galaxy control panels. The software program can also upload, store and download the control panel programming.

NOTE: This software program is only available to registered Galaxy Gold users.

User Management Suite

User Management Suite is a software program designed specifically for in-house security managers, and allows access to key features of the Remote Servicing program in order to facilitate:

- Event log copying
- Holiday period changes
- Summer time date change
- User code amendment

SYSTEM	ORDER CODE
Remote Servicing Suite Licencing Kit	R030 KIT
Remote Servicing Suite Upgrade	R030-CD
Remote Servicing Suite Licence Kit (Dongle)	R031-01-KIT
Remote Servicing Suite Upgrade (Dongle)	R031-CD
User Management Suite Licence Kit	R032-01-KIT
User Management Suite Upgrade	R032-CD
User Management Suite Licence Kit (Dongle)	R033-01-KIT
User Management Suite Upgrade (Dongle)	R033-CD

Table 3-16. Galaxy PC Products and Order Codes

Section 4: The Galaxy Mk7 Keypad/KeyProx

NOTE: References in the text to the Mk7 keypad also includes the KeyProx in this section.

General

The Galaxy Mk7 keypad/keyProx has the following features:

- a 2 x 16 alphanumeric character backlit display
- 16 backlit push buttons as shown in figure 4-1
- internal horn
- power indicator LED
- Lid tamper
- Off-wall tamper
- Address switch
- RS485 serial connector

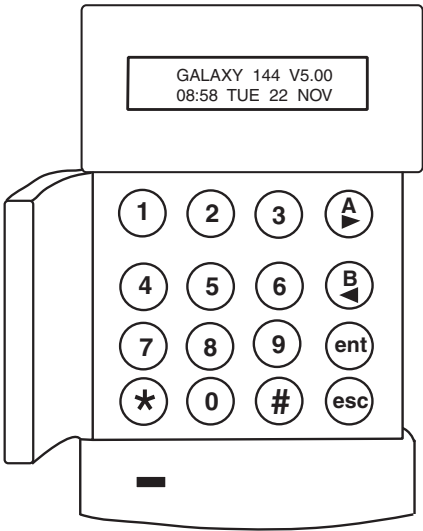


Figure 4-1. Galaxy Mk7 Keypad/KeyProx

Power Consumption

The Galaxy Mk 7 keypad/keyProx requires a 12 Vd.c. supply – from the control panel or a remote power supply. The current consumption of the keypad/keyProx is:

Mode	Current Draw	
	Mk7 Keypad	Mk7 Keyprox
Nominal (backlight OFF)	35 mA	75mA
Backlight ON	55 mA	95mA
Maximum Alarm Current	90 mA	130mA

Table 4-1. Keypad/KeyProx Current draw

Wiring the Keypad/KeyProx

A 16-way rotary address switch is used to address Galaxy LCD keypads. The address switch assigns a hexadecimal address value to the keypad.

NOTE: Any change to the keypad address must be made when the power is disconnected from the keypad.

Addressing

The valid addresses of the keypad on each of the Galaxy panels are shown on the following **Table**:

Control Panel Addresses	Line	Valid Keypad	Valid Keyprox
Galaxy 3-48	1	0 - 2, B, C, D, E, F	0, 1, 2
Galaxy 3-144	1 2	0 - 2, B, C, D, E, F 0 - 6, F	0, 1, 2 0, 1, 2, 3
Galaxy 3-520	1 2, 3, 4	0 - 2, B, C, D, E, F 0 - 6, F	0, 1, 2 0, 1, 2, 3, 4, 5, 6

Table 4-2. Valid Keypad/KeyProx Addresses

It is possible to add additional keypads at any unused comms module addresses (B, C, D and E) as detailed in the following NOTE. These must be standard keypads. An engineer keypad can also be used at address F.

NOTE: On Line 1, keypad addresses B, C, D and E are not available if the Ethernet, ISDN, RS232 or Telecom modules respectively are fitted.

Keypad/KeyProx Installation Procedure

1. To attach the keypad to the wall, the back plate must first be removed from the front plate. To do this, insert a suitable tool into both openings at the bottom of the keypad and turn the tool gently.

CAUTION: When the keypad is separated make sure that the anti-static precautions are taken with the keypad pcb to avoid damage from esd (electro static discharge).

Connections to the terminals are:

Connector Terminals	Galaxy Keypads
A	A line to panel
B	B line to panel
+	12 Vd.c. input
-	0 V

Table 4-3. Keypad/keyProx Terminal Connections

2. Use the backplate as a template, then mark the locations for the three attachment screws in the required position.
3. If it is a new installation, use the keyhole slot at the top of the backplate and the two elongated holes at the bottom. If replacing an existing Mk3 keypad with a Mk7 keypad, use the keyhole slot at the top of the backplate and the two knockout holes at the bottom. This means that you can use the existing holes in the wall, whilst keeping the backplate in the same position.

4. If you are using a wall-run cable for the keypad (A, B, +12V, 0V) position the cable behind the back plate in the cable channels provided. The cable can be run in from either the top or the bottom of the back plate. Use a sharp tool to remove the plastic from the top or the bottom of the cable guides on the back plate skirting.

CAUTION: Use of any screws other than No. 6 Pan-head can damage the keypad mouldings.

5. Make sure that the keypad wiring is fed through the large opening on the keypad backplate, then position the keypad base on the wall and attach it securely with the three No. 6 Pan-head screws.
6. If an off the wall tamper is required, using a No. 6 Pan-head screw, secure the sacrificial wall tamper, indicated in Figure 4-2, to the wall. Make sure that the tamper knockout is still connected to the backplate moulding.
7. Connect the A, B and power wires to the correct terminals of the removable, four-way connector block.

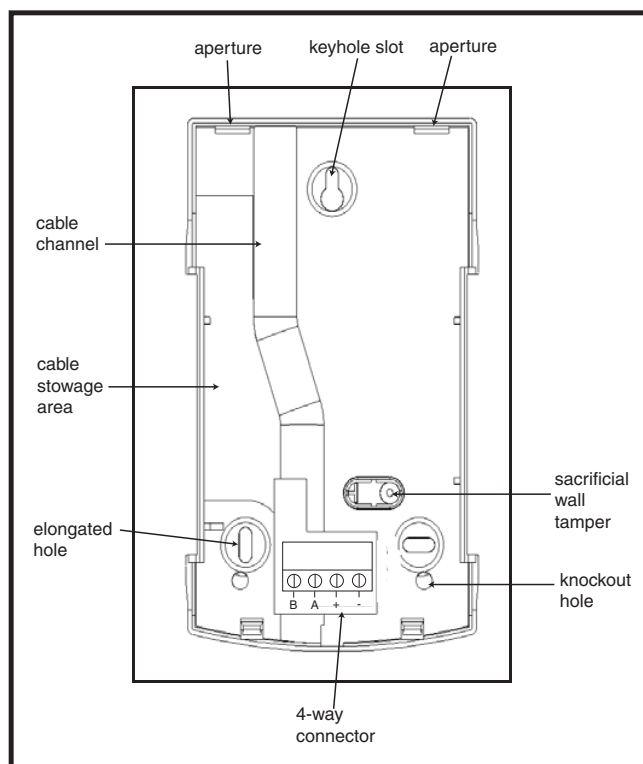


Figure 4-2. Galaxy Mk7 Keypad/KeyProx Backplate Installation

8. Make sure that the power is disconnected then set the keypad to the required address using the 16 way rotary switch on the PCB.
9. To re-assemble the keypad, connect the four-way connector block onto the pins on the keypad PCB. Attach the keypad front plate to the back plate by inserting the two clips on the top of the keypad front plate into the two apertures at the top of the keypad back plate, then gently push the bottom of the keypad front plate into the back plate until it snaps securely into place. Ensure the front and back sections of the keypad are securely fixed at all points of the keypad perimeter.

Note: The keypad door can be re-orientated to allow opening from either the left or right-hand sides. However, fitting or removal of the door must only be done when the front plate is detached from the back plate. Attempting to remove or install the door, when the keypad is assembled, may cause damage to the keypad mouldings.

Volume Control

Where fitted, the Mk7 keypad/keyprox has a volume control switch marked VOL at the bottom right-hand corner of the pcb. Make sure the keypad/keyprox is powered up and adjust to the desired volume (+ or -) for buzzer functions. Refer to **Appendix F** for keypad/keyprox part numbers with volume control function.

