
# NESS-APX
# IP REPORTING MODULE

## TRAINING MANUAL

NESS-APX IP Monitoring Module
TRAINING MANUAL
Rev1

N55

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# Contents

# Introduction

Welcome to the NESS APX IP Monitoring Training Module. This module will introduce you to IP alarm monitoring, including:

- The differences between traditional analogue alarm monitoring and IP monitoring
- Benefits of IP reporting

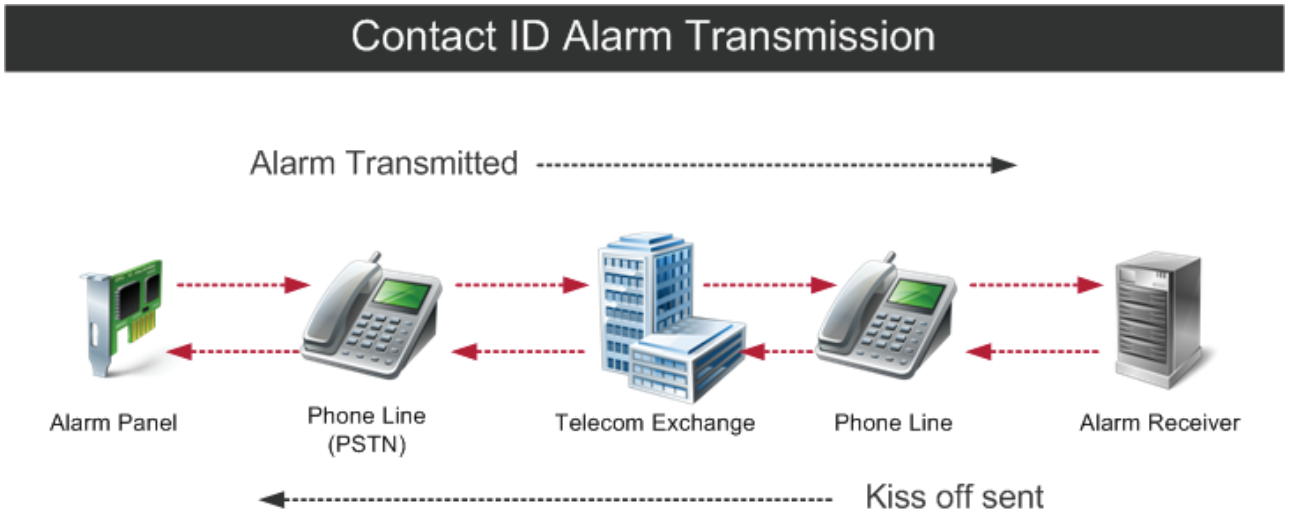
## Document Conventions

| | |
|---|---|
|  | Indicates a warning or cautionary message |
|  | Indicates an important note or advisory information |
|  | Indicates a hint or suggestion |
| **[TEXT]** | Bold text enclosed in brackets is used to show a section number or address of a programmable option or information on programming shortcut sequences |

# Alarm Monitoring

## Traditional Analogue CID Monitoring

When alarm systems first started reporting to a central monitoring station they often used a third party alarm dialler. This device had one or more inputs onboard, which would initiate a phone call to a central monitoring station. The dialler would use either a series of pulses or beeps, or DTMF tones to communicate a message to an alarm receiver at the monitoring station, much like morse code.




As alarm monitoring became more popular, more and more alarm panels came out with onboard diallers, and the industry started to settle on a number of standards or protocols for the communication of alarms.

Contact ID seems to have become one of the most popular of these protocols, and is supported be most modern alarm systems.

Contact ID uses DTMF tones to communicate alarms in the following format:

| 1234 | 18 | 1131 | 01 | 015 | 8 |
|---|---|---|---|---|---|
| **Account** | **Type** | **Event** | **Area** | **Zone** | **Chksum** |

where:

**1234** = The account number (1234)

**18** = The message type used to identify the message as Contact ID

**1131** = The event qualifier (1) for a new event, followed by the event code for perimeter burglary

**01** = The partition or area number (1)

**015** = The zone number (015)

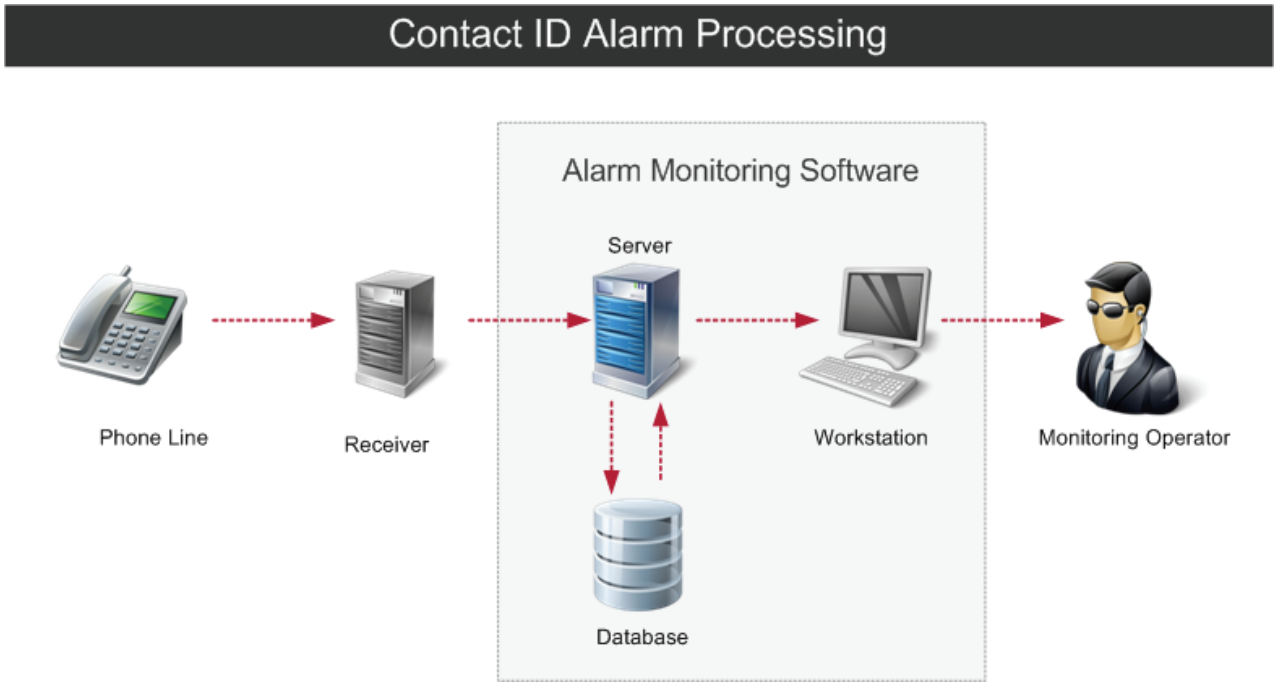
**8** = The checksum

The entire message can be looked at like this:

| 0800 123 456 | 123 18 1131 01 015 8 |
|---|---|
| **Phone Number** | **Contact ID String** |

The panel dials the pre-programmed phone number then waits for the handshake tone. When it receives the handshake tone, it transmits the CID string then waits for the kiss-off tone from the receiver.

