

Integrati/Infiniti Access Controller (IAC)

P/N: 996035 / 996040 / 996140

INSTALLATION MANUAL

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 IAC via an unshielded ethernet cable joiner , such as the one shown here, and short patch cable.



2) End-Of-Line Resistor Scheme Change.

The recommended EOL Resistor scheme for Integrati/Infiniti products is 2k2 / 2k2. Systems with Controller firmware V3.3.4 or later support both the 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. See “Zone Input Wiring” on page 5 for more information.

3) Choosing a Power Supply and Enclosure.

- a) The most suitable Inner Range Smart Power Supply/s and Battery/s for the IAC will be dependent on:
 - The number of UniBus Boards, Readers, Locks and other peripheral devices being powered.
 - The minimum Battery backup time required.
 - The maximum Battery recharge time required.

Ensure that the current required by all the devices connected to the Power Supply, plus the current allowed for battery charging, does not exceed the Power Supplies’ limits.

Note that dedicated Lock Power Supply Inputs are provided on the IAC and the UniBus 2-Door Expander so that a separate battery-backed power supply may be used for Lock power.

The list of recommended powered enclosures and power supplies is provided on Page 3.

- b) Powering an IAC from a 3rd Party Supply is NOT recommended. The Ancillary/3rd Party PSU Cable (P/N: 996794) or External PSU Bypass Link (P/N: 996795) combine the Module power, RDR+ & LAN+, which may allow a fault on one of these supplies to impact the other supplies. These cables should not be used on an IAC.

4) IAC Firmware.

Before upgrading IAC firmware, first ensure that the Integrati/Infiniti software is a Version that supports the latest features and options provided in the firmware. Note that a software version upgrade may incur a fee.

- Firmware for IAC Rev. D must be V20.0.0 or later, OR if a V16 to V19 Firmware Stream is maintained, the relevant version or later from the following: V16.0.9, V17.0.10, V18.2.1 or V19.1.8.
- Firmware for IAC Rev. A or Rev. B must be Version 4.3 or later.

5) Integrati/Infiniti Software Compatibility.

- The Integrati Access Controller is compatible with Integrati Software Version 4.3.6 or later.
- The Infiniti Access Controller is compatible with Infiniti Software Version 4 or later.

6) 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

IMPORTANT NOTES	1
PARTS LIST	2
OVERVIEW & FEATURES	3
ENCLOSURE & POWER SUPPLY	3
HARDWARE CAPACITY & EXPANSION	4
WIRING DIAGRAMS	5-7
<u>THE IAC PCB</u>	
Link Settings	7
Connector and LED details	8
Status & Fault LED indications and LCD Terminal Error Messages	9
Integriti Access Controller PCB layout	10-11
<u>RS485 LAN SYSTEM</u>	
Overview	12
Connecting Modules to the LAN	12-13
System Earthing	12
Cable Types	14
LAN System cabling	15
Troubleshooting Flowchart	16-17
LAN Voltage Testing	18
<u>MEMORY & LICENSING</u>	
SD Card	19
Smart Card	19
SOFTWARE CONNECTIONS	19
SPECIFICATIONS	20

Parts List

NOTE: This parts list is relevant to the “PCB&K” product variants. Other variants will have additional parts.

- IAC PCB assembly.
- Installation Manual. (This document)
- Relevant notices.
- Installation Kit containing:
 - 8 x Metal M3 PCB Mounting Clips.
 - 8 x M3x10mm screws.
 - 2 x 8 Way plug-on screw terminals.
 - 2 x 5 Way plug-on screw terminals.
 - 7 x 4 Way plug-on screw terminals.
 - 4 x 3 Way plug-on screw terminals.
 - 1 x 2 Way plug-on screw terminal.
 - 1 x Earth Cable. Chassis Earth to PCB.
 - 1 x 0.1” Jumper Links. (Spare)
 - 20 x 2k2 End-of-line resistors.
 - Up to 16 for Zone Inputs*. 4 Spare. (red-red-black-brown-brown)
 - 2 x 1N4004 protection diodes. (For connecting across lock strike)

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 & 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.

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Overview.

The IAC is an IP based Enterprise Access Controller that can be used to control and monitor:

Up to 8 fully intelligent local Doors via a combination of onboard I/O and in-cabinet UniBus expansion boards.

Up to 240 additional Doors via compatible Inner Range Access Modules connected to the RS-485 LAN.

Additional Inputs & Relays via compatible Inner Range Security I/O Modules connected to the RS-485 LAN.

The IAC supports two Doors and up to four Wiegand Readers on-board. An on-board RS485 Reader port also supports up to 16 SIFER Readers or compatible 3rd party OSDP Readers or up to 8 Aperio, Intego or Salto SALLIS locks.

NOTES: 1. Aperio, Salto and Intego require Smart Card Door Licences.

2. When a Serial Reader type is selected for a Reader, all other Serial Readers on the IAC must be of the same type.

Up to 3 UniBus 2-Door Expander boards may be connected to support up to 8 Doors. (Or up to 4 Doors if Wiegand Entry and Exit Readers are required)

The multi-controller architecture allows any number of IAC's and ISC's (Integriti Security Controllers) to be combined within the System Software to form a globally managed, small, medium or enterprise sized network where all controllers are managed as one single system.

Additional Features

- SkyTunnel Reporting on the Multipath-IP Network
- Multipath-IP reporting via direct connected Multipath-IP STU
- Dial Up or Multipath-IP reporting via Peer to Peer connection to an Integriti Security Controller.
- Advanced Peer-to-Peer Access Control functions. ("Advanced Peer-to-Peer" License required)

See page 4 for hardware features.

Enclosure and Power Supply.

The IAC is compatible with the following Inner Range Powered Enclosures:

995201PEI / 995201PEEU1	Medium Integriti Powered enclosure with Integriti 3Amp Smart PSU.
995203PEI / 995203PEEU1	Extra Large Integriti Powered enclosure with Integriti 3Amp Smart PSU.
995203PE8 / 995203PEEU8	Extra Large Integriti Powered enclosure with Integriti 8Amp Smart PSU.
995204PE8 / 995204PEEU8	Widebody Integriti Powered enclosure with Integriti 8Amp Smart PSU.
995204PE3 / 995204PEEU3	Widebody Integriti Powered enclosure with Integriti 3Amp Smart PSU.
995220PE8 / 995220PEEU8	Rackmount. 2RU 19 Inch Rack drawer with Integriti 8Amp Smart PSU.
995220PEI / 995220PEEU1	Rackmount. 2RU 19 Inch Rack drawer with Integriti 3Amp Smart PSU.
996154AUC5	Infiniti Class5 Powered Enclosure.

If installed in an unpowered enclosure, the IAC is compatible with the following Integriti Power Supplies:

996091PCB&K	Integriti 3Amp SMART PSU – PCB & Accessories.
996092	Integriti 8Amp (6.5A+1.5A) SMART PSU.

