Model 3000

&

ACCESS 4000

Control Module 995001 / 995002

SECURITY, ACCESS CONTROL & BUILDING AUTOMATION SYSTEM

INSTALLATION MANUAL

OVERVIEW

The 3000/Access 4000 provides the next generation in Access Control, Security and Building Automation Systems.

MODULAR DESIGN & EXPANDABILITY Modular hardware design provides the ability to adapt and expand a system to cater for virtually any configuration or application required - small or large. Large numbers of LCD Terminals, Input/Output Expanders and Access Control Modules can share a secure, monitored LAN system utilizing a fast, efficient communications format. Using the recommended cabling, modules on the LAN can be installed hundreds of metres from the Control Module. With the current range of modules available, this arrangement can provide over 2000 Zone inputs and over 2000 Auxiliaries on a single system.

THE MODULES. The heart of the system is the Control Module. This unit stores all data, communicates with all other modules connected to the system LAN, and reports alarms and system activity to the Central Station via Dialer, Direct Line, GSM modem and other formats. To program and operate the system an Elite LCD Terminal or any of the PC based system management tools mentioned below are normally used. The LCD Terminal provides a 20 key backlit keypad, a backlit Liquid Crystal Display and connections for several Zone Inputs and Auxiliary outputs.
Universal Zone Expanders are used to provide additional Inputs (16 or 32), Sirens and Auxiliary Outputs (8 to 32) in a system and can be installed remotely in suitable locations to greatly reduce the amount of cabling required to detectors and output devices. The Mini Expander Module provides low cost expansion when up to 8 Zones and Auxiliaries are required along with special event counting options (Event Counting available V3 or later).
Door and Lift Access Modules are installed near the Door/s or in Lift Cars to provide Reader interfacing plus all the Inputs and outputs for complete monitoring and control of the Door/s and/or Lifts.
The Analogue Module allows analogue values to be monitored and set points used for trigger control and/or report functions.

SYSTEM MANAGEMENT. Upload/Download software is available for system Programming and Management, allowing the option of local or remote connection with operator password protection. Windows based system management software is also available incorporating dynamic graphics capabilities and sophisticated monitoring and report generation facilites.

INSTALLER PIN CODE.

The Default Installer PIN Code is 01.
This default PIN Code should be changed by the Installer as soon as possible. i.e. As soon as programming commences.

Contents

Electrical Specifications

Power Supply Input:	Transformer Input Voltage:	240V AC -10% / +10%. 50 Hertz.
	Transformer Output Voltage:	16.5V AC. 50 Hertz.
	Current Consumption:	Maximum 500 milliAmps from 240V AC Source.
	Fuse Protection:	Separate AC mains input fuse. 500 milliAmps. M205 (20mm) (Units made prior to September 2000 have an 8AG -25mm fuse)
	PCB AC Input Voltage:	16 to 18V AC. 50 Hertz.
	Battery Capacity:	12V 6.5 AH. Sealed Lead Acid Battery.
	Battery Input Fuse:	5 Amperes.
Power Supply Output:	Current:	Total combined current required by devices connected to LAN "POS" and "DET+" must not exceed:
	- 4A Transformer:	1.2 Amperes.
	- 1.5A Plug pack	800mA.
	Fuse Protection:	Separate 2 Ampere fuses provided for: Siren1, Siren2, LAN Power & Detector Power.

ALWAYS REPLACE FUSES WITH THE SAME FUSE TYPE AND VALUE!

NOTE: *See data supplied with detectors and output devices for actual current consumption of items connected to the module.*

Mechanical Specifications

Dimensions:	Length: 435 mm. Width: 320 mm. Depth: 112 mm.
Weight:	9.5 k.g. (Includes mains transformer, battery and cover.)
	7.3 k.g. (No mains transformer. Includes battery and cover.)

Installing your Model 3000 / Access 4000 system.

Control Module Parts List

- Control Module PCB mounted on metal chassis in metal box.
- Tamper switch bracket.
- Telephone line cable. Notes: Non-standard configuration. Only suitable for use with this product. Not supplied in all countries.
- Installation Kit containing:
  - 9 x plastic “D” bungs. Must be fitted to all unused cable entry cutouts in the cover.
  - 1 x Special AC Powercord entry “D” bung.
  - 6 x 8 Way plug-on screw terminals.
  - 8 x 2 Way plug-on screw terminals.
  - Tamper switch.
  - Tamper switch bracket.
  - 2 x 6.3mm Tamper switch connectors.
  - 1 x 40cm 2-way Battery connection cable with 4.8mm Battery terminal connectors.
  - 1 x 2 Amp M205 (20mm) Fuse. (Spare)
  - 20 x 2k2 End-of-line resistors. 16 x Zone Inputs, 4 x Spare. (red-red-black-brown-brown)
  - 20 x 6k8 End-of-line resistors. 16 x Zone Inputs, 4 x Spare. (blue-grey-black-brown-brown)
  - 8 x M4 x 10mm PAN Head screws.
  - 1 x Jumper Link 0.1”.
- Spiral bound User Manual.
- User’s Quick Reference Card. (4 page booklet)
- Installation Manual. (This document)

AC Supply:
The Controller is supplied with one of the following AC supply options:
-Internal 4Amp Power Transformer with associated mounting, interconnection and fuse hardware.
-1.5Amp Plug Pack.

In countries where a Mains input cable is required and is not pre-fitted, the following parts are also supplied:

- 1 x Plastic Cable grommet.
- Sufficient mounting screws to assemble all parts to housing.

INSTALLATION AND SAFETY INSTRUCTIONS

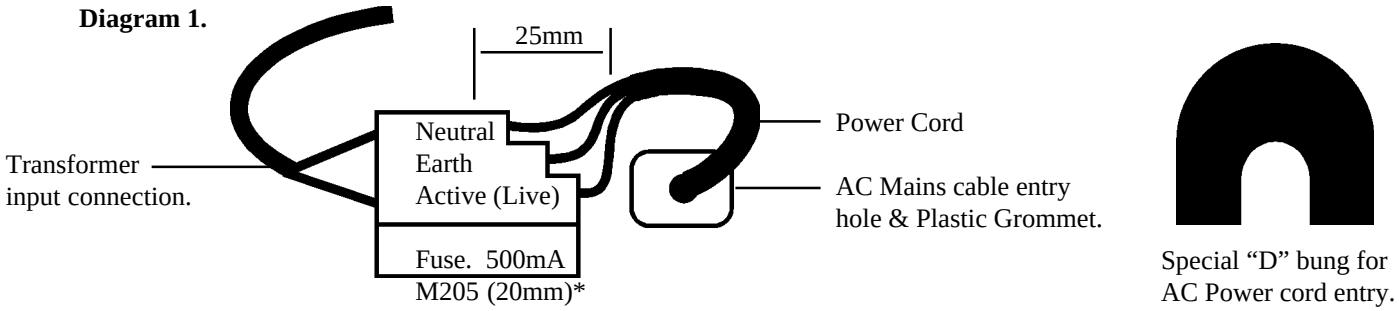
Electrical AC Mains Power connection.
(Only applicable to models fitted with an internal AC Mains Transformer)

In countries where the module is supplied without a mains power cord, a suitable mains power cord for connection to the 240V AC Mains supply must be installed by a suitably qualified electrician or technician.

1. Strip 30mm of the sheath from the end of the power cord. Trim 5mm from the ends of the Active and Neutral conductors so that the Earth conductor remains slightly longer.
2. Strip 5mm of insulation from each of the conductors. (Units manufactured prior to September 2000 used a terminal block with no wire protection leaf and must have conductive sleeves fitted to the exposed ends of the conductors)
3. Feed at least 150mm of the power cord through the AC mains cable entry hole from the rear (underside) of the chassis.
4. Terminate the power cord in the terminal and fuse block as illustrated in Diagram 1 below. (Note that the Active wire is always connected into the termination nearest to the fuse)
5. Determine the appropriate length of power cord between the terminal block and the cable entry hole. (Approx. 100mm) Working from the rear of the chassis, fit the plastic grommet (supplied) around the power cord and apply pressure to both sides of the grommet to clamp the cable. The grommet can now be inserted into the AC mains cable entry hole.
6. When fitting the cover, ensure that the special AC Powercord "D" bung is fitted to the cable entry cutout in the cover where the AC Powercord enters the enclosure. Standard "D" bungs must be fitted to <u>all</u> other unused cable entry cutouts.

IMPORTANT NOTE: An AC Mains socket-outlet shall be installed near the equipment and shall be easily accessible for connection of the mains power cord.

Diagram 1.



*Note: Units manufactured prior to September 2000 have terminal blocks that utilise an 8AG (25mm) fuse.

Mounting the Unit. See Diagram 2.