The software running at the central monitoring station then picks these alarm messages up from the receiver, looks up the account and zone names on its database and displays the alarm to the operator.




As Contact ID only sends a bunch of numbers representing account, area and zone, the monitoring operator relies on the database inside the monitoring software being accurate. The information they receive is only ever as good as that provided by the technician during installation.

## Why IP?

As technology improves and more and more services and functions are being performed on computer networks or the internet, traditional analogue systems are being forced into the digital world.

Analogue technologies such as copper phone lines are becoming more costly to maintain, and are therefore more expensive for the end user. In some cases, they are simply non-existent.

Analogue alarm diallers are no exception to this. Many businesses and now even new residential subdivisions are moving to fibre to the door. This means no analogue phone lines, and in many cases are using VoIP for communications. The problem with VoIP for alarm diallers is that due to many of the compression techniques used, the handshake, DTMF, and kiss-off tones are often completely lost on transmission.

Sometimes it is the cost of a traditional phone line that is prompting the move to digital. Every business call costs around $0.25. If your site only sends open and close messages every day, you are looking at $130.00 per annum for the calls alone. If your average site has 2 alarm activations per month, that adds another $12.00. If your analogue phone line is only being used for the alarm, add another $276.00 per annum for the line rental. These costs add up!

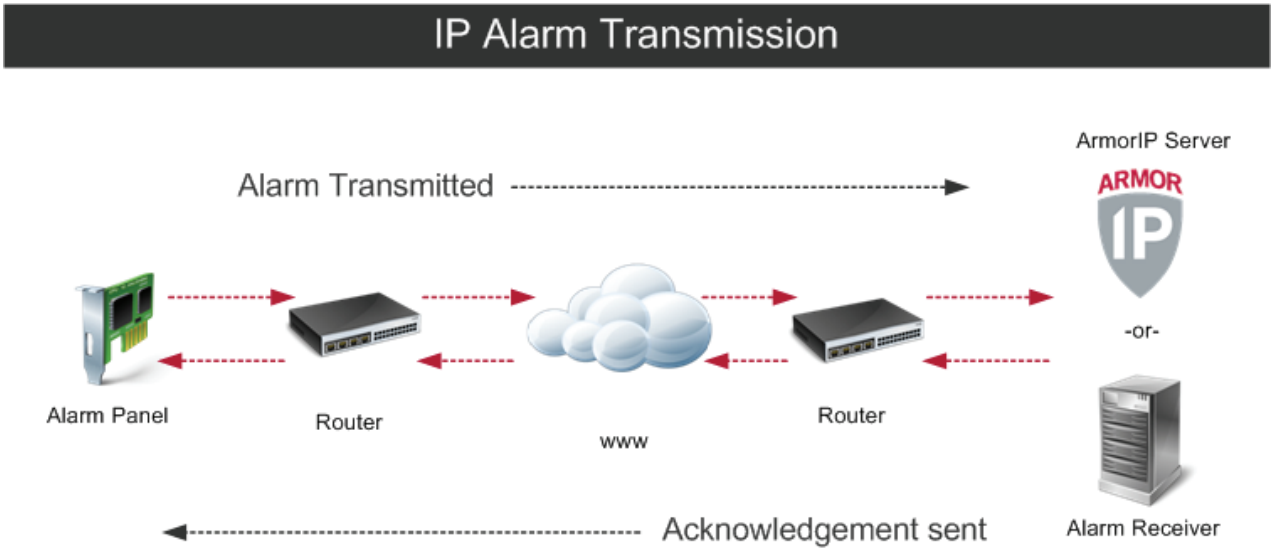
Moving your alarm system to a fully IP solution utilizing an existing internet connection can save upwards of $425.00 per site, per year. This alone can justify the cost of installing a NESS APX or IP alarm panel.

Another key feature is that IP monitoring is essentially always online to the monitoring station, with a default regular polling time of 90 seconds. Many alarm diallers only test once every 24 hours and in many cases only once a week!  Message transmission is almost instant, and a lost connection can be detected in 90 seconds or less.

IP Monitoring can utilize existing IT infrastructure, and certainly won't 'tie up' the internet connection the way an alarm dialler does with a phone line. IP Monitoring uses such a small amount of bandwidth that it can sit on your existing network without any noticeable effect on other network traffic.

# IP Alarm Monitoring

IP alarm monitoring has been developed to achieve the same thing as Contact ID alarm monitoring (to transmit an alarm message to a central monitoring station), only it does this via a network connection across the internet.




The Armor IP protocol takes the contact ID message and encapsulates it inside a TCP/IP message. Along with this is the ability to add additional information if it is available, such as panel name, event time, panel type, serial number, zone or user name, and much more. This data is all transmitted across the internet to the monitoring station.

| 0800 123 456 | 1234 18 1131 01 015 8 |
|---|---|
| **Monitoring Phone Number** | **Contact ID String** |