Adding a Keypad/KeyProx to the System

When adding a keypad to an existing system, the following points must be considered:

1. Ensure that the keypad to be added has a unique address from the other keypads on the system.
2. Ensure that the keypad has a valid address.
3. Connect the keypad to the system - refer to the Keypad Installation Procedure.

Note: A new keypad can only be configured into an existing Galaxy system from engineer mode.

4. Access engineer mode.
5. Connect the RS485 (AB) line of the keypad in parallel with the RS485 (AB) line of the existing keypads.
6. Connect + and – terminals of the keypad to a power supply.
7. Exit engineer mode - engineer code + **esc**:
8. The Mk7 keypad displays the message **1 MOD. ADDED — esc=CONTINUE**. Press the **esc** key; the keypad returns to the unset banner.

NOTE: If this message is not displayed, the keypad is not communicating with the control panel and has not been configured into the system. In this case all connections and addresses should be rechecked.

NOTE: If adding a keyProx to the system, the message **2 MOD ADDED** will be displayed to indicate that both a keypad and MAX have been added to the system.

9. The keypad is now configured into the system.

Removing a Keypad/KeyProx from the System

A keypad can only be removed from an existing Galaxy system from engineer mode

1. Access engineer mode.
2. Disconnect the keypad.
3. Exit engineer mode. The message **1 MOD. MISSING — [<],[>] to View** is displayed
4. Press the **A** or **B** key. The message **KEYPAD XX — *=REMOVE MODULE** is displayed.
5. Press the ***** key to acknowledge and accept that the keypad has been removed. The keypad returns to the unset banner.

NOTE: If removing a keyProx from the system the message **2 MOD MISSING** is displayed to indicate both a keypad and MAX have been removed from the system. Each should be removed separately by pressing the ***** key twice.

Self Diagnostics

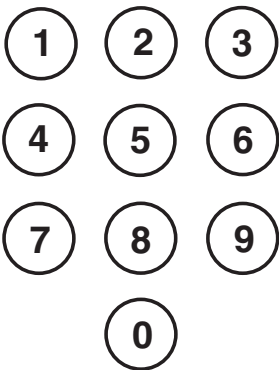
The keypad has a self diagnostic feature that is used to test the operational status of the inputs and outputs of the keypad.

The test is started by disconnecting the power from the keypad, then reapplying the power while pressing the **ent** key. The test routine commences immediately. Each test last approximately four seconds. The test is terminated by removing the power.

- Keypad address is displayed
- Keypad buzzer is activated and a bell symbol is displayed.
- Power LED is illuminated and an a.c. (⌚) and LED (⚡) symbol is displayed.
- Keypad keys are displayed. Each key press is confirmed by the buzzer sounding and the key display being highlighted.
- To return keypad to operational mode remove and reapply power.

Keypad/KeyProx Operation

Number Keys



The number keys are used to enter the Personal Identification Number (PIN) which identifies users to the Galaxy and permits access to the system options. The PIN Code is a 5 or 6 digit number.

	Default Code
Engineer	112233
Remote User	543210
Master Manager	12345
Authorisation	54321

Table 4-4. Default Codes

The number keys are also used, once access to the system has been gained, to select and modify options.

View Keys



These keys are used to initiate the setting of the Galaxy
Pressing the **A** or **B** key immediately after a valid PIN has been entered starts one of the routines for setting the system. The **A** key initiates the full setting of the Galaxy. The **B** key starts the part setting routine.
Once the system has been successfully accessed the **A** key can be used to step forward through the Galaxy menu options and the **B** key to step backwards.
The **A** and **B** keys can also be re-programmed for different functions.

Enter Key



The **ent** key is used to:

- Access the menu options
- Confirm the programming selections

Escape Key



The **esc** key cancels any modification made to the current option and returns to the previous option level. Successive pressing of this key returns the user to the banner display.

The **esc** key also aborts the setting routine if pressed during the exit time.

Hash Key



The # key is used :

- as a toggle key, which enables or disables the programming features of the Galaxy options, for example, enabling the OMIT attribute of a zone,
- to give additional information on the programming options, for example pressing the # key while in option **22=DISPLAY LOG** shows details of the user number, descriptor and keypad used to cancel alarms or unset the system.
- to activate the Duress and PA outputs; enter a valid user code followed by two presses of the # key, then the **ent** key to activate the duress alarm.

Star Key



The * key is used:

- to correct or erase PINs in the **CODES** option and alpha-numeric descriptors in the **TEXT** option,
- to start printing from the current event when viewing option **22=DISPLAY LOG**.
- to display the set status of the groups. When Show Status (refer to option 58.6=KEYPADS.Show Status) is enabled, pressing the * and # keys simultaneously when the normal banner is displayed indicates the group set status.

R = Ready to Set (all active zones in group closed)

F = Faulted (at least one of the active zones in the group is open)

S = Set

P = Part Set

L = Locked Out

- = Group not assigned to keypad

Note: The **Show Status** indicates the set conditions of groups when the system is set (keypad blank) or unset (normal banner). **Show Status** does not operate while engineer mode is accessed.

Pressing the * and # keys again toggles the display to show the status of the groups individually. To move between each groups, press the * and A or the * and B keys simultaneously.

Pressing the * and # again returns the keypad to the banner display.

Galaxy 3-520

The Galaxy 3-520 has more than eight groups; these are displayed on the keypad in blocks of eight groups. Press the **A** or **B** key to display each of the group blocks.

Power LED

The green power LED indicates the status of the a.c. power supply and the stand-by battery.

Power LED	a.c. Status	Battery Status	Fuse Status
ON	a.c. OK	Battery OK	Fuses OK
Slow flash	a.c. Fail	Battery OK	Fuses OK
Quick Flash	a.c. Fail/OK	Battery Low	Fuse blown

Table 4-5. a.c./Battery Status Indicator

NOTE: It is advised that a suitably rated stand-by battery is fitted to the system in order to provide continued protection in the event of a mains failure. The battery is not included.

Display

The Galaxy Keypad/KeyProx have a 2 x 16 character backlit display used to display programming information and system status.

GALAXY 520 V5.00 08:58 TUE 22 NOV
--

The Galaxy KeyProx

General

The KeyProx is a standard Mk7 keypad with a proximity card reader built in to the lower right corner. This allows users to set and unset the system, using proximity cards, rather than a pin.

NOTE: The keyProx is not intended for use as a door control unit. Installation and wiring of the KeyProx is identical to the Mk7 keypad.

Addressing

Both the KeyProx and reader share a common address, set by the rotary address switch.

An address must be chosen which will be valid for both the keypad and MAX.

Please note that in order for the reader to operate, MAX mode must be enabled in the panel programming, (option **63.2.1 = Options.MAX.MAX Mode**). The MAX addressing function in option **63.2.2 = MAX Address**, is **not** required for keyprox units.

Operation

The operation of the KeyProx is identical to the Mk7 keypad. The proximity reader is seen by the panel as an on-line MAX reader. It is programmed in exactly the same way with the exception that it does not require to be addressed (this being set already by the rotary switch).

Card Types

The KeyProx can read standard ASK (Amplitude Shift Keying) type cards up to 34 bit. A self learn feature is incorporated into the KeyProx to aid in card programming.

For further details on how to set up user cards, to set and unset the system, refer to **Galaxy 3 Series Programming Manual (IP1-0033), Option 42 - Codes**.

Section 5: Door Control Module - MAX³

Introduction

The MAX³ is a proximity reader access control device for a single door, which can also be used for setting and unsetting of your alarm control panel. The MAX³ can be configured in one of two ways:

Standalone

In this configuration the MAX³ can be used for either door control or alarm system set/unset control, by either connecting the internal relay output to a door lock, external relay or into the keyswitch zone of the alarm system. When in standalone mode the MAX³ is programmed and operated using the MAX³ proximity cards or tags. The proximity cards and tags each have unique ID numbers and must be identified to the MAX³ before being used to operate the system. The MAX³ memory can store up to 999 ID numbers, including at least three reserved for Masters. Once programmed, the ID number of the tags and cards are stored indefinitely in the MAX³ memory until voided (removed) or erased. Removing power from the MAX³ does not erase the programming memory.

