APPLICATION NOTE

AN0015

PORTAL PLUS COMMUNICATION USING 3G

INTRODUCTION

This application note details cellular 3G connectivity between a Portal Plus EWS controller and PRO'S server-client monitoring software. As an alternative to hardwired internet, 3G cellular data connectivity is readily available across the UK with most providers claiming up to 90% coverage. The benefits over older 2G communications is the large bandwidth available, allowing for higher speed data transfers, ideal for monitoring access control or CCTV systems. The cost of 3G tariffs has reduced over time and price plans (fixed or pay per MB) are now in line with hardwired broadband costs.

HARDWARE REQUIREMENTS

3G Router (Pro Route H685P used in this guide)
3G enabled data SIM card (**see SIM card notes**)
Portal Plus EWS controller
Workstation or laptop

It is highly recommended to setup a data usage cap/plan with the SIM card provider to prevent unnecessary high billing charges.

SOFTWARE REQUIREMENTS

PRO'S CS Software (version 1.1.5.0 or later)

SIM CARD NOTES

Most SIM card data plans offered by providers do not have a real fixed IP address or provide a proper legacy connection to the internet as standard. Generally these SIM cards have dynamically allocated IP addresses hidden behind a NAT and therefore are not visible over the internet. A real fixed IP SIM card is required for this guide (standard – not mini or micro).

Fixed IP NAT-free Sim cards are available on request from most telecom providers. This guide details use of an Andrews & Arnold Ltd data SIM based on the three network (details can be found at http://www.aa.net.uk/telecoms-mobile-data.html).

It is recommended to check that the area where the SIM card is to be used has sufficient 3G coverage. The performance of the device is totally dependent on the location and strength of the signal in the operational area.

PRO ROUTE H685 CONFIGURATION

Remove the 2 screws on the reverse side of the router to gain access to the SIM card holder.

Slide the SIM card holder to the left to release, and insert the SIM card.

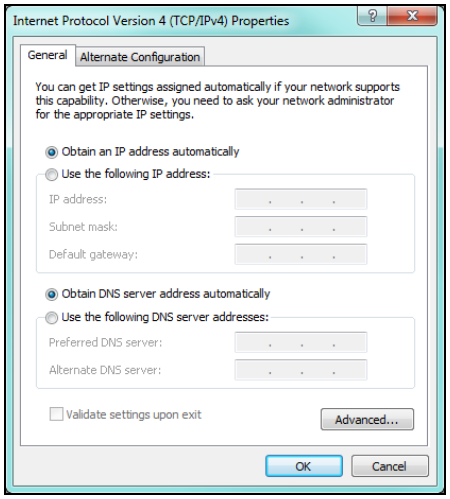
The unit is supplied with 2 magnetic mount antennas. Connect a Cellular Antenna to the Cell antenna port. If required you can connect the second antenna to the Aux antenna port, using this will not help with signal strength but may help with data throughput when the router is connected at 3G (HSPA+).

Connect the power lead supplied. As an alternative, a 13.8V dc 1A power supply may be hardwired directly to the 10 way green terminal block.

Now, and only after the SIM card is inserted, power the unit up.

CONNECTING TO THE NETWORK

The unit is supplied with a DHCP server enabled. Set your PC network card to automatically obtain an IP address (Appendix A).



The unit will take between one and two minutes to run through the start-up process before allowing access to the router web administration interface.

Connect your PC to the device via an RJ-45 cable in to the LAN port of the router.

Within a web browser type http://192.168.8.1 and hit the 'enter' key. When prompted enter the default credentials:

Username: **admin**
Password: **admin**

LOADING OPERATOR SETTINGS AND APN

The Andrews & Arnold SIM card featured in this guide does not require operator or APN settings to be entered, they are automatically configured and the rest of this section may be skipped. For other providers this may not be the case, and details will have to be entered.