*Contact ID Format*

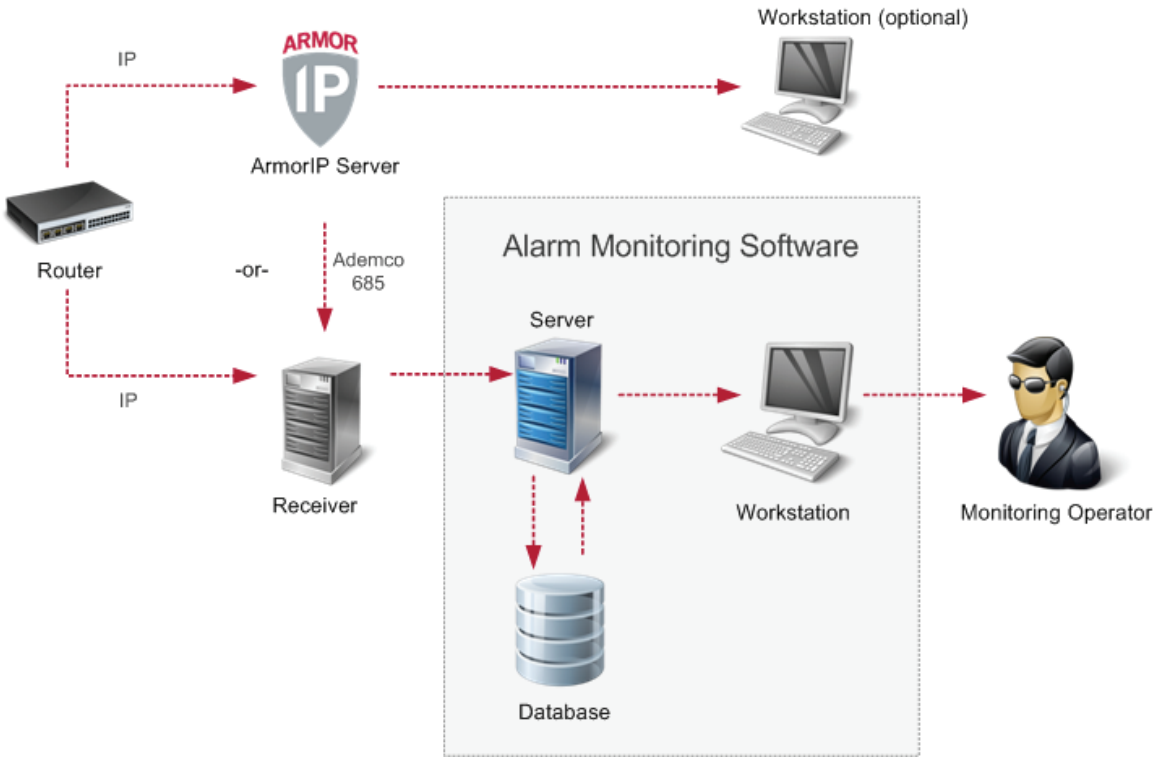
| 203.97.49.55 | | 1234 18 1131 01 015 8 |
|---|---|---|
| **Monitoring IP Address** | **Additional Data** | **Contact ID String** |

*ArmorIP Format*

The message can be received at the monitoring station either by the existing receiver (if it is IP capable), or by the ArmorIP software running on a server. The ArmorIP software has the added advantage of being able to display all of the additional data that comes with the ArmorIP protocol.

This means that changes to names of users, areas and zones on site will be transmitted to the monitoring station as they are seen on site, so there are no more mismatches between what the monitoring station and the people on site are looking at.

# IP Alarm Processing




The Armor IP server receives the IP message from the alarm panel, sends an acknowledgement to the panel, then passes the data to the alarm receiver via RS232 using the Ademco 685 protocol. This allows the monitoring station to utilize their existing software for processing and tracking the alarm, and optionally displaying the alarm direct from ArmorIP as well, to ensure the additional information received from site is seen.

## IP Alarm Monitoring Key Points

- No copper phone line required = $$$ saved
- Always online
- Instant transmission of alarms
- Uses existing network infrastructure = no additional cost
- Can display additional, accurate information from site

# NESS APX IP Reporting Module

Many control panels include both an onboard analogue dialler and an Ethernet adapter to allow IP reporting. But what if you have an existing alarm panel or dialler that only supports Contact ID? Enter the NESS IP Reporting Module...


The NESS APX IP Reporting Module is designed to help transition existing alarm monitoring solutions from traditional PSTN reporting to IP capable devices with minimal effort and at a low cost.

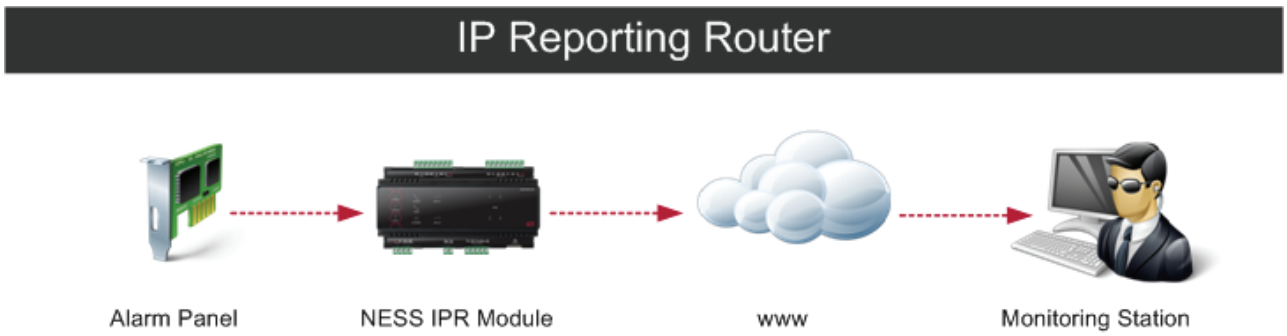
Current features of the NESS APX IP Reporting Module include:

- Full PSTN phone line emulation circuit that will interface with any alarm panel
- 10/100 Base-T Ethernet
- Independent modem that supports downstream phones
- 4x configurable inputs or outputs
- Small physical size to fit inside existing installations
- 12VDC power supply input
- Emulates a full CID receiver
- UDP and TCP based IP reporting protocols
- Configurable 128, 192 or 256 bit AES encryption.
- Fully configurable through an internet browser
- Backup reporting options
- 64 message queue
- Industry standard DIN Rail mounting
- Online and remote upgradeable firmware

# Applications

The NESS APX IP Reporting module has been designed to cater for a number of different applications. Let's take a look at what the NESS AXP is capable of:

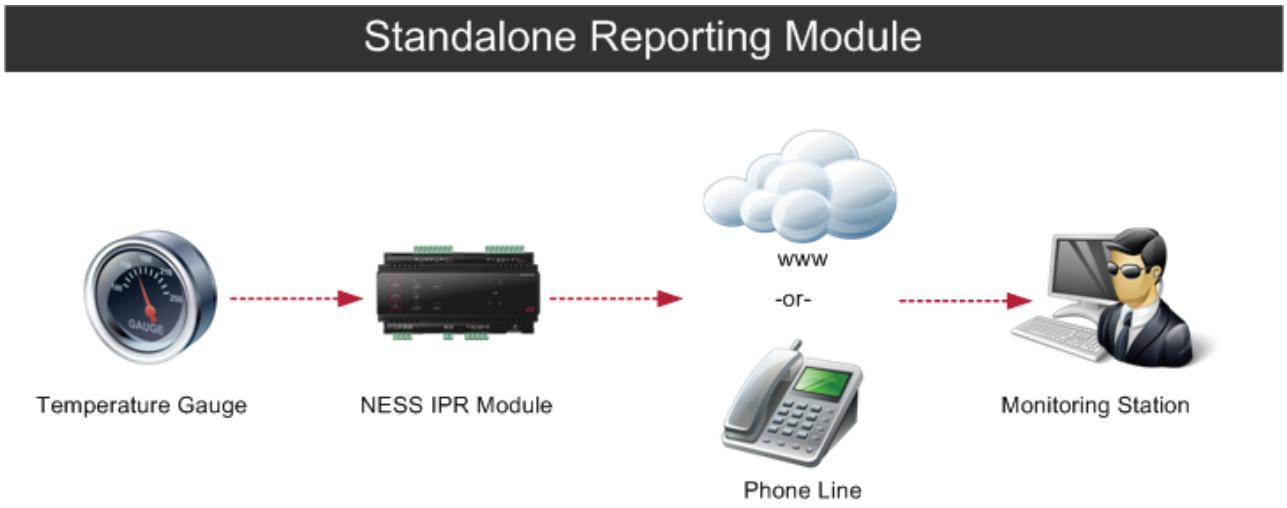
## IP Reporting Router




In this mode, the NESS APX acts as a phone line and monitoring station simulator. It answers the alarm panel's 'phone call', receives the Contact ID signals then 'kisses off'' the panel. It then transmits that contact ID signal to the monitoring station via the internet.