Product Variants.

At the time of publication, this installation manual is relevant to the following products:

- 996035PCB&K Integriti IAC.
- 996035EUPCB&K Integriti IAC for Europe.
- 996040PCB&K Infiniti IAC
- 996040M2 Infiniti IAC 2-Door Kit in Medium Enclosure with 3A Smart PSU
- 996040WB4 Infiniti IAC 4-Door Kit in Widebody Enclosure with 8A Smart PSU
- 996040WB6 Infiniti IAC 6-Door Kit in Widebody Enclosure with 8A Smart PSU
- 996040WB8 Infiniti IAC 8-Door Kit in Widebody Enclosure with 8A Smart PSU
- 996140PCB&K Infiniti Class 5 IAC
- 996140AUC5 Infiniti Class 5 Controller Kit in Widebody Enclosure with 8A Smart PSU, Encrypted Expander, ELM x4, & LCD Terminal.

Hardware Capacity and Expansion.

IAC PCB ONLY.

- 2 x Door lock relay outputs on-board.
- Dedicated Lock Power input. Allows Lock power to be sourced from a separate supply if required.
- 2 + 2 Wiegand Reader inputs on-board.
- Reader RS485 port for up to 16 Inner Range Sifer Readers or compatible OSDP readers; Or up to 8 APERIO, Intego or Salto “SALLIS” wireless locks. (Aperio, Salto and Intego require Smart Card Door Licences)
- Door Open Too Long (DOTL) warning relay outputs for each Door.
- Door monitoring inputs (Reed & Tongue) for each Door.
- Request to Exit (REX) & Request to Enter (REN) Inputs for each Door.
- “Valid” and “Invalid” Open Collector outputs for each Reader.
- Arm button inputs for each Reader.

EXPANSION - UNIBUS.

- NOTES:
- 1) A maximum of 6 UniBus Boards can be connected.
 - 2) UniBus Zone Expanders cannot be used on an IAC UniBus port.
 - 3) UniBus Relays can be used for general purpose outputs when mapped to X01 to X16, or if mapped to X17 to 32 will mimic the IAC Door Lock and DOTL outputs.

UniBus Type	Part Number	Provides (per UniBus board)	No. supported
2-Door Expander.	996535PCB&K	2 Wiegand Reader ports / 2 Door lock outputs.	3
UART Expander.	996520PCB&K	2 UART Ports.	4
8 Relay Expander.	996515PCB&K	8 Relays.	2
Lift Interface.	996540PCB&K	16 Floors.	6

EXPANSION - RS-485 SUB-LAN.

LAN Modules compatible with the IAC RS-485 Sub-LAN (Check Module installation manual for any IAC firmware limitations):

- NOTES.
- 1) * Optional SIFER Reader Add-on kit can be installed in these products.
 - 2) † Infiniti Class 5 Only.
 - 3) Some Concept Type 0, Type 1 & Early Type 2 Modules may not be compatible with the IAC.
 - 4) Concept LAN Modules are not compatible with Class 5 IAC or when Encrypted LAN is enabled.

INTEGRITI PLATFORM LAN MODULES

Integrati EliteX Terminal *

Integrati PrismaX Terminal *

Integrati Graphic Terminal (Prisma) *

Integrati 2 Door LAN Access Modules (SLAM)

Integrati ILAM (with Unibus expansion)

Integrati 8-Zone LAN Expander (with Unibus expansion)

Inner Range LAN Ethernet Bridge

Infiniti Class 5 Encrypted Expander †

Infiniti Class 5 EliteX Terminal † *

Infiniti Class 5 PrismaX Terminal † *

Infiniti Class 5 Prisma Terminal † *

Infiniti Class 5 Prisma-SIFER Terminal †

Infiniti Class 5 Elite LCD Terminal †

LEGACY CONCEPT LAN MODULES

Concept Elite LCD Terminal

Concept 2 Door Access Modules (Std & Cached)

Concept 1 Door Access Modules

Concept IFDAM

Concept I2DAM

Concept Universal Expanders

Concept Mini Expanders

Concept Hi-O / Aperio Interface Module

Concept Weatherproof Keypads (Terminals)

Concept RF Expanders

Concept Analogue Module

Concept Terminal Emulator

Concept LAN Power Supply

Installation and Safety Instructions.

1. Installation environment must be indoors and should be maintained at a temperature of 0° to 49° Celsius (32° to 120° F) and 15% to 85% Relative humidity (non-condensing)
2. The IAC is housed in a suitable Inner Range metal enclosure or other approved enclosure with appropriate tamper detection.

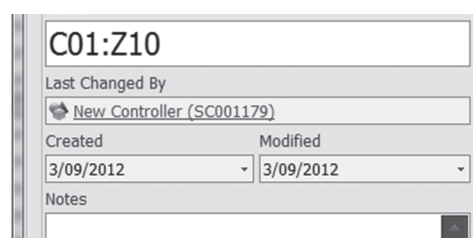
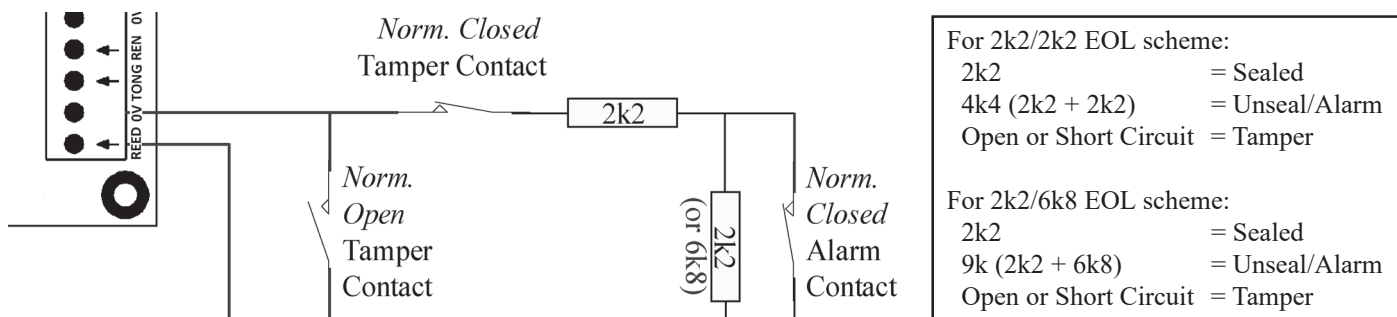
For full physical installation and power supply details, refer to the Installation Manuals provided with the Enclosure and Power Supply chosen for each IAC installation.

Wiring Diagrams

ZONE INPUT WIRING - Reed and Tongue Sense Inputs. - REX and REN Inputs if “Override EOL” option is Disabled (default).

