Integriti
Security Controller (ISC). 996001

SECURITY, ACCESS CONTROL & AUTOMATION SYSTEM

INSTALLATION MANUAL

Contents

Important Notes.

1) Wiring / Earth loops.

    a) Ensure that all "0V" terminals including LAN 0V, DET- and Battery- are NOT connected to a PCB Earth lug, the metal enclosure or any other Earth connection. Connecting 0V to Earth defeats Surge Diversion circuits and may create Earth Loops. When wiring is complete, disconnect all power and batteries, then use a Multimeter on Ohms range to verify there is no connection between 0V & Earth.

    b) Only unshielded (UTP) Ethernet cable should be used for the Ethernet connection. If shielded cable is provided it must be connected to the ISC via an unshielded ethernet cable joiner and short patch cable. *See Note on p9.*

2) End-Of-Line Resistor Scheme Change.

    The recommended EOL Resistor scheme for Integriti products is now 2k2 / 2k2. Systems with Controller firmware V3.3.4 or later support both the new 2k2/2k2 scheme and the previous 2k2/6k8 scheme by default. (i.e. When the "EOL for Zones" options are left at the default blank setting) No programming changes are necessary.

    The previous 6k8/2k2 scheme is still required for LAN Modules & UniBus boards connected to Integriti Controllers with firmware prior to V3.3.4. 6k8 Resistors will continue to be supplied with these products for a period of time. *See "Zone Input Wiring" on page 5 for more information.*

3) 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.

Parts List.

NOTES:

1) The Integriti Security Controller may be supplied:

a) In an Enclosure with an internal 3A or 4A Power Transformer, associated mounting, interconnection and fuse hardware & Installation kit.

b) As a Tested PCB assembly & Installation kit.

2) Items marked with an asterisk (*) are not included if product is supplied as a PCB & Installation kit. When these items are supplied, the Controller is mounted on the metal mounting plate and the Transformer Output cable and the Mains Earth Wire are pre-wired to the Controller.

- Integriti Security Controller Module.
- Metal PCB mounting plate in metal enclosure. *
- Mains Cable, Mains Terminal Block and Transformer. *

- Installation Kit containing:
    -   5 x 8 Way plug-on screw terminals.
    -   1 x 6 Way plug-on screw terminal.
    -   1 x 3 Way plug-on screw terminal.
    -   4 x 4 Way plug-on screw terminals.
    -   1 x 2 Way plug-on screw terminal. (Pre-fitted on PCB if supplied in enclosure with transformer)
    -   Earth Cable. Chassis to PCB. (Pre-fitted on PCB if supplied in enclosure with transformer)
    -   6 x 0.1" Jumper Links.
    -   1 x 60cm Integriti Battery connection cable with 4.8mm Battery terminal connectors.
    -   Tamper switch. *
    -   Tamper switch bracket. *
    -   2 x 4.8mm Tamper switch crimp terminals. *
    -   1 x 1.0 Amp M205 (20mm) Slow Blow Fuse. (Spare) *
    -   40 x 2k2 End-of-line resistors. 16 x Zone Inputs, 8 x Spare. (red-red-black-brown-brown)
    -   Telecom cable RJ12.
    -   Telecom Adapter RJ12-605.

    Notes: Telecom Cable and Adapter.
    1) These items are not supplied in all countries.
    2) The Integriti Control Module Telephone Line connector, P4,complies with standard Modular socket pinouts. Telephone line cables supplied with our previous "Concept" range of products are NOT compatible with the Integriti Control Module PSTN connection.

- Installation Manual. (This document)

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.

NOTE: ONLY REPLACE FUSES WITH THE SAME FUSE TYPE AND VALUE!
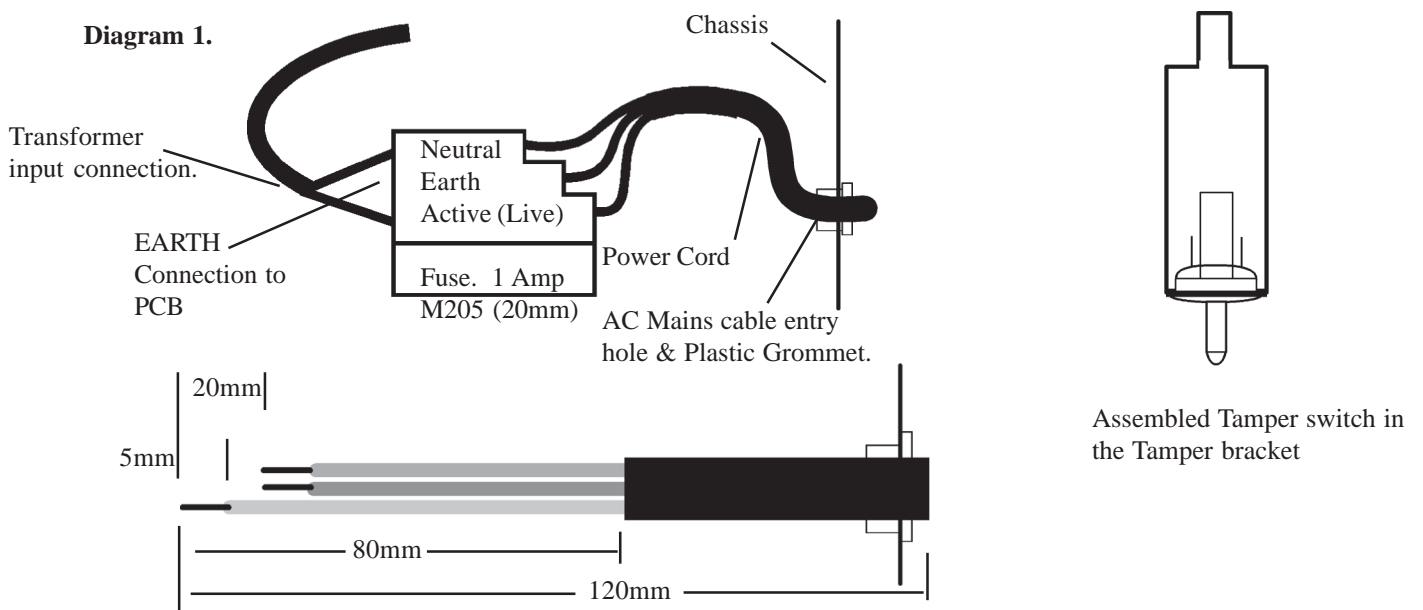
INSTALLATION AND SAFETY INSTRUCTIONS

Electrical AC Mains Power connection.
(Only applicable to models fitted with an internal AC Mains Transformer and no mains power cord)

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 80mm of the sheath from the end of the power cord. Trim 20mm 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.

3. Feed at least 150mm of the power cord through the AC mains cable entry hole 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. 120mm), 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.

   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.

Transformer input connection.

EARTH Connection to PCB

Neutral
Earth
Active (Live)

Fuse. 1 Amp M205 (20mm)

Chassis

Power Cord

AC Mains cable entry hole & Plastic Grommet.

20mm
5mm
80mm
120mm

Assembled Tamper switch in the Tamper bracket

Mounting the Unit.   See Diagram 2.

1. Installation environment should be maintained at a temperature of 0º to 50º 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. When mounting this product onto flammable surfaces, a steel fire protection backplate MUST BE INSTALLED. The backplate size, shape, material and finish must comply with local regulations and have no holes other than the holes that align with the mounting holes in the equipment enclosure.

4. The tamper switch bracket must be positioned through the slot in the chassis at the opposite end to the transformer, before the lid is secured to the chassis.

5. In Order to comply with regulations, the screw provided to fix the cover to the chassis must be tightly secured.

Connecting Power to the PCB.   See Diagram 2 below.

IF INTERNAL MAINS TRANSFORMER FITTED.
1. The flying lead from the Transformer secondary is pre-wired to the "AC" Input connections on the PCB. This lead should be routed underneath the PCB mounting plate as shown.

