

**Technical Support**



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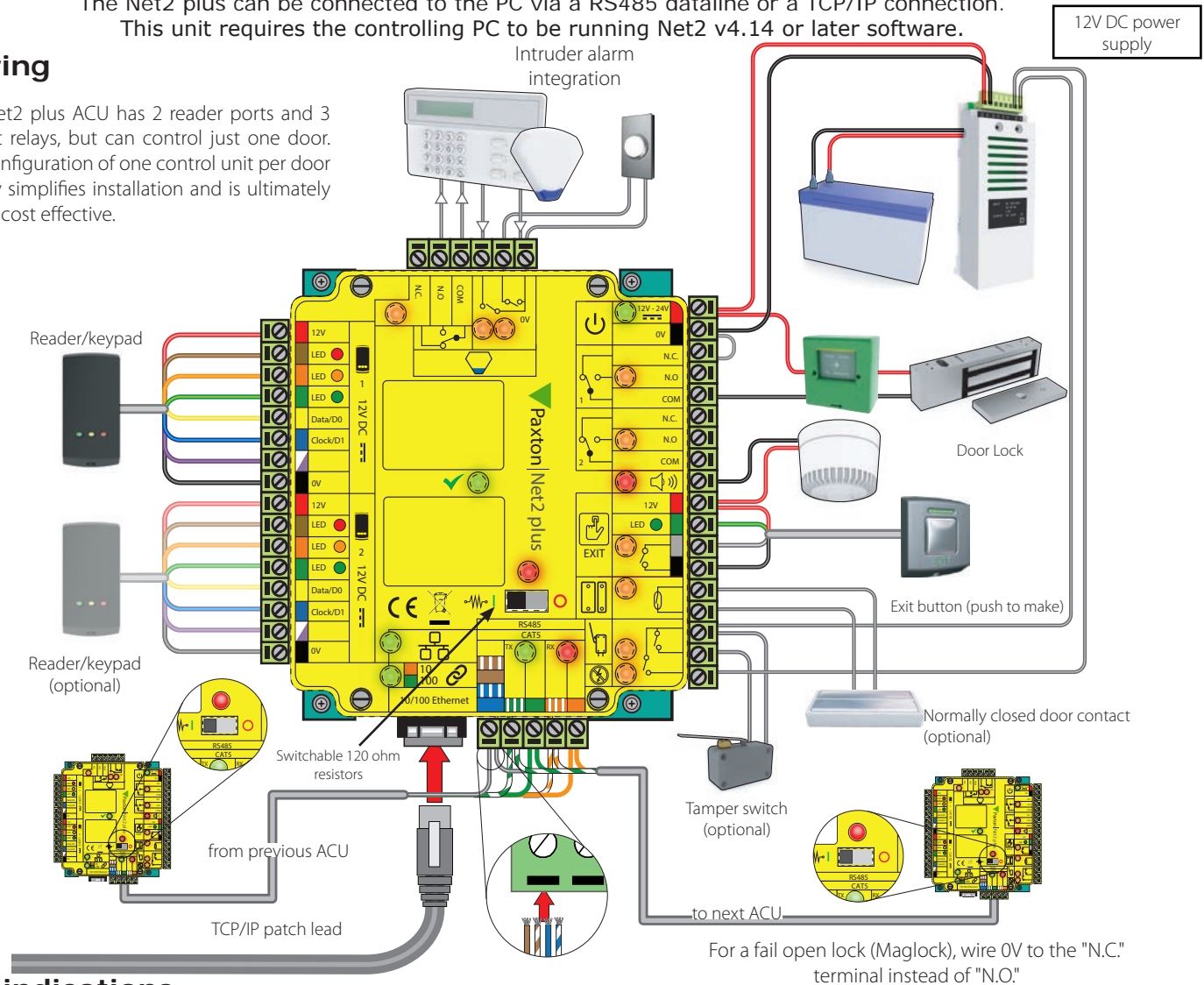
Technical help is available: Monday - Friday from 02:00 AM - 8:00 PM (EST)

Documentation on all Paxton products can be found on our web site - <http://www.paxton-access.com/>

The Net2 plus can be connected to the PC via a RS485 dataline or a TCP/IP connection. This unit requires the controlling PC to be running Net2 v4.14 or later software.

**Wiring**

The Net2 plus ACU has 2 reader ports and 3 output relays, but can control just one door. The configuration of one control unit per door greatly simplifies installation and is ultimately highly cost effective.