Note : The MAX³ defaults to standalone mode. It can be configured to on-line mode directly from and of the Galaxy 3 Series control panels.

On-line

The MAX³ can operate in on-line mode, with the Galaxy 3 Series control panel range, as a completely integrated module on the system. In this configuration the MAX³ can be used for both door control and alarm system set/unset control with complete user traceability stored within the Galaxy control panel.

For detailed instructions on how to programme the MAX³ onto the system in on-line mode refer to **Galaxy 3 Series Programming Manual IP1-0033, Option 63.2=MAX**.

Installing the MAX³

MAX³ Pack

Your Max³ pack contains the following:

- Max³ proximity reader *
 - Max³ drilling template
 - Max³ installation instructions
 - Surge suppressor
- * The MAX³ is supplied with 3 metres of 12 wire E111235 AWG cable which is fixed and sealed through a keyhole opening on the rear surface of the MAX³.

Mounting the MAX³

To mount the MAX³ use the step by step diagrams provided with the drilling template. The drilling template should be used as an aid to locate the holes required to secure the MAX³ and insert the connection cable. The MAX³ comes with an infra red lid tamper. The tamper is activated when the lid is removed from the MAX³ unit.

Wiring the MAX³

The MAX³ unit can be connected to the control panel in one of two ways depending upon whether it is being used in an on-line or standalone configuration. The diagrams below provides details for both configurations. The MAX³ relay is configured in either the NC or NO configuration depending upon the variant purchased (MX03 - Normally Closed, MX03-NO - Normally Open).

NOTE: Fitting of an external relay may be required when using AC powered locks.

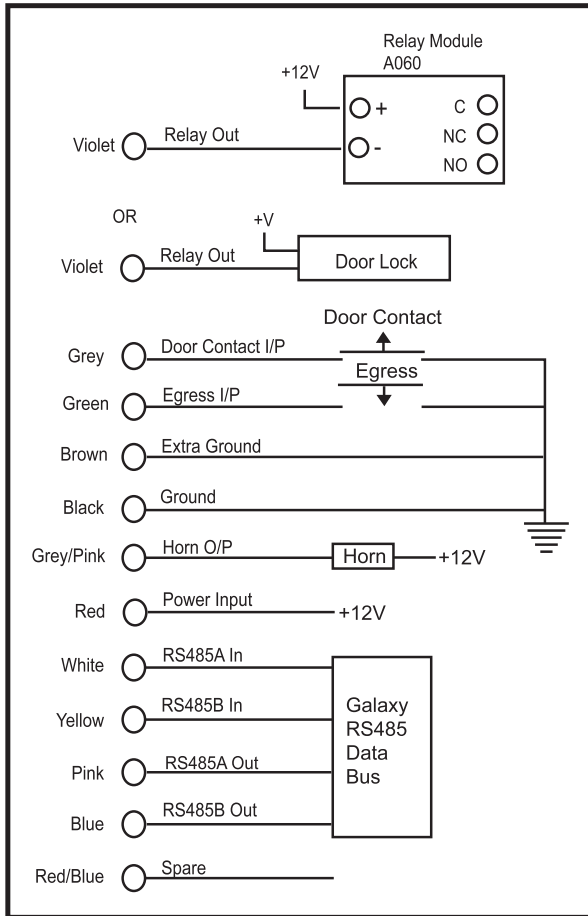


Figure 5-1. Online Connection diagram

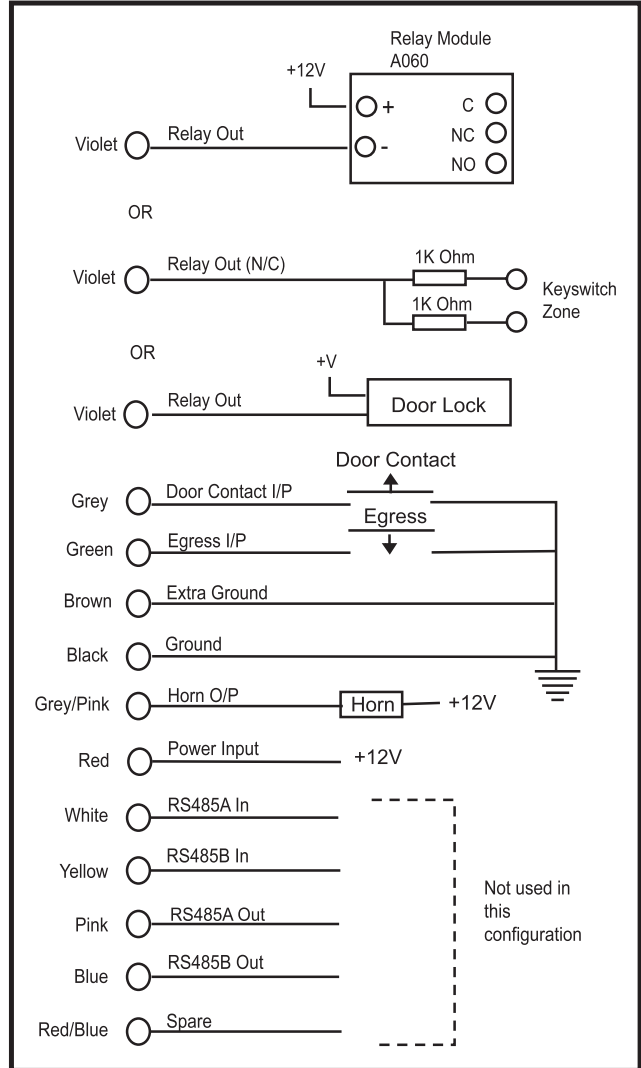


Figure 5-2. Standalone Connection diagram

Configuring a MAX³ Reader into the System

MAX³ readers can only be configured into the Galaxy system from engineer mode.

Access engineer mode. Wire the MAX³ as per the instructions given in **Figures 5-1 or 5-2**

The MAX³ reader must be assigned as either an **On-Line** or a **Stand-Alone** module using option **63.2.2 = OPTIONS.MAX.MAX Address:**

0 = On-Line: The MAX³ is fully integrated with the Galaxy system and communicates via the AB line, sharing system resources and facilities.

1 = Standalone (default): The MAX operates as an entirely independent unit. The Galaxy does not monitor the MAX³ for alarms, tampers or power failure.

Configuring as On-Line MAX³

1. Connect power to the MAX³ as per Figure 5-1.
2. Ensure that the MAX mode is enabled (option **63.2.1 = OPTIONS.MAX.MAX Mode**).
3. Select option **63.2.2 = OPTIONS.MAX.MAX Address** and press the **ent** key; the Galaxy panel may prompt (depending on model) for the AB line (1 – 4)) that is to be searched; select the line and press the **ent** key. The Galaxy searches for the MAX³ with the highest address. New MAX³ readers are addressed as 8 (standalone) by default.
4. **Only if adding a new MAX³ reader:** On locating the MAX³ address, the keypad prompts for the **OPERATING MODE** of MAX³ to be assigned: select **0 = On-Line** and press the **ent** key.

NOTE: If reprogramming an existing stand-alone reader, the system automatically selects the **On-Line** operating mode.

The MAX³ can then be readdressed. The keypad displays the current address of the MAX³ and the range of valid addresses. Enter the new MAX³ address and press the **ent** key; the Galaxy then reprograms the address of the MAX³. The keypad indicates the old and new MAX³ addresses and the status of the reprogramming.

All new MAX³ readers default to address **7**.

NOTE: It is recommended that when adding a reader, it is addressed as the lowest available number on the line.

When the reprogramming is complete the MAX³ bleeps, the LEDs on the MAX³ switch off and the keypad display returns to **2 = MAX Address**.

5. Exit engineer mode - engineer code + **esc**: the keypad displays the message **1 MOD. ADDED - esc=CONTINUE**. LED 2 on the MAX³ reader switches on. Press the **esc** key; the keypad returns to the unset banner.

If this message is not displayed, the MAX³ reader is not communicating with the control panel and has not been configured into the system (LED 2 does not switch on).

NOTES:

1. The MAX³ reader **will not** operate until engineer mode is exited and the reader is configured into the system.
2. All MAX³ doors **must** be closed, otherwise engineer mode cannot be exited.
6. The on-line MAX³ reader is now configured into the system.