2. An EARTH wire is pre-wired from the EARTH on the "Terminal Block and Fuse" to the "EARTH" Lug on the PCB. This connection must not be removed.
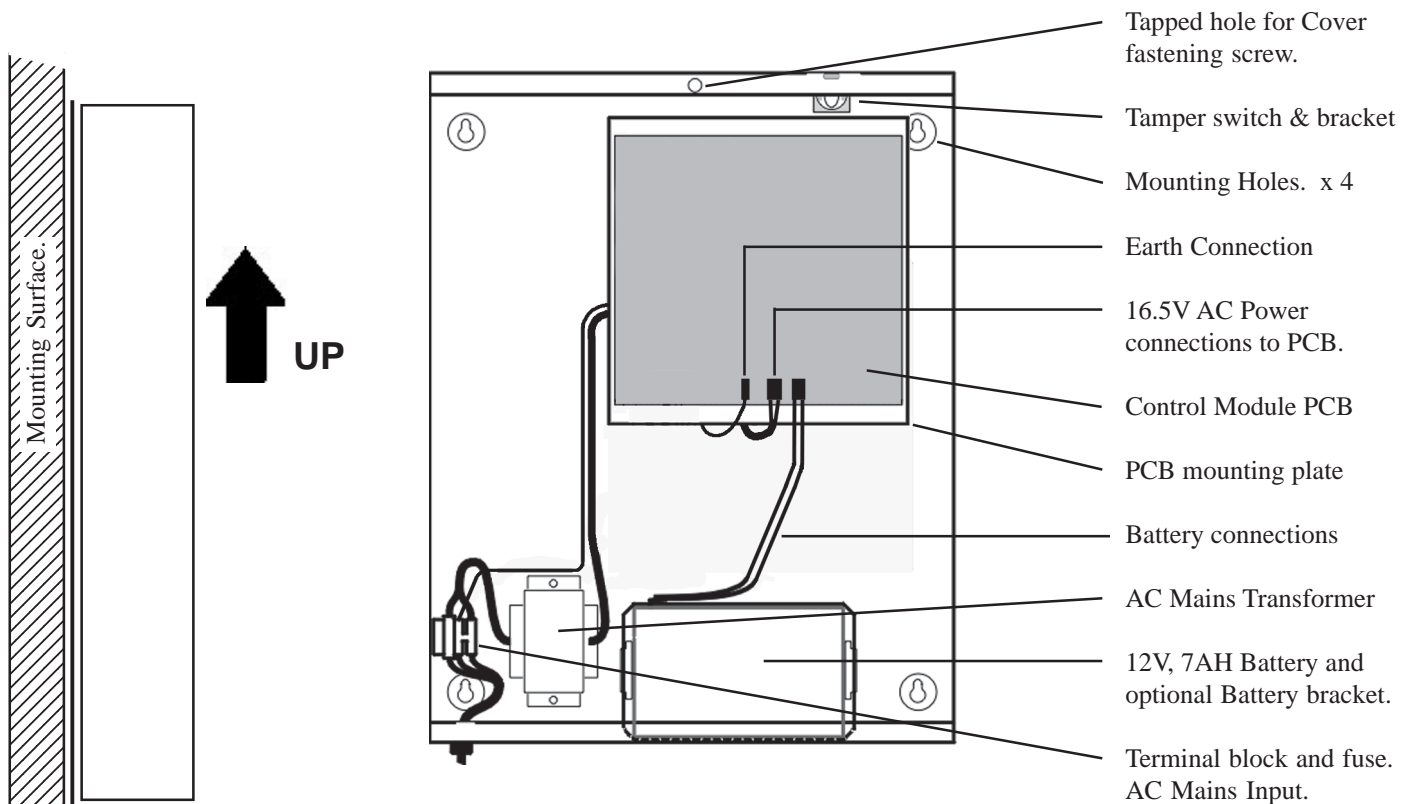
IF PLUG PACK SUPPLIED.
1. Feed the 16V AC cable from the plug pack into the enclosure via one of the cable entry holes. Ensure that 5mm of insulation is stripped from the end of the cables and terminate into the "AC" Input connections on the PCB.

2. When 3-Wire Plug Pack is used, terminate the Earth Wire with the 6.3mm Quick Connect plug and connect to EARTH lug on the PCB.

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

1. Connect the pre-assembled Battery cable provided, between the polarised "BATTERY" connector (T6) on the PCB and the Battery terminals.
    - Ensure correct orientation when fitting the plastic connector to the PCB "BATTERY" connector.
    - Connect the Red wire to the Battery Positive (+) terminal and the Black wire to the Battery Negative (-) terminal.

2. Route any excess cable length under the PCB mounting plate to avoid interference with other cables.

Diagram 2.

Tapped hole for Cover fastening screw.

Tamper switch & bracket

Mounting Holes. x 4

Earth Connection

16.5V AC Power connections to PCB.

Control Module PCB

PCB mounting plate

Battery connections

AC Mains Transformer

12V, 7AH Battery and optional Battery bracket.

Terminal block and fuse. AC Mains Input.

UP

Mounting Surface.

Fire Protection Backplate. (Side View)

Control Module Enclosure

IMPORTANT NOTE: This diagram shows the recommended orientation for installing the enclosure with the Battery located on the bottom lip.
If the enclosure is mounted with the Battery on the left-hand side or right-hand side of the enclosure, the optional Battery bracket must be used.
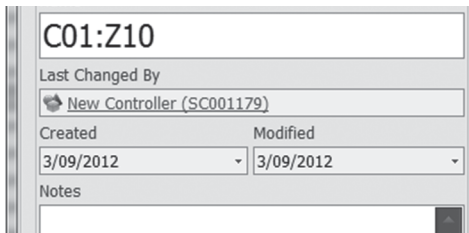
Wiring Diagrams

ZONE INPUT WIRING

The End-of-line (EOL) Resistors must be installed on the detection device. Typical Detection devices with *Normally Closed* Alarm contacts and *Normally Closed* **OR** *Normally Open* Tamper Contacts are wired as follows:
See "Important Note 2" on page 1 for more information on the EOL Resistors.

Schematic diagram
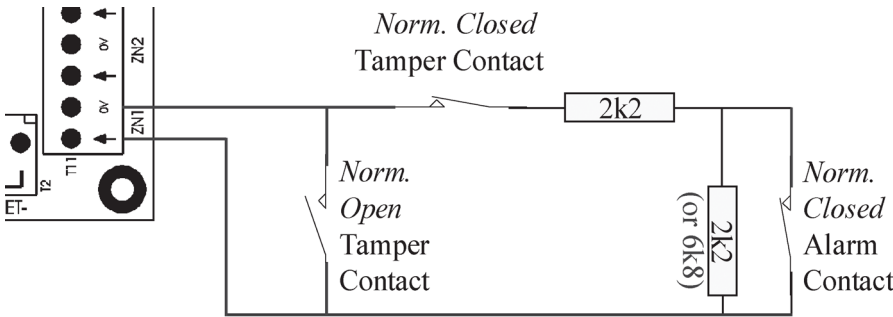
For 2k2/2k2 EOL scheme:
2k2	= Sealed
4k4 (2k2 + 2k2)	= Unseal/Alarm
Open or Short Circuit	= Tamper

For 2k2/6k8 EOL scheme:
2k2	= Sealed
9k (2k2 + 6k8)	= Unseal/Alarm
Open or Short Circuit	= Tamper

Detection devices with *Normally Open* Alarm contacts are wired in exactly the same manner as shown above. However, when programming the Zone Input, the option to "Swap Alarm and Seal" must be set to [Y]es.

Example. PIR Movement Detector
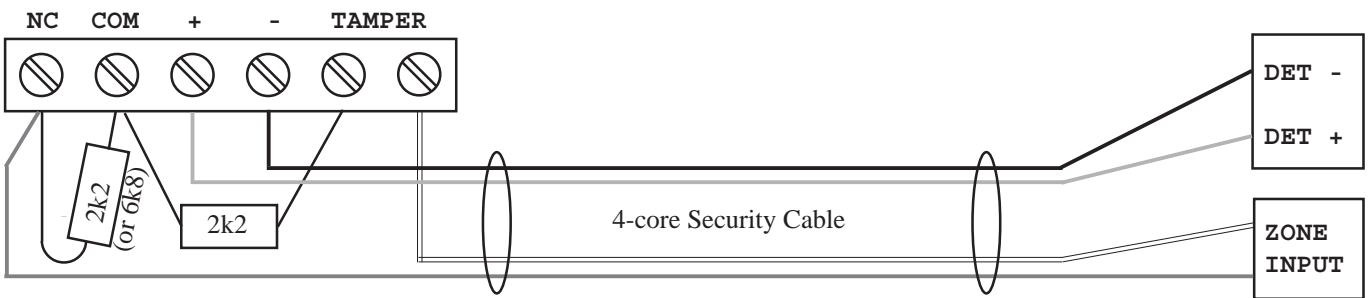
Note that the connector terminals may be arranged and labelled differently to the example shown above. Please check the manufacturers documentation. The table opposite provides details of some of the more common Detector terminal labelling.