1. Installation environment should be maintained at a temperature of 0º to 40º Celsius and 15% to 85% Relative humidity (non-condensing)
2. CE Control Modules are supplied in metal enclosures which must be secured to a flat, vertical surface using fasteners through the four "keyhole" mounting holes in the chassis.
3. <u>When mounting this product onto flammable surfaces, a fire protection backplate MUST BE INSTALLED</u>. The mounting holes in the backplate align with the mounting holes in the chassis so no additional mounting hardware is required. Standard "D" Bungs must be fitted to <u>all</u> unused cable entry cutouts.
   This backplate is available from your distributor. Please quote part number 925010.
4. The tamper switch bracket must be positioned through one of the slots in either side of the chassis and under the base of the chassis, <u>before</u> the chassis is secured to the wall.
5. Orientation of the enclosure MUST be as per either of the illustrations in Diagram 2.

Connecting Power to the PCB. See Diagram 2 below.

IF INTERNAL MAINS TRANSFORMER FITTED.

1. Measure and cut two appropriate lengths of insulated cable to connect between the AC mains transformer output terminal block (A) and the "AC" Input connections on the PCB (B).
2. Strip 5mm of insulation from both ends of the cables and terminate into the transformer output terminal block and then into the "AC" Input connections on the PCB. The cables may be routed underneath the chassis to avoid interference with other cables.

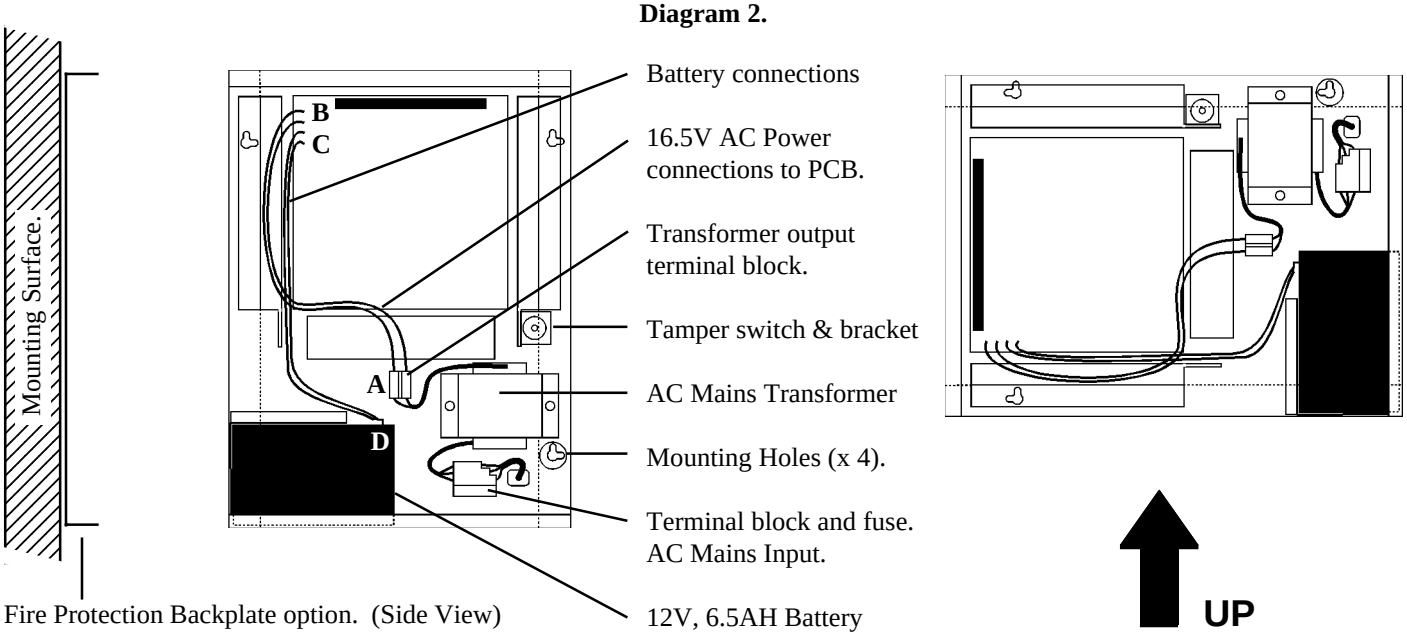
IF PLUG PACK SUPPLIED.

1. Feed the 16V AC cable from the plug pack into the underside of the chassis and up through the cable entry hole beside the AC input terminals. Ensure that 5mm of insulation is stripped from the end of the cables and terminate into the "AC" Input connections on the PCB (B).
2. When fitting the cover, ensure that the special AC Powercord "D" bung is fitted to the cable entry cutout in the cover where the Plug Pack cable enters the enclosure. Standard "D" bungs must be fitted to all other unused cable entry cutouts.

Connecting the Battery to the PCB. See Diagram 2 below.

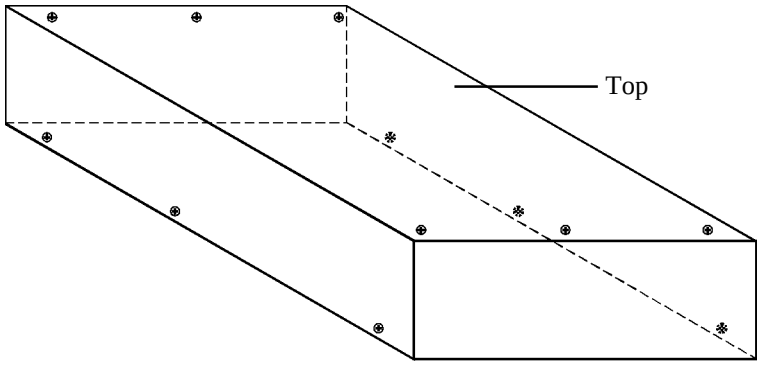
1. Measure and cut two appropriate lengths of insulated cable to connect between the "+B" and "-B" connections on the PCB (C) and the Battery terminals (D).
2. Strip 5mm of insulation from both ends of the cables and terminate one end into the "+B" and "-B" connections on the PCB. IMPORTANT NOTE: There are two terminals provided for each of the "+B" and "-B" connections. Ensure that each cable is connected to the correct terminal to avoid creating a short circuit across the Battery.
3. Terminate the other end of the cables into the 4.8mm Battery Terminal connectors supplied in the installation kit. The cables may be routed underneath the chassis to avoid interference with other cables.

Diagram 2.



Fire Protection Backplate option. (Side View)

Diagram 3.



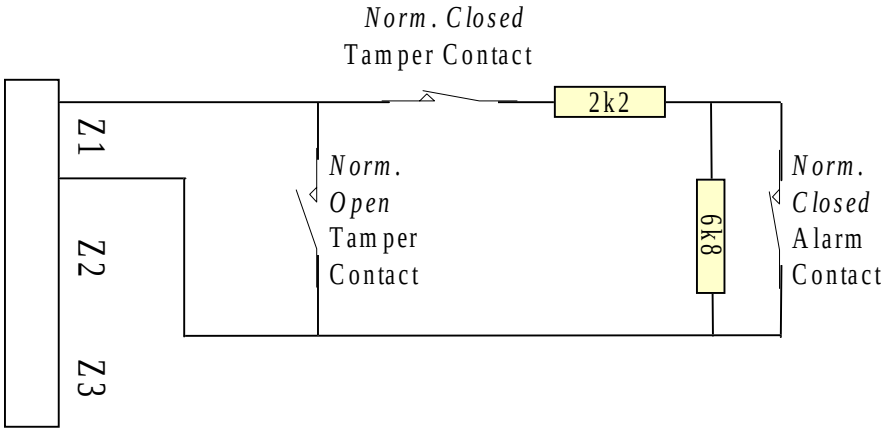
Fitting the Cover.

In order to comply with regulations, all twelve (12) of the screws provided to fix the cover to the chassis must be tightly secured. Three screws are located on each of the long sides, and at each end of the top of the cover as illustrated in Diagram 3 opposite.

Wiring Diagrams

ZONE INPUT WIRING

Typical Detection devices with *Normally Closed* Alarm contacts and *Normally Closed* **OR** *Normally Open* Tamper Contacts are wired as follows:



INPUT STATES:		
2k2	=	Sealed
9k (2k2 + 6k8)	=	Unsealed (or Alarm)
Open Circuit	=	Tamper
Short Circuit	=	Tamper

Detection devices with *Normally Open* Alarm contacts are wired in exactly the same manner as above. When programming the Zone Input, however, the option to "**S**wap Seal and Alarm conditions" must be set to [Y]es.

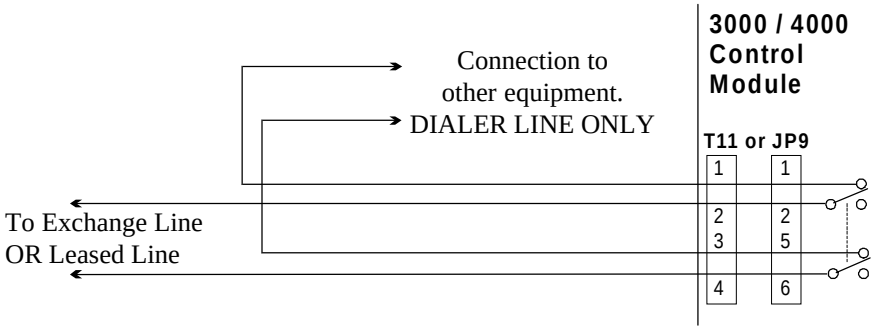
e.g.

