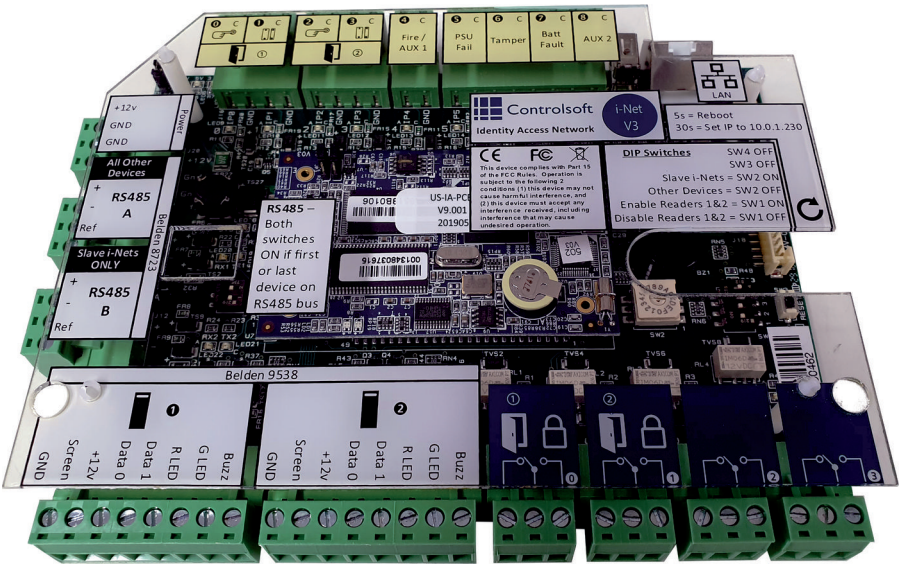
Installation Instructions

i-Net™ PLUS
UL Certified
Access Control Unit

Part Codes: US-IA-PCB
US-IA-ACB
US-IA-ACU
US-IA-KIT



This device is configured for DHCP.

Identity Access software will find this device, go to "Setup" and "Controller", then click the magnifying glass icon. Once found, the controller can be identified by its MAC Address.
For reliability, you MUST subsequently assign a Static IP Address using the i-Net Configurator tool.

controlsoft®

Contents

Introduction

The i-Net PLUS Intelligent Access Control Unit from Controlsoft® provides a single board solution for one or two doors, which is expandable through the use of additional i-Net controllers up to 32 doors and beyond. The i-Net PLUS is compatible with Controlsoft's Identity Access software.

The product is available in 4 versions:
US-IA-PCB: i-Net PLUS controller, PCB only
US-IA-ACB: i-Net PLUS controller in a metal box
US-IA-ACU: i-Net PLUS controller in a large metal box with 4A power supply
US-IA-KIT: US-IA-ACU bundled with one HID R10E UL Approved Reader

For further information on product part numbers, please refer to the Controlsoft Product Reference Guide available to download from www.controlsoft.com

Cable Specification

For RS485 connections between i-Net controllers we recommend using **Belden 8723** or equivalent. This is a 2 **twisted pair cable** (22AWG), with each pair screened. **Do not** use twisted pair CAT5 or CAT6 cables for RS485 connections.
Note: the RS485 '+' and '–' connections must be run on either side of the same twisted pair (e.g. Green and White), with a separate core (e.g. Black) used for the REF connection.

From the i-Net controller to Wiegand readers we recommend using **Belden 9538 or 5506FE** (or equivalent). This is an **untwisted 8 core cable** (24AWG) with an overall screen. **Do not** use twisted pair CAT5 or CAT6 cables to connect readers to the i-Net controller.
The maximum length of the Wiegand reader cable is 262ft (80m) but if this distance exceeds 81ft (25m) we recommend using a local power supply for the reader.

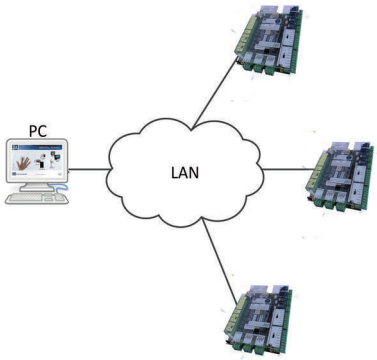
Between the i-Net Controller and Exit Buttons we recommend 22 AWG or thicker gauge alarm cable. We recommend cables with spare cores in case a core breaks. **Do not** use CAT5 or CAT6 cables to connect exit buttons.

Between the i-Net Controller and Locks we recommend 18 AWG or thicker gauge alarm cable. We recommend cables with spare cores in case a core breaks. **Do not** use CAT5 or CAT6 cables to connect locks.

NOTE: Wiring between the i-Net controller and other devices must not exceed 98.5ft (30m)

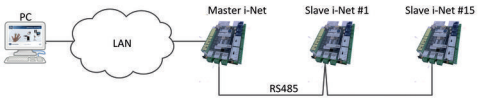
Example Configurations

Standalone i-Net Controllers
Each i-Net Controller has its own IP connection/address, and controls 2 doors (or 1 door with in/out readers). Communication to the PC is over the TCP/IP network.



NOTE: The i-Net will continue to operate in "stand alone" mode if the PC is shut down or disconnected. Any events that subsequently occur are stored in the i-Net and are automatically sent to the Identity Access software when it is back on-line.

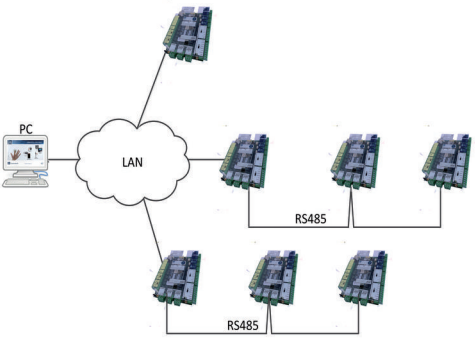
i-Net to i-Net
The Master i-Net Controller is connected to the PC via TCP/IP. Additional Slave i-Net Controllers are daisy-chained on the RS485 Port B data line, up to a maximum of 15.