Label in example	Alternative labels	Description
NC COM	N/C, ALARM NC RELAY NC	Normally Closed Alarm output contacts
+ -	+ 12V DC -	Power Supply Input
TAMPER	TAMPER NC 24 HR	Normally Closed Tamper Contacts

Example. Reed Switch
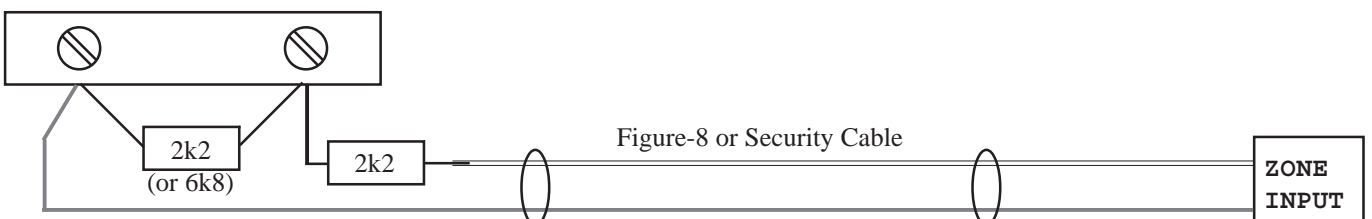
TELECOMMUNICATIONS WIRING

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

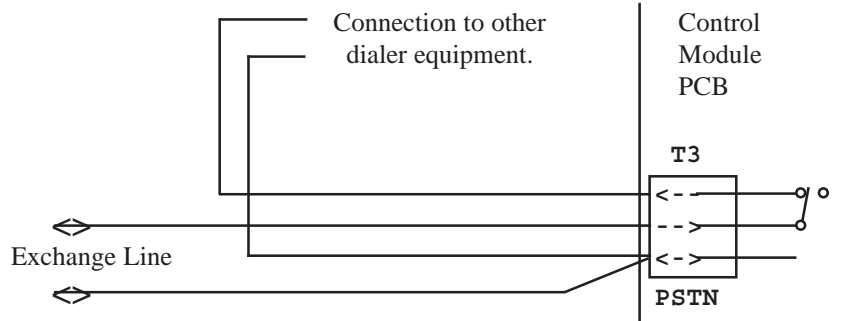NOTE: Telephone cables supplied with Concept Control Modules are NOT compatible with Integriti. Only the telephone cable supplied with the Integriti Controller, or a standard RJ12 telephone cable must be used in the socket P4.

604 Socket pinouts:
Dialer Line IN: Pins 2 & 6
Dialer Line OUT: Pins 1 & 5
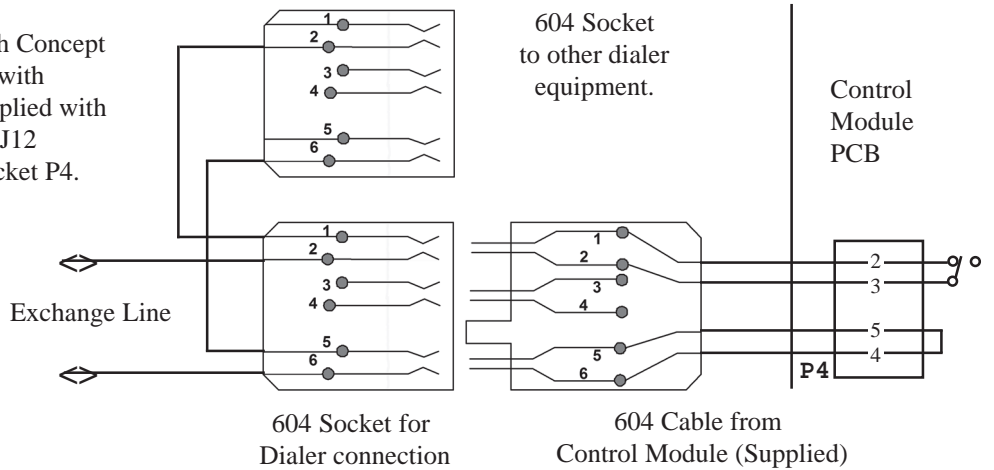
SIREN WIRING

A maximum of two 8 Ohm Siren speakers may be connected to each siren output, wired in parallel. Normally Closed Siren cover Tamper switches may be wired in series with the speaker cable. This method utilizes the siren speaker circuit monitoring.

When wiring 2 speakers in parallel, the Siren Cover Tamper Switches should each be connected to a separate Zone Input.
A single 2k2 EOL Resistor is connected in series with the Tamper switch as shown, and the Inputs programmed for Tamper processing.
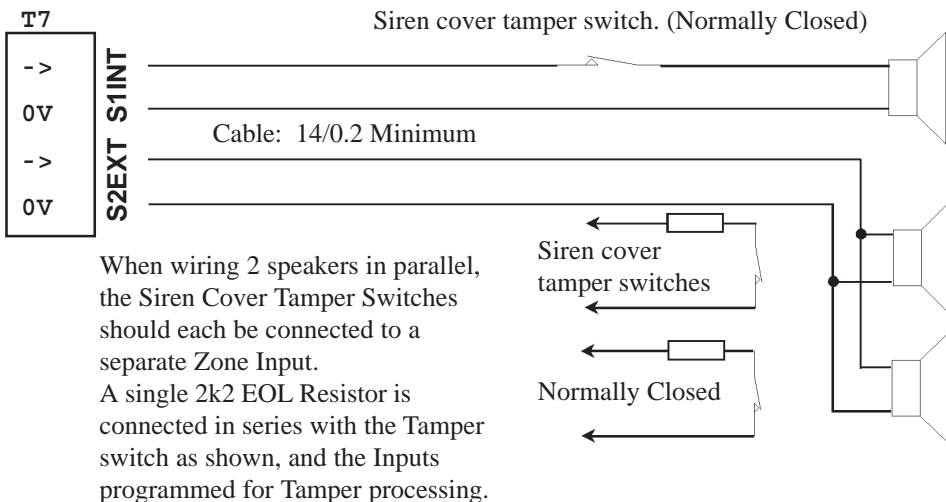
NOTE:
If high-impedance devices such as Piezo Siren speakers are used, a 2k2 Resistor should be fitted across the Piezo Siren device terminals to Seal the "Siren Tamper" System Input.

AUXILIARY WIRING

- Auxiliary Relay Outputs AX1 and AX2 can switch up to 1A at 30Volts DC. It is NOT recomended to switch AC loads.
- The Common contact of each relay can be connected to DET- using LK9 (AX2) or LK10 (AX1) respectively. These Links are shorted by default. This allows the load to be simply be connected between DET+ and the Normally Open (NO) contact of each output (see diagram below).
- An external power supply must be used if the combined current draw on the Auxiliaries + LAN current + Detectors + Other peripheral expansion boards exceeds:
  - 700mA if 1.5A Plug pack is used;   - or 1.2 Amp if 3A or 4A Transformer is used.
- If an Inductive load (eg door lock) is connected then a Clamp diode should be fitted across the load. Cathode (bar) to +ve. (see diagram below)

Clamp Diode MUST be fitted across Lock. Cathode to +ve.

+ External Power Supply. (Battery-backed) -

Lock or Solenoid control.
An External Power Supply is used to power inductive loads to protect the Controller, provide longer battery backup & minimise the possibility of earth loops.
The corresponding Link to DET- (LK10 in this example) MUST NOT be fitted.

12V Strobe or LED control. The Common (COM) contact of the relay is connected to DET- using LK9. The load is then connected between DET+ and the NO contact.

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

IN1-IN3   Select Default/Initialization option:
    IN1 Shorted: Default Installer Code to 01 and allow full Menu access on first entry.
    IN1 & IN2 Shorted: Default the Memory Configuration and Database. ALL PROGRAMMING IS ERASED.

OK   Momentarily shorted to confirm the Default/Initialization selection above (see procedure below), or to rectify a problem indicated on the "Fault1/Fault2" Lamps.
    If using as a result of a fault condition, read the "*Control Module Fault LEDs*" table on the following page first.
    Procedure for using IN1-IN3 and OK Links:
    1) Disconnect AC and Battery from Control Module.
    2) Short the appropriate "IN" Link or Links to select the default/initialization option required.
    3) Re-apply power to the Control Module and wait until the "Prompt" Lamp (near the SIM/SD Card) is flashing.
    4) Momentarily short the "OK" Link.