The End-of-line 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:

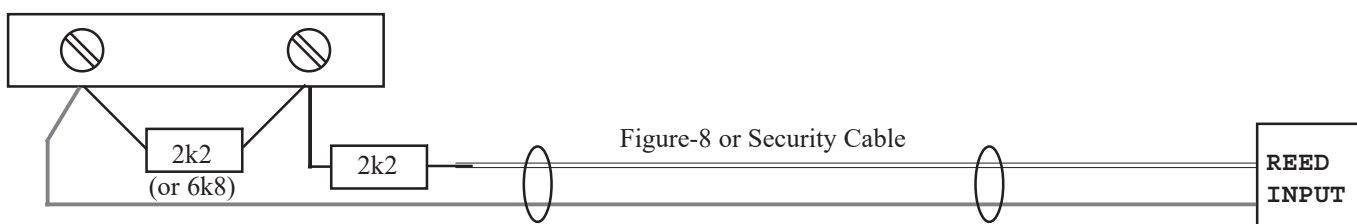
Schematic diagram



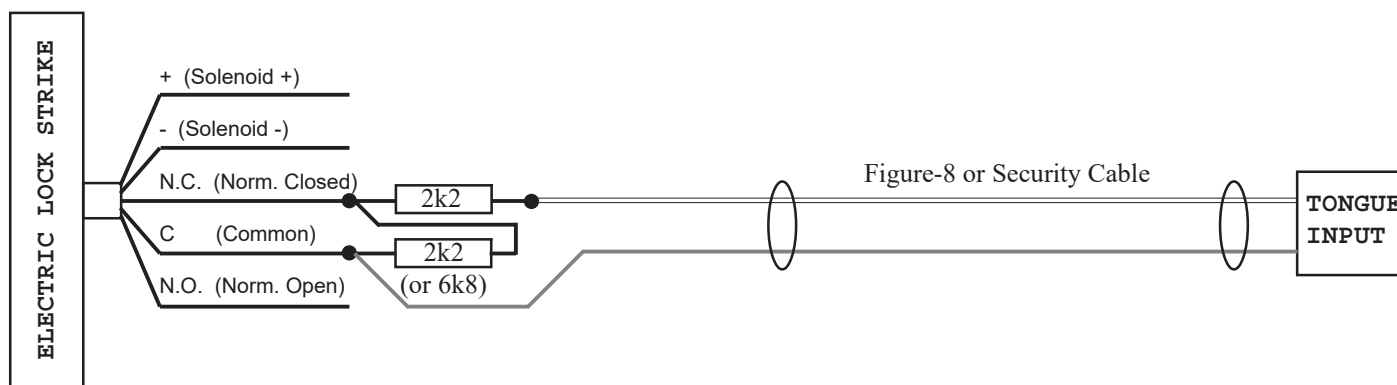
Options	
Summary Zone	<input checked="" type="checkbox"/>
Ignore Physical Input	<input type="checkbox"/>
Swap Alarm and Seal	<input type="checkbox"/>
No test on exit	<input type="checkbox"/>
Auto-Isolate on exit	<input type="checkbox"/>
Zone Self Test Enabled	<input checked="" type="checkbox"/>
No Review	<input type="checkbox"/>
Isolate All Only	<input type="checkbox"/>

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. Reed Switch



Example. Lock Strike Tongue Sense output.

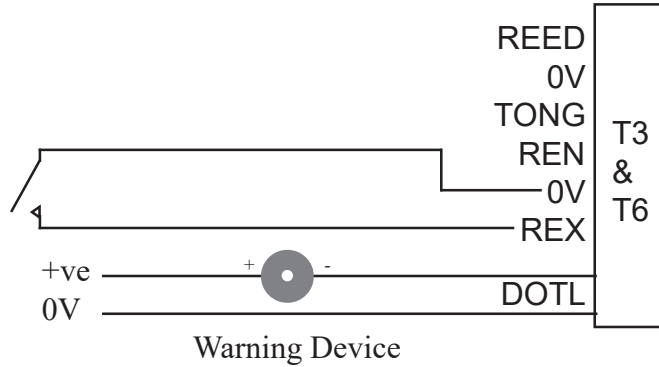


Note that the flying leads or connector terminals on the lock strike may be arranged and labelled differently to the examples shown above. Please check the manufacturers documentation.

BUTTON WIRING - REX and REN Inputs if “Override EOL” option is Enabled.
DOTL WIRING

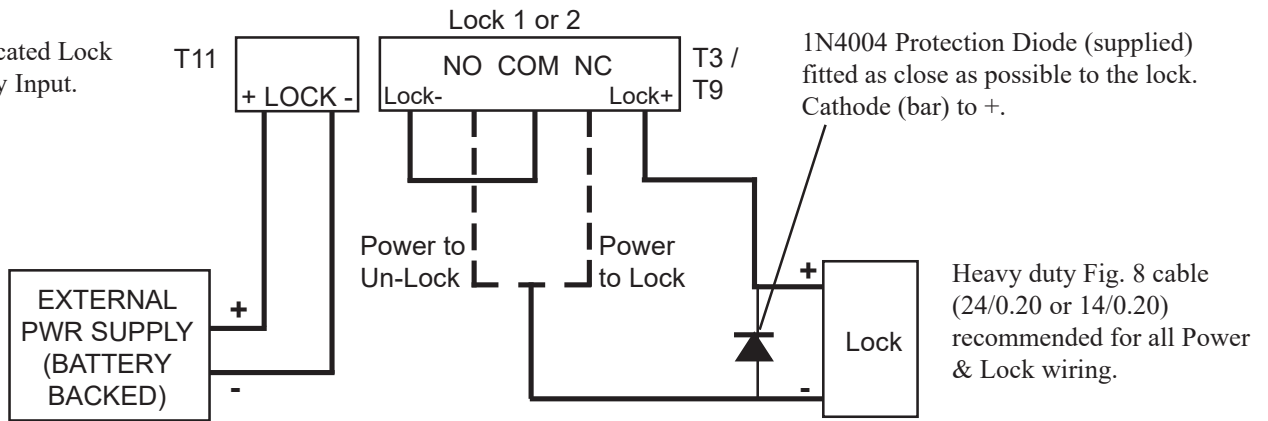
Normally Open Button contact. - ARM button.
 - REX & REN if “Override EOL” Enabled)

Normally Open DOTL Relay output.



LOCK WIRING

T11 is a dedicated Lock Power Supply Input.



Lock Relay Auxiliary Numbers. IAC on-board Locks: Lock 1 Ixx:X01 Lock 2 Ixx:X02
 UniBus 2-Door Expander 1: Lock 1 Ixx:X03 Lock 2 Ixx:X04 etc.

READER WIRING. T5, T6, T12 & T13. (Wiegand / Clock & Data)

Always refer to Reader Installation guides to check wiring details. Readers connected to T5, T6, T12 or T13 must be wired with Shielded Data cable. DO NOT use twisted pairs!