These Slave i-Nets have fully distributed intelligence, so they continue to operate even if the RS485 data line is broken. When the RS485 data line is restored, the Slave i-Nets transfer events to the Master i-Net which forwards them to the Identity Access Server software.

The RS485 bus must be wired in a daisy-chain topology as shown above and not a STAR topology. **NEVER** wire additional i-Net Controllers on a 'spur' to create a third end.

For maximum flexibility, the system can be wired as a combination of the above techniques, allowing system expansion for more than 32 doors



For UL Compliance, the Ethernet connection was not used other than for programming

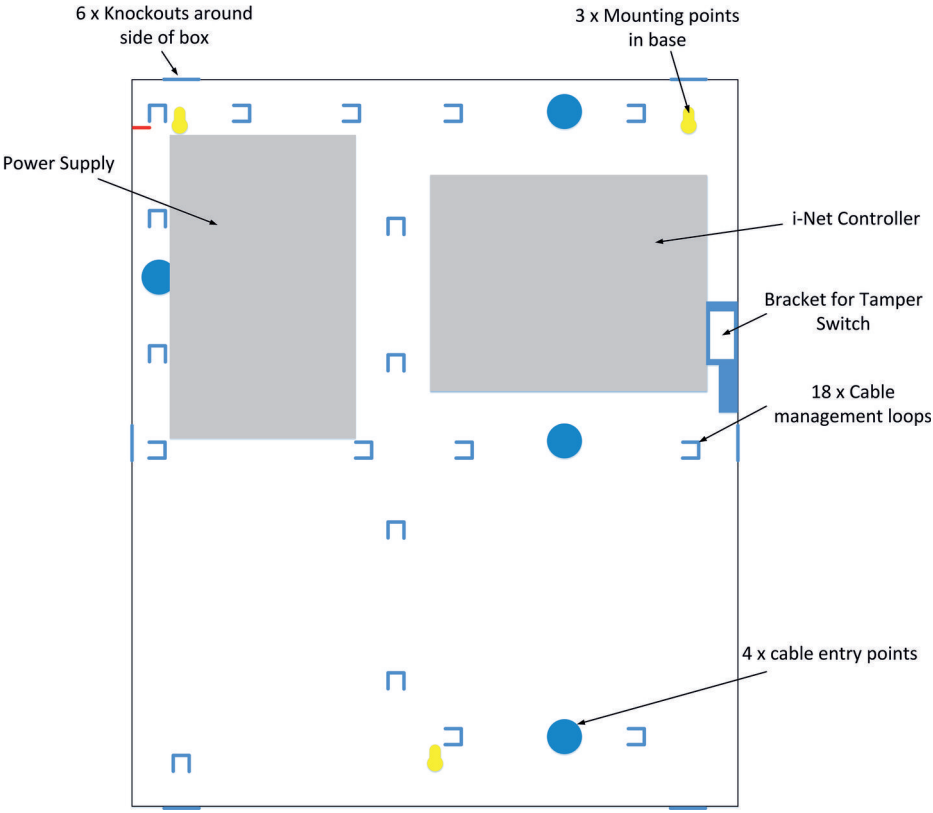
Step 1: Fit the Box to the Wall

NOTE: This product is for Indoor use only.

If necessary, remove knockouts as required and fit 7/8" grommets or glands.

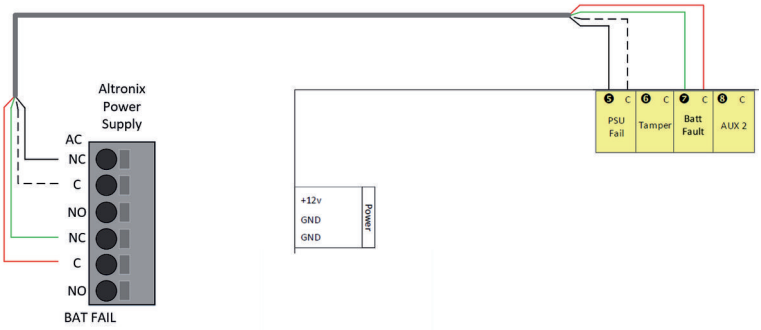
Using the base as a template, mark the wall and drill the required mounting and cable entry holes. Fit wall plugs in the mounting holes and fit the housing to the wall. A Tamper switch is fitted to the metal box to detect when the lid is open, ensure that this is wired to the "Tamper" input on the PCB

Box Layout: US-IA-ACU

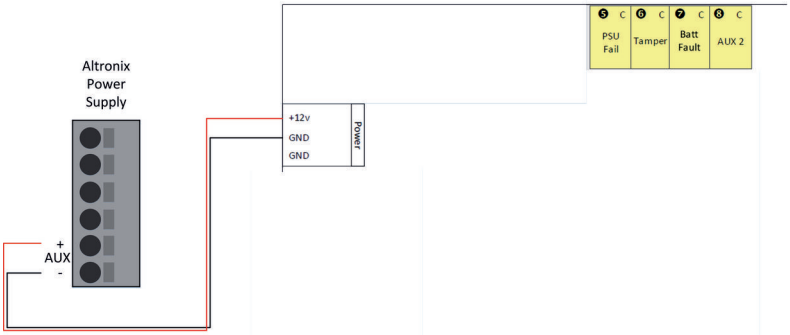


Always run cables along the line of the cable management loops. When complete, loop a cable tie behind the cable management loop and around the cables then tighten to secure the cables.