E01:Z01	X S R A N T . .
Options ->	n Y n n n n n n

TELECOMMUNICATIONS WIRING

Mode 3 wiring diagram for Dialer reporting formats. (e.g. Contact ID, 4+2, IRfast, etc.)

Other equipment such as a telephone, fax machine or answering machine may share the Dialer line connection. If so, the telecom connection must be wired as shown to ensure that the system has priority use of the line so that alarm reporting is not compromised.



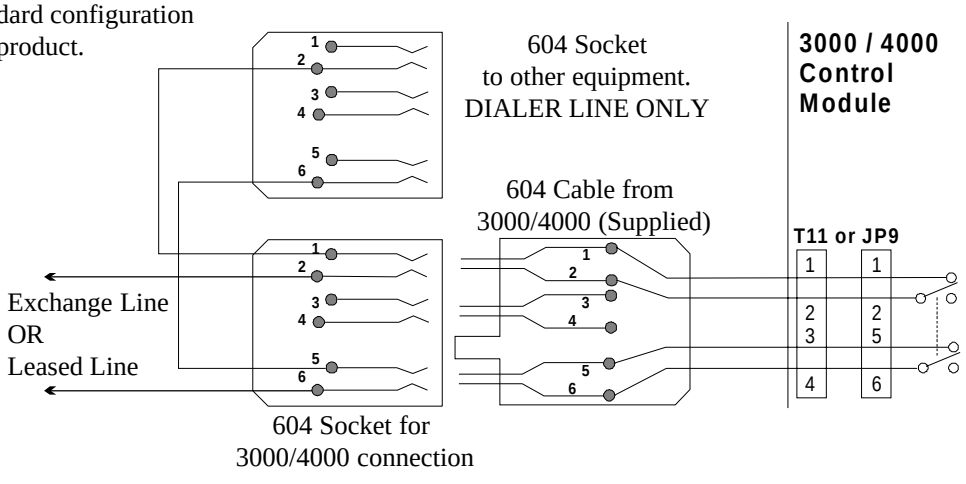
"604" Plug & socket wiring. (Australia Only)
NOTE: Cable supplied is a non-standard configuration and is only suitable for use with this product.

Dialer Line

Phone Line IN: Pins 2 & 6
Phone Line OUT: Pins 1 & 5

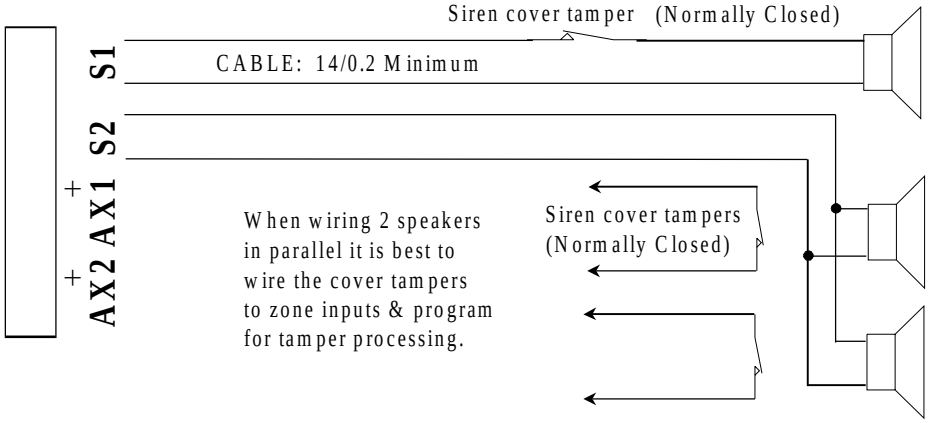
Direct Line

For Direct Line formats (e.g. EarthNet), the Leased Line connects to Pins 2 & 6.



SIREN WIRING

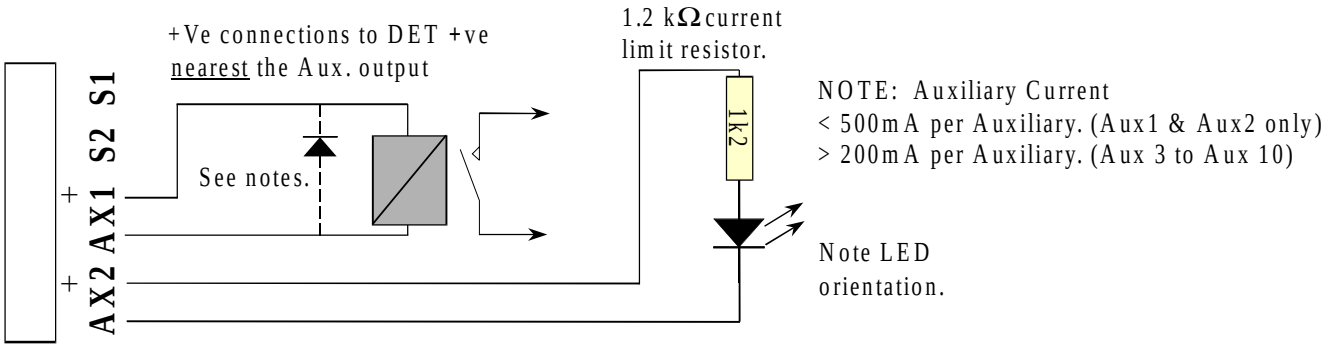
Maximum of two 8 Ohm Siren speakers may be connected to each siren driver, wired in parallel. Norm. Closed Siren cover Tampers may be wired in series with the speaker cable. This method utilizes the siren speaker circuit monitoring.



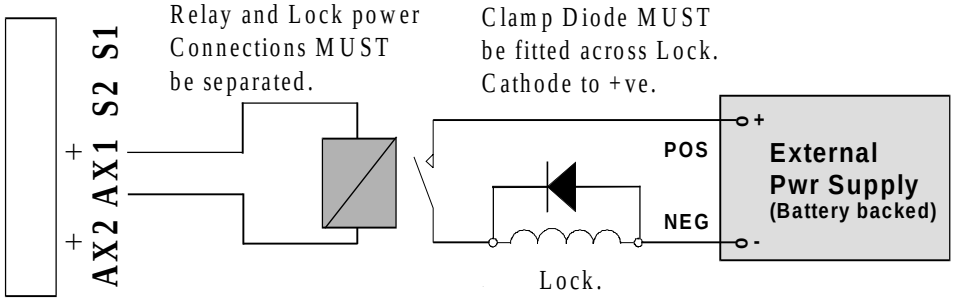
AUXILIARY WIRING

Rules for Auxiliary wiring on any module in the 3000/Access 4000 system.

- Auxiliaries 1 & 2 on the Control Module & Expander Modules can switch up to 500mA continuous and are suitable for inductive loads provided that a clamp diode is fitted across the load as shown below.
- Max current on any other individual Auxiliary must be less than 200mA.
- On any module with Plug pack; Auxiliaries + LAN current + Detectors must be less than 700mA, or an external power supply should be used.
- The Positive of the device must be wired to the Positive connection nearest the Auxiliary. i.e. On the same module.
- If an external power supply is used to power the device, a good common Negative connection MUST exist between the power supply and the module.
- Clamp diode should be fitted across inductive loads. Cathode (bar) to +ve.



Locks are activated via a relay. External power supply is used for lock power to prevent voltage spikes reaching the Concept equipment, provide longer battery backup & minimise the possibility of earth loops.



LINKS. *See pages 10 & 11 for location.*

LK1 Telecom Country Selection. Removed: Europe TBR21 Fitted: Australia / New Zealand.

LK2 Memory chip (RAM) size select.
- 1-2 128k DS1245Y (32 Pin) or 512k DS1247Y (32 Pin)
- 2-3 32k DS1230Y (28 Pin)

LK3 Installer Code Default. Disconnect AC and Battery from Control Module; Short LK3 Pins; Reconnect power, then remove the short. Installer code will be defaulted to "01".

LK4 RAM Initialize. ("Continue"). Used when required to rectify Memory problems.
CAUTION! Will erase all programming if shorted to initialise memory.

LK6 Microprocessor select. Factory use only. Removed (Normal): Standard Micro. Fitted: Micro Type 1 or 2.

LK8 EPROM type selection. Factory or Firmware upgrade use only.
- 1-2 Flash. (EEPROM) V5.00 or later.
- 3-4 4 MBit EPROM.
- 5-6 2 MBit EPROM. V1 to V4.9x

LK9 EPROM configuration. Factory or Firmware upgrade use only.
- 1-2 EPROM. V1 to V4.9x
- 2-3 Flash. (EEPROM) V5.00 or later.

See page 11 for diagrams.