Reader power and data connections are wired according to the following table.

READER	D0 R#	D1 R#	+VE	GND
Omron Swipe	Brown (Data)	Red (Clock)	Yellow	Green
IR Secure40 Prox Reader	Green	White	Red	Black/Shield
HID/Indala with flying leads	Green	White	Red	Black/Shield
HID with screw terminals	Data 0	Data 1	+VE	GND

The LED control wires provided on many Readers can normally be wired directly to the VALID / INVALID outputs on the Reader Module if required. (The dropping resistor is usually built in to the reader) Check information supplied with the Reader for LED control details before connecting.

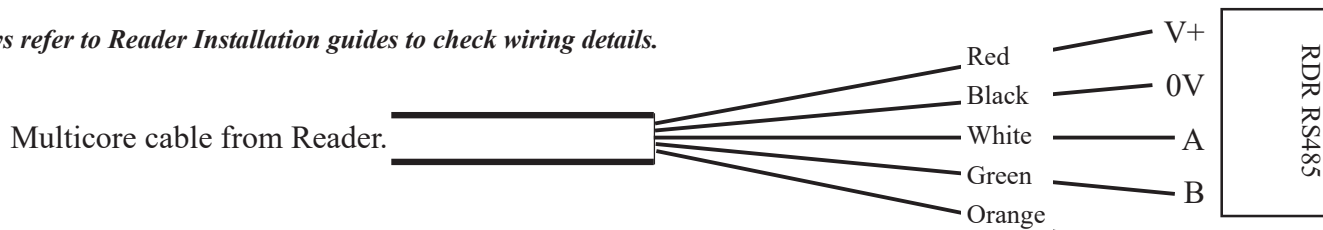
If +VR is used to power external LEDs or dropping resistors are not provided in the Reader, connect a 1.2kOhm resistor between +VR & the LED Anode.

READER WIRING T7. (RS485)

T7 is provided for connecting Inner Range SIFER Smart Card Readers, compatible 3rd Party OSDP Readers or a wireless lock system.

NOTE: Other RS485 devices such as LAN Isolators & Fibre Modems must not be connected to this port.

Always refer to Reader Installation guides to check wiring details.



To extend the length of the Reader pigtail cable, twisted pair cable must be used as follows:

Pair 1. Data A and Data B

Pair 2. V+ and 0V.

See page 14 for examples of suitable Twisted Pair Cable.

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 “STATUS AND FAULT LEDs” table on page 9 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.

LK5/6/ LK 5, 6, 7 & 10 are used to set the Reader supply voltage.

LK7/10 See Table below for details.

LK11/12 Factory Only.

READER LINK SETTINGS

READER	LK5 / LK6 / LK7 / LK10
Omron Magnetic Swipe	5V
Inner Range Secure40 Prox Reader	12V
HID ProxPoint / MiniProx / ThinLine / iClass R10 / R15 / R30 / R40	5V
HID Swipe / Insertion / Turnstile Wiegand Card Readers	5V
HID ProxPro. HID iClass R90 / RKL55	12V
Indala. SlimLine(Mullion) / WallSwitch / PinProx / ValueProx	5V
Indala. Standard / Mid Range 610 / MasterProx / Long Range 620	12V

NOTE: It is recommended that Readers with wide supply voltage ranges (e.g. 4V to 14V, 5V to 16V, etc.) are powered with 5V unless 12V is required for a longer read range.

TERMINALS. See pages 10 & 11 for location.

T1	Tamper Switch Input. (Tamper switch supplied with Integriti enclosures). No End-of-line resistors necessary. Watchdog: 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.
T3	Lock 1 Power and Relay output. See drawings on page 6.
T4	Door 1 Inputs and DOTL Relay. See drawings on pages 5 & 6.
T5	Reader 1 Input & Output connections . See page 6 for details.
T6	Reader 2 Input & Output connections . See page 6 for details.
T7	Reader RS485 connections . See page 7 for details.
T8	LAN connections. See “LAN SYSTEM” details beginning on page 12 for details.
T9	Lock 2 Power and Relay output. See drawings on page 6.
T10	Door 2 Inputs and DOTL Relay. See drawings on pages 5 & 6.
T11	Lock Power Supply Input. See Lock Wiring on page 6.
T12	Reader 3 Input & Output connections . See page 6 for details.
T13	Reader 4 Input & Output connections . See page 6 for details.
T16	EARTH Connection. Connect to chassis earth using supplied cable.

HEADER PLUGS. See pages 10 & 11 for location.

P1	Port 0. <u>TEMPORARY</u> PC connection for Upload/Download using the “Port 0 Interface cable” (993030).
P2	External Power. From Integriti Smart Power Supply (cable supplied with PS). See Important Note 3b on Page 1.
P3	UniBus Port. Local “UniBus” for UART, Door Expansion, Low-level Lift interface and Auxiliary expansion. A UniBus UART Board and appropriate cable/s must be fitted if a Printer, RS232 PC connection, GSM modem, External modem or Securitel Interface 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	JTAG. Factory Only.
P6	Ancilliary 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 Important Note 1b on Page 1.
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. Allows connection to Management Software PC via USB.

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

Fault 1/Fault 2	See “STATUS AND FAULT LEDs” table on page 9.	L14	FLASH	See “UNIBUS LED” table on p9.
Prompt	See “FAULT LEDs” and “LINKS” tables.	L15	ON	13.8V Supply OK.
Status1/Status2	See “STATUS AND FAULT LEDs” table on page 9.	L16	ON	Short cct. on Reader 3 power (+VR/0V).
L6	ON Port 0. Receive Data	L24	ON	3.3V Supply OK.
L7	ON Port 0. Transmit Data	L25		Ethernet. ON =100M. OFF =10M.
L9	Reader RS485 Receive Data.	L26	FLASH	Ethernet Link active.
L10	Reader RS485 Transmit Data.	L27		USB-P Status.
L11	ON Short cct. on Reader 4 power (+VR/0V).	L29		USB-H Status.
L12	ON RS485 LAN Receive Data.	L33	FLASH	D0. Data received on Reader D0.
L13	ON RS485 LAN Transmit Data.	L34	FLASH	D1. Data received on Reader D1.
		L45	ON	Short cct. on Reader 1 power (+VR/0V).
		L48	ON	Short cct. on Reader 2 power (+VR/0V).

STATUS AND FAULT LEDs. *See page 10 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. *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. (Not communicating with the Controller)

ON OFF Too many modules on Network for Control Module Permission Level. Check limits and licencing.

OFF ON Module type unknown. Module type not supported or Controller firmware upgrade required.

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 or check limits and licencing.

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.

THE IAC PCB - CONNECTOR, LINK & LAMP

P11 / L29 - USB-H

USB socket and Status Lamp for USB peripherals. See Page 11.

CARD1 SIM

SmartCard Holder. See Page 20.

Fault / Prompt / Status Lamps.