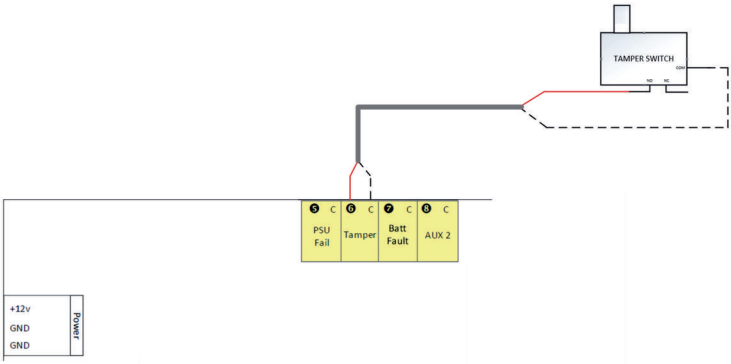
PSU Monitor Wiring (US-IA-ACU)



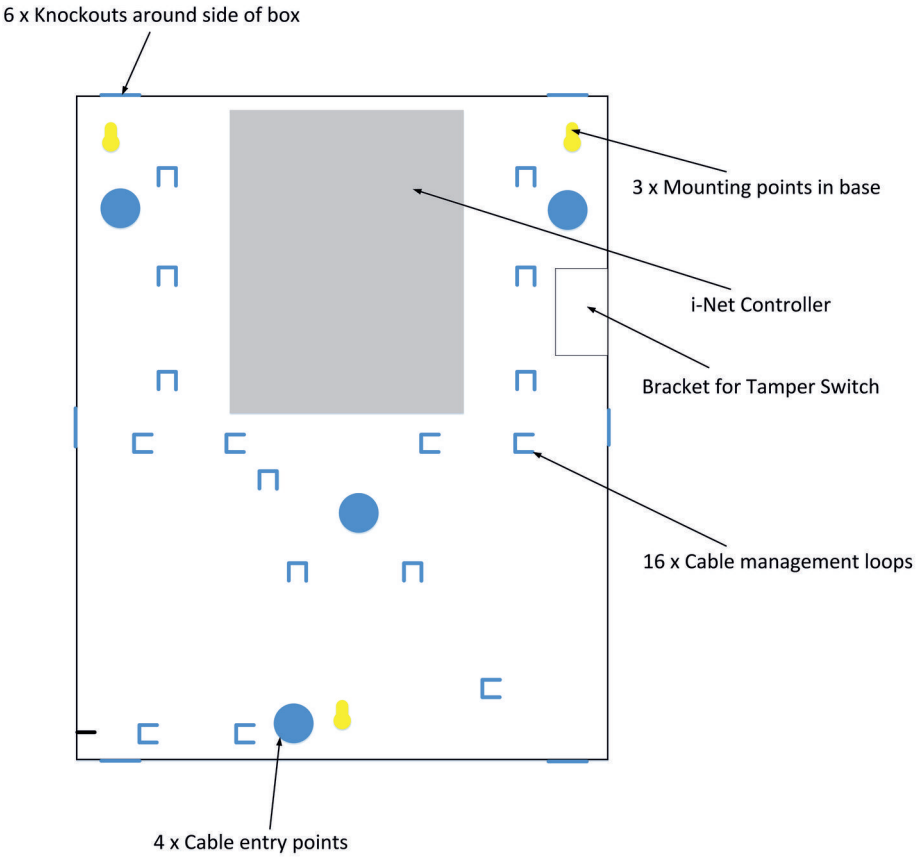
PSU Power Wiring (US-IA-ACU)



Tamper Switch Wiring US-IA-ACU and US-IA-ACB)



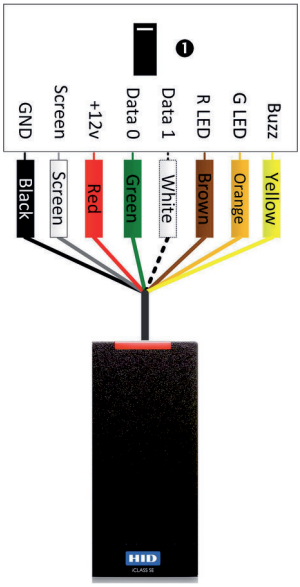
Box Layout: US-IA-ACB



Always run cables along the line of the cable management loops. When complete, loop a cable tie behind the cable management loop and around the cables then tighten to secure the cables.

NOTE: The US-IA-ACU has the i-Net controller fitted horizontally whereas in the US-IA-ACB, it is fitted vertically.

Step 2: Install the Readers



The i-Net Controller supports the industry standard Wiegand protocol. See Page 3 for cable requirements.

UL Compatible Readers

This product is approved for use with any of the following readers:

HID iCLASS and multiCLASS Readers
- R10E
- R15E
- R40E
- RK40E
- RP10E
- RP15E
- RP40E
- RPK40E

Idemia Sigma Series Fingerprint Readers
- Sigma Lite
- Sigma Lite Plus
- Sigma
- Sigma Extreme

Wiring between the i-Net controller and readers must not exceed 98.5ft (30m)
UL has verified these readers for Wiegand communications only to the control panel

Wiring for Sigma Series Fingerprint Readers

SIGMA Lite, SIGMA Lite Plus, SIGMA and SIGMA Extreme Readers

Signal	Connection	Colour
Wiegand GND	20 Wiegand_Gnd	RED/BLACK
Data 0	14 Wiegand_Out0	GREEN
Data 1	16 Wiegand_Out1	WHITE
Green LED	17 Wiegand_LEDOUT1	BLUE
GND	2 Power GND	BLACK (Optional *)
+12v	1 Power +12V	RED (Optional *)