LK5   "2A". Regulated Power Supply Total Current Limit setting. *See "Electrical Specifications" for more details.*
    Not Shorted.   1.3 Amp . Setting for 1.5A Plug Pack or when supplied as PCB only.
    Shorted   2.2 Amp. Setting for 3A or 4A Transformer.

LK9   "AUX2" Auxiliary Output Relay Option, Short LINK to connect Relay AX2 Common to DET -.

LK10   "AUX1" Auxiliary Output Relay Option, Short LINK to connect Relay AX1 Common to DET -.

LK8/11   Factory Only.

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

T1   Tamper Switch Input: Tamper switch supplied. No End-of-line resistors necessary.
               Watchdog: (F'ware V3.0.2 or later only) Solid state relay output allowing the Controller status to be monitored.
               Output is low impedance during normal operation and open circuit at all other times. i.e. If unpowered, in reset,
               booting, critical firmware fault, etc.

T2 / T18   Detector Power. 12V Supply for Detectors and Auxiliary Devices.
               Total current sourced from "DET+" and "LAN POS" must not exceed the limits specified on Page 19.

T3   Telecom connection Terminal block. Connection for PSTN Dialer line. *See drawings on page 6.*
               Pins 1 & 3:   Line Out. Connection to other equipment sharing the Exchange line.
               Pins 2 & 3:   Line In. Connection to Exchange line or Leased line.

T4   16 to 18 V AC Input to PCB. (From Transformer Secondary winding or Plug Pack output cable)

T5   Auxiliary outputs . *See "AUXILIARY WIRING" on page 7 for details.*

T6   Battery connection. *See Note 2 under Electrical Specifications on Page 19.*

T7   Siren Speaker Outputs. *See "SIREN WIRING" on page 6 for details.*

T8   LAN connections.   *See "LAN SYSTEM" details beginning on page 12 for details.*

T9   EARTH Connection. *See Page 4.*

T11-14   Zone Input connections. *See Zone Input Wiring on page 5 and Important Note 2 on page 1.*

HEADER PLUGS.   *See pages 10 & 11 for location.*

P1   Port 0 connection. <u>TEMPORARY</u> connection of a PC is allowed using the "Port 0 Interface cable" (993030).

P3   UniBus Port. Local "UniBus" for UART, Auxiliary expansion and Zone expansion. A UniBus UART Board and
               appropriate cable/s must be fitted if a Printer, RS232 PC connection, GSM modem or External modem etc. is required.
               UniBus Boards can be connected while the Control Module is powered up. The "Unsecured" System Input will be
               triggered to indicate that a new UniBus board is present.

P4   Telecom socket. Connection for PSTN Dialer line. *See drawings on page 6.*

P5   Factory Only.

P6   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.

P7   Ethernet socket. For connection to System Management Software. ***Use Unshielded (UTP) Ethernet Cable. See Note***
               at the bottom of Page 9.

P9   JTAG. Factory use only.

P11   USB-H. USB Host Connector. Allows USB peripherals to be connected such as a Memory Stick for Firmware
               upgrades, Review logging, etc.

P12   USB-P. Will allow connection to Management Software PC via USB when implemented.

INDICATOR, STATUS AND FAULT LAMPS.   *See pages 10 & 11 for location.*

Fault1		See "Fault LEDs" table	**L16**	**ON**	Detector + Fault (Fuse Blown).
Fault2		See "Fault LEDs" table	**L17**	**ON**	Battery Connected.
Prompt		See "Fault LEDs" and "Links" table	**L18**	**ON**	Battery Fault.
Status1		See separate Status LEDs table	**L19**	**ON**	Modem Dial Indicator
Status2		See separate Status LEDs table	**L20**	**ON**	LAN Power Fuse Blown.
L6	**ON**	Port 0 Receive Data	**L21**	**ON**	Modem Ring Voltage Indicator
L7	**ON**	Port 0 Transmit Data	**L22**	**ON**	Dialer Modem Receive Data
L8	**ON**	Phone Disabled	**L23**	**ON**	Dialer Modem Transmit Data
L9	**ON**	Aux 1 On	**L24**	**ON**	3.3V Supply OK.
L10	**ON**	Aux 2 On	**L25**		Ethernet. **ON**=100M. **OFF**=10M.
L12	**ON**	RS485 LAN Receive Data	**L26**	**FLASH**	Ethernet Link active.
L13	**ON**	RS485 LAN Transmit Data	**L27**		USB-P Status.
L14	**FLASH**	See "UNIBUS LED" table on p9.	**L29**		USB-H Status.
L15	**ON**	13.8V Supply OK.	**L30**	**ON**	16V AC Supply OK.

STATUS AND FAULT LEDs.   *See pages 10 & 11 for location.*

Panel Faults are displayed via the Fault 1/Fault 2 LEDs and are read in conjunction with the Status LEDs.

Status 1	Status 2	PANEL STATUS
Alternating	FLASH	Panel operating normally. Note that the Panel may take up to 60 seconds to reach normal operating status after power-up or after a default operation.

Status 1	Status 2	PANEL STATUS
ON	OFF	Panel Booting.
Fault 1	**Fault 2**	**EXPLANATION / REMEDY**
ON	OFF	No SD Card installed. Power-down the Control Module, check SD Card fitted correctly or replace.
FLASH	OFF	Non-volatile RAM not initialised. Check "Prompt" LED is flashing and Short "OK" Link for 1 second to initialize the NVRAM. (**NOTE:** Erases all programming)

Status 1	Status 2	PANEL STATUS
OFF	ON	Panel Reading DataBase
Fault 1	**Fault 2**	**EXPLANATION / REMEDY**
FLASH	OFF	Database error. Check "Prompt" LED is flashing and Short "OK" Link for 1 second to default the Memory Configuration and the Database. (**NOTE:** Erases all programming)

Status 1	Status 2	PANEL STATUS
ON	ON	Panel Reading Review
Fault 1	**Fault 2**	**EXPLANATION / REMEDY**
FLASH	OFF	Review error. Check "Prompt" LED is flashing and Short "OK" Link for 1 second to default the Review Log. (**NOTE:** Erases all Review)

UNIBUS LED (L14). *See page 10 for location.*

FLASH	Idle. No UniBus boards connected. UniBus cable fault or board not working.
OFF	OK. UniBus Card/s communicating correctly.
ON	Fault. Problem with one or more UniBus Cards. e.g. Address conflict.

RS485 LAN MODULE FAULT LEDs. e.g. SLAM, 8-32 Zone LAN Exp, Concept Modules, etc.

RX	TX	EXPLANATION / REMEDY
ON	ON	Module is un-addressed.
OFF	ON	Module type unknown. Module not currently supported by Control Module Firmware.
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. Select a lower Module number.
ON	OFF	Too many modules on Network for Control Module Permission Level.
OFF	Flash	Module disabled.

ELITE 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. 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. Select a lower Module number.
Too Many	Too many modules on Network for Control Module Permission Level.

NOTE: P7. Ethernet Socket. Only unshielded (UTP) Ethernet cable should be used for the Ethernet connection. If shielded cable is provided it must be connected to the ISC P7 via an unshielded ethernet cable joiner, such as the one shown here, and a short patch cable.

THE CONTROL MODULE PCB - CONNECTO

P12 - USB-P.
L27 - USB-P Status Lamp
USB socket for connection to PC. *See Page 8.*

P11 - USB-H
L29 - USB-H Status Lamp
USB socket for peripherals. *See Page 8.*

P7 - Ethernet
L25/L26 - Ethernet 100Mbit / LINK indication
Ethernet socket and status lamps for Management
Software connection. *See Pages 8 and 9.*

L19/L21/L22/L23 - DIAL / TXD / RXD / RING
Modem status indicator lamps. *See Page 8.*

T3 - PSTN
Screw terminal connection for Mode 3 Telecom Line
connection. *See Pages 6 & 8.*

LK8/LK11
Factory use only. *See Page 7.*

P4
RJ Socket for Mode 3 Telecom Line connection. *See
Pages 6 & 8.*

T9 - EARTH
EARTH Connection. *See Page 4.*

L8 - PHONE DISABLED
See Page 8.