Configuring as a Stand-Alone MAX³

1. Ensure that the MAX³ is connected to the Galaxy (**RS485 AB line**) and the MAX mode is enabled (option **63.2.1 = OPTIONS.MAX.MAX Mode**).
2. Select option **63.2.2 = OPTIONS.MAX.MAX Address** and press the **ent** key; the Galaxy searches for the MAX³ with the highest address (the new MAX³ reader). The Galaxy panel may prompt (depending on model) for the AB line (1 – 4) that is to be searched; select the line and press the **ent** key. On locating the MAX address, the keypad prompts for the **OPERATING MODE** of MAX to be assigned: select **1 = Standalone** and press the **ent** key. The MAX³ reader is readdressed as **32**.

When the reprogramming is complete the MAX³ bleeps, LED 3-7 on the MAX³ switches on and the keypad display returns to **2 = MAX Address**.

3. Disconnect the **AB line** from the MAX³ reader. Ensure that all other modules (keypads, RIOs and on-line MAX³ readers) are still daisy-chained into the Galaxy panel. If the MAX³ reader is the last module on the **AB line**, remove the 680Ω end of line resistor and put it into the last module on the line.
4. The MAX³ reader is now programmed as a stand-alone module in sleep mode (LEDs 3–7 on) and can be programmed using the MAX³ cards (refer to Programming Stand-Alone MAX³ Readers).

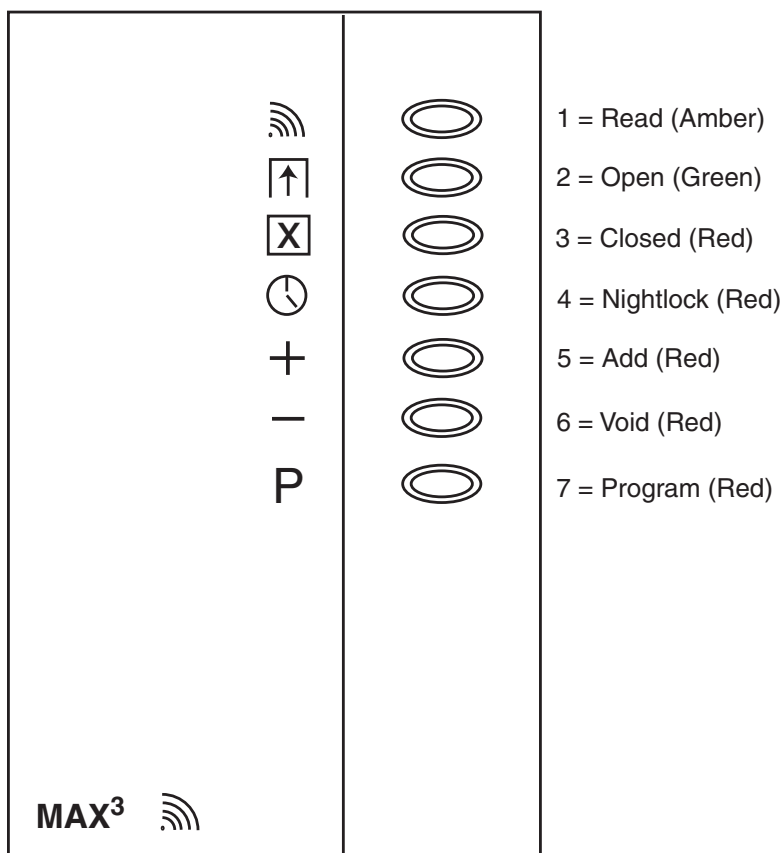


Figure 5-3. MAX³ LED's

Removing a MAX³ Reader from the System

On-Line Mode

1. Access engineer mode.
2. Disconnect the MAX³ reader (**AB line** and power).
3. Exit engineer mode.
4. The message **1 MOD. MISSING — [<],[>] to View** is displayed.
5. Press the **A** or **B** key.
6. The message **MAX XX — ★ =REMOVE MODULE** is displayed.
7. Press the **★** key to acknowledge and accept that the MAX³ reader has been removed. The keypad returns to the unset banner.

Operating Instructions

The MAX³ must be presented with a valid user card to allow access. Opening the door without presenting a valid card activates a door forced alarm at the panel; the buzzer sounds and LED 2 flashes until the door is closed.

Activating the egress switch allows the door to be opened without activating an alarm when no card has been presented to the MAX³.

1. Ensure that LED 3 is on and all other LEDs are off.
2. Swipe the MAX with a standard user or nightlock access user card. LED 3 switches off and LED 2 switches on for the programmed **Open Timeout**.
3. Open the door while the LED 2 is on and access the area.
4. Close the door; LED 2 switches off and LED 3 switches on. The door must be closed within the programmed **Close Timeout**; if the door remains open longer than this, an alarm is activated.

Card-Held Function

The MAX³ card can be assigned a single menu option (refer to option **42.1.8 = CODES.User Codes.MAX Function**). To activate the function assigned to the MAX³ card, hold the card in front of the reader for three seconds; all of the LEDs switch on. If a keypad has been assigned to the MAX function then it displays the details of this option. If no keypad is assigned, pressing a key on any of the keypads assigned to a common group to the user displays the card-held function.

Card-Held System Setting

If the MAX³ card is assigned one of the setting options (option 12, 13, 14 & 16 – 19), the card-held function starts the setting procedure for the groups assigned to the card.

NOTE: If **Group Restriction** is assigned, then only the groups that are common to both the MAX³ reader and the MAX³ user are set/unset

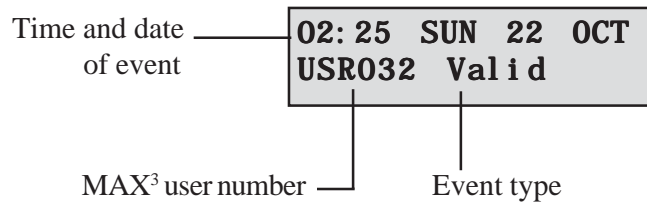
To unset the system using the MAX³, swipe the reader with a valid MAX³ card. The MAX³ reader beeps. All of the groups assigned to the card are instantly unset.

All new MAX³ readers default to address **7**.

MAX³ Log

The Galaxy system has a panel dependent event log for recording the MAX³ activations. This log is shared by all readers on the system and operates on a first-in-first-out basis for overwriting events when the log is filled. To display the events in the MAX³ log select option **25 = ACCESS DOORS**; use the **A** or **B** keys to select the required MAX³ address then press the **ent** key. The first event that occurred on the selected MAX³ is displayed along with details of the time, date and MAX³ number.

To view the log press the **A** key to move forward in time through the events or the **B** key to move backwards. Press the **esc** key to return to the MicroMAX address display. To view the log of another MAX³, use the **A** or **B** key to select the required address. To escape from the **Access Doors** option press the **esc** key.



MAX³ Events Print-Out

The MAX³ events can be printed out as they occur to an on-line printer. To print the MAX³ events ensure that option **51.27 = PARAMETERS.On-Line Print** is enabled. Select option **51.28 = PARAMETERS.On-Line Level** and enter **2** to print out all system events including the MAX³ events or **3** to print out only the MAX³ events.

NOTE: A serial printer must be connected to line one of the Galaxy panel and the printer must remain on-line (ready to print) at all times.

Downloading the MAX³ Log

The MAX³ event log can be downloaded to Galaxy Gold by using the MAX Log copy option in Galaxy Gold.

Dual Access Cards

If a user's card number is assigned a *, then the card becomes Dual access. This means that it will not open the door on its own; it needs another PIN or card as well. If the PIN belonging to the same user has a # assigned, then that PIN must be entered first before access will be granted to that card.

If the PIN has no # assigned, then the card will work only in conjunction with any other Dual Access card that shares one or more groups (see option **42 = Codes** for programming).

Dual Focus (Card Held)

If a card has a # assigned to the number, then any card-held function will only work in conjunction with the PIN from the same user, provided that the PIN has a # assigned also. The Dual Focus function will work in either order, but if the card is presented first, it will simply enable the PIN to gain access to the normal menu (see option **42 = Codes** for programming).

Timed Anti-Passback

When the Timed Anti-Passback feature is enabled, it will prevent more than one use of any particular card at a particular reader within a given time period. See option

63.2.3.6 = Options.MAX.Max Parameters.Anti-Passback for programming details.