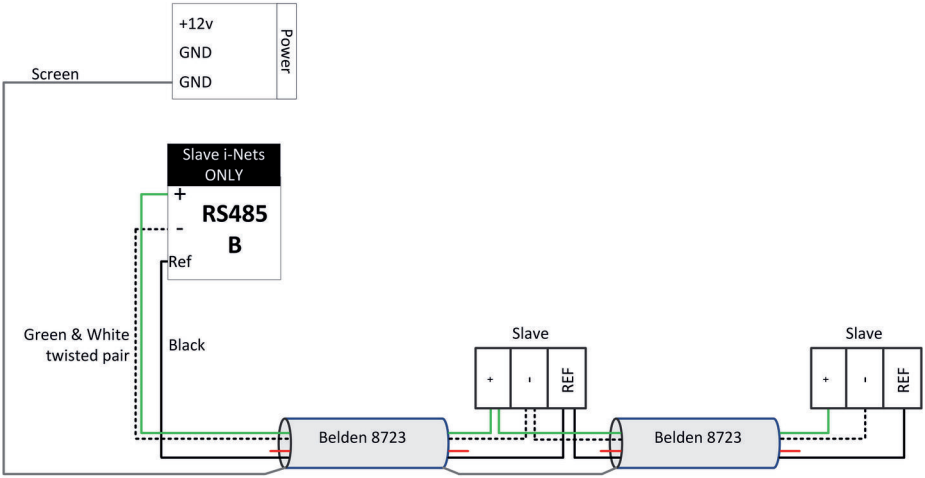
* SIGMA Series readers can be powered from a +12v power supply OR via PoE+. Do NOT connect the reader to both. Never power Sigma readers from the i-Net's reader port as the reader requires more power than the i-Net can provide.

Always use BELDEN 9538 or equivalent cable betwen the Idemia reader and the ACU
NOTE: Always refer to the reader manufacturer's installation intructions for full details of wiring and ratings

Step 3: Connect the RS485 Bus

The RS485 bus must be wired with a twisted pair screened cable. Please refer to the cable specifications on Page 3

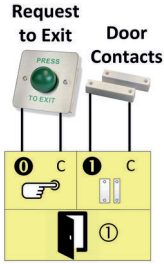
The RS485 '+' and '–' must be on the same pair (example Green & White). The 'Ref' connection can use either of the other pair (usually Black). The cable screen **must** be connected to the GND terminal (0V) at the Master Controller ONLY, as shown in the wiring diagram (see also centre pages).
A correctly wired RS485 data line is shown in the diagram below.



Step 4: Connect the Inputs

The default function of each input is indicated on the i-Net cover (for example, Input 0 = Request to Exit for Door 1). Using these defaults will make system configuration in the Identity Access software much quicker.

These defaults, however, are not mandatory as inputs are fully programmable so any door contact, REX etc. can be connected to any input. The function of each input is then programmed via the software (Please see Identity Access Software Manual for further information)



Refer to the wiring diagram on the centre pages

Step 5: Connect the Outputs

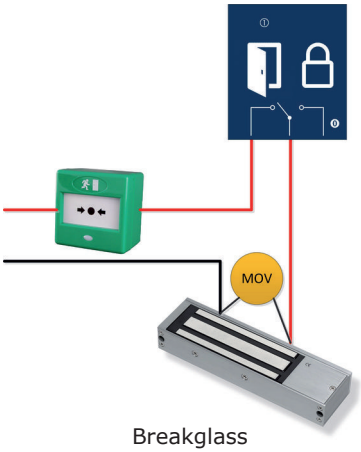
The default function of each output is indicated on the i-Net cover (for example, Output 0 = Lock for Door 1). Using these defaults will make system configuration in the Identity Access software very much quicker.

All outputs are fully programmable so any maglock, strikelock etc. can be connected to any output. The function of each output is then programmed via the software.

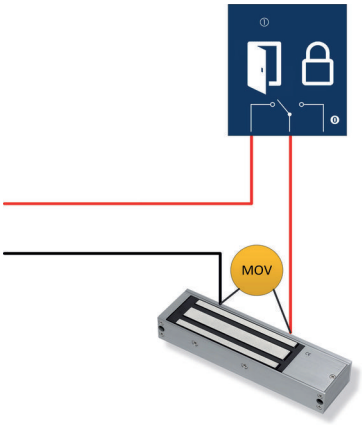
A door lock takes its power from the UL Listed power supply, through the door relay on the i-Net controller, through the lock and back to the power supply.

Important
To prevent back EMF damaging the i-Net controller, ALWAYS install a MOV (supplied) across the coil of every lock

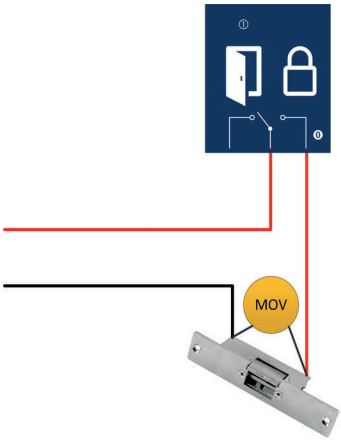
Panic hardware
To ensure a reliable method of egress in the event of an emergency, a "breakglass" should be fitted in conjunction with a fail open lock. The breakglass disconnects the 12V supply to the lock to remove power when activated.
The diagram below shows how to wire in the breakglass.



Breakglass



Fail Open (Maglock)



Fail Closed (Strikelock)

Step 6: Select the Switch Settings

Bank of 2	Bank of 4
 i-Net controller is **NOT** at the end of the bus	**Switch 1 ON enables on-board readers** **Switch 2 ON to use Slave i-Nets** **Switch 3 MUST always be OFF**. **Switch 4 MUST always be OFF**
 i-Net controller is at the end of the bus	 On-board (Wiegand) Readers Enabled Master i-Net connected to Slave i-Nets on Port B
When terminating an i-Net, ensure that both DIP switches 1 & 2 are in the **ON** position. By default these are **OFF**.	