See Pages 12 & 13.

P3 / L14 - UniBus.

UniBus Connector and Status Lamp. Local "UniBus" for UART, Door expansion, etc. See Page 11.

T1 - TAMP / WDOG

Cabinet Tamper input & Watchdog output. See Page 11.

LK10 - 5V / 12V

Reader 3 Power Supply selection. See Page 10.

T12 - READER 3

Reader and Arm button connections. See "Reader Wiring" on Page 9.

IN1 / IN2 / IN3 / OK

Default/Initialization Links. See Page 10.

L9/L10 - RDR RX/TX

RS485 Reader Data indication. See Page 12.

T7 - RDR RS485

See Page 10 and refer to the relevant SIFER or RS485 Reader installation guide.

LK12 - Factory Only

T11 - +LOCK-

External Power Supply Lock Power Input. See Page 9.

T3 - LOCK 1. Lock Relay connections.

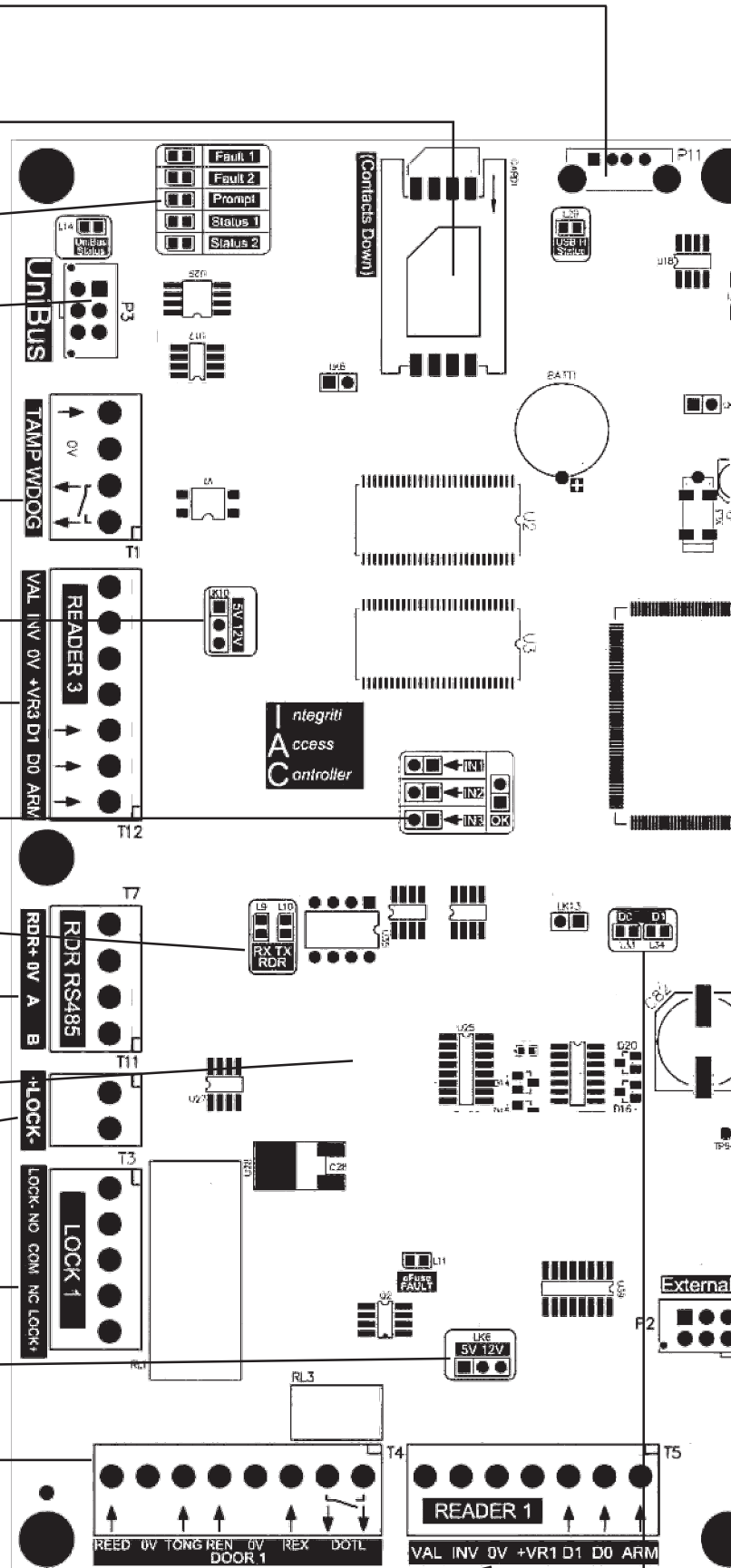
See Page 9 (Lock Wiring) & Page 3 (Electrical Specs)

LK6 - 5V / 12V

Reader 1 Power Supply selection. See Page 10.

T4 - DOOR 1

Door 1 Input / Output connections. See "Zone Input, Button & DOTL wiring" on p8 & 9.