A forgiveness function is available to clear all or particular antipassback restrictions in force. There are set Anti-Passback users as defined in the following **Table**. If a card belonging to one of these users is swiped at a reader, all anti-passback restriction at that reader are cleared. A manager code can authorise a forgive function on a particular user in option **42.1 = Codes.User Codes**. An engineer code can authorise a forgive function on a particular reader in option **63.2.3.6 = Options.MAX.Max Parameters.Anti-Passback**.

Appendix A : Door Control - MAX (MX01)

Installation Instructions

The MAX box contains the following:

- MAX reader (P/N **MX01**),
- MAX facia label (P/N **21_1627**),
- 10-way connector block.

The MAX installation sequence is as follows:

1. Wiring the MAX
2. Mounting the MAX
3. Attaching the facia label

Wiring the MAX

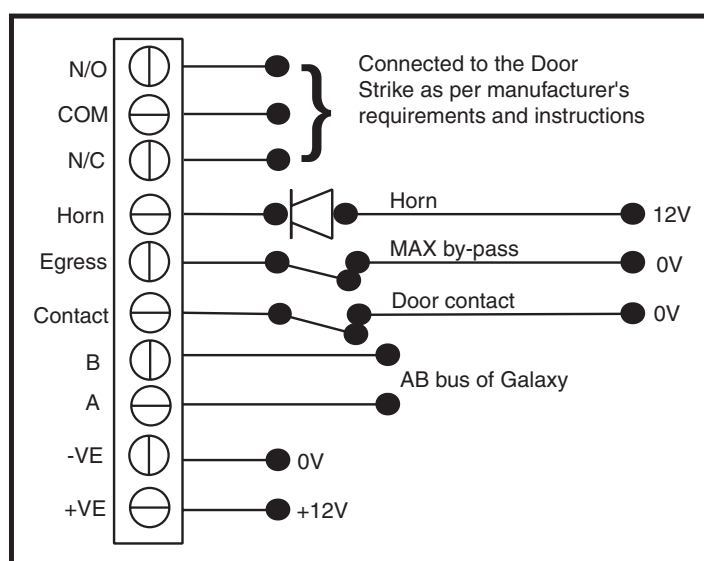


Figure A-1 MAX Wiring Details

1. Connect the A and B lines of the Galaxy communication bus to the **A** and **B** terminals. This configuration must be a daisy-chain (parallel) connection. If the MAX is the last module in the line, then the End of Line (EOL) resistor must be connected across the A and B terminals.
2. Connect the door strike in accordance with the manufacturer's recommendations, via the relay.
3. The **Horn** output is an open collector. This is connected to the output device via a relay.

NOTE: With MAX software version 1.23 the horn output does not function when the reader is programmed as on-line operating mode.

4. The **Egress** switch is used to activate the door strike, allowing the door to be opened without activating the horn (the egress switch is normally open).
5. The **Contact** switch is used to connect the access door to an alarm contact, giving alarm indication when the door is opened without the door strike being activated (either by a MAX card or the egress switch).
6. Connect a 12 Vd.c. power supply to the MAX terminals marked **-VE** and **+VE**.

Mounting the MAX

Attach the wired-up 10-way connector block to the pins on the rear of the MAX reader.

Surface Mounting the MAX

1. If the wiring is not wall recessed, remove the appropriate knock-out (from the sides, top or bottom of the MAX).
2. Using the MAX reader as a template locate the two mounting screws in the required positions.

NOTE: The MAX is positioned with the 2 LEDs at the top of the module.

3. Securely attach the module to the wall with 2 No.8 roundhead 2 inch screws.

Flush Mounting the MAX

1. Using the template on the lid of the MAX flush mounting kit box (P/N **MX02**), locate the position of the screws and mark and cut-out the recess area required.

NOTE: Ensure that there is sufficient wall surface to securely fix the screws.

2. Fit the MAX reader into the flush mounting kit; push the reader in from the rear ensuring that the four retaining arms on the flush mounting kit click into place
3. Securely attach the module to the wall with 2 No.8 roundhead 1½ inch screws.

NOTE: The MAX is positioned with the 2 LEDs at the top of the module.

Remove the backing from the facia label, line up the label images with the 6 LEDs and place it on the face of the MAX.

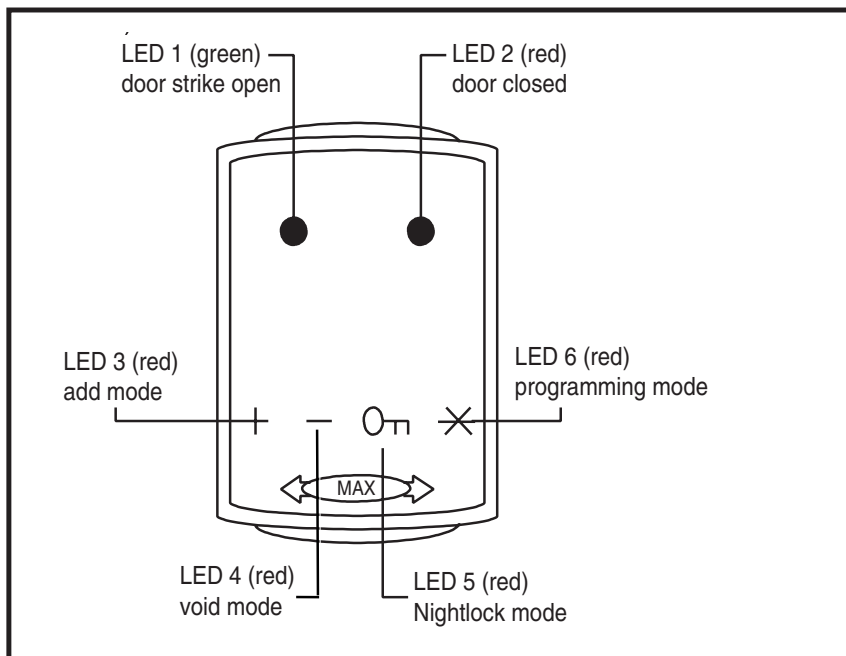


Figure A-2 MAX LED's

Configuring a MAX Reader into the System

MAX readers can only be configured into the Galaxy system from engineer mode.

NOTE: When adding a MAX reader to a Galaxy panel ensure that there are no more than eight MAX readers connected to the RS485 (**AB**) line.

Wire the MAX as per the instructions given with figure 5-1 then access engineer mode.

The MAX reader must be assigned as either an **On-Line** or a **Stand-Alone** module using option **63.2.2 = OPTIONS.MAX.MAX Address:**

0 = On-Line: The MAX is fully integrated with the Galaxy system and communicates via the AB line, sharing system resources and facilities.

1 = Standalone: The MAX operates as an entirely independent unit. The Galaxy does not monitor the MAX for alarms, tampers or power failure.

NOTE: Early versions of MAX readers cannot convert between the stand-alone and on-line operating modes:

- **MX01S (software V1.23)** is a dedicated stand-alone reader. This cannot be converted to on-line mode and must not be connected to the Galaxy AB line. The horn output is fully functional.
- **MX01 (software V1.23)** is programmed as an on-line reader. The horn output is non-functioning. The reader can be reprogrammed, via the Galaxy system, into stand-alone mode, however, once programmed as stand-alone it cannot be converted to on-line mode. In stand-alone mode the horn output is fully functional.
- **MX01 (software V1.32)** can be reprogrammed as stand-alone or on-line as often as required. In on-line mode, the horn output is non-functioning; in stand-alone mode the horn output is fully functional.

Configuring as a Stand-Alone MAX

1. Ensure that the MAX is connected to the Galaxy (**RS485 AB line**) and the MAX mode is enabled (option **63.2.1 = OPTIONS.MAX.MAX Mode**).
2. Select option **63.2.2 = OPTIONS.MAX.MAX Address** and press the **ent** key; the Galaxy searches for the MAX with the highest address (the new MAX reader). The Galaxy 500 and 512 prompt for the AB line (1 – 4) that is to be searched; select the line and press the **ent** key. On locating the MAX address, the keypad prompts for the **OPERATING MODE** of MAX to be assigned: select **1 = Standalone** and press the **ent** key. The MAX reader is readdressed as **32**.

When the reprogramming is complete the MAX bleeps, LED 2 on the MAX switches on and the keypad display returns to **2 = MAX Address**.