This mode essentially converts your standard Contact ID dialler to an IP reporting module.

## Standalone Reporting Module




In this mode, the NESS APX can be used as a standalone dialler to transmit alarms off site via IP **or** analogue Contact ID reporting. The NESS APX has four double end of line monitored inputs on-board.

This is an ideal solution for getting plant alarms off-site without the need for an alarm panel.

## Email Alert Device


The NESS APX unit has the ability to send emails when it receives an incoming Contact ID signal, or when one of its 4 onboard zone inputs changes state.

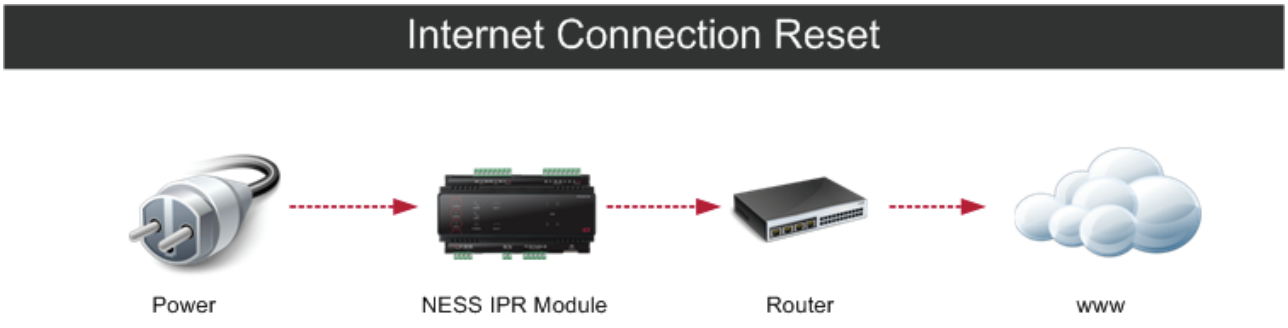
This option can be used in conjunction with most other modes of operation.

## PSTN Router


In this mode, the NESS APX unit takes the incoming Contact ID message from the alarm panel, then dials the number it has programmed and reports the alarm to the new monitoring station using the account code it has programmed.

This is an excellent way to quickly move a site from one monitoring station to another without having to reprogram the panel.

## Internet Connection Reset



When using an ADSL internet connection to get your internet access, it is quite common for the router to 'lock up' from time to time. The NESS APX module has two relays on board which can be programmed to activate for a short time when it detects the loss of an internet connection. This will drop power to the ADSL router for a short period of time to reset the internet connection.

If you are using a stand-alone ADSL connection for IP monitoring, it is recommended that this is enabled.

## Failure to Communicate Notification


The second onboard relay can be programmed to activate on failure to communicate. This relay can then be hardwired into a zone input on the alarm panel to signal a communication problem to the people on site.

# Labs

Before we can begin any of the labs, we will need to connect our laptops to our NESS APX modules, and configure an appropriate IP address on our laptops.

Out of the box, NESS APX modules come with a default IP address of **192.168.1.2** and a subnet mask of **255.255.255.0**. To connect to the NESS APX, your laptop will need an IP address on the same subnet. For example, 192.168.1.x - where x is any number other than 2.

For the purposes of this training module, you should give your laptop an IP address which has the last octet set to 200 + your seat number:

**192.168.1.201** for seat 1

**192.168.1.202** for seat 2

Once you have configured your laptop, you should be able to ping your NESS APX on 192.168.1.2.

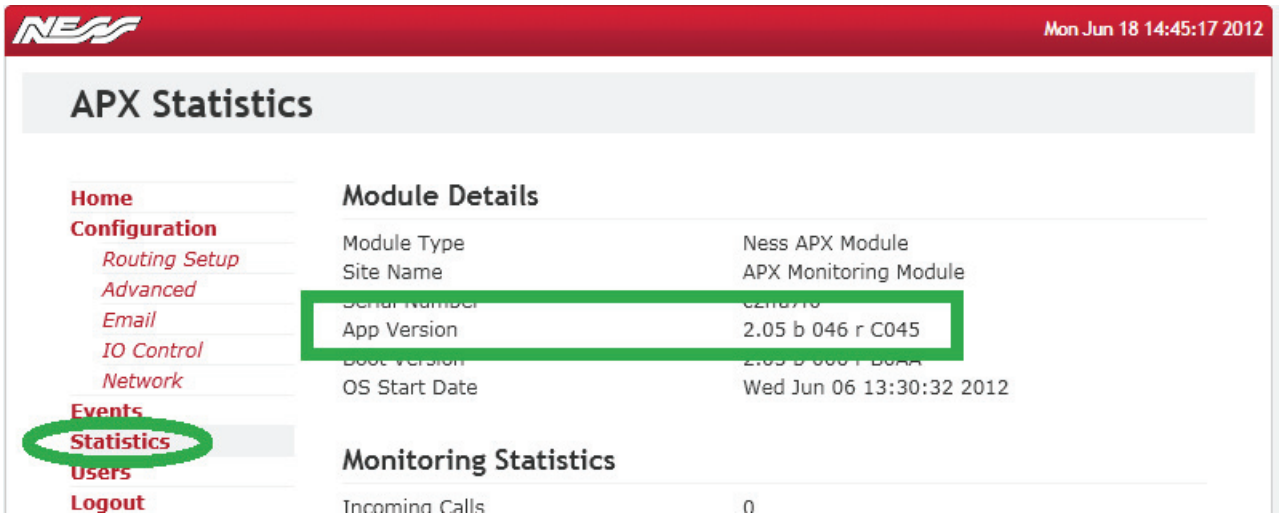
## Firmware Upgrade

We release regular software and firmware updates. Updating the firmware on the NESS APX module is relatively straight forward.