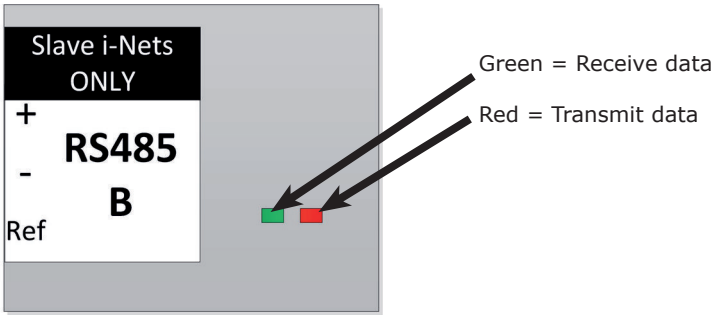
Each device on the RS485 bus must be assigned with a unique bus address. The RS485 bus supports one Master i-Net (address 0) plus up to 15 Slave devices, so the i-Net has a 16 position rotary switch marked '0' to 'F'. The table below shows how the switch position relates to the address:

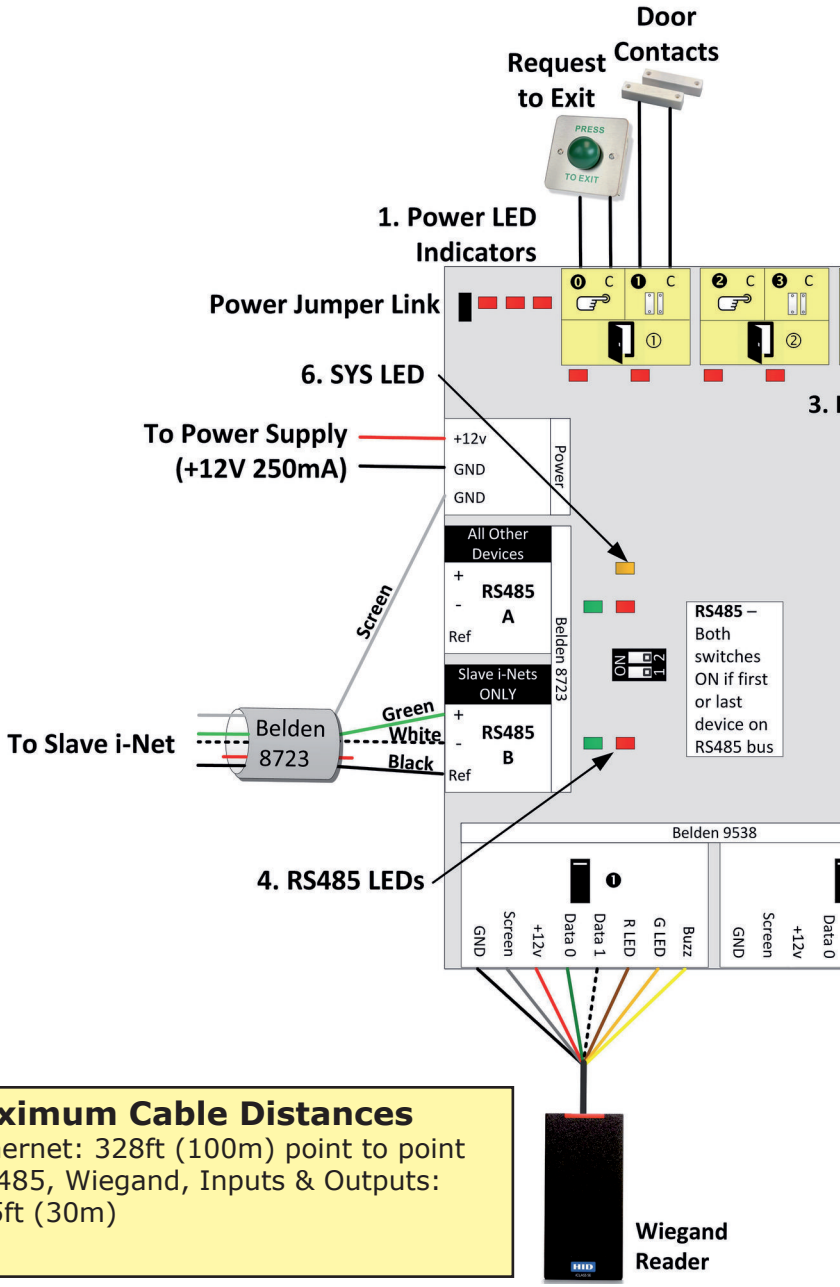
Rotary Value	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Bus Address	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

An i-Net connected to the TCP/IP network is regarded as the Master, and must be given address 0. Each Slave i-Net must be given a unique address between 1 and F.

Always keep a record of the address for each device to avoid duplication.