**LED indications**

12/24V	(Green)	- Power LED.
Relay 1	(Orange)	- The relay is energised - (NO/COM contacts are closed).
Relay 2	(Orange)	- The relay is energised - (NO/COM contacts are closed).
Alarm	(Red)	- 12V Alarm output is active.
Exit	(Orange)	- The exit button contacts are closed.
Contact	(Orange)	- The door contacts are closed.
Tamper	(Orange)	- The tamper contacts are closed.
PSU	(Orange)	- The PSU contacts are closed.
OK	(Green flash)	- The internal software is running.
Termination	(Red)	- The on-board resistors are in place across the RS485 data pairs.
Rx	(Red)	- The ACU is receiving data (TCP/IP or RS485) - See also FAQ section.
Tx	(Green)	- The ACU is responding to data - (TCP/IP or RS485).
Server Connected	(Green)	- The TCP/IP interface is communicating with the PC Net2 server.
Server Link		- Green = 100 Mbit/s : Orange = 10 Mbit/s (TCP/IP speed).

## Overview

A Net2 plus can connect to the Net2 PC using either an un-shielded RJ45 patch cable or an RS485 data line. This greatly increases the number of installation options available to the installer.

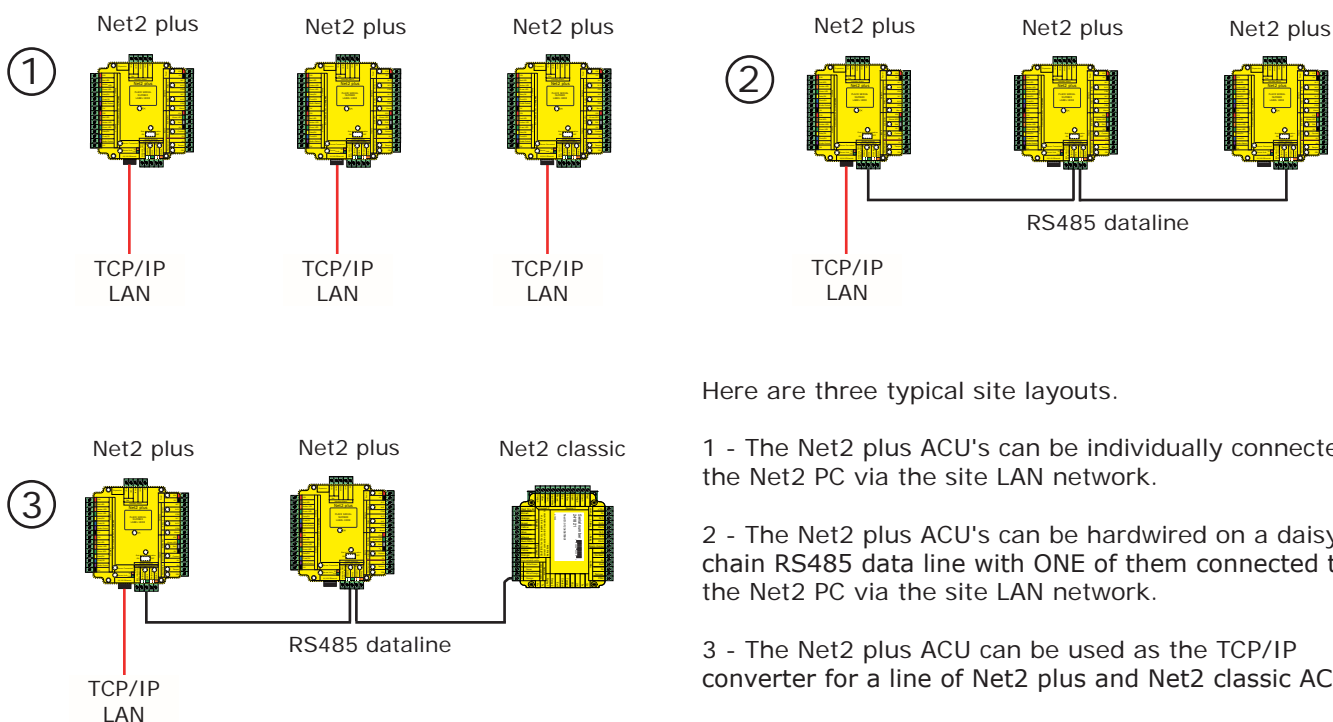
One Net2 plus can also be used as the TCP/IP interface for an RS485 daisy chain of Net2 plus and Net2 classic units.