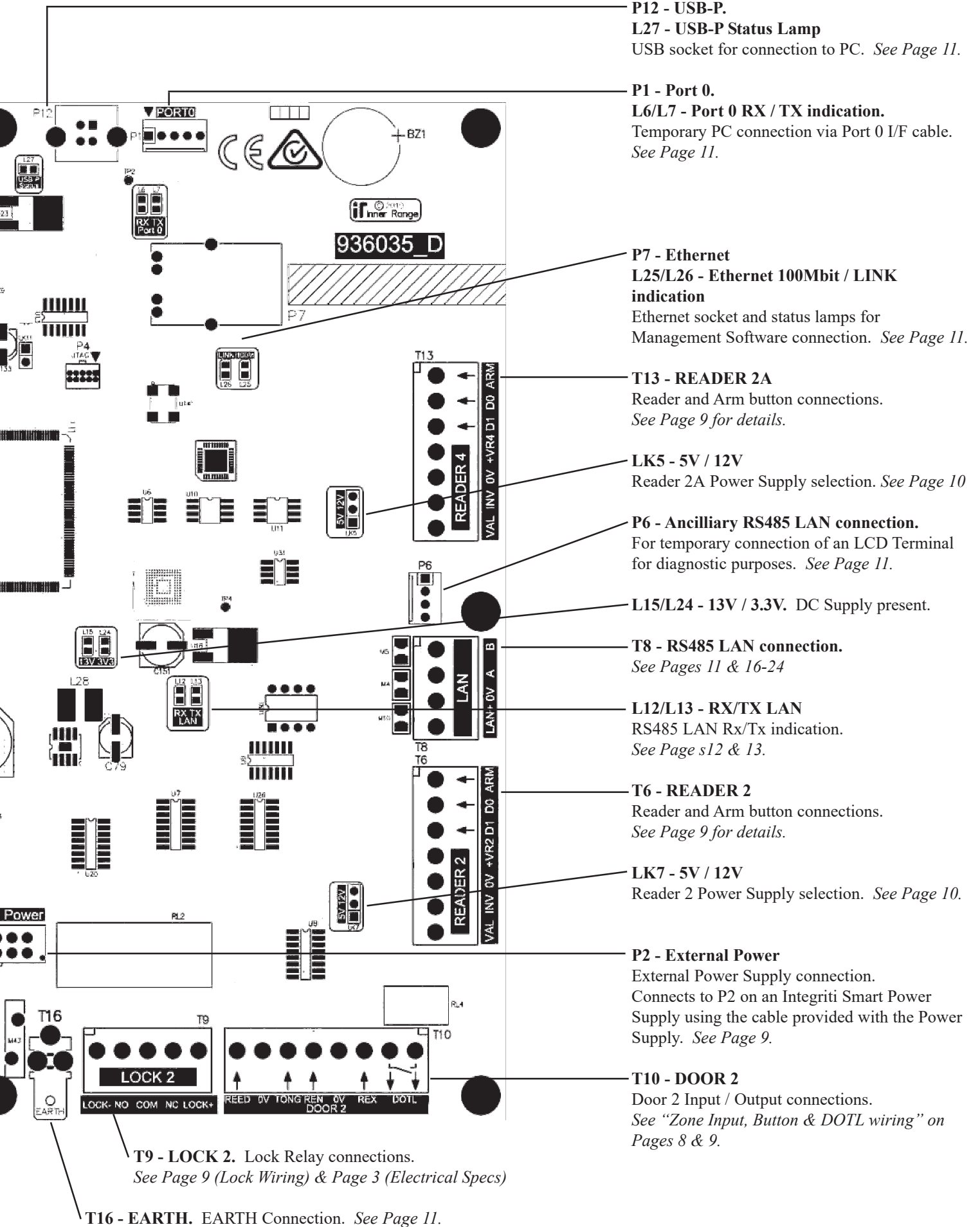


T5 - READER 1

Reader and Arm button connections. See Page 9.

L33 / L34 - D0 / D1. Reader Data indication.

AND INDICATOR LAMP LOCATIONS



RS485 LAN SYSTEM

The Integriti/Infiniti 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, LAN Modules can be installed hundreds of metres from the Controller.

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. **##**
See “Cable Types” details on page 14.
The “NEG” connection (0V reference) must also be wired to every module. **##**.
- 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. **##**
- 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. **##**
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. **##**
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. **##**

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.
- 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.

Connecting Modules to the LAN.

CONTROL
MODULE

- IAC
- ISC

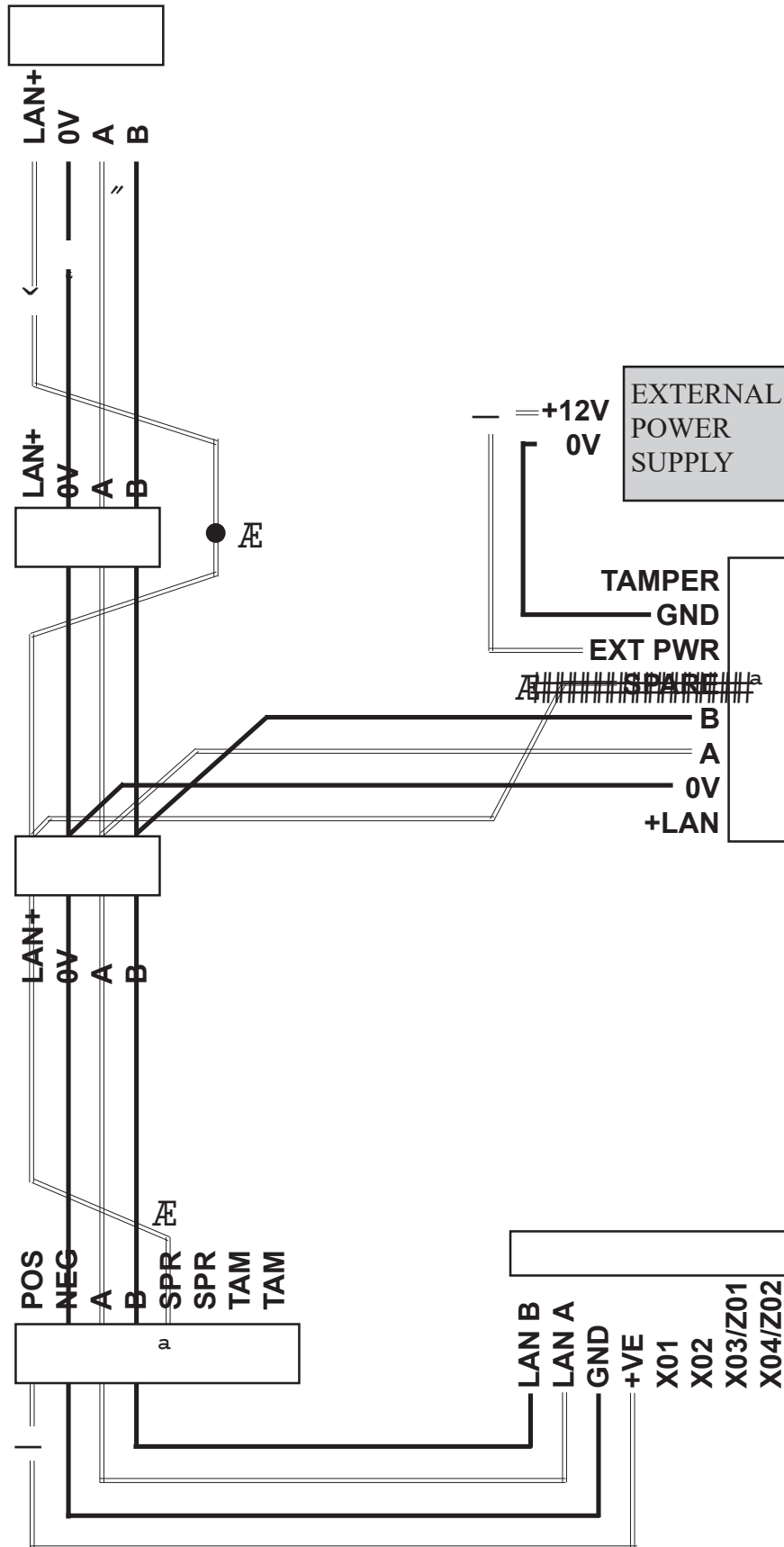
MODULE WITH
LOCAL POWER
SUPPLY.

- LAN “+ve”
bypasses Module.

MODULE
POWERED FROM
THE LAN.

LEGACY
CONCEPT 3/4000
UNIV. EXPANDER
MODULE

- LAN +ve wired to
“SPR” (Spare).
- “POS” used as
LAN +ve supply
source.