L30 - AC PRESENT
AC Supply present. *See Page 8.*
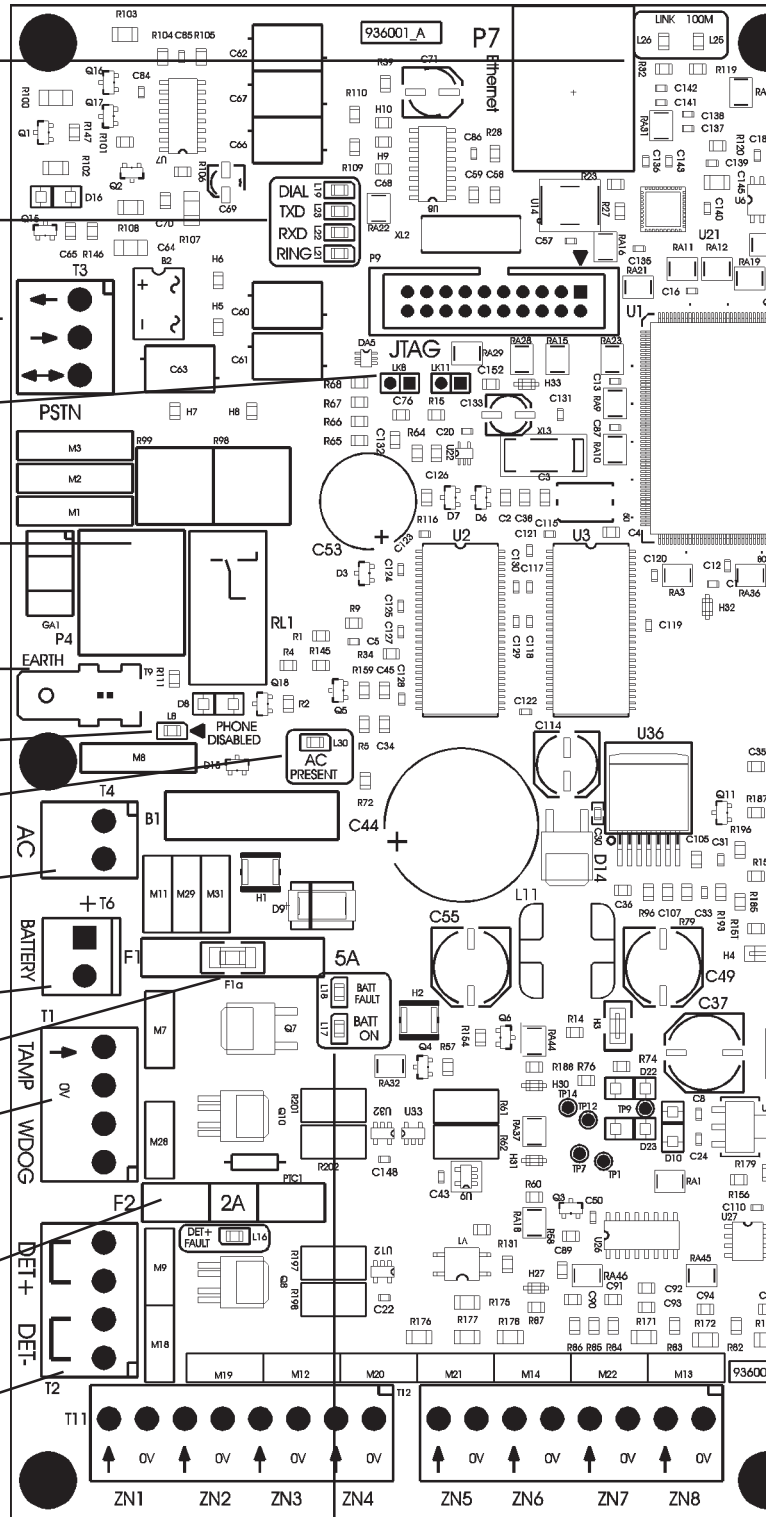
T4 - AC
16V AC Input. *See Pages 4 & 8.*

T6 - BATTERY
Battery connection. *See Pages 4 & 8.*

F1 - 5A Battery Fuse. (If fitted)
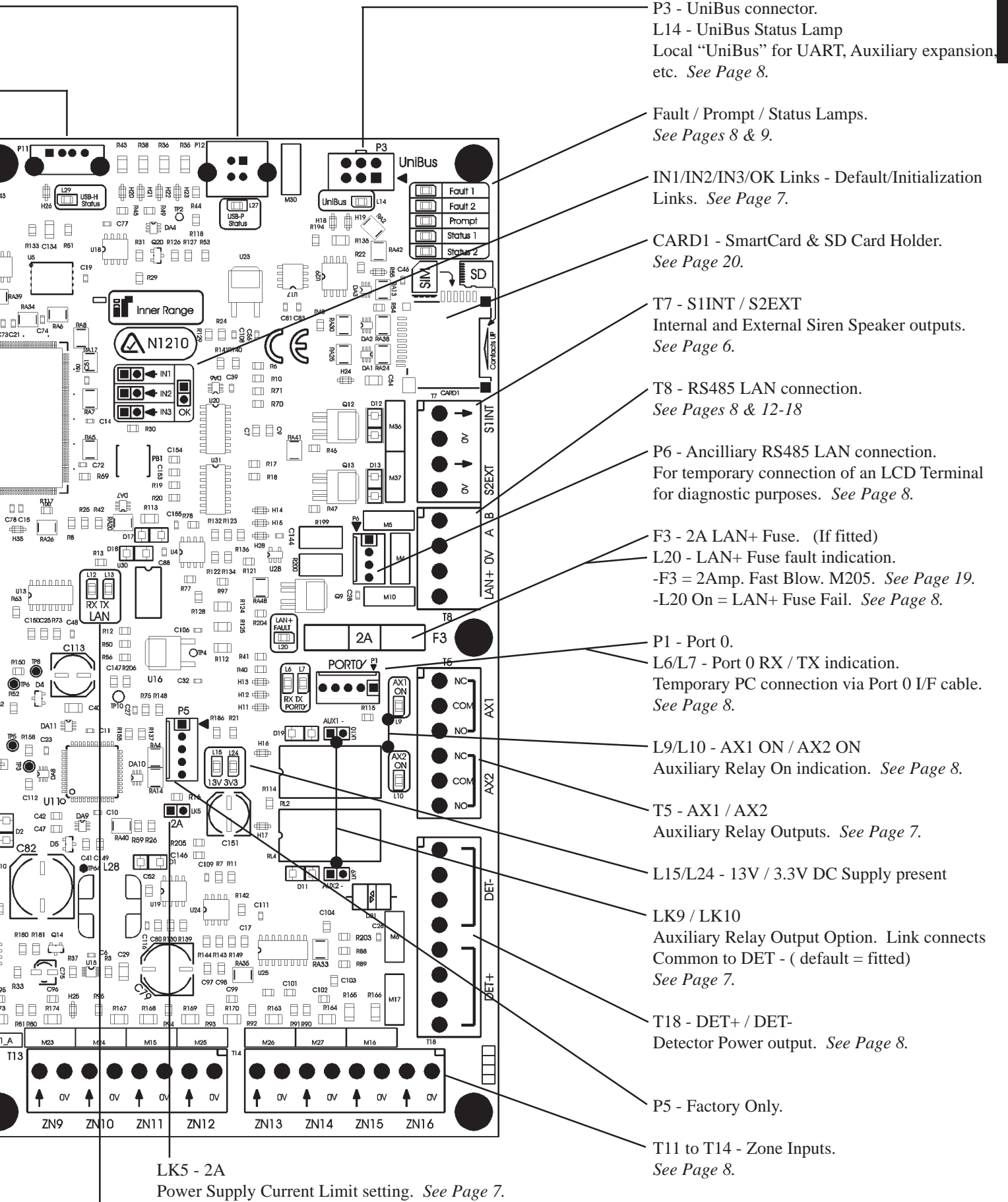5 Amp. Fast Blow. M205. *See Page 19.*

T1 - TAMP / WDOG
Cabinet Tamper input & Watchdog output.
See Page 8.

F2 - 2A Detector Power Fuse. (If fitted)
L16 - DET+ FAULT
2Amp. Fast Blow. M205. *See Page 19.*
L16 On = DET+ Fuse Fail. *See Page 8.*

T2 - DET+ / DET-
Detector Power output. *See Page 8.*

L18 - BATT FAULT
L17 - BATT ON
See Page 8.