When used with a TCP/IP connection, it must first be detected using the Net2 Server Configuration Utility as defined later in this instruction.

When used with an RS485 data line, on-board termination resistors can be put in circuit with a simple slide switch. Ensure that units installed in the middle of the data line have this switch turned OFF.

A dedicated Intruder Alarm connection is provided.

### Site Layout Examples



Here are three typical site layouts.

1 - The Net2 plus ACU's can be individually connected to the Net2 PC via the site LAN network.

2 - The Net2 plus ACU's can be hardwired on a daisy chain RS485 data line with ONE of them connected to the Net2 PC via the site LAN network.

3 - The Net2 plus ACU can be used as the TCP/IP converter for a line of Net2 plus and Net2 classic ACU's.

The TCP/IP interface allows an RS485 data line to be controlled by the Net2 Server running across a LAN network.

An RS485 data line has a 1000 yds maximum. This distance can be increased with the use of Paxton high speed repeaters or by using shorter independent data lines using multiple LAN connections controlled from the same PC.

## Control unit installation

Wire the components to the Access Control Unit (ACU) as shown on the first page.

Press the exit button or in the absence of an exit button short the 0V and exit terminals to test the relay function. The lock Relay LED will come on and the lock should release.

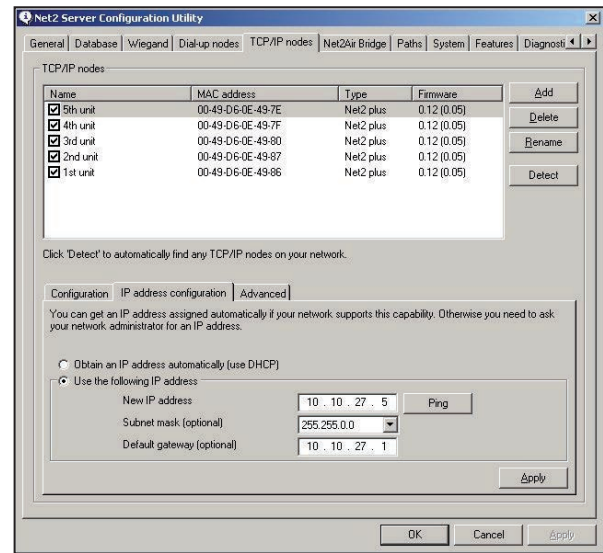
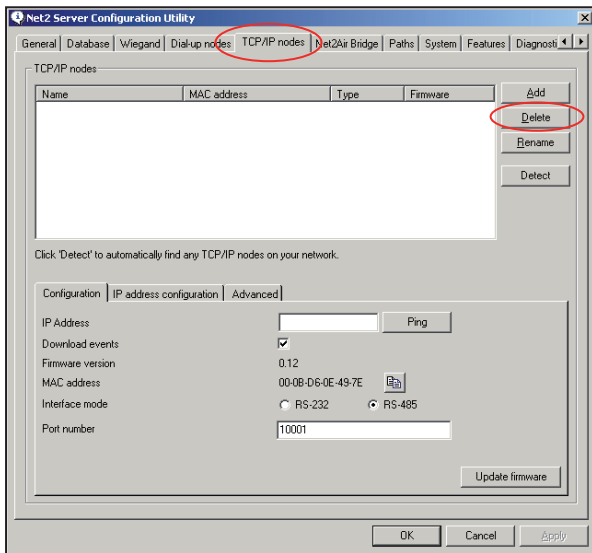
The reader's default indication has all the LED's on. Access granted is denoted with a single flashing Green LED. Access Denied is a single flashing Red LED.

Each time the unit is powered on, it will run an internal health check. During this phase (about 5 secs) the OK LED will flash quickly before changing to a slower heartbeat.

## Connecting to the PC via the Ethernet port

The IP address should be assigned a fixed value, or a DHCP reservation. Unreserved IP addresses issued by DHCP servers are not guaranteed to be constant, leading to potential failure of PC to Net2 bridge communications.

Run the Net2 Server Configuration Utility (Start/Programs/Net2) and Click on TCP/IP nodes.



Click on **Detect** and the MAC address of the device(s) will appear in the table. You must then use the "IP address configuration" tab to manually assign the IP address, subnet mask and gateway.