LK10 LAN Termination.
No Link. Unterminated. Link not fitted unless unit is first or last module on the LAN system.
Link IN. Terminated. Link fitted when unit IS the first or last module on the LAN system.
(See "LAN SYSTEM" details beginning on page 12 of this manual for more information)

LK12 PSTN (Dialer) / Direct Line (e.g. EarthNet) selection.
LK13
- Both links 1-2 PSTN (Dialler formats: IRfast, Contact ID, etc.)
- Both links 2-3 Direct Line (e.g. EarthNet)

JP5 Regulated Power Supply Current Limit setting.
- Not Shorted 1.0 Amp. Normal setting for 6.5 to 7.0 AmpHour Battery.
- Shorted 3.0 Amp. Setting for 15 to 17 AmpHour Battery.

TERMINALS. *See pages 10 & 11 for location.*

T1-4 Zone Input connections. *See Zone Input Wiring on page 6.*

T5 LAN connections. *See "LAN SYSTEM" details beginning on page 12 for details.*

T6 Auxiliary outputs and Siren Outputs. *See "SIREN WIRING" & "AUXILIARY WIRING" on page 7 for details.*

T7 Battery connection.

T8 Detector Power. 12V Supply for Detectors and Auxiliary Devices.
Total current sourced from "DET+" and "LAN POS" must not exceed 1.2 Amps.

T9 16 to 18 V AC Input to PCB. (From Transformer Secondary winding or Plug Pack output cable)

T10 Tamper Switch Input. Tamper switch supplied. No End-of-line resistors necessary.

T11 Telecom connection Terminal block. Alternate connection for Dialer line or Direct line connection.
- Pins 2 & 4: Line In. Connection to Exchange line or Leased line.
- Pins 1 & 3: Line Out. Connection to other equipment sharing the Exchange line.

See drawings on page 6.

LEDs. DIALER, LAN, POWER SUPPLY STATUS & FUSE FAIL. *See pages 10 & 11 for location.*

LED2	**ON**	Line Seize Relay active
LED3	**ON**	Dial Indicator
LED4	**ON**	Ring Voltage Indicator
LED5	**ON**	Telecom/Port 0 Transmit Data
LED6	**ON**	Telecom/Port 0 Receive Data
LED7	**ON**	LAN Power Fuse Blown.
LED8	**ON**	Detector Fuse Blown.
LED9	**ON**	Battery Fuse Blown & AC not present.
LED10	**ON**	5V Supply OK.
LED11	**ON**	13.8V Supply OK.
LED12	**ON**	16V AC Supply OK.
LED15	**ON**	LAN Receive Data
LED16	**ON**	LAN Transmit Data
LED17	**ON**	Battery Charge Relay On. (Batt >12.7V)

HEADERS. *See pages 10 & 11 for location.*

JP1 Port 0 connection. TEMPORARY connection of a PC for Upload/Download programming is allowed using the "Port 0 Interface cable" (993030). This Port shares the on-board modem with the Line interface and therefore MUST NOT be used as a permanent connection.

JP2 UART Serial Port Board. A UART Board and appropriate cable/s must be fitted if Printer, PC, GSM modem, External modem or Securitel Interface etc. is being used.
NOTE: Control Module must be powered down when fitting or removing a UART board.

JP3 Auxiliary Expansion Port. For 8 Auxiliary Expansion board. P/N: 995055.

JP4 Auxiliary LAN connection. An LCD Terminal can be connected to this Header if required for diagnostic purposes. A cable is available (P/N: 993028) with matching header socket and flying leads.

JP6 Fibre Optic Port. For future applications.

JP7 Not currently used.

JP9 Telecom socket. *See drawings on page 6.*

CONTROL MODULE FAULT LEDs (LED 13 & LED 14). *See pages 10 & 11 for location.*

LED1	LED2	EXPLANATION / REMEDY
ON	OFF	Ram Fault. RAM faulty, in backwards, out by one pin or LK2 not correct. Power off, fit correctly or replace.
OFF	ON	Non-volatile RAM not initialised. Short LK4 to continue. (**NOTE:** Erases all programming)
ON	ON	Configuration Problem. (RAM Directory) Return options memory chip to Distributor.
Fast Flash	OFF	Hardware Problem. (EEPROM not itialized) Return unit for service.
OFF	Fast Flash	Wrong GAL for NVRAM size. (Illegal Memory size) Contact the Distributor.
Fast Flash	Fast Flash	Wrong GAL for required options. (Illegal option/s) Contact the Distributor.
Fast Flash	ON	Faulty Program chip. (EPROM) Return unit for service.
ON	Fast Flash	Default of installer code not allowed. Contact Installer or return to Distributor for defaulting. Short LK4 or remove and reconnect power to the Control Module to continue with normal operation.
Slow Flash	OFF	PIC Micro not communicating. Return unit for service.
OFF	Slow Flash	Incorrect Micro. Contact the Distributor.
Slow Flash	Slow Flash	Secure Micro Version wrong. Contact the Distributor.
Slow Flash	ON	Lock bits not set. Contact the Distributor.
ON	Slow Flash	Configuration Version problem. Contact the Distributor.

EXPANDER / READER MODULE FAULT LEDs

RX	TX	EXPLANATION / REMEDY
ON	ON	Module is un-addressed.
OFF	ON	Module type unknown. Firmware upgrade required to Control Module.
Flash	ON	Duplicate Module. This module number is already in use by a module of the same type.
Flash	Flash	Module number selected is too big for Control Module RAM size. Select a lower Module number.
ON	OFF	Too many modules on Network for Control Module RAM size.

LCD TERMINAL ERROR MESSAGES

MESSAGE	EXPLANATION / REMEDY
No Rx	Terminal requesting address from Control Module, but no reply being received.
Can't Tx	Terminal cannot send data because LAN is being held in "start" condition. Check for A/B reversed.
Exists	Module number selected already being used by another LCD Terminal. Choose another number.
Too Big	Module number selected is too big for Control Module RAM size. Select a lower Module number.
Too Many	Too many modules on Network for Control Module RAM size.

THE CONTROL

T7 & T9
16V AC Input & Battery connections.

LED12. AC Supply present.
LED 9. Battery Fuse blown.

JP5
Regulated P.S. Current Limit.

LED17
On = Battery Charge relay On.
(Battery supply above 12.7V)

JP1
Port 0. Temporary PC connection
via Port 0 interface cable.

LK8 *****
EPROM Type selection.
1-2 Flash. (EEPROM)
3-4 4 MBit EPROM.
5-6 2 MBit EPROM.

***** See Page 8 for more details & firmware versions.

LK9 *****
EPROM Configuration.
1-2 EPROM.
2-3 Flash. (EEPROM)

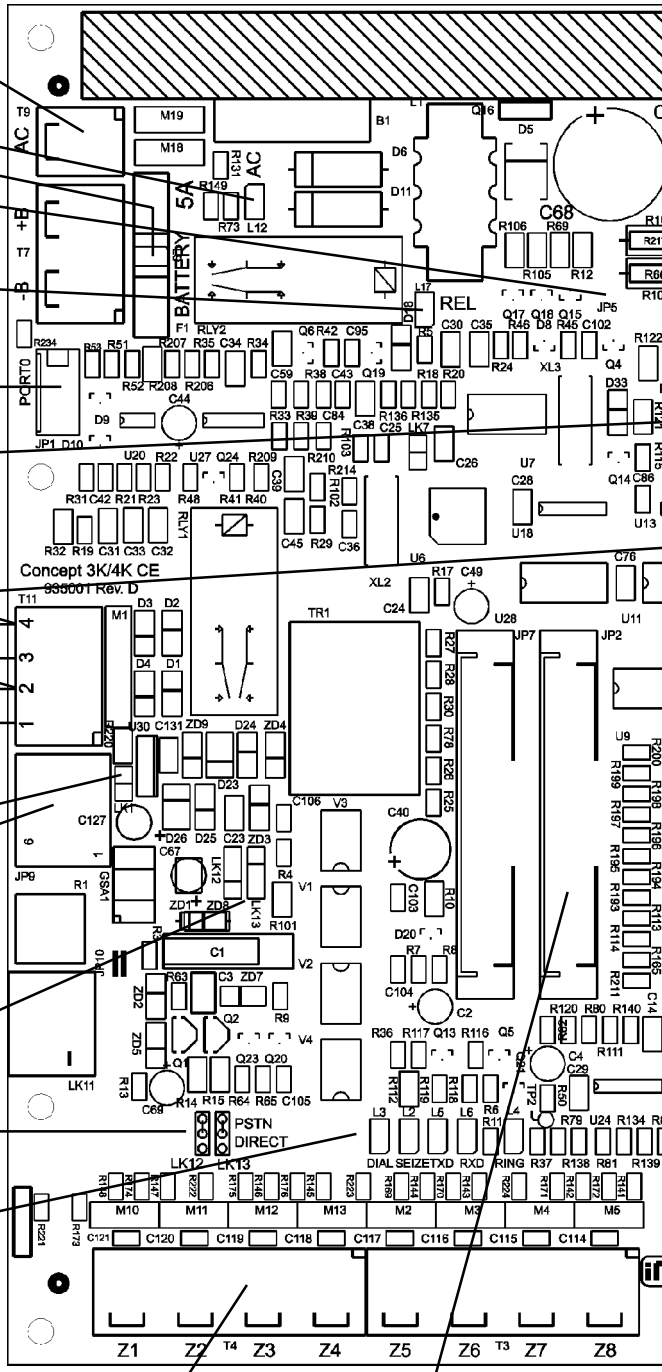
IN 2 & 4
OUT 1 & 3

T11
Alternate Telecom Line connection.