R, LINK AND INDICATOR LAMP LOCATIONS

P3 - UniBus connector.
L14 - UniBus Status Lamp
Local "UniBus" for UART, Auxiliary expansion, etc. *See Page 8.*

Fault / Prompt / Status Lamps.
See Pages 8 & 9.

IN1/IN2/IN3/OK Links - Default/Initialization Links. *See Page 7.*

CARD1 - SmartCard & SD Card Holder.
See Page 20.

T7 - S1INT / S2EXT
Internal and External Siren Speaker outputs.
See Page 6.

T8 - RS485 LAN connection.
See Pages 8 & 12-18

P6 - Ancilliary RS485 LAN connection.
For temporary connection of an LCD Terminal for diagnostic purposes. *See Page 8.*

F3 - 2A LAN+ Fuse.   (If fitted)
L20 - LAN+ Fuse fault indication.
-F3 = 2Amp. Fast Blow. M205. *See Page 19.*
-L20 On = LAN+ Fuse Fail. *See Page 8.*

P1 - Port 0.
L6/L7 - Port 0 RX / TX indication.
Temporary PC connection via Port 0 I/F cable.
See Page 8.

L9/L10 - AX1 ON / AX2 ON
Auxiliary Relay On indication. *See Page 8.*

T5 - AX1 / AX2
Auxiliary Relay Outputs. *See Page 7.*

L15/L24 - 13V / 3.3V DC Supply present

LK9 / LK10
Auxiliary Relay Output Option. Link connects Common to DET - (default = fitted)
See Page 7.

T18 - DET+ / DET-
Detector Power output. *See Page 8.*

P5 - Factory Only.

T11 to T14 - Zone Inputs.
See Page 8.

LK5 - 2A
Power Supply Current Limit setting. *See Page 7.*

L12/L13 - RS485 LAN RX / TX indication. *See Page 8.*

RS485 LAN SYSTEM OVERVIEW

The Integriti RS485 LAN (Local Area Network) is a 3 or 4 wire network, and is the primary method used to connect the modules in a system. Using recommended cable types, modules on the LAN can be installed hundreds of metres from the Control Module.

The RS485 LAN is a secure communications network, providing a programmable supervisory polling system to monitor the network for cable tamper, cable fault conditions, module off-line and module substitution. The data format used 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 (e.g. 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.

- When wiring the LAN to Modules that are powered by an on-board power supply (e.g. 16-Zone Expanders), or from a local external Power Supply (e.g. Reader Modules, 8-Zone Expanders), do not connect any incoming LAN +12V wires to the LAN+ (LAN POS) connection on the Module. ❺ & ❻
  Some legacy Concept 3000/4000 Modules have a wiring terminal labelled "SPARE". Use this "Spare" terminal (labelled "SPARE" or "SPR") for the LAN +ve connection.   ❻

  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.

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

SYSTEM EARTHING

- Ensure that 0V(Common) and DET - , on all Modules have NO local connection to Earth. (Defeats Surge Diversion circuitry if connected)

- 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 legacy Concept 4000 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.

- While the metal chassis of Modules with on-board power supply such as 16-Zone 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.

Connecting Modules to the LAN.
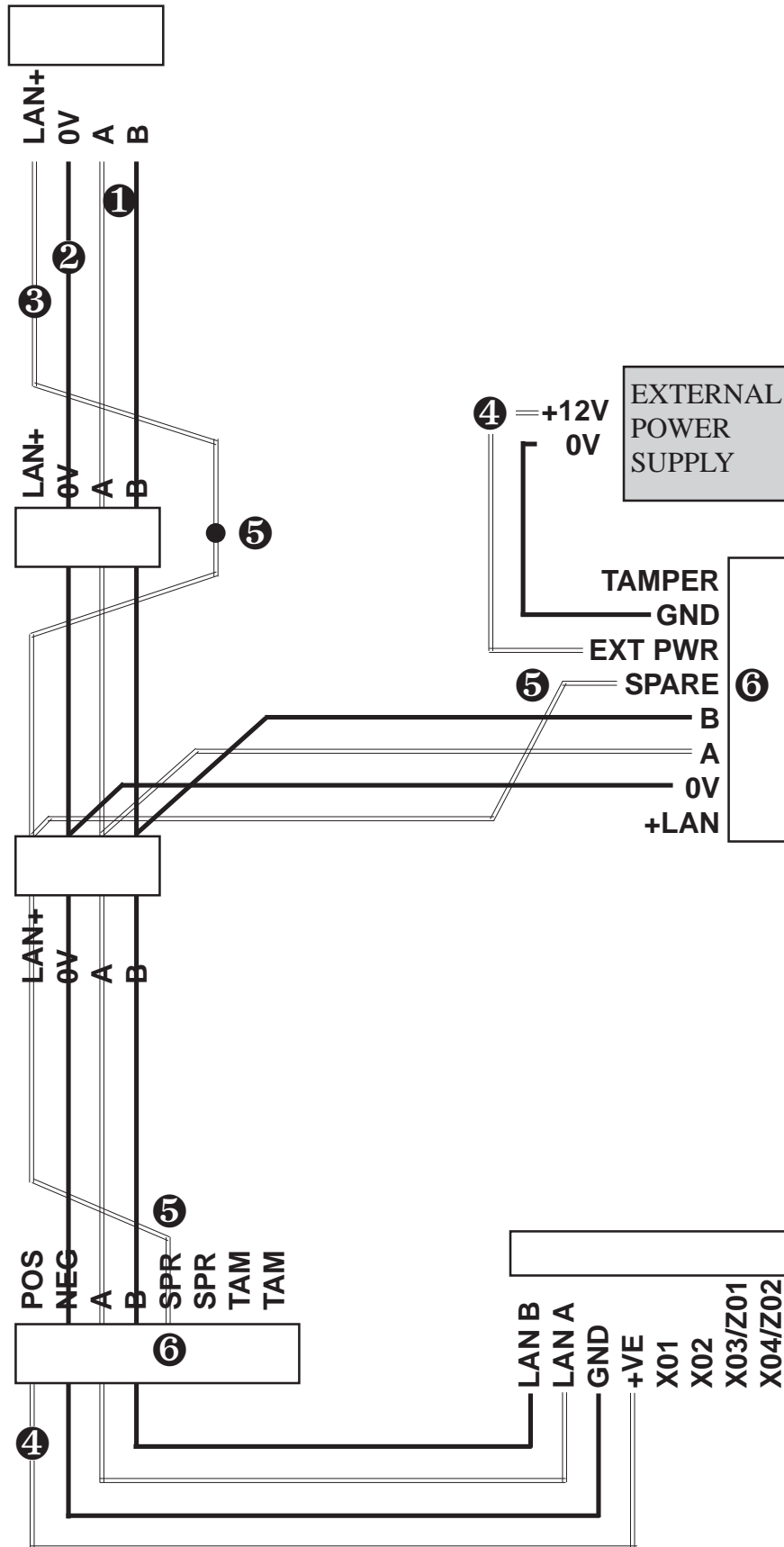
CONTROL
MODULE
• ISC
• IAC

LAN+
0V
A
B

❶
❷
❸

MODULE WITH
LOCAL POWER
SUPPLY.
• LAN "+ve"
bypasses Module.

LAN+
0V
A
B

❺

❹ ═ +12V
        0V

EXTERNAL
POWER
SUPPLY

TAMPER
GND
EXT PWR
SPARE ❻
B
A
0V
+LAN

LEGACY
CONCEPT 3/
4000 2-DOOR
ACCESS
MODULE
• Powered
from external
Power Supply
(LAN "+ve"
connected to
"SPARE")

❺

MODULE
POWERED FROM
THE LAN.

LAN+
0V
A
B

LEGACY
CONCEPT 3/4000
UNIV. EXPANDER
MODULE
• LAN +ve wired to
"SPR" (Spare).
• "POS" used as
LAN +ve supply
source.