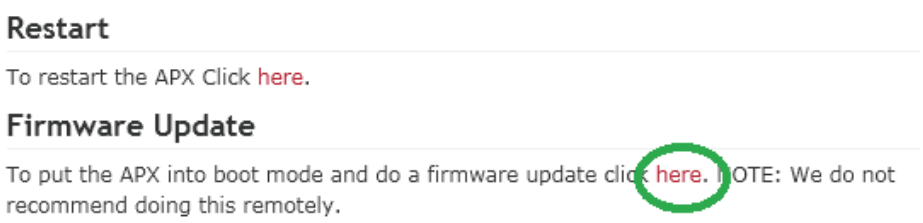
1. Open up a web browser and browse to **192.168.1.2**.
2. Login using the default admin account:

   username = admin

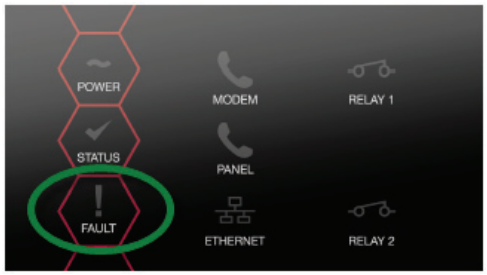
   password = admin
3. Browse to the **Statistics** page and take note of the App version.



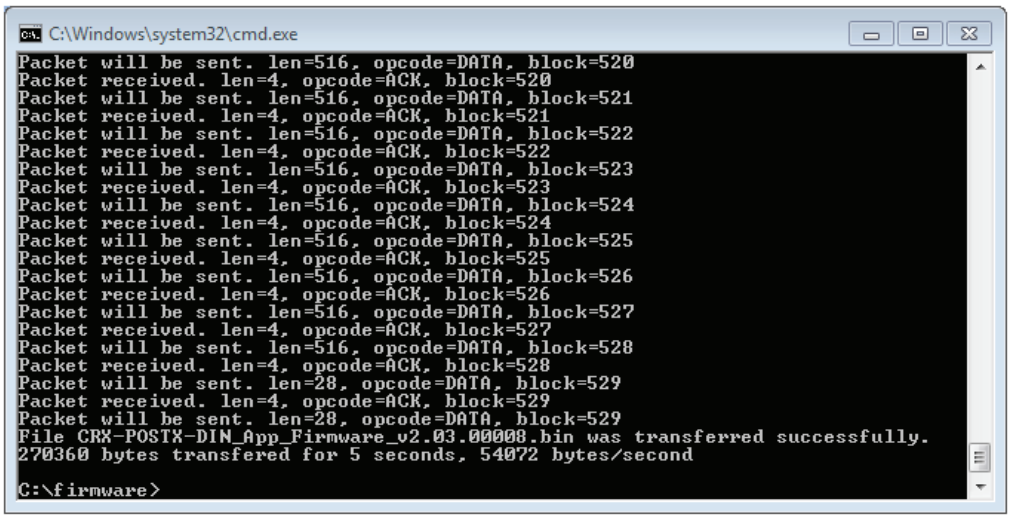

4. Browse to the **Configuration | Advanced** page.
5. Scroll to the bottom of the page and select the link to put the NESS APX into boot mode.



6. The fault indicator on the front of the NESS APX should now be flashing rapidly.




7. Your new firmware and the TFTP.exe file should be in an easy to locate folder on your laptop's hard drive, such as C:\firmware.
8. Open a command prompt and change directory to your firmware directory.
9. Type **TFTP –i –v 192.168.1.2 PUT**, and then press the tab key. This should populate your command with the firmware filename. If not, keep pressing tab until it does.
10. Press **Enter**.




11. Once the download has finished, cycle the power on the NESS APX to restart.
12. Using your web browser, browse again to 192.168.1.2.

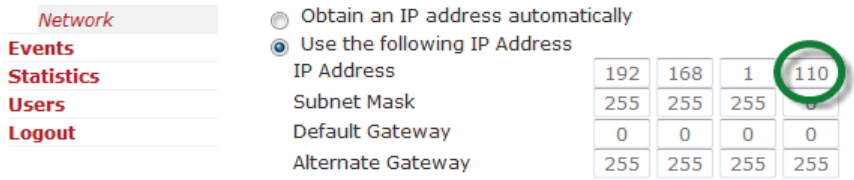
Be sure to remove the **/boot.php** off the end of the URL or you will put the NESS APX straight back into boot mode

13. Browse to the Statistics page and take note of the App version.

# IP Reporting Router

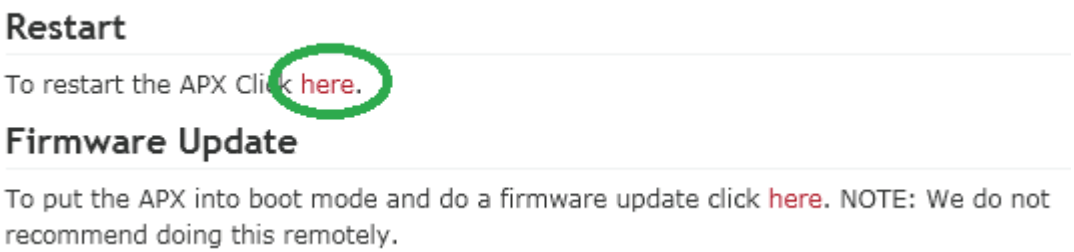
Now that we have the latest firmware onboard, we can start configuring our NESS APX.

1. Browse to the **Configuration | Network** page.
2. Give your NESS APX an IP address of 192.168.1.10x (seat number).



You would normally get the rest of the network settings from your clients IT Network Administrator.