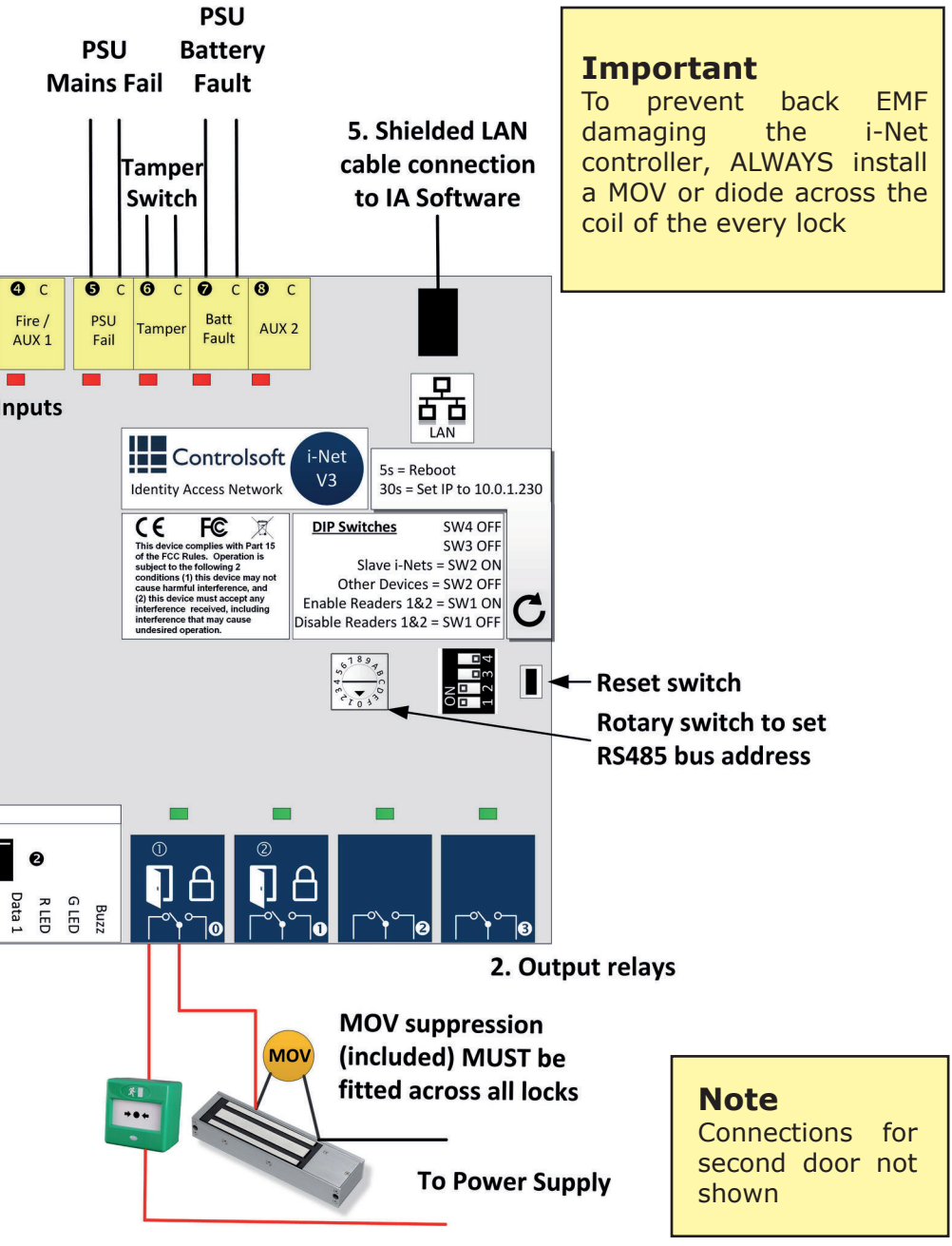
When the i-Net is transmitting data on the RS485 bus, the red LED to the right of the connections will flash. When the i-Net is receiving data, the green LED will flash.





Maximum Cable Distances

- Ethernet: 328ft (100m) point to point
- RS485, Wiegand, Inputs & Outputs: 98.5ft (30m)



Important

To prevent back EMF damaging the i-Net controller, ALWAYS install a MOV or diode across the coil of the every lock

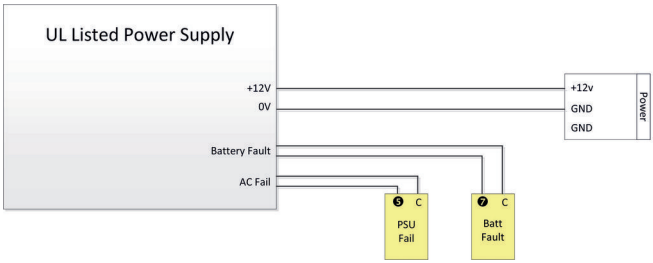
Note

Connections for second door not shown

Step 7: Connect Power (US-IA-PCB and US-IA-ACB)

Connect a UL 294 or UL 603 Listed power supply (e.g. a 4A Altronix eFlow4NB) to the +12Vdc IN and GND terminals on the i-Net PLUS Controller as shown in the diagram on the centre pages.
The power supply shall have a class 2 power limited output. When the power supply is used consult the power supply manufactures installation instructions for installation and wiring.

PSU Fail and Battery Fault:
If the i-Net controller is to monitor the power supply for AC Fail and Battery Fault, connect the relevant outputs of the power supply to the i-Net controller inputs:



The power supply must provide a voltage greater than 10.5Vdc on full load and less that 15.0Vdc on no load.

US-IA-ACU: The power supply and all monitoring connections are preconnected.

A 12V 12AH battery must be connected to the power supply capable of supporting the system for 30 minutes when the mains supply is off.