LK1
Telecom Country selection.

JP9
Mode 3 Line Socket for connection to Telecom Line. (Cable supplied)

LK12 & LK13
PSTN (Dialer) Both 1-2.
Direct Line Both 2-3.

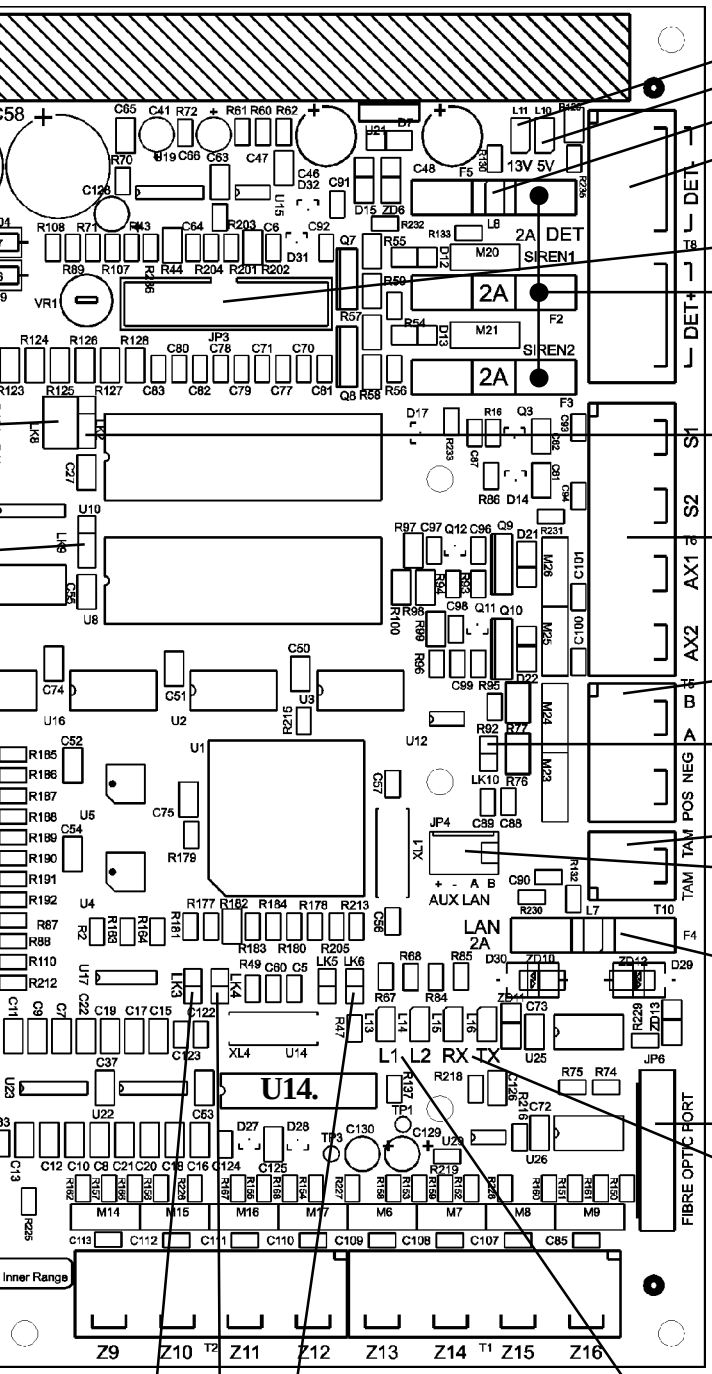


LED 2 to LED 6
Telecom/Port 0 Status LEDs.
LED 2. On = Line Seize Relay Active.
LED 3. On = Dial Indicator.
LED 4. On = Ring Voltage Indicator.
LED 5. On = Telecom/Port 0 Transmit Data.
LED 6. On = Telecom/Port 0 Receive Data.

T1 to T4.
Zone Inputs.
See "ZONE INPUT WIRING" on p6 for details.

JP2
Expansion Port
UART Interface connection.
NOTE: Control Module must be powered down when fitting or removing a UART board.

L MODULE PCB


LED 11. On = 13V Supply present
LED 10. On = 5V Supply present.
LED 8. On = Detector Fuse blown.
T8
Detector Power connections.
JP3
Auxiliary Output Expansion Port.
F2, F3 & F5
Fuses for Siren 1, Siren 2 & Detector Power.
2 Amp. M205.
LK2
Memory chip (RAM) size select.
2-3 28 Pin (32k)
1-2 32 Pin (128k & 512k)
T6
Auxiliary outputs & Siren outputs.
T5
LAN connections.
LK10
LAN Termination.
T10
Cabinet Tamper input.
JP4
Auxiliary LAN connection. For temporary connection of LCD Terminal for diagnostic purposes.
F4 LAN "POS" Fuse. 2Amp. M205.
LED7 On = LAN Fuse Fail.
JP6
Fibre Optic Port.
For future applications.
LED15 & LED 16 (RX & TX)
LAN Activity LEDs
Rx =Receive Data
Tx =Send Data
LK6
Microprocessor select.
LK4
Initilize RAM (Continue).
CAUTION.
LK3
Installer Code Default
LED13 & LED14 (L1 & L2)
FAULT LED
DIAGNOSTICS
See table on page 9.
JUMPER LINK ORIENTATION
1 2 3
1 2
3 4
5 6

LAN SYSTEM OVERVIEW

The 3000/Access 4000 LAN (Local Area Network) is a 3 or 4 wire network used to connect the modules in a system. Up to 250 modules can be connected on the LAN system, comprising up to 99 modules of any particular type. (Depending on Memory size & configuration) Using recommended cable types, modules on the LAN can be installed hundreds of metres from the Control Module.

Data encryption ensures secure LAN communications at all times, while the programmable supervisory polling system continuously monitors the network to detect cable tamper, cable fault conditions, module off-line and module substitution. The data format used in the 3000/Access 4000 LAN has been developed to ensure fast, reliable communications regardless of the size of the system.

For larger systems and complex sites, LAN Isolators can provide opto-isolation between sections of the LAN, eliminate potential earth loop problems, improve surge protection, provide signal level restoral for improved performance over longer cabling distances and offer a monitored "loop" LAN wiring option for a higher level of LAN integrity.

CONNECTING MODULES TO THE LAN. ***Refer to diagram opposite.***

- "A" & "B" signal connections are wired in parallel across the system using TWISTED PAIR cable. ❶
  See "Cable Types" details on page 14.
  The "NEG" connection (0V reference) must also be wired to every module. ❷

- An optional + 12 V connection (LAN +ve) may be used to provide power to modules that do not have their own on-board power supply. e.g. LCD Terminals. ❸

- The + 12 V connection (LAN +ve) used to power LCD Terminals, etc. can be derived from any module with it's own on-board power supply (Control Module and Expander Modules), or from a separate external power supply. ❹
  CAUTION ! Never connect the +ve (POS) of two power supply sources together. i.e. Control Module LAN POS, Expander Module LAN POS, or External Power Supply +ve. This is one of the reasons that "SPARE" wiring terminals are provided on most types of modules.

- When wiring the LAN to modules that are powered from their own on-board power supply (e.g. Zone Expanders), use the "Spare" terminal (labelled "SPARE" or "SPR") for the LAN +ve connection. ❺
  NOTE: LAN "POS" and "NEG" should not be used to power detectors, relays, etc. Always use "DET+" and "DET-" on the module to power these devices.

- When wiring the LAN to modules that are powered from an external Power Supply (e.g. Reader Modules), use the "Spare" terminal (labelled "SPARE" or "SPR") for the LAN +ve connection. ❻

- A DC Voltmeter may be used to check that the LAN will operate reliably. *See "LAN Voltage Testing" on Page 18.*

SYSTEM EARTHING

- The System Ground is connected to Mains Earth via the Power cord at the Control Module. The enclosure can be mounted on a grounded conductive surface, providing a secondary ground connection.