❺

POS
NEG
A
B
SPR
SPR
TAM
TAM

❻

❹

ELITE LCD
TERMINAL

LAN B
LAN A
GND
+VE
X01
X02
X03/Z01
X04/Z02

CABLE TYPES

- TWISTED PAIR Cable MUST be used to connect the RS485 LAN.
  Multi-strand wire is preferred for terminating into the screw terminal connectors.
  Two pair or Category 5/5e LAN cable is suitable as it provides all 4 conductors required. One pair for "A" & "B", and the
  other for "POS" & "NEG". The twist ratio should be equivalent to Category 5 cable or RS485 cable or better.
  Unshielded cable is quite acceptable, however, in situations where electrical storms or higher levels of electrical interference
  may be present, shielded 2 pair cable should be used. Examples of suitable 2 pair cables:

Unshielded. *Figure 1.*	Shielded (All Multistrand) *Figure 2.*	
Olex JCAT5E	Olex JD2PS485A3	Belden 8723 * / 9842
Tycab TIC6105 †	Tycab DPF4702	Tycab DQQ47025 *
Tycab DPZ81051	Tycab DCK4702	Garland MCP-2S
Alpha 1317C	Alpha 2466C * / 6413	Garland MCP-2IS *
Belden 9744	Electra EAS7202P / 7302P	Electra EAS16202P
DCS CM-CAT5E	General Cable B2002CS	Roadworx RW600224
Garland UTPL5E		
Garland UTPL5EMTP ‡		

Legend:

† 3 Pair.
‡ Multistrand (7/0.2).
* Indivually screened pairs.

- 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

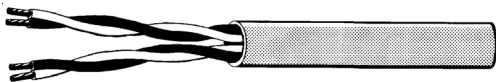*Figure 1.* Twisted pair communications cable.   *Figure 2.* Shielded, twisted pair communications cable
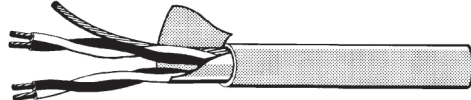

Figure 3.
Heavy duty Figure 8 cable. **24 / 0.20** Used for LAN +ve & GND on long cable runs.

SURGE PROTECTION.

- In multi-building installations and on longer cable runs, shielded cable may be used to provide added protection.
- Each individual shield should be terminated to a Protective Earth point such as an earth stake, building earth (metal building
  framework) or Earth point in the Control Panel chassis. ❶ It is very important to ensure that the shield makes no
  contact with Negative, 0V, Ground or any other wiring within the system.
- Inner Range Advanced Surge Protection Devices provide surge protection for the Integriti and Concept family of products.
  They consist of the Power Surge Diverter, IR LAN Surge Diverter and the PSTN (Telecom) Line Surge Diverter and can be
  used where LAN cabling enters/exits each building, or on cable runs that are more exposed to spikes or surges. LAN Isolator/
  s can also be included in a Surge protection scheme to electrically isolate different sections of the LAN.

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 OR from a CLOE Slave.   ❸
  (LAN Isolator/s can be used to extend the cabling distance. CLOE devices can be used to link LAN sections via Ethernet)

- <u>TOTAL LAN CABLING</u> 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 Integriti RS485 LAN is self-terminating and Integriti Modules do not have a "Termination" setting.**

- **Any Concept 3000/4000 Modules used in an Integriti LAN MUST NOT BE TERMINATED.**
  i.e. The "Term" Link must be removed. (Termination on Concept 3000/4000 Modules is set with a jumper link or a
  DIPswitch, depending on the Module type)

  NOTE: If a section of the LAN contains ONLY Concept 3000/4000 Modules, AND is isolated from the Integriti Controller
  and any Integriti Modules by a LAN Isolator or CLOE Slave, termination links may be fitted as per Concept 3000/4000 LAN
  Termination instructions. ❻ e.g. Termination on isolated Concept 4000 Modules is indicated with a "**T**" on Fig. 5 below.

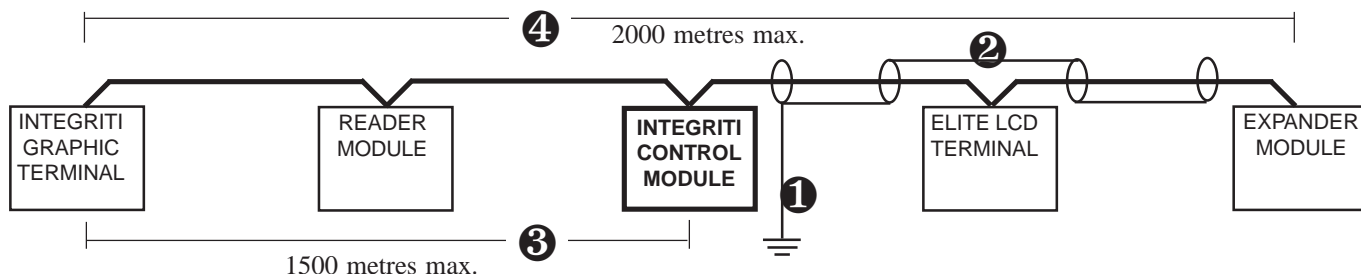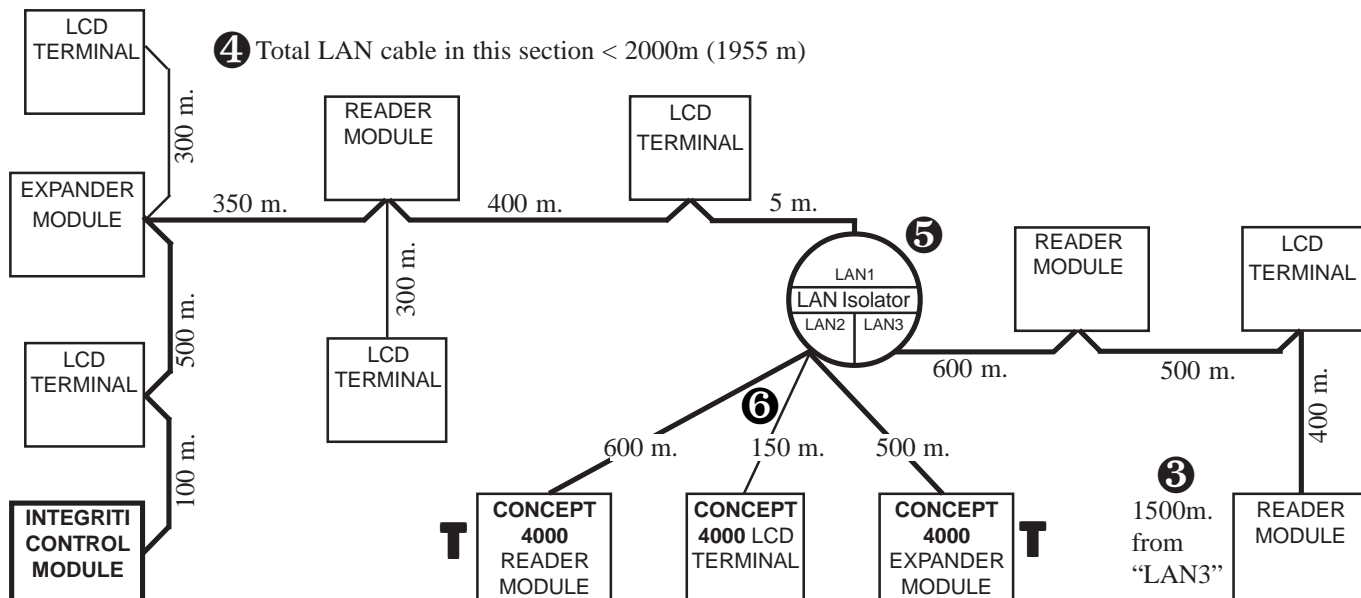### *Figure 4.* Simple LAN configuration.

Figure 5. Complex LAN configuration.

RS485 LAN TROUBLESHOOTING FLOWCHART

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

A1. <u>WHERE POSSIBLE, PHYSICALLY CHECK:</u>
-LAN A & B connections not reversed on any module.
-No module '0V' terminals connected to earth via ext.
power supplies, input/output cabling, etc. (Only 'earth'
terminal/s should be connected to earth) Exercise
caution when connecting the Controller to external
equipment (e.g. Printer, PC, modem, etc.) to ensure that
an earth loop is not created.
-Legacy Concept 3000/4000 Modules are NOT
terminated.

⇓

A2. <u>CHECK FOR SHORT CIRCUITS ON THE LAN</u>
(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. <u>CHECK LAN TERMINATION</u>
(No Power connected AND No batteries connected)
METER ON OHMS RANGE
Measure between LAN A & B on the Control Module:
If 470 Ohms or less, check for:
a) A Short circuit across LAN A & LAN B,
b) One or more legacy Concept 3000/4000 Modules are
present and are terminated. Locate the Modules and
remove the Termination. *See Note 1.*

⇓

POWER UP SYSTEM & CONNECT BATTERIES

A4. <u>CHECK CONTROL MODULE OPERATION</u>

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 Status & Fault
               LEDs*" table on Page 9.