NOTE: When all wiring is complete, use the cable ties provided to strap the cables to the cable management points provided in the base of the metal box

Step 8: Check LED Indications

Function	Colour	Description
1. Power	Red Red Red	The left LED indicates that the 12v supply is OK The centre LED indicates that the 5v supply is OK The right LED indicates that the 3.3v supply is OK
2. Relays 0 to 3	Green	Relay is energised (Normally Open & Common contacts are closed)
3. Inputs 0 to 8	Red	Contacts connected to input are closed
4. RS485	Red Green	The i-Net controller is transmitting RS485 data The i-Net controller is receiving RS485 data
5. LAN port	Green	The i-Net controller is communicating on the LAN
6. SYS	Amber	The internal software is running

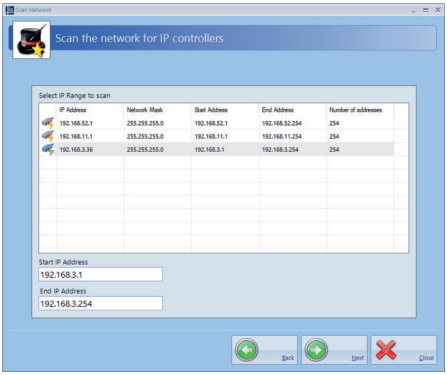
NOTE: Inputs are used for Access Control functions only. The contacts and circuits have not been evaluated by UL for burglar alarm use.

System Configuration

New i-Nets are configured for DHCP and will be allocated an IP Address by the router. If the IP Address of the i-Net controller needs to be changed, first ensure that your PC is on the same network range as the i-Net. If neccessary, press and hold the i-Net reset switch for 30 seconds to set the IP Address to a known value (10.0.1.230).

Run the Identity Access User Interface and select the  button to run i-Net Configurator.
Login and enter the IP Address of the i-Net, select "Basic Configuration" then click [Connect]. Enter the required IP Address, Subnet Mask and Gateway, then select [Write]. Click [Reboot Controller] to apply the change and close i-Net Configurator.

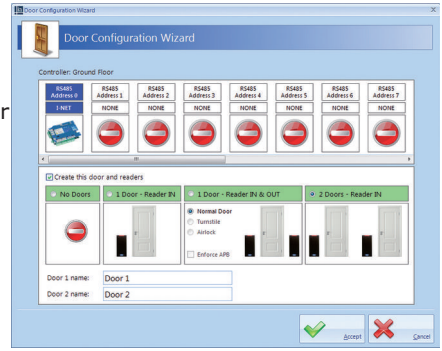
To find i-Nets in Identity Access, select the  button to run the Find Controller Wizard. Click [Next] to display the screen shown:



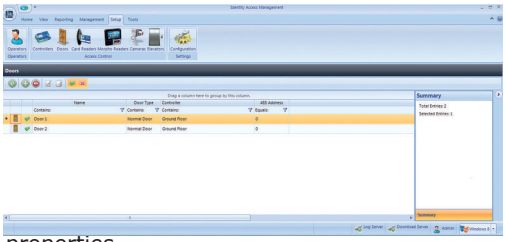
Select the Start IP Address and Stop IP Address to define the range to be scanned (if connecting directly to one i-Net these can be the same) and press [Next]. The software will then find all IP devices in the defined range. When the scan is complete, devices that are not i-Nets will be hidden from view.

Tick the box in the left hand column to select the i-Net controller/s to be added to the system, then select [Next], followed by [Finished]. The i-Net controller/s will then be added to the list of available i-Net controllers. The 'Summary' panel will show the Controller Status for the i-Net controller/s.
To give an i-Net controller a name, double the relevant row, enter the name and click [Accept].

If the inputs and outputs have been wired as per the instructions on the i-Net cover, the doors and readers can be configured with the  button to run the Door Wizard.
Ensure that the option 'Create this door and readers' is ticked. Select the appropriate option whether the i-Net controller is connected to 1 door with an IN reader, 1 door with IN and OUT readers, or 2 doors with IN readers (as in this example).
Enter names for the doors to be created and click [Accept].



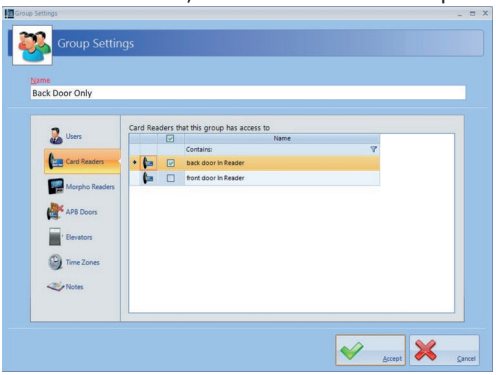
Having created the doors, selecting the Doors icon in the ribbon bar will then display the doors on that i-Net controller as shown opposite:



As can be seen, in this example, the Master Controller called "Ground Floor" now has 2 doors called "Door 1" and "Door 2". These names can be changed if required by editing the door properties.

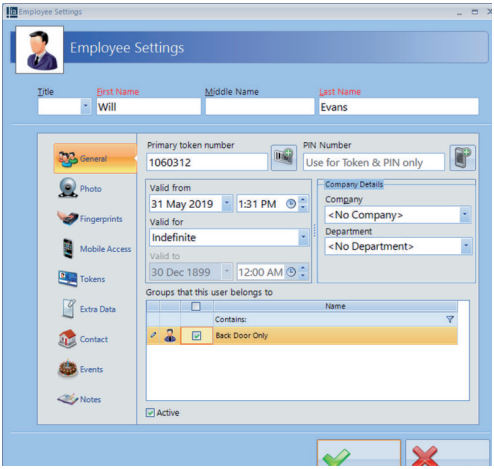
Checking the Card Readers window will display the card readers created by the Door Configuration Wizard.

Having configured our i-Net controller, doors and readers, we next create a Group. Select 'Management' in the menu bar, followed by 'Groups' in the ribbon bar, then select the button to create a new Group.
Give the Group a name, then select 'Card Readers' from the side bar and select all the readers that members of this Group will have access to.
Click [Accept] when done.



Finally,we will create an employee. Select 'Employees' from the ribbon bar and click the button to display the screen shown. Enter a First Name and Last name, a Token Number and select a group for the Employee.

You can now test the system by ensuring that the employee can access the doors.