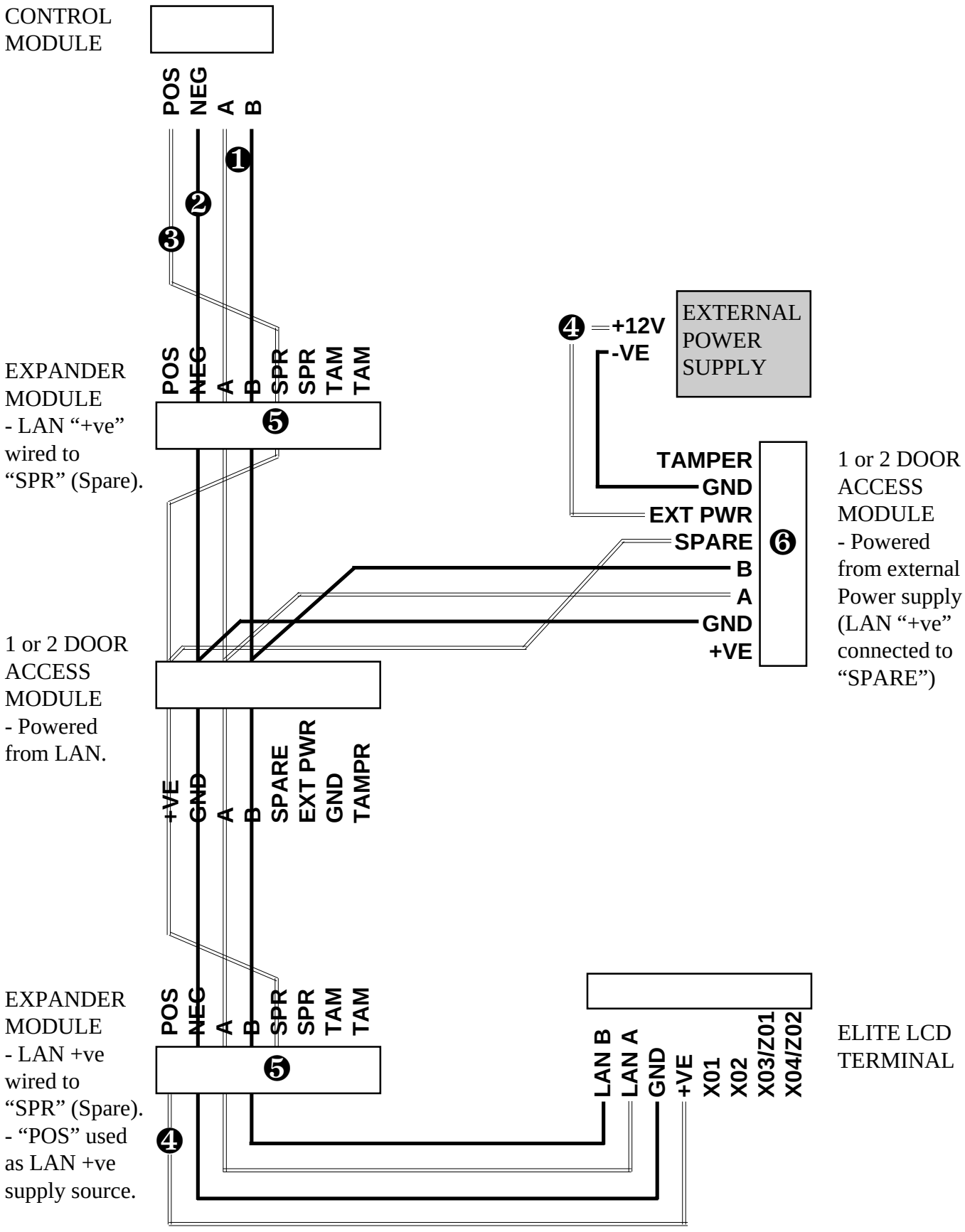
- In some cases a Printer, PC, modem, etc. connected to the Control Module UART board may also provide a connection to earth via the peripheral device. If so, ensure that the peripheral device is powered from the same AC Mains circuit or the RS232 Serial connection is isolated.

- The Intelligent 4 Door Access Module also has local Ground connected to Mains Earth via it's Power cord, however, the System LAN connection (X1 "ISO LAN") is isolated to eliminate Earth loops. Ensure that there are no other 0V or Ground connections between the Control Module and Intelligent 4 Door Access Modules.

- While the metal chassis of Modules with on-board power supply such as Universal Expanders is connected to Mains Earth, the PCB circuitry is isolated from the chassis. Ensure that wiring, additional hardware or peripherals connected to these modules does NOT provide an Earth connection to the Module PCB.

- Ensure that all other Modules (with no on-board Power supply) have NO local connection to Earth.

Connecting Modules to the LAN.



CABLE TYPES

- TWISTED PAIR Cable MUST be used to connect the LAN.
  Multi-strand wire is preferred for terminating into the screw terminal connectors.
  Two pair Telephone or LAN cable is suitable as it provides all 4 conductors required.
  One pair for "A" & "B", and the other for "POS" & "NEG". Unshielded cable is quite acceptable, however, in situations where electrical storms or high levels of electrical interference are a problem, shielded 2 pair cable may be used.
  Examples of suitable 2 pair cables:

Unshielded. ***Figure 1.***	Shielded (All Multistrand) ***Figure 2.***		
Olex TJC590AA002	Olex JEIP87AA002	Belden 8723 *	† 3 Pair.
Tycab TIC6105 †	Tycab DPF4702	Tycab DQQ47025 *	‡ Multistrand (7/0.2).
MM MegaTwistpatch ‡	MM B2002CS	Garland MCP-2S	* Indivually screened pairs.
Category 5.	Electra EAS7202P / 7302P	Electra EAS16202P	

- If SHIELDED CABLE is used, DO NOT use the shield as a negative connection & do not allow the shield to make contact with Negative, Ground, or any other wiring or metalwork within the system. Shields should only be terminated to a Protective Earth at ONE END of the cable. ❶ *See "System Earthing" below.* If no suitable earth point is available at a module location, the shield can be looped back to the shield of the previous length of cable. ❷

- LAN POWER CABLING. Separate heavy duty Figure 8 cable (24 / 0.20 recommended) should also be run for "POS" & "NEG" over longer distances if used for powering modules. e.g. LCD Terminals. ***Figure 3.***

LAN "POS" current required:	**Max. Cabling Length for LAN +ve (POS) & GND (NEG)**		
	Twisted pair	Fig 8. 14 / 0.20	Fig 8. 24 / 0.20
60mA (e.g. 1 LCD Terminal)	200 metres	400m	640m
120mA (e.g. 2 LCD Terminals)	100 metres	200m	320m
180mA (e.g. 1 Reader Module - Reader pwr not incl)	62metres	130m	210m
250mA (e.g. 4 LCD Terminals)	50 metres	100m	160m
500mA (e.g. 8 LCD Terminals)	25 metres	50m	76m

Remember to allow for any extra current required by Detectors, Auxiliaries, Readers, etc:
NOTE: Lock strikes must not be powered from the LAN.

Relay (1A contacts)	approx. 25mA	Small Proximity reader (~10cm read range)	~50 to 120mA
Relay (5A contacts)	approx. 45mA	Standard Prox reader (~15cm read range)	~120 to 180mA
PIR	15 to 25mA typical.	Magnetic Swipe reader.	~15mA

Figure 1.
Twisted pair communications cable.

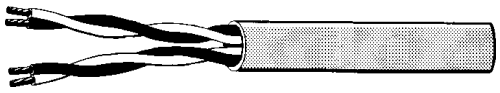


Figure 2.
Shielded, twisted pair communications cable

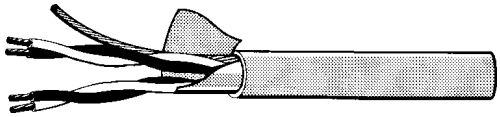


Figure 3.
Heavy duty Figure 8 cable. **24 / 0.20**
Used for LAN +ve & GND on long cable runs.

SURGE PROTECTION.

- In multi-building installations and on longer cable runs, shielded cable may be used to provide added protection against voltage surges.

- Each individual shield should be terminated to a Protective Earth point such as an earth stake, building earth (metal building framework) or water pipe. ❶ It is very important to ensure that the shield makes no contact with Negative, Ground or any other wiring within the system.

- LAN Isolator/s can also be included in a Surge protection scheme to electrically isolate different sections of the LAN at the point where LAN cabling enters/exits each building, or on cable runs that are more exposed to voltage spikes or surges.

SYSTEM CABLING CONFIGURATION ***Figure 4 & Figure 5.***

- Avoid installing the LAN cable with mains power cables & any other cables likely to cause interference wherever possible

- No module is to be more than 1.5km (1500 metres) cable length from the Control Module OR from a LAN Isolator "LAN 2" or "LAN 3" Port. ❸ (LAN Isolator/s can be used to extend the maximum cabling distance)

- TOTAL LAN CABLING in a system without LAN Isolators should not exceed 2000 metres, and/or 64 Modules. ❹ If the total amount of LAN cable will exceed 2000 metres, and/or there are more than 64 modules to be connected, LAN Isolator/s must be used to separate the LAN system into sections and maintain optimum LAN performance. i.e. Include one LAN Isolator for every 2000 metres of LAN cabling and/or for every 64 Modules connected. ❺

LAN TERMINATION ***Figure 4 & Figure 5.***

- The LAN MUST be Terminated for optimum performance, by ensuring that the Termination Resistor (470 Ohm*) is "IN" on the first and last modules in the LAN network. Terminated modules are indicated with a "**T**" on the illustrations. ❻ (Termination is put "IN" with a jumper link or a DIPswitch, depending on the module type) * *See Note 1 on Page 15.*

- MULTIPLE CABLE RUNS. In systems where there are multiple cabling runs going out from the Control Module or LAN Isolator (i.e. "star" configuration), Termination is fitted on the modules at the end of the two longest runs. ❼

Figure 4.
Simple LAN configuration.