Be aware that if the IP address that you give the device is not in the same IP range as the PC, the device will no longer respond until you connect to it with a PC that is in the same IP range.

Some firewall/virus protection software and other wireless hardware can block the IP detection process. Disable these and try to detect the device again. Please contact Technical Support if you require further advice.

If you detect the MAC address but the device now shows 'Not Responding', you must check the IP address, to make sure it is still in range with the PC or network. If it is not, you should either change the IP address of the PC or the IP address of the device so they are both again in the same range. Our Technical team can talk you through this if you need help.

If the MAC address does not appear when you click **Detect**, ensure that the following ports are open on all devices between this unit and the Net2 PC:-

69	UDP
10001	TCP
30718	UDP

**TCP/IP Reset** - The unit can be returned to DHCP settings by powering down the unit and linking the 'Red LED' and 'Media Detect' terminals on reader port 2. Power up the unit again and the unit will beep to acknowledge the link. You may now remove the link and the OK LED will flash fast for a few seconds. When the OK LED returns to a steady heartbeat, the IP settings will be reset to DHCP.

If you still cannot detect the MAC address of the device, call our Technical Support Help line.

NOTE: The device will 'beep' when detected by the Net2 Server Configuration Utility or when new IP settings are applied. The sounder will also respond to a direct 'Ping' over the network to help locate the unit.

### When connecting to a WAN or different subnet mask

If you are connecting this device to a remote subnet which is different from the Net2 software PC, the standard detect mechanism cannot work across the network routers between them. The IP address, along with the correct subnet mask and gateway for the remote subnet have to be set. Either do this on the local subnet with the existing Net2 PC, or use a PC on the remote subnet once the device is installed.

The PC that has the Net2 server installed must be able to access the IP address range on the WAN/remote site.

This may require the routers and gateways to be configured between the networks. Again, this would be done by the Network administrator of that site. Make sure the ports listed above are open on all intermediate routers.

Once installed, create a record with the **Add** button (if none was created during initial set up) and you should then be able to detect its MAC by entering the IP address in the Configuration screen Ping box.

## TCP/IP Loopback test

The following test should be run if there are problems setting up the IP configuration of the interface. This test sends data to the device and checks this against the data it receives back. This confirms that the network pathing is working correctly.

The Net2 server program must be shut down during this test.

Remove any wires from the RS485 data line connector and create a hardwired data loop as follows. Connect the Orange to White/Green and Green to White/Orange. To run the test, click the Loopback button in the advanced section of the Server Config Utility/TCP/IP Nodes. If the test fails, connect the unit directly to the PC with a network patch cable and test it again. Should this still fail, please call Technical Support for further advice.

## Connecting to the PC or other ACU's via the RS485 data connection

**90% of installation faults are caused by wiring errors on the RS485 data line.  
Special attention to this area can save time and effort.**

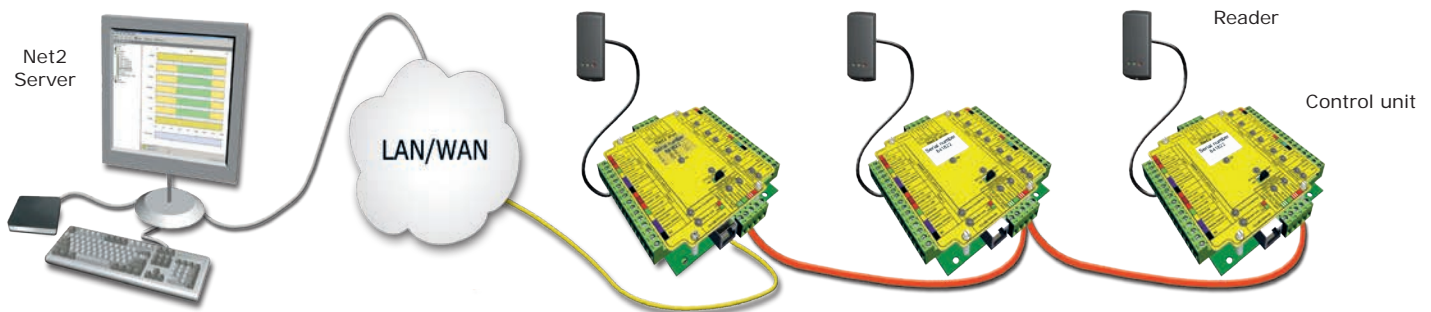
### END OF LINE TERMINATION SWITCHES.

- These should all be OFF except for those at both ends of the data line.