⇓

A5. <u>DETERMINE THE TYPE OF LAN PROBLEM</u>

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. <u>IS THE LAN COMPLETELY DEAD ?</u>

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

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

⇓

A7. <u>CHECK STATUS OF PROBLEM MODULE/S</u>

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 2.*

Check FAULT LEDs (TX & RX LEDs) <u>OR</u> LCD Display
on problem Module:
Both LEDs Off <u>OR</u> 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*"
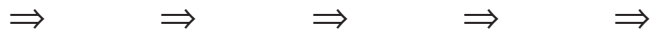   table on Page 9.

⇓

A8. <u>TEST LAN VOLTAGES AT PROBLEM MODULE/S</u>

Perform LAN Voltage Checks at the problem Module/s.
Refer to the table "*LAN Voltage Testing*" on Page 18.

⇓

A9. <u>SUBSTITUTE MODULE/S</u>

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.

⇒   ⇒   ⇒   ⇒   ⇒

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 Recovered" or "Module Found" messages.

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

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 18.

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

⇓

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.
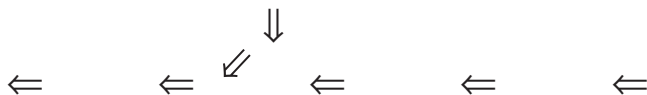
NO. *Proceed to Step A8*

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.*

⇓
⇙
⇐   ⇐   ⇐   ⇐   ⇐   ⇐

NOTES:

1. LEGACY MODULE TERMINATION RESISTOR CHECK
To determine if a legacy Concept 3000/4000 module is fitted with a Termination Resistor, 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 "Programming via LCD Terminal-Generic LCD Terminal operations" for details.*

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 1 minute (60 seconds) or greater.
    b) Disconnect LAN A and LAN B from any unaddressed modules on the LAN, as these modules may be constantly attempting to send messages to the Control Module.
    c) Ensure that Terminals, Card Readers, etc. are not being used while performing tests.
        Before proceeding with Voltage tests, check the "LAN RX" LED (L12) 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.

3.   If a section of the Integriti LAN contains ONLY legacy Concept 3000/4000 Modules, AND is isolated from the Integriti Controller and any Integriti Modules by a LAN Isolator or CLOE Slave Unit, termination links may be fitted in that section of the LAN as per Concept 3000/4000 LAN Termination instructions.
        In such a case the LAN Voltages for this section of the LAN will be in accordance with the table provided on page 18 of the Concept 3000/4000 Control Module Installation Manual.

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	> 0V DC < 5V DC	**Negative reading (< 0V).** LAN A & LAN B connections reversed. **0V.** Short circuit between LAN A & B.
LAN A	LAN -ve or GND	> 0V DC < 5V DC	**≤ 0V or > 5V DC.** There may be one or more Modules in the system where '0V' is connected to an earth point, causing earth loop/s. Ensure that only the dedicated 'Earth' terminals on the PCBs are connected to earth. Remember that a Module's 0V rail 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 earth loops unavoidable, install LAN Isolator/s, Fibre Modem pairs or CLOE devices at suitable points in the LAN system to isolate sections of the LAN.
LAN B	LAN -ve or GND	> 0V DC < 5V DC	As above.

Electrical Specifications

Power Supply Type	Type A (EN50131-1)

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. 1.0 Amp. Slow Blow. M205 (20mm)
PCB AC Input Voltage:	16 to 18V AC. 50/60 Hertz.

Battery
(12V, Sealed
Lead Acid Type)
Charger Output Voltage:	13.75V DC -0.15/+.05 V
Battery Capacity:	Min; 6.5 to 7.2 AH Max; 18AH
	NOTE: If Plug Pack used, Battery capacity must not exceed 7.2 AH.
Battery Input Fuse:	5 Amperes.
Low Battery Voltage Alarm:	< 11V DC +/- 100mV
Deep Discharge protection:	Activates at 10.4 V +/-100mV. Restores at 12.4V +/-100mV.

Power Supply Output
LAN "POS" & DET+:	Output Voltage: 13.75V DC -0.15/+.05 V
Maximum Ripple:	At maximum ancillary load current: < 200mV P-P / 75mV RMS
Low DC Voltage Alarm:	< 11V DC +/- 100mV

Relay Contact Ratings.
AX1 / AX2:	30 V DC. 1 Amp maximum.
Watchdog output:	30 V DC. 200mA maximum. (Solid-state relay output) *See page 8.*

AC Source.	JP5 Setting	Total Current Limit	Static Controller Current	Battery Capacity	Max Ancillary Current
1.5A Plug Pack:	NOT shorted	1.3 Amp.	275mA	7 AH	700mA
3A or 4A Transfomer:	Shorted	2.2 Amp.	275mA	7 AH	1.2A
3A or 4A Transfomer:	Shorted	2.2 Amp.	275mA	18 AH	480mA

NOTES:
1) "Max Ancillary Current" is the maximum combined current allowed to be drawn from LAN "POS" and "DET+".
2) Battery re-charge times will depend on the remaining current available to the Battery after the "Static Controller Current", "Ancillary Current" and UART current (if fitted) are subtracted from the "Total Current Limit". To shorten Battery re-charge times, minimise the Ancillary current by using separate battery-backed Power Supplies for Detectors, Warning Devices, etc.
3) See data supplied with detectors and output devices for actual current consumption of items powered from the module.

Fuse Protection	Separate 2 Ampere replaceable fuses are provided for: LAN "POS" & "DET+".
Over-voltage Protection	Protection from over-voltage transients of up to 5 seconds is provided via the Battery and limits the Power Supply Output voltage to 16V DC. Longer term over-voltage conditions may result in damage to the on-board electronic components &/or the Battery. Further protection from higher voltage transients is provided by Epcos S07K14 Metal-Oxide Varistors fitted on all Power Supply outputs.

Mechanical Specifications

With Enclosure:
Dimensions:	Length: 464 mm. Width: 360 mm. Depth: 80 mm.
Weight:	8.2 k.g. (Includes mains transformer, 7AH battery and cover.)

PCB Only:
Dimensions:	Length: 200 mm. Width: 200 mm. Depth: 40 mm.

SD CARD.

Integriti Controllers are supplied with a 2GB Micro SD Card memory. This card is installed in the combined Smart Card/SD Card holder, CARD1. *See page 11 for location.*
This memory is used to store the Controller database and the Review Event log and must remain in place at all times.

In the event of Controller failure, if the Micro SD card is not damaged or corrupted, it may be installed in the replacement Controller.

SMART CARD.

The Smart Card is used to licence database expansion and additional features.

The Level One Smart Card can be purchased from your Integriti distributer. P/N: 996020L1.

Expansion Keys for upgrading to other Smart Card Levels and providing additional features such as Smartphone Interface, Lift HLI, SALTO Door integration, etc. are supplied online via Inner Range KeyPoint.
https://license.innerrange.com/

In the event of Controller failure, if the Smart Card is not damaged or corrupted, it may be installed in the replacement Controller.

Current Smart Card database expansion levels are shown in the following table.

Permission Level	Zones	Doors	Users	Review Events
No Smart Card	100	16	200	10,000
Level One	200	40	2,000	20,000
Level Two	600	80	10,000	30,000
Level Three	2,000	160	65,000	60,000
Level Four	3,000	240	100,000	100,000

NOTE: Modules. A Smart Card Level does not restrict the type or number of Modules that may communicate with an Integriti Security Controller. Up to 99 Modules of each type may be connected regardless of the Smart Card Level.
However, Zone and Door limits imposed by the Smart Card Level will determine the numbers of these entities allowed to be "in use" on Modules connected to a particular Integriti Security Controller.

DISCLAIMER

1. The manufacturer &/or it's agents take no responsibility for any damage, financial loss or injury caused to any equipment, property or persons resulting from the correct or incorrect use of the system or it's peripherals. The purchaser assumes all responsibility in the use of the system and it's peripherals.
2. While every effort has been made to ensure the accuracy of this manual, the manufacturer assumes no responsibility or liability for any errors or omissions. Due to ongoing development, this manual is subject to change without notice.