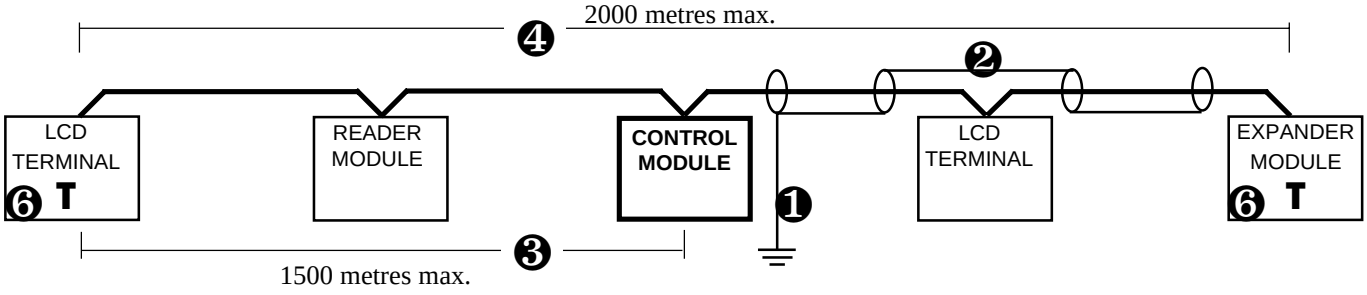
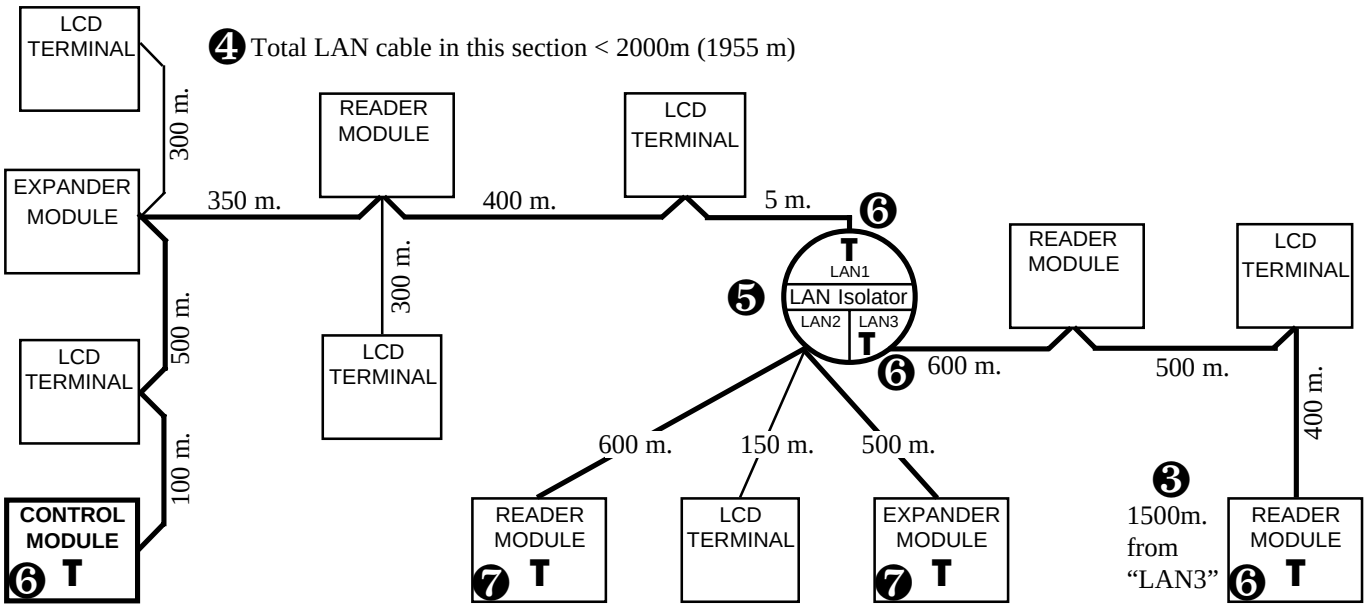


Figure 5.
Complex LAN configuration.



LAN TROUBLESHOOTING FLOWCHART

BEFORE SYSTEM POWER UP
(No Power connected to modules
AND No batteries connected)

A1. WHERE POSSIBLE, PHYSICALLY CHECK:
-LAN A & B connections not reversed on any module.
-No modules connected to earth. (via mounting bolts, ext. power supplies, input/output cabling, etc.) Note that the Control Module may be connected to earth via external equipment connections. i.e. Printer, PC, modem, etc. If so, this must be the only earth connection in the system.
-Only two modules in the system are terminated.

⇓

A2. CHECK FOR SHORT CIRCUITS ON THE LAN
(No Power connected AND No batteries connected)
METER ON OHMS RANGE
Check at the Control Module for short circuits between:
-LAN A & B.
-LAN A to +ve and -ve.
-LAN B to +ve and -ve.
Note:DC Resistance in the LAN cable (~0.18Ohms/metre) can mask short circuits that exist on longer cable runs.

⇓

A3. CHECK FOR CORRECT LAN TERMINATION
(No Power connected AND No batteries connected)
METER ON OHMS RANGE
Measure between LAN A & LAN B on the Control Module:

170 to 300 Ohm.*	OK. (System with up to 32 modules)
140 to 270 Ohm.*	OK. (System with up to 64 modules)
Lower value.	More than two modules terminated or Short cct across LAN A & LAN B.
Higher value.	Less than two modules terminated or Open cct on LAN A &/or B wiring.

** See Notes 1 & 2.*

⇓

POWER UP SYSTEM & CONNECT BATTERIES

A4. CHECK CONTROL MODULE OPERATION

DC POWER CHECK. With Meter on DC Volts range, measure between LAN +VE & LAN -VE (GND) on the Control Module:

11V to 14V.	OK.
<11V.	Too many devices being powered from the Control Module or Battery Flat.

Check FAULT LEDs on Control Module:

Both Off.	OK. *Proceed to step A5.*
Any other state.	Refer to "*Control Module Fault LEDs*" table on Page 9.

⇓

A5. DETERMINE THE TYPE OF LAN PROBLEM

A. SOME MODULES HAVE INTERMITTENT COMMUNICATIONS PROBLEM.
Proceed to Step B1, "Intermittent LAN problems". ⇒

B. SOME/ALL MODULES NOT COMMUNICATING AT ALL. *Proceed to Step A6.*

⇓

A6. IS THE LAN COMPLETELY DEAD ?

YES. *Proceed to Step C1, "LAN Dead".* ⇒ ⇒

NO. (Some Modules not communicating, others OK)
Proceed to Step A7.

⇓

A7. CHECK STATUS OF PROBLEM MODULE/S

DC POWER CHECK. Meter on DC Volts range. Check for 11 to 14 Volts between LAN +VE & LAN -VE (GND) on the problem module. *See Note 3.*

Check FAULT LEDs (TX & RX LEDs) OR LCD Display on problem Module:
Both LEDs Off OR Display has no "Module ..." messages. *Proceed to step A8.*

Any other state. Refer to "*Expander/Reader Module Fault LEDs*" table or *"LCD Terminal Error messages"* table on Page 9.

⇓

A8. TEST LAN VOLTAGES AT PROBLEM MODULE/S

Perform LAN Voltage Checks at the problem Module/s. Refer to the table *"LAN Voltage Testing"* on Page 16.

⇓

A9. SUBSTITUTE MODULE/S

If the troubleshooting procedure fails to locate any power, wiring or termination problems, you may have an equipment fault. Replace the module/s suspected of causing the problem.

⇒ ⇒ ⇒ ⇒ ⇒

LAN DEAD

⇒ **C1.** TEST VOLTAGES AT CONTROL MODULE

Perform LAN Voltage Checks at the Control Module. Refer to the table *"LAN Voltage Testing"* on Page 16.

If this fails to locate the problem, *proceed to Step C2.*

⇓

C2. ISOLATE PROBLEM CABLING OR MODULE/S

Disconnect all LAN wiring from Control Module. Reconnect one LCD Terminal and ensure that it communicates. (If it doesn't, follow Steps A7 & A8)

Reconnect the LAN one module at a time until a problem module, or section of cabling kills LAN communications when reconnected.

With the problem area identified, *proceed to Step A8.*

⇓

⇐ ⇐ ⇙ ⇐ ⇐ ⇐

INTERMITTENT LAN PROBLEMS

B1. WHICH MODULES ARE INTERMITTENT ?

Using an LCD Terminal or Review Logging via Upload/ Download software, check Review Data for "Module Lost" and "Module Found" messages.

Each message will also identify the Module type and number. Note the problem module/s.
Proceed to Step B2.