3. (**MAX software versions 1.23 and 1.32**) Disconnect the **AB line** from the MAX reader. Ensure that all other modules (keypads, RIOs and on-line MAX readers) are still daisy-chained into the Galaxy panel. If the MAX reader is the last module on the **AB line**, remove the 680Ω end of line resistor and put it into the last module on the line.

NOTE: The Galaxy cannot operate if the **AB line** is connected to stand-alone MAX readers with software V1.23 or V1.32.

4. The MAX reader is now programmed as a stand-alone module in sleep mode (LEDs 2 – 5 on) and can be programmed using the MAX cards (refer to Programming Stand-Alone MAX Readers).

Configuring as On-Line MAX

1. Only if reprogramming an existing stand-alone MAX reader:

- Put the MAX reader into the sleep mode (present the **Void Master** card then swipe twice with the **Program Master** card — LEDs 2 – 5 switch on. Refer to the **MAX Installation and Operations Guide (L120)**.).
 - Remove the power from the MAX reader.
2. Connect the **AB line** of the MAX reader to the **AB line** from the control panel (ensuring that a daisy-chain connection is maintained and that the 680Ω resistor is located in the last module on the line). Connect 12 Vd.c. to the +**VE** and –**VE** terminal of the MAX reader.
 3. Ensure that the MAX mode is enabled (option **63.2.1 = OPTIONS.MAX.MAX Mode**).
 4. Select option **63.2.2 = OPTIONS.MAX.MAX Address** and press the **ent** key; the Galaxy searches for the MAX with the highest address (the new MAX reader). The Galaxy 500 and 512 prompt for the AB line (1 – 4) that is to be searched; select the line and press the **ent** key.

Only if adding a new MAX reader: On locating the MAX address, the keypad prompts for the **OPERATING MODE** of MAX to be assigned: select **0 = On-Line** and press the **ent** key.

NOTE: If reprogramming an existing stand-alone reader, the system automatically selects the **On-Line** operating mode

The MAX can then be readdressed. The keypad displays the current address of the MAX and the range of valid addresses. Enter the new MAX address and press the **ent** key; the Galaxy then reprograms the address of the MAX. The keypad indicates the old and new MAX addresses and the status of the reprogramming.

NOTE: All new MAX readers default to address **7**. It is recommended that when adding a reader, it is addressed as the lowest available number on the line.

When the reprogramming is complete the MAX beeps, the LEDs on the MAX switch off and the keypad display returns to **2 = MAX Address**.

NOTE: If the Galaxy has been warm-started with the MAX connected and the reader is re-programmed with its existing address, then the LED does not switch off and engineering mode does not have to be exited to configure the MAX into the system.

5. Program the MAX Parameters. This option defines the operational features of the MAX reader.

- 1 = Descriptor:** This option is used to assign a name of up to 12 characters to each of the MAX modules.
- 2 = Open Timeout:** This is the period, following the user card swipe, that the MAX relay is activated allowing a door strike to be unlocked and the door to be opened without creating an alarm. The MAX relay de-activates as soon as the door is closed or the **Close Timeout** occurs.
- 3 = Close Timeout:** This is the period following the user card swipe that the door can remain open when gaining access. If the door remains open longer than the period assigned to the **Close Timeout**, then an alarm occurs.
- 4 = Groups:** Each MAX module can be assigned to selected groups; the MAX then responds only to cards that have a group common to it.

Keypad Group Restriction: To restrict the operation of the function only to groups that are common to both the card and the MAX, press the * key when assigning groups to the MAX. This means that when a card with access to groups 1, 2 and 3 activates the MAX card function on a MAX module assigned to groups 2, 3 and 4, the function only operates on the common groups (groups 2 and 3).

6. Exit engineer mode — engineer code + **esc**: the keypad displays the message **1 MOD. ADDED — esc=CONTINUE**. LED 2 on the MAX reader switches on. Press the **esc** key; the keypad returns to the unset banner.

If this message is not displayed, the MAX reader is not communicating with the control panel and has not been configured into the system (LED 2 does not switch on).

NOTES:

1. The MAX reader **will not** operate until engineer mode is exited and the reader is configured into the system.
 2. All MAX doors **must** be closed, otherwise engineer mode cannot be exited.
7. The on-line MAX reader is now configured into the system

Removing a MAX Reader from the System

Stand Alone Mode

The stand-alone MAX reader is not connected to the **AB line**, therefore it can be removed simply by disconnecting the power to the reader. There is no requirement to access engineer mode.

On-Line Mode

1. Access engineer mode.
2. Disconnect the MAX reader (**AB line** and power).
3. Exit engineer mode.
The message **1 MOD. MISSING — [<],[>] to View** is displayed.
4. Press the **A** or **B** key.
The message **MAX X — *=REMOVE MODULE** is displayed.
5. Press the * key to acknowledge and accept that the MAX reader has been removed. The keypad returns to the unset banner.

Programming Instructions for On-Line Readers

Refer to **Section 6: System Operation**, menu option **63 = OPTIONS** for details on programming the **Open Timeout**, **Close Timeout** and **Group** parameters for the MAX reader.

NOTE: These programming instructions refer only to on-line MAX readers (modules that are connected to a host Galaxy panel via the RS485 data bus). For details on stand-alone MAX installation refer to the **MAX Installation and Operations Guide (L120)**.

For details on the programming of the MAX user cards and functions refer to **Section 6: System Operation**, menu option **42 = CODES**.

Operating Instructions (On-Line Modes)

The MAX must be presented with a valid user card to allow access. Opening the door while LED 2 is on activates an alarm; the buzzer sounds and LED 1 flashes until the door is closed.

Activating the egress switch allows the door to be opened without activating an alarm when no card has been presented to the MAX.

Gaining Access

1. Ensure that LED 2 is on and all other LEDs are off.
2. Swipe the MAX with a standard user or nightlock access user card. LED 2 switches off and LED 1 switches on for the programmed **Open Timeout**.
3. Open the door while the LED 1 is on and access the area.
4. Close the door; LED 1 switches off and LED 2 switches on. The door must be closed within the programmed **Close Timeout**; if the door remains open longer than this, an alarm is activated.

Nightlock Access (Stand-Alone Only)

Only cards programmed as nightlock access users can gain access when the MAX is nightlocked. The operation is identical to the standard user card.

NOTE: Access cannot be gained using a standard user card.

Card-Held Function

The MAX card can be assigned a single menu option (refer to option **42.2.8 = CODES.User Codes.MAX Function**). To activate the function assigned to the MAX card, hold the card in front of the reader for three seconds; all of the LEDs switch on. If a keypad has been assigned to the MAX function then it displays the details of this option. If no keypad is assigned, pressing a key on any of the keypads assigned to a common group to the user displays the card-held function.

Card-Held System Setting

If the MAX card is assigned one of the setting options (option 12, 13, 14 & 16 – 19), the card-held functions starts the setting procedure for the groups assigned to the card.

NOTE: If **Group Restriction** is assigned, then only the groups that are common to both the MAX reader and the MAX user are set.

If all of the groups that are assigned to the MAX are set (either by the card-held function or by any other setting means) all of the LEDs switch off.

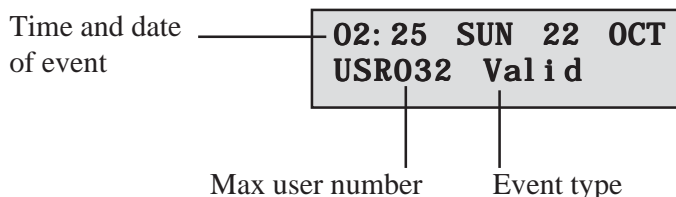
To unset the system using the MAX, swipe the reader with a valid MAX card. The MAX reader beeps and LED 2 switches on. All of the groups assigned to the MAX are instantly unset.

Max Log

The Galaxy system has a 1000 event log (500 for 3-48) for the recording the MAX activations. This log is shared by all readers on the system and operates on a first-in-first-out basis for overwriting events when the log is filled.

To display the events in the MAX log select option **25 = ACCESS DOORS**; use the **A** or **B** keys to select the required MAX address then press the **ent** key. The first event that occurred on the selected MAX is displayed along with details of the time, date and MAX number.

To view the log press the **A** key to move forward in time through the events or the **B** key to move backwards. Press the **esc** key to return to the MAX address display. To view the log of another MAX, use the **A** or **B** key to select the required address. To escape from the **Access Doors** option press the **esc** key.