LEGACY
CONCEPT 3/
4000 2-DOOR
ACCESS
MODULE

- Powered
from external
Power Supply
(LAN “+ve”
connected to
“SPARE”)

ELITE LCD
TERMINAL

CABLE TYPES

- **TWISTED PAIR Cable MUST be used** to connect the RS485 LAN and is also used for the RS485 Reader Port. 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.

Olex JCAT5E
 Tycab TIC6105 †
 Tycab DPZ81051
 Alpha 1317C
 Belden 9744
 DCS CM-CAT5E
 Garland UTPL5E
 Garland UTPL5EMTP ‡

Shielded (All Multistrand) Figure 2.

Olex JD2PS485A3
 Tycab DPF4702
 Tycab DCK4702
 Alpha 2466C * / 6413
 Electra EAS7202P / 7302P
 General Cable B2002CS
 Belden 8723 * / 9842
 Tycab DQQ47025 *
 Garland MCP-2S
 Roadworx RW600224
 Electra EAS16202P

Legend:
† 3 Pair.
‡ Multistrand (7/0.2).
* Individually 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. “###” 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.

- **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)		
	<u>Twisted pair</u>	<u>Fig 8. 14 / 0.20</u>	<u>Fig 8. 24 / 0.20</u>
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 external devices connected to Modules that are powered via the LAN. e.g. Relays, Detectors, Auxiliaries, Readers, etc. **NOTE:** Lock strikes must not be powered from LAN power.

Relay Coil (1A relay)	approx. 25mA	Small Proximity reader (~10cm read range)	~50 to 120mA
Relay Coil (5A relay)	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.

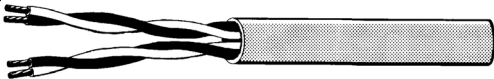


Figure 2. Shielded, twisted pair communications cable

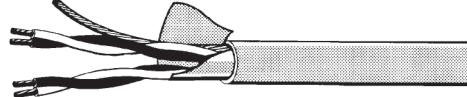


Figure 3.

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. “ ” It is very important to ensure that the shield makes no contact with 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.
 - (LAN Isolator/s can be used to extend the cabling distance. CLOE devices can be used to link LAN sections via Ethernet)
- **TOTAL LAN CABLING** in a system without LAN Isolators should not exceed 2000 metres, and/or 64 Modules.
 - 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.

LAN TERMINATION *Figure 4 & Figure 5.*

- The RS485 LAN is self-terminating and Integriti/Infiniti Modules do not have a “Termination” setting.
- Any Concept 3000/4000 Modules used in an Integriti/Infiniti 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 IAC and any Integriti/Infiniti Modules by a LAN Isolator or CLOE Slave, termination links may be fitted as per Concept 3000/4000 LAN Termination instructions. ^a e.g. Termination on isolated Concept 4000 Modules is indicated with a “T” on Fig. 5 below.

Figure 4. Simple LAN configuration.

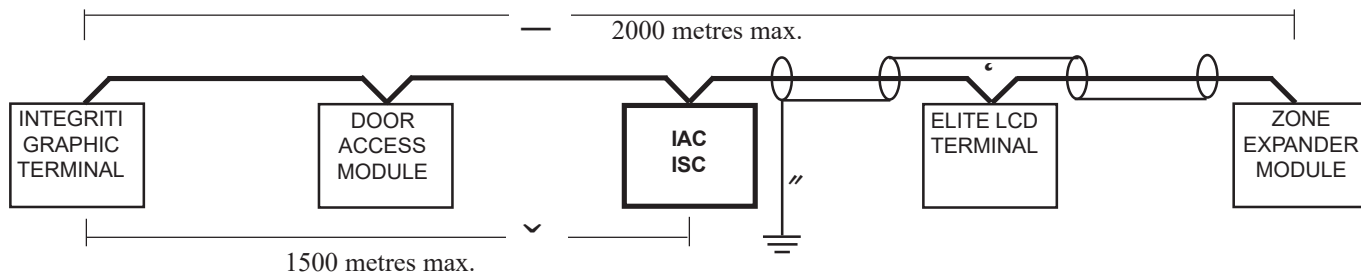
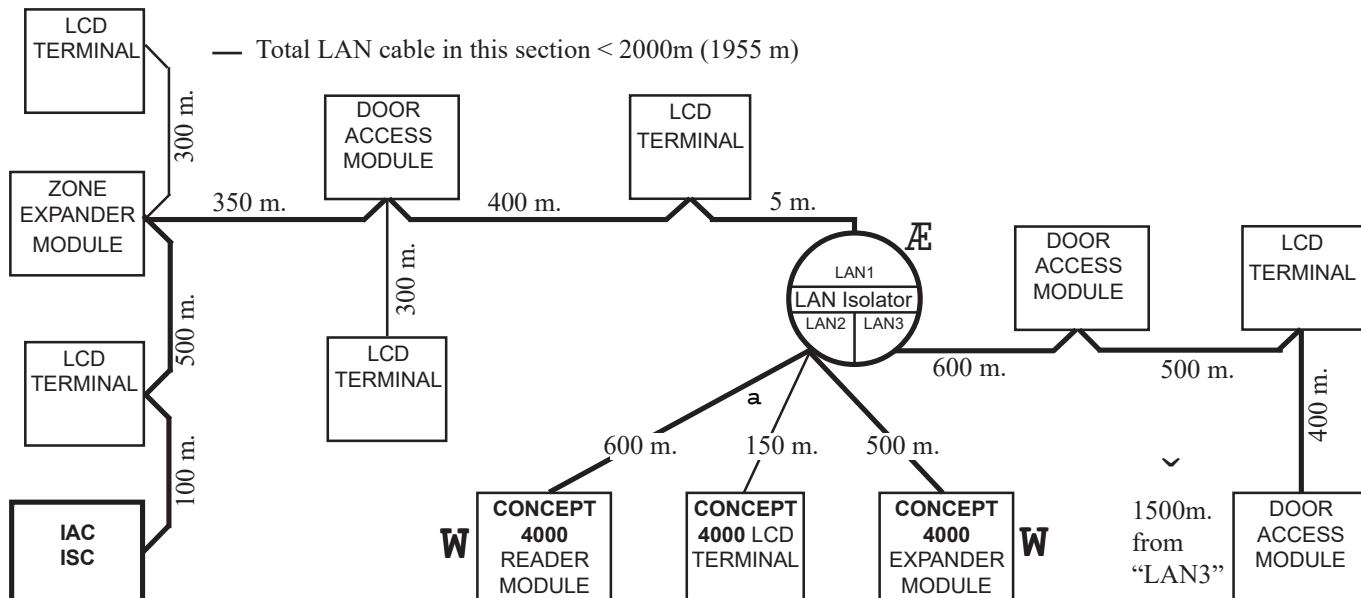


Figure 5. Complex LAN configuration.