Frequently Asked Questions

Why are my RS485 devices not polling?	• Ensure that the Master i-Net Controller is connected to Slave i-Net Controllers using 'RS485 Port B'. • Ensure that the 4 way DIP switch is set correctly. • Ensure that each device has a unique address on the bus, where address 0 is reserved for the Master i-Net Controller.
How do I reset the IP address of the i-Net controller?	There is a reset button on the top of the board, press and hold for 30 seconds. The i-Net should reboot twice, and the IP address returns to its default address (10.0.1.230).
When the door unlocks the i-Net controller becomes unresponsive	When the Lock changes state, it can generate back EMF, which can damage the i-Net controller. Make sure that every lock has a suppression device (MOV) installed across the power at the lock
How do I reboot my i-Net controller?	There is a Power Jumper located to the left of the Power LEDs on the controller. If this is removed the board will power down. Replace the jumper to power the unit up again. Alternatively, hold the reset button down for 5 seconds.

Spares Pack

The US-IA-ACU is supplied with a spares pack containing the following items:
- 4 x MOVs
- 1 x Battery cable
- 1 x Resistor
- 1 x Installation Instructions for Altronix power supply

The US-IA-ACB is supplied with a spares pack containing the following item:
- 4 x MOVs

The US-IA-PCB is supplied with a spares pack containing the following items:
- 4 x MOVs
- 4 x Self-adhesive PCB Supports

Specifications

Electrical	
Input voltage (US-IA-ACU)	110Vac. 60Hz @ 3.5A max
Input voltage (US-IA-PCB and US-IA-ACB)	10.5Vdc to 15.0Vdc
Output voltage (US-IA-ACU)	12Vdc 4A
PCB Current (no load)	250mA
Inputs	10.5Vdc to 15.0Vdc
Output Relay contacts rating	30Vdc @ 2A
Tamper Switch rating	12Vdc @ 100mA
Current available per reader port	250mA
Reader port voltage	10.5Vdc to 15.0Vdc
Maximum cable length	98.5ft (30m)
Environment	
Operating temperature	32°F to 131°F (0°C to 55°C)
Humidity	Up to 85% RH
Waterproof	Indoor Use Only
Communication	
Ethernet network speed	10 / 100 Mbs
Ethernet bandwidth requirement	200 Kbs
DHCP support	Yes (fixed IP recommended)
RS485 network speed	9600 baud (Port A) 115200 baud (Port B)

Specifications

Features	
Number of Cardholders	50,000
Time Zones	63
Maximum door open time	1800 sec
Doors per i-Net controller	1 or 2
Reader per i-Net controller	2 IN readers OR 1 IN + 1 OUT
Devices per RS485 bus	Master plus 15 Slaves
Events stored in i-Net with server disconnected	100,000
Dimensions	
US-IA-ACU	15 x 18 x 4 inches
US-IA-ACB	12 x 15 x 3.5 inches
US-IA-PCB	6.9 x 5.3 x 1.5 inches
Performance Levels	
Destructive Attack	Level I
Line Security	Level I
Endurance	Level IV
Standby Power (US-IA-ACU)	Level II

Product Compliance & Limitations

To comply as a UL listed installation, the following conditions must apply:-

US-IA-PCB and US-IA-ACB: Power must be provided via a separate UL Listed DC supply, Power-Limited, power source capable of providing standby power. This is to be wired into the "GND" and "+12V" terminals and the cable secured with the cable ties provided.
US-IA-ACU: Power is provided via an Altronix eFlow4NB UL Listed Power-Limited DC power source, capable of providing 30 minutes standby (Class II).

Wiring methods shall be in accordance with the National Electrical Code (ANSI / NFPA70), local codes, and the authorities having jurisdiction.

Software features and functions have not been evaluated by UL. Server based functions (Remote door release etc.) have not been evaluated by UL and cannot be used for UL294 installations.

Wiring: - Where an equivalent cable / wire is used it must be ' UL Listed'
All interconnecting devices must be UL Listed.

Exit buttons - A UL listed button must be used.
Door contact - A UL listed contact must be used.
Break glass- A UL listed break glass must be used.
Fire door interface - This feature has not been evaluated by 'UL' and must not be used in UL294 installations.
NOTE: This product has been evaluated by UL for Access Control use only.

FCC Compliance
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Controlsoft is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

24 i-Net Cover Pictograms

Inputs 0 and 1 (Door 1).
Connect Request to Exit between 'C' and input 0
Connect Door Contact between 'C' and input 1

Inputs2 and 3 (Door 2).
Connect Request to Exit between 'C' and input 2
Connect Door Contact between 'C' and input 3

Input 4
Auxiliary input for general use

Input 5
Connect to "Mains Fail" output on PSU

Input 6
Connect to box Tamper switch

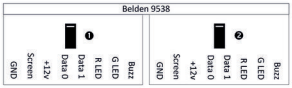
Input 7
Connect to "Battery Fault" output on PSU

Input 8
Auxiliary input for general use

Network port
Connection to the LAN

Input for power from power supply.
Use first 2 connections for +12v and 0v

Connections for Slave i-Nets.
Connections '+' and '-' must be on either side of the same twisted pair (eg. Green and White)



Wiegand inputs
Readers for doors 1 and 2

Relay output 0 for door 1
Normally closed, common and normally open contacts

Relay output 1 for door 2
Normally closed, common and normally open contacts

Relay outputs 2 and 3
Normally closed, common and normally open contacts

Reset switch.
Press and hold for 5 seconds to reboot the i-Net.
Press and hold for 30 seconds to change the IP Address to 10.0.1.230

Controlsoft

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UL CERTIFIED SAFETY SECURITY US BP21150

Information on all our products can be found on our website www.controlsoft.com

This product is not suitable for retail sale.
All warranties are invalid if this product is not installed by a trained technician.