### READER & DATA CABLE SCREENS.

- Data cable screens and spare cores MUST be connected throughout.
- Reader and keypad screens where provided should be connected to the Black (0V) terminal.

The data line must be wired in a single daisy chain. The data connection to the PC may be located at any position along the data line.



## RS485 data line resistance check

**Power down all TCP/IP, USB and RS232 converters (individual and Net2 plus).**

- ✓ Check the resistance across each data pair is 60-80 ohms.
- ✓ Check that there are no data line to screen shorts.
- ✓ Check the screen of the data cable is continuous - this provides the 0V DC system reference.

## Software configuration

**Door name:** Name the Door.  
**Door open time:** Set the door open time.  
**Unlock the Door during:** Holds the door unlocked during this timezone. - Set to 'At No Time' for normal user operation.

**Reader 1:** Settings for Reader 1 and Keypad 1 on the ACU.  
**Reader 2:** Settings for Reader 2 and Keypad 2 on the ACU.  
**Alarm:** Contains settings for the different types of alarm.  
**Codes:** Valid codes can be viewed, added and removed. (Can only be viewed when a keypad is active).  
**Events:** Shows the events for the control unit selected.

**Name:** Each reader can be named individually if required.  
**Reader type:** Set the reader type, if applicable.  
**Keypad type:** Set the keypad type, if applicable.  
**Token data format:** Select the type of cards being used on the system. (New formats can be created).

**Reader operating mode:** Set the operating mode.  
**Timed operating modes:** A different operating mode can be configured within a time window.

**Reader action:** Set the action required when access is granted.

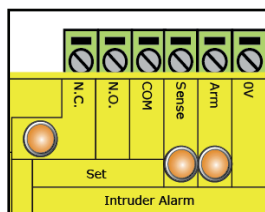
## PC installation

The current specification for compatible PC hardware, network and operating systems is available on our website at the following link: <http://paxton.info/720>

## Intruder alarm integration

A dedicated port for input and output signals is provided when integrating a Net2 plus ACU with an alarm system.

Please see [AN1035 - Integrating Net2 with an intruder alarm system](http://paxton.info/91) < <http://paxton.info/91> > or call Technical Support for further information.



- Arm - Arm confirmation Push Button - Wire across 0V and Arm.
- Sense - Wire a voltage free loop across 0V and Sense to monitor the alarms current status.
- Set - Wire a voltage free loop across COM and N.O. or N.C. to provide a set signal for the alarm.

# Technical Help

## **1 - RS485 Data line resistance check - ACU not responding or fails to be detected.**

First power down any data line converters and disconnect any ACU's that do not have a flashing OK LED. Using a Multimeter, measure the resistance across the White/Green and Green pair at one end of the network.

A resistance of between 60 and 80 ohms is required. Repeat the test for the White/Orange and Orange pair.

This is vital for a stable and trouble free installation.

## **2 - ACU Reset - No OK LED flashing.**

The ACU has no factory reset condition as it does not contain any fixed settings. The unit does have an operating program (firmware) that controls its functions and can be confirmed as running by means of the flashing OK LED.

- If the OK LED is flashing steadily, then there should be no reason to reset the unit.

- If the OK LED is not flashing, you need to clear the unit so that it can receive a firmware download from the PC.

Any other ACU's without OK LED's must be taken off the line or powered down.

1. Stop Net2 Server (Net2 server icon - Bottom right of screen - Right mouse click, Select Stop the Net2 Server).
2. Power down the Net2 ACU.
3. Insert a link wire between the 'Amber LED' and 'Media Detect' terminals on reader 2 port.
4. Power up the ACU. - The OK LED flashes very quickly.
5. With the unit still powered, remove the link.
6. Go to the PC and Start the Net2 Server and go into the Doors screen. Click on the Detect button. This should look for the ACU and then download its firmware (This may take up to 5 minutes). - The OK LED should now be flashing with a steady heartbeat. This procedure must only be done for one ACU at a time.

NOTE: If this unit is using the TCP/IP interface, any fixed IP settings will be retained.

If the unit is in DHCP mode it will need to be detected at each stage using the Server Config Utility as a new address may be issued by the IP server, each time the PCB resets.

## **3 - Can we use a DHCP IP address?**

The Ethernet interface does support DHCP, but for more reliable communication, a static IP address must be reserved for the unit. This is because some servers issue different DHCP addresses each time they are restarted and this requires the Net2 interface to be manually set up again - a time consuming process.