⇓

B2. IS ANOTHER EVENT CAUSING THE MODULE TO BE LOST ?

Look at the Review Messages immediately preceding the "Module Lost" messages for any event that repeatedly coincides with the loss of module/s, or if the loss of module/s occurs at, or around, the same time of day. Look for messages such as Door Un-lock/Lock, Siren On, Auxiliary On, etc., and note the times when the "Module Lost" messages occured.

YES. Ancillary devices & external equipment (e.g. electrical machinery) can produce voltage spikes, electrical noise and excessive current drain.
If the LAN, Power & Auxiliary circuits are not wired correctly or Earth loops exist, these devices can interfere with LAN communications.

If such an event does coincide with loss of comms, reproduce the sequence of events to confirm the effect, then check any associated wiring circuits accordingly.

NO. *Proceed to Step A8*

NOTES:

1. LAN TERMINATION CHECK
Very early 3000 products (Australia & NZ only) had 120 Ohm Termination resistors which results in lower measurements (~70 to 140 Ohms). When expanding these systems, take termination OUT on the existing modules, and put termination IN on two of the new modules. Alternatively, take termination OUT on the existing modules and fit a 470 Ohm resistor between LAN A & B on those two modules instead. NOTE: This is only necessary if expanding the system, or if there are communication problems. If the system is operating reliably, no modification is necessary.

2. TERMINATION RESISTOR CHECK
To determine if a module is fitted with a 120 Ohm or 470 Ohm Termination Resistor, ensure that TERM is "IN", disconnect the module from the LAN, remove power, and measure across LAN A and B on the module with the meter on the OHMS range.

3. MODULE POWER TEST
The Test Menu can be used to check LAN Power conditions. Logon to the LCD Terminal, then press <MENU>, 4, 8. This activates the power test, and the results will be displayed on the LCD Terminal, and in the review memory. See "Concept 3000 Programmer's manual" Rev 2.3 p154 for more information.

LAN VOLTAGE TESTING

NOTES:

1. These Voltage checks should be done with no (or minimal) communications traffic on the LAN. To ensure this:
   a) Check that poll times for all addressed modules in the system are set to the default 60 / 120 seconds or greater.
   b) Disconnect LAN A and LAN B from any unaddressed modules on the LAN, as these modules will be constantly attempting to send messages to the Control Module.
   c) Ensure that Terminals, Readers, etc. are not being used while performing tests.
   Before proceeding with Voltage tests, check the "RX" LED on the Control Module to confirm that there is minimal LAN activity.

2. To determine if a problem exists on the module under test, or elsewhere on the LAN, these voltage tests can be performed:
   a) With the module connected to the LAN.
   b) On the cable connections with the module disconnected from the LAN.

Test Point + PROBE	**Test Point - PROBE**	**EXPECTED RESULT**	**PROBLEM/ REMEDY**
LAN +ve	LAN -ve or GND	11V to 14V DC	**0V.** Open circuit LAN +ve connection, or short cct between LAN +ve and LAN -ve. **<11V.** Too many modules powered from the LAN power supply source. Length (or guage) of LAN cabling causing excessive Voltage drop on the cable.
LAN B	LAN A	200 to 400mV DC	**<200mV.** Short cct between LAN A & B. More than 2 modules terminated in this section of LAN. **>400mV.** LAN A &/or LAN B Open circuit. Less than 2 modules terminated in this section of LAN **<0V (Negative reading)**. LAN A & LAN B connections reversed.
LAN A	LAN -ve or GND	200mV to 2.5V DC	**<200mV / >2.5V DC.** System may have more than one module connected to an earth point, causing earth loop/s. Ensure that no more than one module in the system is connected to earth. Remember that a module may be connected to earth via a peripheral device or it's cabling. e.g. PC, Printer, External power supply, Detector, Output device, etc. If installation methods &/or system configuration makes multiple earth points unavoidable, install LAN Isolator/s at suitable points in the LAN system to isolate the earthed section/s
LAN B	LAN -ve or GND	200mV to 2.5V DC	As above.

SYSTEM OPTIONS

A special Options Micro chip is used to enable certain system options and upgrade options in the Control Module.
The Chip is labelled U14 and is located between the Zone 9 to 16 Input connections and Links LK3 to LK6.
See PCB layout on page 11.

A range of standard Options Micro chips are available. These chips can be purchased and changed over by the installer at any time to provide additional features.
The price of each Options Micro Chip Type will vary according to the feature/s that the chip will enable.

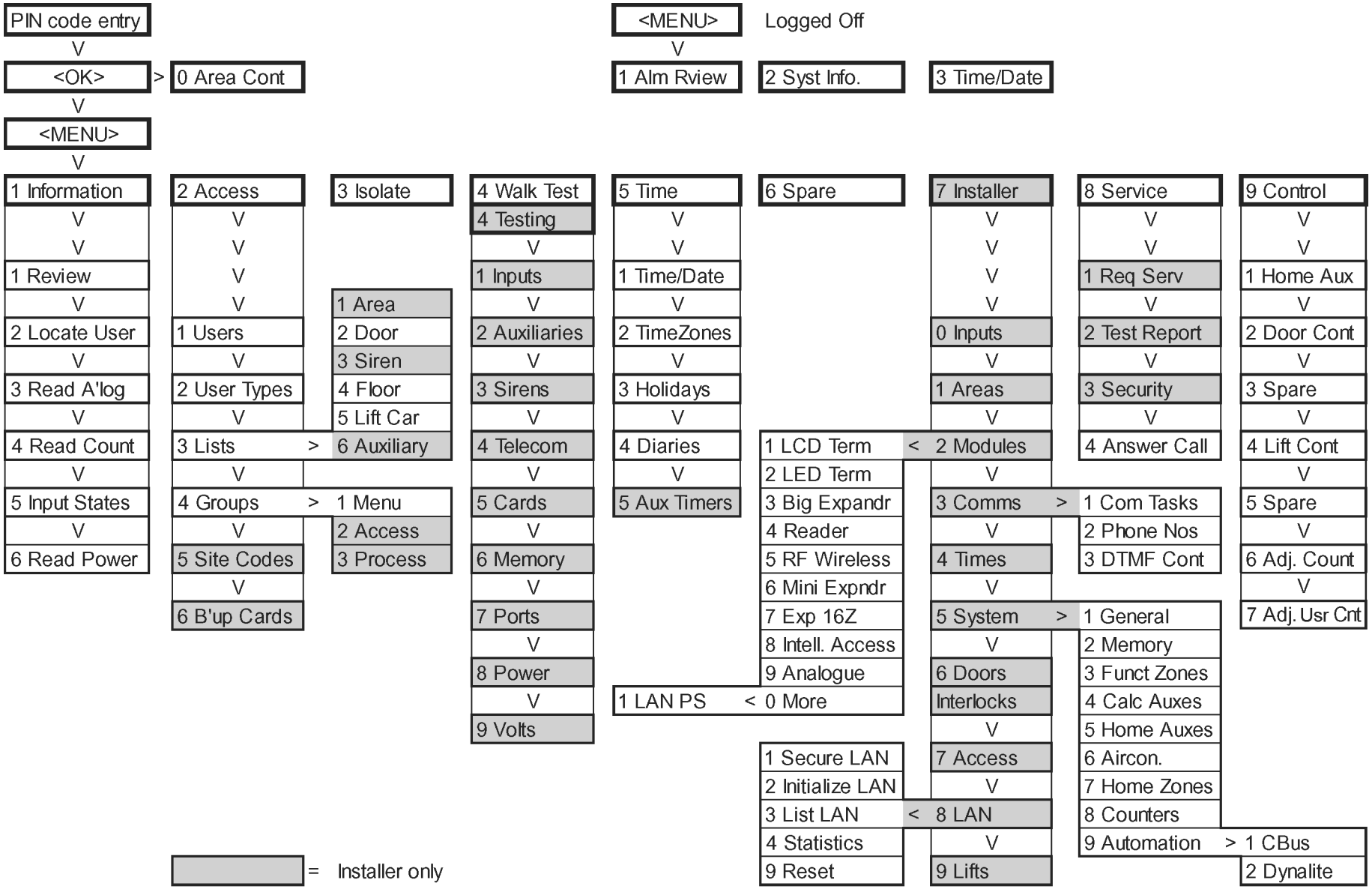
NOTE: If the additional feature required is new and was not available in the version of firmware currently in the Control Module, then the Control Module firmware AND the Options Micro will need to be changed.

When purchasing 128k or 512k Memory expansion for the Control Module, an Options Micro chip will also be supplied to enable the use of the additional memory.
IMPORTANT NOTE: When purchasing Memory expansion you must specify which product is being upgraded. "3000" or "Access 4000".

Standard Factory Memory Sizes:
Model 3000: 32k.
Model Access 4000: 128k.

For full details of Options Micro Chip types, refer to the current Version of the Programmer's Manual or the Website. These details will be found under "3000 and Access 4000 Model Options" in the Overview and Introduction section.

Designed & manufactured in Australia.



3000 / ACCESS 4000
Menu Flowchart