RS485 LAN TROUBLESHOOTING FLOWCHART

BEFORE SYSTEM POWER UP

(No Power connected to modules
AND No batteries connected)

A1. WHERE POSSIBLE, PHYSICALLY CHECK:

- 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. 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 LAN TERMINATION

(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. 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 Status & 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 DC between LAN +VE & LAN -VE (GND) on the problem module. See Note 2.

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.



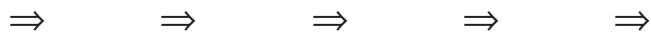
A8. TEST LAN VOLTAGES AT PROBLEM MODULE/S

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



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 18.

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

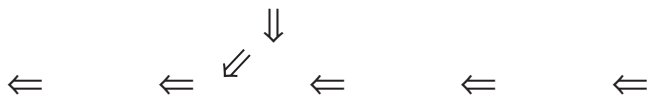


C2. ISOLATE PROBLEM CABLING OR MODULE/S

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 Recovered” or “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 occurred.

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. 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.

2. 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 LAN contains ONLY legacy Concept 3000/4000 Modules, AND is isolated from the IAC/ISC and any Integriti/Infiniti 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.

Memory and Licensing

SD CARD.

IACs and ISCs are supplied with a 2GB Micro SD Card memory. This card is installed in the combined Smart Card/SD Card holder, CARD1. *See page 10 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 IAC.

SMART CARD.

The IAC is shipped from the factory with a Smart Card already fitted.

The Smart Card is used to enable database expansion and additional features by storing the License Keys for the required expansion level and features.

License Keys for upgrading to other Smart Card Expansion Levels and providing additional features such as Smartphone Interface, Lift HLI, Automation HLIs, 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. Replacement Blank Smart Cards for IAC are also available. P/N: 996020.

The IAC is shipped from the factory with the 'IAC Level 0' Smart Card licence, providing 16 Doors, 100 Zones, 10,000 Users and 30,000 Review Events.

NOTE: Prior to 11th April 2017, the IAC was shipped from the factory with a blank Smart Card providing 16 Doors, 100 Zones, 200 Users and 10,000 Review Events.

Current Smart Card database expansion levels for Integriti Access Controllers are provided in the 'Controller Operating Levels' page on the Inner Range Website.

<http://www.innerrange.com/pd/Integriti-System/Integriti-Controllers/Integriti-Access-Controller#IAC-Operating-Levels>

Contact Inner Range if Smart Card level information is required for Infiniti Access Controllers.

NOTE: Modules. A Smart Card Level does not restrict the type or number of Modules that may communicate with an IAC or ISC. 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 IAC or ISC.

Software Connections

Integriti Professional.

- At present, Integriti Professional software requires an "Allow Licensed IAC Connections" licence. An extra Controller license is also required per IAC.

Integriti Express.

- Integriti Express only allows 1 Integriti Controller connection. The connection may be an ISC or an IAC. Note that if an IAC is connected, an ISC cannot be connected.

Integriti CS (For Installer System Commissioning use only).

- Connection of CS to an IAC via USB or Serial is without restriction. Each IAC is treated as a standalone system when connecting via CS.
- Connection via IP or PSTN is restricted without a valid "Allow CS Remote Connection" Smart card license (996029). This applies to all Integriti & Infiniti Controllers with the exception of Integriti IAC/ISC Level 0. *See Smart Card Permission levels above.*

Specifications.

Electrical Specifications

Power Supply Input	13.75 V DC from Integriti Smart Power Supply.		
Low DC Voltage Alarm:	<11VDC +/-100mV		
IAC Current Consumption.	Idle:	150mA.	
	With both on-board lock relays active:	220mA (35mA per Relay)	
	Add 15mA for each active DOTL Relay.		
	(DOES NOT include current drawn by peripheral devices. e.g. Readers, Locks, Detectors, etc.)		
Power Supply Outputs.			
*LAN+:	13.75V DC -0.15/+0.05 V. 3A maximum depending on choice of power supply †		
*RDR RS485+:	13.75V DC -0.15/+0.05 V. 3A maximum depending on choice of power supply †		
Reader +VR1/+VR2: (Selectable)	5VDC.	5V DC -0/+0.5V. 300mA maximum per Reader. <i>See "Typical Reader Current" below.</i>	
		1A maximum for all Readers, including those connected to UniBus boards.	
	*12VDC.	13.75V DC -0.15/+0.05 V. 300mA maximum per Reader. <i>See "Typical Reader Current" below.</i>	
USB-H:	5V / 100mA † (USB 2.0, 1 unit load)		
* NOTE: Devices powered from these outputs must be rated to operate with a power supply of up to 14 VDC.			
† Maximum Total Ancillary Current including UniBus device O/Ps. (LAN+, RDR RS485+, DET+, UniBus, & USB-H combined)			
3A Smart PSU:	2.2A		
8A Smart PSU:	6A		
NOTE: See 'Standby Power' below.			
Typical Reader Current: (General approximations)	Allow 50 to 120mA for small Proximity Reader (~10cm range)	Allow 120 to 180mA for standard Proximity Reader (~15cm range)	
	<i>See information supplied with Reader for actual current consumption.</i>		
Fuse Protection:	Separate electronic fuses are provided via the Integriti Smart Power Supply for "LAN+" & "DET+" and onboard for "Reader +VR" and "USB-H". <i>Refer to Power Supply Installation Manuals.</i>		
Battery Backup:	Via Integriti Smart Power Supply. <i>Refer to Power Supply Installation Manuals.</i>		
Standby Power:	Maximum Total Ancillary Current = 1.5A: 4 Hours (7AH SLA Battery)		
Relay Contact Ratings.	Lock Relays:	30 V DC. 1 Amp maximum.	
	DOTL Relays:	30 V DC. 1 Amp maximum.	
	Watchdog output:	30 V DC. 200mA maximum. (Solid-state relay output) <i>See page 8.</i>	

NOTES:

- Battery re-charge times will depend on the remaining current available to the Battery after the current required by all the devices powered by the Power Supply is subtracted from the Power Supply's "Total Current Limit".
(i.e. The current required by the IAC motherboard, UniBus boards, Readers and any other Modules or peripheral devices) To shorten Battery re-charge times, minimise the Ancillary current by using separate battery-backed Power Supplies for Locks, Warning Devices, etc. The following table provides a guide for achieving full battery recharge within 24 hours.

<u>Total Current Limit</u>	<u>Static Controller Current</u>	<u>Battery Capacity</u>	<u>Max Total Ancillary Current</u>
2.2 Amp.	250mA	7 Ah	1.2A
- See data supplied with Readers, Locks, Detectors, etc. for actual current consumption of 3rd party items.
- Over-voltage Protection. Protection from over-voltage transients of up to 5 seconds is provided via the Smart Power Supply 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

PCB Dimensions: Length: 200 mm. Width: 200 mm. Depth: 30 mm.