Max Events Print-Out

The MAX events can be printed out as they occur to an on-line printer. To print the MAX events ensure that option **51.27 = PARAMETERS.On-Line Print** is enabled. Select option **51.28 = PARAMETERS.On-Line Level** and enter **2** to print out all system events including the MAX events or **3** to print out only the MAX events.

NOTE: A serial printer must be connected to line one of the Galaxy panel and the printer must remain on-line (ready to print) at all times.

Appendix B: 3 Ampere Smart PSU - P015

The Galaxy Smart PSU can be connected to the Galaxy control panels. The Smart PSU integrates a three ampere power supply with an eight zone Galaxy RIO. This can be used in place of a standard RIO to overcome power problems that arise when the additional RIO is fitted distant to the control panel.

The connection, addressing, zones and outputs information is identical to that described in the previous **Remote Input Output (RIO) Modules** sub-section.

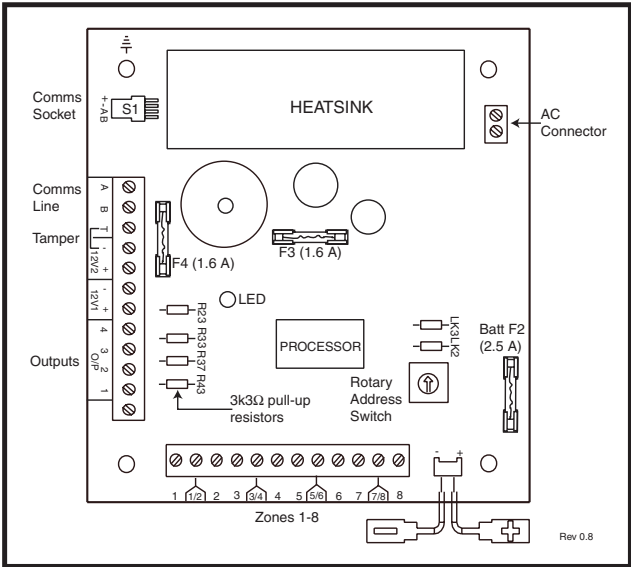


Figure B-1. Galaxy 3A Smart PSU

NOTE: The number of pull-up resistors may vary with different hardware revisions.

Grounding

The 0V on the Galaxy system is connected to earth via mounting screws on the Smart PSU. The 0V must be connected to earth at the main control panel only. If a smart PSU is being used remotely, an insulating washer should be fitted behind the head of the top left mounting screw.

The integrated RIO has eight programmable zones and four programmable outputs. It is programmed and operates in exactly the same way as the standard Galaxy RIO. The Smart PSU has two separately fused regulated 12 Vd.c. outputs, each capable of supplying one ampere to additional modules and devices. A fused regulated voltage is also supplied to charge a 12 volt lead-acid stand-by battery.

For further information refer to **Galaxy Smart Power Supply Unit Installation Instructions (II1-0101)**.

The default functions and pull-up resistors of each Smart PSU output, when connected to a Galaxy are shown in the following **Table**:

Output No.	Function	Pull-up Resistor
1	Bells	R43
2	Strobe	R37
3	PA	R33
4	Reset	R23

Table B-1. Smart PSU Output Default Functions

NOTE: The number of pull-up resistors may vary with different hardware revisions.

Appendix C: Panel Comparisons

	Galaxy G3 Panel		
	3-48	3-144	3-520*
Zones (on board to max)	16 to 48 (16 on board)	16 to 144 (16 on board)	16 to 520 (16 on board)
Zone types	49	49	49
Outputs (on board to max)	8 to 24	8 to 72	8 to 260
Output Types	76	76	76
User Codes	100	250	999
Groups	4	8	32
Muti-Users	4	8	16
Event Log	1000	1500	1500
MAX Log	500	1000	1000
Links	64	128	256
7-Day Timers	2	2	2
Autoset	20 On/Off (per group)	20 On/Off (per group)	20 On/Off (per group)
Timed Lockout	Yes	Yes	Yes
Pre-Check	Yes	Yes	Yes
Part Set	Yes	Yes	Yes
Library (Words)	538	538	538
RS485 Lines	1	2	4*
RIO's	4	8 per line	63 (15 line 1) (16 lines 2, 3, 4)
Output Module	4	4 per line	4 per line
Keypads	8	8 per line	8 per line
Keyprox	3	7 (3 line 1) (4 line 2)	24 (3 line 1) (7 lines 2, 3, 4)
MAX's	4	4 per line	8 per line
RS232 Module Support	on-board + 1 optional	on-board + 1 optional	on-board + 1 optional
Printer Module Support	on-board + 1 optional	on-board + 1 optional	on-board + 1 optional
Telecom Module Support	on-board + 1 optional	on-board + 1 optional	on-board + 1 optional
Remote Servicing	Yes	Yes	Yes
Ethernet Module Support	Optional	Optional	Optional
ISDN Module Support	Optional	Optional	Optional
RF RIO	Optional	Optional	Optional

* The Galaxy 520 requires an additional plug-on module in order to provide two additional RS485 lines.

Appendix D: Declaration of Conformity

Compliance and Approvals

The Galaxy 3 Series control panels are compatible with the relevant parts of the following standards:

- **PD6662:2003** Scheme for the application of European Standards for intruder alarm systems.
- **EN50131-1:2003 Draft 9d** Alarm systems - Intrusion systems - General requirements (grade 3).
- **TS50131-3** Alarm systems - Intrusion systems: Part 3 Control and indicating equipment (grade 3).
- **prEN50131-5-3** Alarm systems - Intrusion systems: Part 5-3 systems using wire-free interconnections (grade 2).
- **EN50131-6:1998** Alarm systems - Intrusion systems - Power supplies (grade 3).
- **EN50136-1-1:1998** Alarm systems - Alarm transmission systems and equipment - General requirements for alarm transmission systems.
- **EN50136-1-3:1998** Alarm systems - Alarm transmission systems and equipment - Requirements for systems with digital communicators using the public switched telephone network.
- **EN50136-2-1:1998** Alarm systems - Alarm transmission systems and equipment - General requirements for alarm transmission equipment.
- **EN50136-2-3:1998** Alarm systems - Alarm transmission systems and equipment - Requirements for equipment used in systems with digital communicators using the public switched telephone network.
- **CE Standards**, including all EN safety and EMC standards.
- **R&TTE 99/5/EC**
- **BS6799:1986** Code of practice for wire-free intruder alarm systems.
- **DD243:2002** Installation and configuration of intruder alarm systems designed to generate confirmed alarm conditions - code of practice.
- **BSIA Guidelines for Remote Maintenance** to systems installed to EN50131-1



EN50131 Compliance

This product is suitable for use in systems designed to comply with PD6662:2004 and prEN50131-1: 2004/6

Security Grade: 3

Environmental Class: II

Power Supply Type: A

The built-in Telecom module is for Remote Servicing use only on Grade 3 systems. An external Grade 3 communicator or Ethernet module must be used for alarm signalling.

The built-in Telecom module can be used for alarm signalling on Grade 2 systems:

Alarm Transmission System: 2 (options A, B, C & X)

This product is suitable for use in systems designed to comply with EN50131-1: 1997

Security Grade: 2

Environmental Class: II

Alarm Transmission System: 2 (options D2, T2, A2, S0, I0)

Power Supply Type: A

PD6662 Compliance

This product is suitable for use in systems designed to comply with PD 6662:2004 at grade 3 and environmental class II.

Public Switched Telephone Network (PSTN) approval

The equipment has been approved to Council Decision 98/482/EC for Pan -European single terminal connection to the Public Switched Telephone Network (PSTN). However due to differences between the individual PSTNs provided in different countries the approval does not, of itself, give an unconditional assurance of successful operation on every PSTN network termination point.

In the event of problems contact the equipment supplier in the first instance.

The Galaxy is designed to interwork with the following networks:

Austria	France	Italy	Norway	Switzerland
Belgium	Greece	Liechtenstein	Portugal	United Kingdom
Denmark	Iceland	Luxembourg	Spain	* Germany
Finland	Ireland	The Netherlands	Sweden	

* *May have interworking difficulties.*

NOTE: Contact the equipment supplier before using the Galaxy on any network not listed.