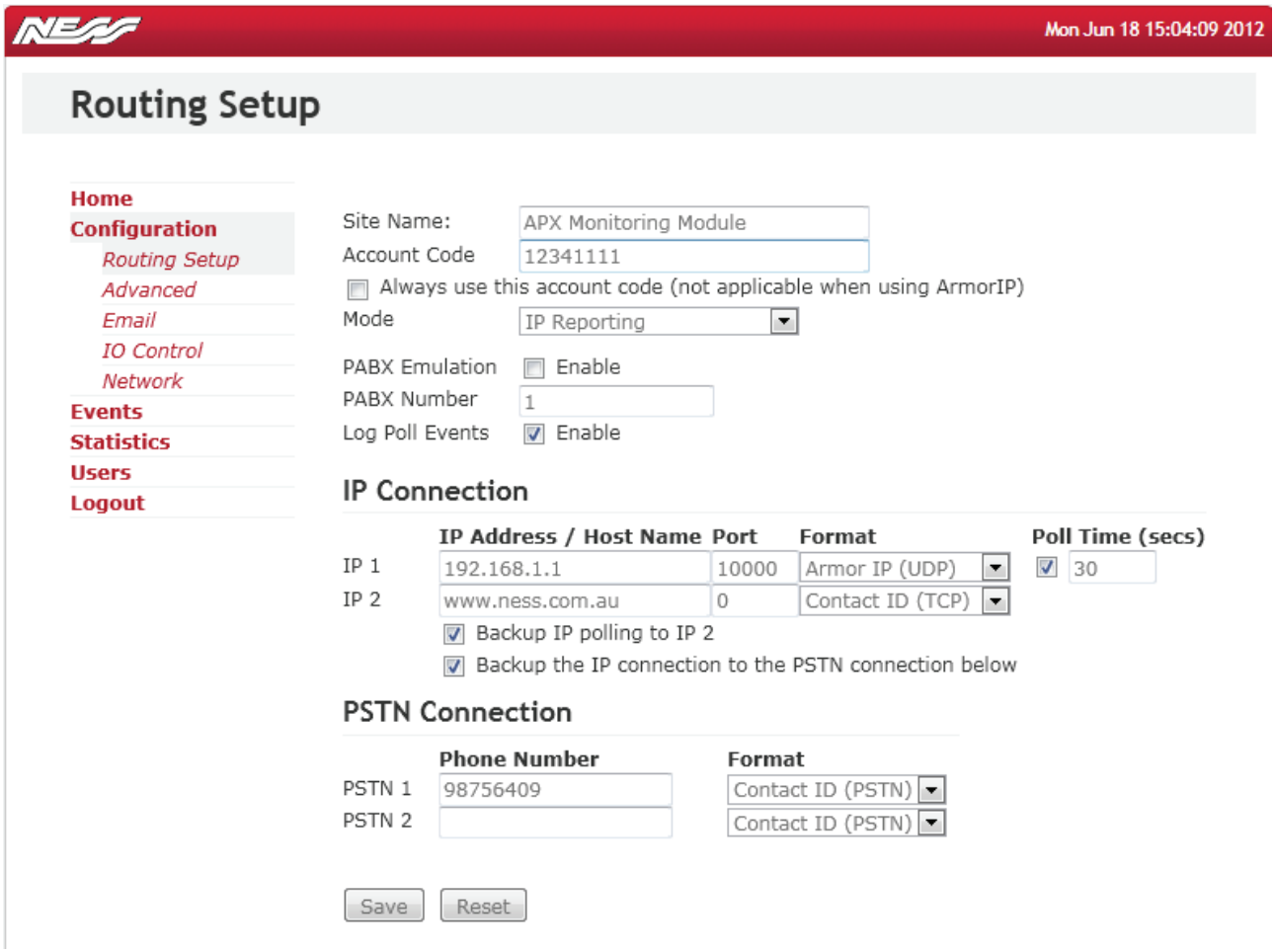
3. Set the time to your PC time by clicking the **Apply PC Time** button.
4. Click **Save**.
5. Browse to the **Configuration | Advanced** page.
6. Click the **Restart** link.




You should be very careful selecting the **Obtain an IP address automatically** option, as it may be difficult to discover the assigned IP address to browse and configure the NESS APX later.

7. Connect your NESS APX and Laptop to the main network now.
8. Browse to the **Configuration | Routing Setup** page.
9. Enter a site name.
10. Enter an account code (1234xxxx) where x=seat number.
11. Select **IP Monitoring** from the dropdown box.
12. Tick the **log polling events** checkbox.
13. Set a primary IP address of 192.168.1.1 on port 10000.
14. Set a poll time of 30 seconds.

15. Click **Save**.




16. Observe your account status on the ArmorIP server interface.
17. Once your account is shown as active and you can see the poll cycle working, unplug your NESS APX from the network and observe the poll failure.
18. Browse to the **Events** page and observe the polling log.
19. Browse to the **Statistics** page and note the monitoring statistics.
20. Connect an alarm panel to your NESS APX and generate some signals.
21. Observe the events showing up in the ArmorIP server interface.

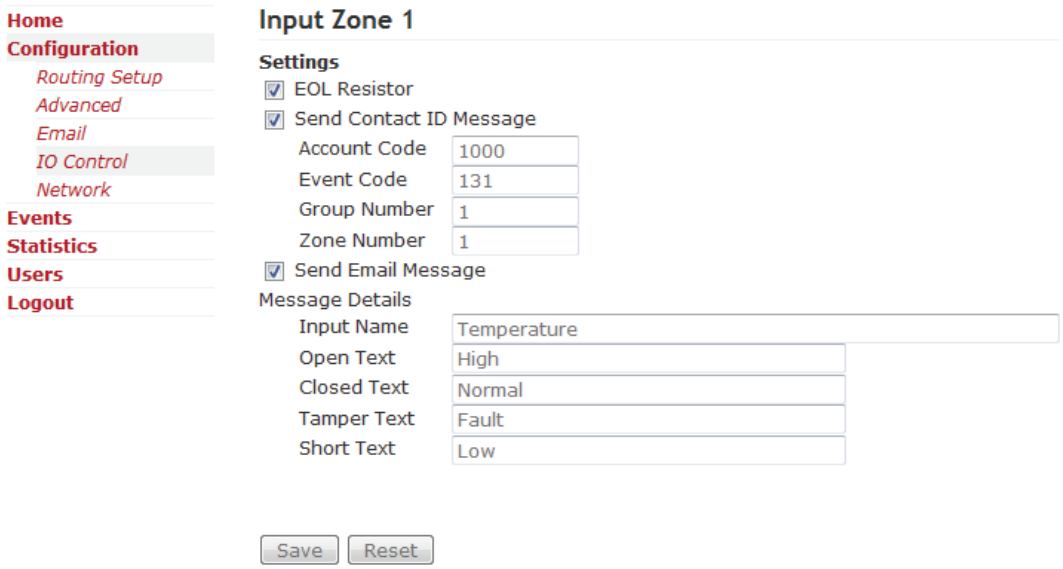
# Standalone Reporting Module

You have seen now how the NESS APX takes Contact ID from an existing panel and converts it to an IP signal. Let's take a look now at running the module in standalone reporting mode.

The NESS APX is already configured to send alarms to ArmorIP, so all that is left to configure is how to react to a state change of an input.

1. Browse to **Configuration | IO Control**.
2. Enter an email address to send your alarms to.
3. Click **Save**.
4. Click on the **Input Zone 1** link.