## **4 - TCP/IP - Direct PC connection.**

Connect the network interface directly to the LAN port of the PC. Without the presence of a DHCP server the unit will default to an IP address in the range 169.254.X.X.

Check the IP address of the network card of your PC by typing IPCONFIG at the command prompt. Detect the TCP/IP interface through the Net2 Configuration Utility and change the IP address of the interface to an address similar to that of your machine. For example, if the IP address of the PC is 192.168.10.7, change the IP address of the TCP/IP interface to 192.168.10.8. Once the IP address of the interface has been changed into the range of the PC then Net2 will be able to communicate with it.

NOTE: Do not change the IP address of your PC to 169.254.x.x, this will not allow the IP address of the TCP/IP interface to be fixed correctly.

## **5 - Cannot detect ACU via a TCP/IP interface.**

1. Ensure the TCP/IP interface has been detected in the Net2 Configuration Utility, and responds when PINGed from the utility. A static IP address must be used for the interface.
2. If the interface is responding, try a loopback test. (see Loopback section)
3. The Net2 data line should be checked for resistance readings.



Here is the list of topics about this product that receive the most technical support inquiries. We list them here to help you speed up the installation and trouble shooting process.

## 6 - Readers/Keypads not working.

- Software settings - Confirm that the settings of the reader or keypad are correct.
- Connections - Check the wiring and integrity of the connectors. - If possible, test this reader on the other port.
- Cable - Belden 9540 / 9538 or General Cable C0744A / C0745A should be used to extend the reader cable. Twisted pair alarm cable should not be used. To confirm that a cable extension is not at fault, wire the reader direct into the reader port.
- Supply voltage - Confirm that the voltage is within specification. (see table)
- User token - Confirm that the user token used for testing is OK by presenting it to a known working reader.
- Interference - Confirm whether the reader works when tested 'in hand' and not mounted on the wall. Ensure that readers are not mounted back to back or there is no interference from other local RF devices.

## TCP/IP and RS485 LED indication

The Net2 plus performs two functions. It is an access control unit and also a TCP/IP RS485 converter. Information can pass across the PCB between the TCP/IP and RS485 data port but is not relevant to this ACU

### - Server Connected LED (Steady Green)

This LED shows that the TCP/IP interface is active and receiving data from the Net2 PC server. This includes all data for other ACU's that may be linked via the RS485 data port.

### - Rx and Tx LED's

These LED's show the activity for this ACU only. This is same indication as seen on a Net2 classic ACU.

It is not dependant on the source (TCP/IP or RS485). The Rx LED will flash for all data being received and the Tx LED will only flash when this unit responds to its own address.

## FCC Compliance

Class B digital devices.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Class A digital devices.

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 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.

<b>Specifications</b>			
<b>Electrical</b>	Min	Max	
Voltage	12V DC	24V DC (+20%)	
PCB Current (depending on activity)	200 mA	3 A	
Relay switchable voltage		24V DC (+20%)	
Relay switchable current		4 A	
Alarm output voltage		12V DC	
Alarm output current		1 A	@ 12V DC
Combined reader port output current		500 mA	
Reader port voltage	11.4V DC	12V DC	
Exit button voltage	11.8V DC	12V DC	
Exit button current		20 mA	
<b>Environment</b>	Min	Max	
Operating temperature - Battery limits	0 °C (32 °F)	55 °C (131 °F)	
Humidity		85% - Relative humidity	
Waterproof			No
<b>Communication</b>	Min	Max	
Ethernet network speed	10 Mbits/sec	100 Mbits/sec	
Ethernet bandwidth requirement		200 kbits/sec	
DHCP support (fixed IP recommended)			Yes
RS485 network speed		115.2 kbits/sec	
<b>Features</b>	Min	Max	
Number of Cards		50,000	Net2 v4.16
Number of PIN's		50,000	Net2 v4.16
Access Levels		250	
Time Zones		64	
Maximum door open time	1 sec	999,999 sec	
Number of Codes		50	
Doors per ACU		1	
Reader ports per ACU		2	
Readers per port		2	
Keypads per port		2	
ACU per dataline		200	
Datalines per PC		200	Net2 v4.21
Data retention after total power loss	30		
Events stored in ACU with no server connection		2,728	
<b>Dimensions</b>	Width	Height	Depth
Control Unit	4 1/2 inch	5 inch	1 inch

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