Appendix E: Specifications

Panel Specifications

Mechanical (all variants)

Enclosure (with PCB and transformer)	Width: 440 mm Height: 352 mm Depth: 88 mm Weight: 6.4 kg
Physical space for batteries	2 x 17Ah Max (not suitable for 12Ah batteries)
PCB only	Width: 265 mm Height: 120 mm Depth: 47 mm Weight: 0.3kg
Operating temperature:	-10 deg.C to + 55 deg.C

Electrical

Mains input:	230V ac (+10%/-15%) @ 50 Hz
Power supply: (G3-48)	Type A Total capacity 1.5A (0.75A dedicated to battery) Operating temperature: -10 deg.C to +40 deg.C
Power supply: (G3-144/520)	Type A Total capacity 2.5A (1.25A dedicated to battery) Operating temperature: -10 deg.C to +40 deg.C
Auxiliary +12V outputs: (G3-48)	12V nominal 0.5A in total 50.0 mV maximum ripple
Auxiliary +12V outputs: (G3-144/520)	12V nominal 1.0A in total 50.0 mV maximum ripple

Fuses

AUX1	1.0A - 20 mm anti-surge
AUX2	1.0A - 20 mm anti-surge
BELL	1.0A - 20 mm anti-surge
BATT (G3-48)	1.0A - 20 mm anti-surge
BATT (G3-144/520)	1.6A - 20 mm anti-surge

NOTE: Fuse AUX2 is not required on the G3-48.

PSTN	V.22 Modem 1200 Baud
RS232	300 - 56k programmable
RS485	9600 Baud, Full Duplex, Asynchronous

Modules	Weight	Order Code
Galaxy Keypad (Mark VII).....	190 g	CP027
Size:	149 x 91 x 31 mm (L x B x H)	
Galaxy Keyprox (Mark VII).....	190 g	CP028
Size.....	149 x 91 x 31 mm (L x B x H)	
Keypads Material		PC + ABS
Keypad Colour		Neutral
Galaxy RIO (Boxed)	300 g	C072
Size:	150 x 162 x 39 mm (L x B x H)	
Galaxy RFRIO (Boxed)	270 g	C076
Size	150 x 162 x 39 mm (L x B x H)	
Galaxy Output Module (Boxed)	270g	C078
Size	150 x 162 x 39 mm (L x B x H)	
Galaxy Relay Module	22 g	A237
Size	31 x 50 x 20 (L x B x H)	
RS232 Module (Boxed)	823 g	E054
Size:	180 x 155 x 35 mm (L x B x H)	
Doorguard	995g	C075
Size:	150 x 185 x 40 mm (L x B x H)	
Printer Interface (6-Way DIN Plug)	120 g	A134
Printer Interface (25-Way D Plug)	130 g	A161
Box Size:	75 x 52 x 28 mm (L x B x H)	
Cable Size:	2m for 4-Way IDC, and 0.3m for 6-Way/25-Way plug.	

PCBs	Weight	Order Code
2-75A Power Block	163 g	A270
Size:	115 x 102 x 33 mm (L x B x H)	
Galaxy Power RIO Control.....	118 g	A250
Size:	120 x 120 x 43 mm (L x B x H)	
Galaxy Power Unit Control.....	118 g	A251
Size:	120 x 120 x 43 mm (L x B x H)	
PSU Control.....	118 g	A252
Size:	120 x 120 x 43 mm(L x B x H)	
Galaxy 3-144C.....	320 g	A3045-01
Size:.....	265 x 120 x 50 mm (L x B x H)	
Galaxy 3-520C (with Expander)	378 g	A307-01
Size:.....	265 x 120 x 50 mm (L x B x H)	
Galaxy 3-144	320 g	A304-01
Size:.....	265 x 120 x 50 mm (L x B x H)	
Galaxy 3-520 (with Expander).....	378 g	A306-01
Size:.....	265 x 120 x 50 mm (L x B x H)	

PCBs	Weight	Order Code
Galaxy RIO	92 g	A158
Size:	121 x 90 x 15 mm (L x B x H)	
Galaxy RFRIO	63 g	A215
Size:	121 x 97 x 12 mm (L x B x H)	
RS232	124 g	A169
Size:	135 x 90 x 17 mm (L x B x H)	
Telecom	90 g	E062
Size:	121 x 90 x 20 mm (L x B x H)	
Ethernet	56 g	E080
Size:	121 x 90 x 15mm (L x B x H)	
ISDN	114 g	A211
Size:	121 x 90 x 15 mm (L x B x H)	

Note: The above weights and order codes are from the populated Printed Circuit Board (PCB) only.

Device	Quiescent Current (mA)	Device	Quiescent Current (mA)
Galaxy 3-48C	150	RS232 Module (E054, E055)	50
Galaxy 3-144	150	4-Way Relay Interface (C037)	160
Galaxy 3-144C	150	General Purpose Relay Interface (A060)	40
Galaxy 3-520	150	Galaxy Mk 7 (LCD) Keypad	55
Galaxy 3-520C	150	Key Prox	90
Galaxy RIO (Note 1)	40	Printer Interface (A134/A161)	100
RF RIO	55	Doorguard (C075)	10
Output Module	45	Max Reader	35
3 A Smart PSU (Note 1)	100	MicroMAX	25
Smart PSU G3 Standalone		ISDN Module	40
Telecom Module (E062) (Note 2)	45	Ethernet	155

Table E-1 Current Consumption

Note 1: Measured with no load on zone input

Note 2: Not communicating

[illegible]

Index

A

Adding a Keypad/Keyprox to the System	4-4
Addressing	4-2
Addressing the RF RIO	3-6
Appendix A: Door Control (MAX)	A-1
Appendix B: 3 Ampere Smart PSU	B-1
Appendix C: Panel Comparisons	C-1
Appendix D: Declaration of Conformity	D-1
Appendix E: Specifications	E-1
Appendix F: Parts List Index	F-1

B

C

Configuring a MAX ³ Reader into the System	5-3
Configuring the RIO	3-2
Connecting Additional Telecoms apparatus	2-8
Connecting the Galaxy 3 Series to the PSTN	2-7
Connecting the RIO	3-2
Connecting the RF RIO	3-5
Configuring the RF RIO	3-7

D

Dual Access Cards	5-7
Dual Focus (Card Held)	5-7

E

Entry/Exit RIO	3-3
Ethernet Module	3-21
Event Monitoring	3-17

F

Fuses	2-7
-------	-----

G

Galaxy Gold	3-21
Galaxy Keypad	4-1
Galaxy Keyprox	4-8

H

I

Installing the MAX ³	5-1
Introduction	1-1
ISDN Module	3-19

J

K

Keypad/Keyprox Installation Procedure	4-2
Keypad/Keyprox Operation	4-5

L

Line Monitoring	2-8
-----------------	-----

M

MAX ³	5-1
Memory	2-10

N

O

On-board Power Supply Unit	2-9
Optional Modules and Facilities	3-1
Output Module	3-8

P

PCB Layout	2-4
Power Supply Unit	3-12
Power Consumption	4-1
Printer Interface Module	3-15

Q

Quick Setup	1-3
-------------	-----

R

RF RIO	3-5
RS232 Interface Module	3-17
RS 485 Data Communication Bus (AB Lines)	2-10
RS485 Expansion module	2-3
RS485 Wiring Configurations	2-10
RS485 Wiring Recommendations	2-11
Remote Input Output (RIO) Module	3-1
Remote Servicing Suite	3-21
Removing a Keypad/Keyprox from the System	4-4
Removing a MAX ³ Reader from the System	5-5

S

Self Diagnostics	4-5
Serial Printer Interface	3-18
SPI Header	2-18
Stand-by Battery	2-9
System Architecture	2-1
System Installation and Wiring	2-6

T

Telecom Module	3-16
Timed Anti-Passback	5-7

U

User Management Suite	3-21
-----------------------	------

V

W

Wiring Keypad/Keyprox	4-2
Wiring Keyswitches	2-15
Wiring Terminator Buttons	2-16
Wiring the MAX ³	5-2
Wiring Multiple Zones	2-15
Wiring Zones	2-14

X

Y

Z

Zones	2-13
Zone addresses	2-13

Honeywell Security (UK 64)
Newhouse Industrial Estate
Motherwell
Lanarkshire
ML1 5SB
UK

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