5. Configure the zone similar to that shown below.

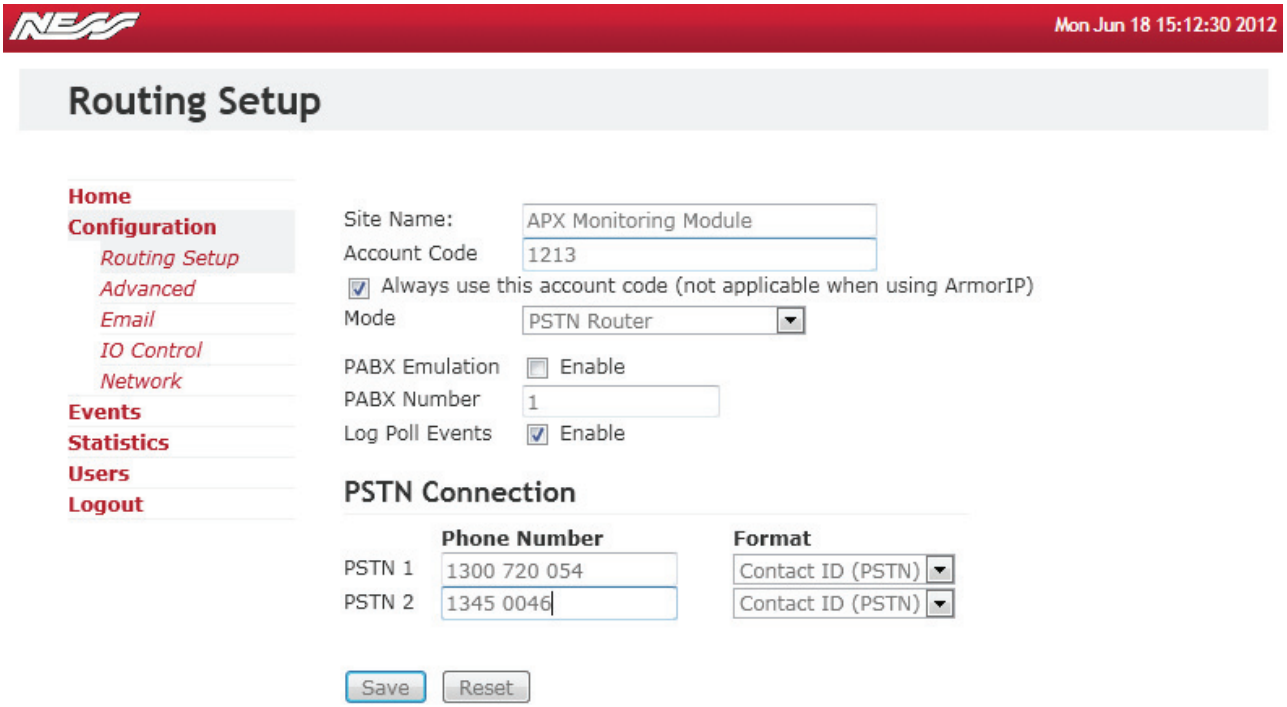



6. Click **Save**.
7. Wire two resistors in series across the Z1 and V- terminals.
8. Note how the 4 states (open, closed, tamper and short) are indicated by the LED.
9. Observe the events showing up in the ArmorIP server interface.
10. Observe the emails that have been sent.

# PSTN Router

Another handy feature of the NESS APX is the ability to use it as a PSTN router. This effectively takes the Contact ID signal from the alarm panel and redirects it to a new monitoring station. This is a very quick way of changing someone over without having to re-program their alarm panel.

1. Browse to **Configuration | Routing Setup**.
2. Change the account code to the new 4 digit code.
3. Change the mode to **PSTN Route**r.
4. Enter your new monitoring stations phone numbers.
5. Click **Save**.



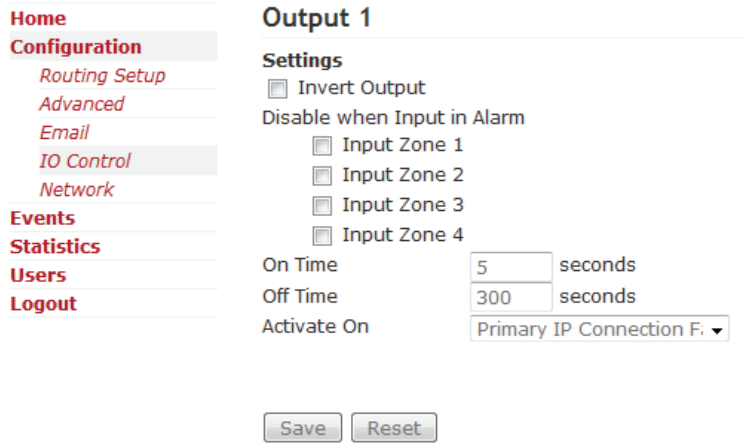

As quickly as that, you have changed to a new monitoring station!

Note that you can still configure the four onboard inputs to send Contact ID as well.

Now set your Routing mode back to **IP Monitoring**.

# Internet Connection Reset

1. Browse to **Configuration | IO Control | Output 1**.
2. Set an on time of **5**.
3. Set an off time of **300**.
4. Set **Activate On** to **Primary IP Connection Failure**.
5. Click **Save**.

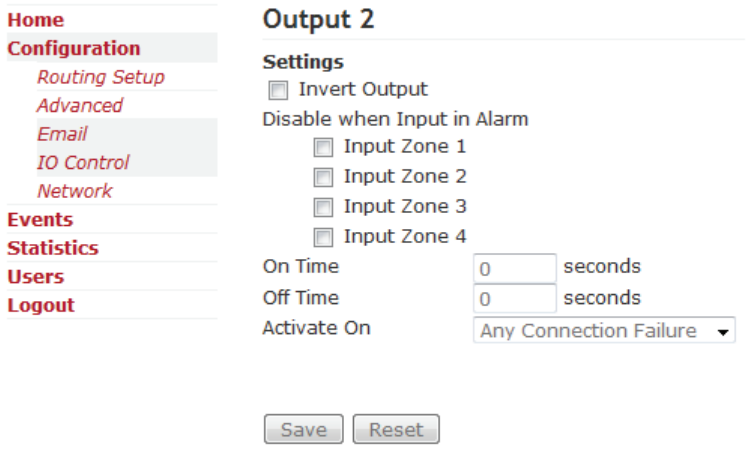



6. Remove the Ethernet cable from the NESS APX.
7. Observe the Relay 1 operation.

If we have an IP failure now, the NESS APX will activate Relay 1 for 5 seconds, and then switch it off for 300 seconds (5 minutes). It will continue to do this until the IP connection is restored. This can be used to drop power to the internet gateway router and wait 5 minutes for a reconnect.

# Failure to Communicate Notification

1. Browse to **Configuration | IO Control | Output 2**.
2. Set an on time of **0**.
3. Set an off time of **0**.
4. Set **Activate on** to **Any Connection Failure**.
5. Click **Save**.




6. Remove the Ethernet cable from the NESS APX.
7. Observe the Relay 2 operation.

If we have any connection failure now, the NESS APX will activate Relay 2 until **all connections** are restored. This can be used to trigger a zone input or warning light at the site to alert staff to a possible communication problem.

# Backup Configuration

Now that you have done all this work it would be wise to back it up. This can also be used as a way to create a template with default configuration for all of your sites.

To create a configuration file, set up a NESS APX Module with all the required settings. Open the Windows command prompt (Start->All Programs->Accessories->Command Prompt) and type in the following command using the IP address of the NESS APX Module:

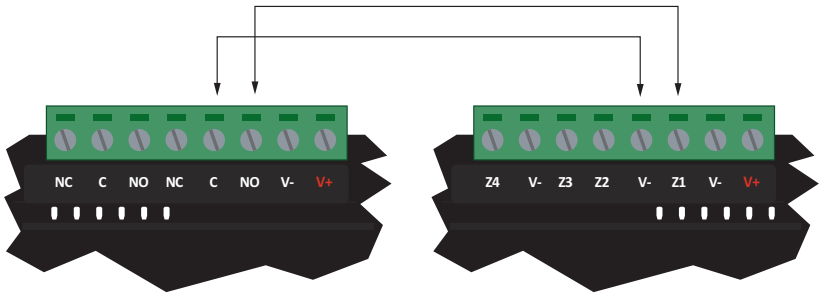
```
tftp -i 192.168.1.2 GET config.bin
```

This will create a file called "config.bin" in the same directory where you typed in the command. This file is the default configuration file you can download to any other NESS APX Module.

# Default IP

To change the IP address to a static address of 192.168.1.2 and a subnet mask of 255.255.255.0 complete the following steps:

1. Connect the terminals for Zone 1 and NO of Relay 1 together. Repeat the procedure for the V- and C terminals as shown in the diagram below.



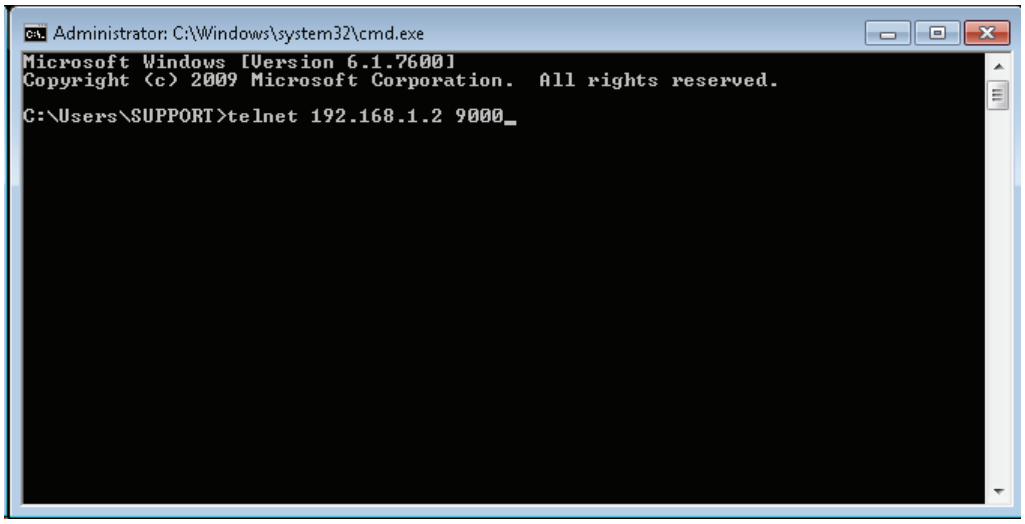

2. Enable DC supply to the NESS APX Module.

Note: If any zone on the NESS APX is closed, it will not activate any of the relays, and therefore not default the IP address. To successfully default the IP address, all zone inputs must be open.

# Command Line Interface

The NESS APX Module also provides a command line interface to help with setup diagnostics. This can be accessed through a Telnet session. The following instructions detail how to establish a Telnet session.

1. Open a command prompt (Click Start | Run, then type "cmd" into this window and click "OK").
2. Type **ping 192.168.1.2 9000** into the command prompt and press ENTER.
3. Wait for the command prompt to respond. The command prompt "ICTNET>" will come up when a connection has been established, as shown by the diagram below. To terminate the telnet session, type "exit" into the command prompt.




*Starting a Telnet Session*

To start using the RS485 interface, apply DC power to the NESS APX Module and connect the ACC-485 to both the NESS APX Module and an available serial port on your computer. Open a terminal program such as HyperTerminal or TeraTerm with the baud rate set to 38400 (38400, 8, n, 1). Press ENTER or ESC to get the command prompt.

**This should only be used by users experienced with Telnet.**

## Command Line Interface Commands

| Command | Example | Description |
|---|---|---|
| arp -1 | arp -a | Lists all the entries in the ARP table (IP address and MAC address details) |
| arp -d | arp -d | Deletes the ARP cache. This is useful if the IP address of a device you are trying to talk to has changed. |
| boot | boot | Restarts the NESS APX in boot mode. Note that this will disable the command line interface. |
| default | default | Defaults the NESS APX to factory settings |
| dhcp | dhcp | Displays the DHCP client details |
| dhcp -d | dhcp -d | Starts the DHCP server discovery process. Note: This does not change the NESS APX into the DHCP mode. The IP address, subnet mask and default gateway values obtained during the discovery process will become the new settings used in network configuration web interface for static IP configuration when the NESS APX restarts. |
| emac | emac | Displays statistics for the Ethernet interface |
| exit | exit | Disconnects an active telnet session |
| ipconfig | ipconfig | Lists the details of the UIP setup, IP address, gateway, subnet mask etc |
| ipconfig -all | ipconfig -all | Extended IP configuration details |
| ping | ping 192.168.1.1 | Sends a ping command to the selected IP address |
| restart | restart | Restarts the NESS APX |
| set ip | set ip 192.168.1.56 | Sets the IP address. The NESS APX must be restarted for the change to take effect. |
| set gateway | set gateway 192.168.1.1 | Sets the gateway address. The NESS APX must be restarted for the change to take effect. |
| set mask | set mask 255.255.0.0 | Sets the subnet mask. The NESS APX must be restarted for the change to take effect. |
| set dnsl | set dnsl 1952.168.1.1 | Sets the primary DNS server. The NESS APX must be restarted for the change to take effect |
| set ntpl | set ntpl 202.156.2.125 | Sets the primary SNTP server. The NESS APX must be restarted for the change to take effect |
| sntp | sntp 202.156.2.125 | Updates the time from the SNTP server at the given IP address. This can be used to confirm the SNTP server is working before you save it in the network configuration. |
| system | system | Displays the system details including serial number and software version |
| time | time | Displays the current time stored in the NESS APX |

*Command Line Interface Commands for the NESS APX Module*

**This should only be used by users experienced with Telnet.**

# Restore Configuration

Once a configuration file has been created, it can be downloaded to any other NESS APX Module. Open the Windows command prompt (Start > All Programs > Accessories > Command Prompt) and change to the directory where the configuration file has been saved. Type in the following command using the IP address of the NESS APX Module:

```
tftp –i 192.168.1.2 PUT config.bin
```

Restart the NESS APX Module for the new configuration to take effect.

Note: The IP address will NOT be changed as part of the config download.