On the menu on the left hand side select 'Internet Settings' then in the sub menu select 'WAN'. Then select 'Advance Parameter Groups'. You will then need to enter APN, User and password settings which have been given to you by your service provider. If this is a fixed IP SIM this will come with the instructions. If it is a normal data SIM then you can get these from the mobile operator support services.

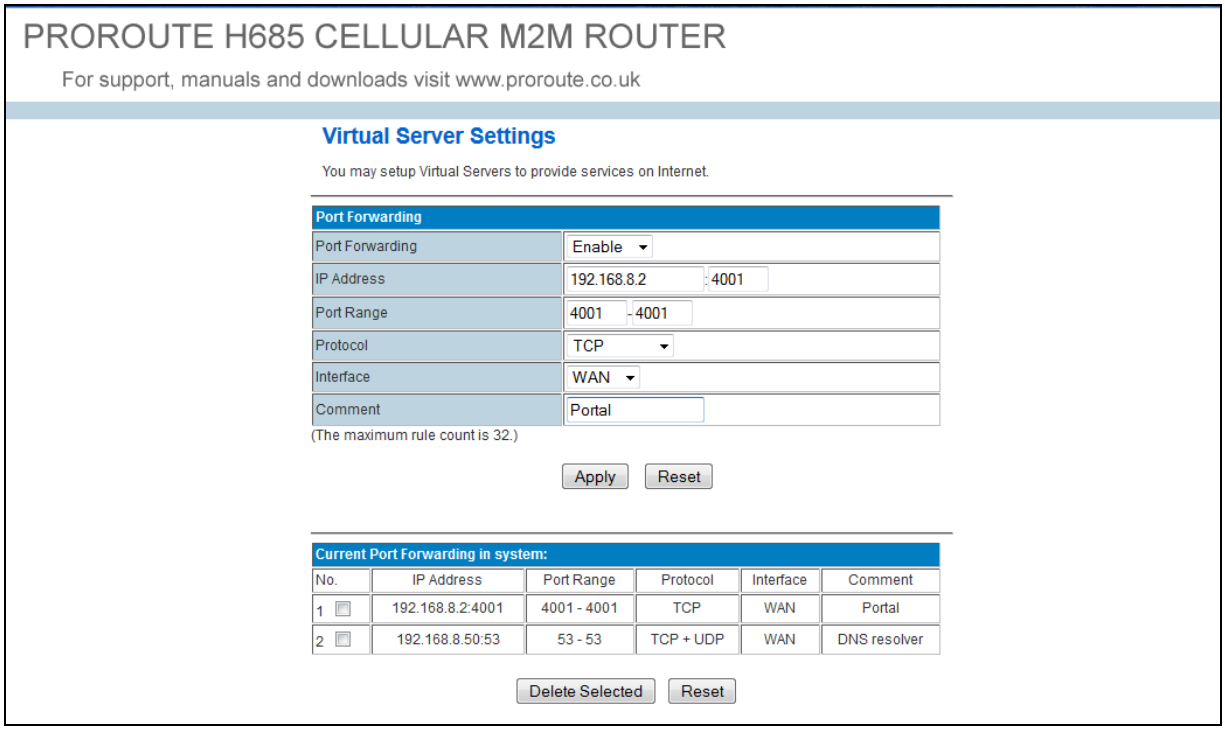
At this point no other items within this menu need to be changed from their default settings. When these have been entered correctly select the 'add/edit' tab and wait. When the next field appears select the 'Apply' tab.

Once all settings have been entered, check the main router status page to check if the router has a connection to the internet. This can be confirmed by a blue flashing 'Cell' light on the front of the router. It should also be possible to browse the internet on the PC connected to the router making use of the 3G connection.

PORT FORWARDING

This is the process by which you can ensure efficient connectivity between outside servers and devices and resources connect to the LAN side of the router.

Select 'Firewall' in the menu and then 'Port Forwarding'. On this page select 'Enable'.



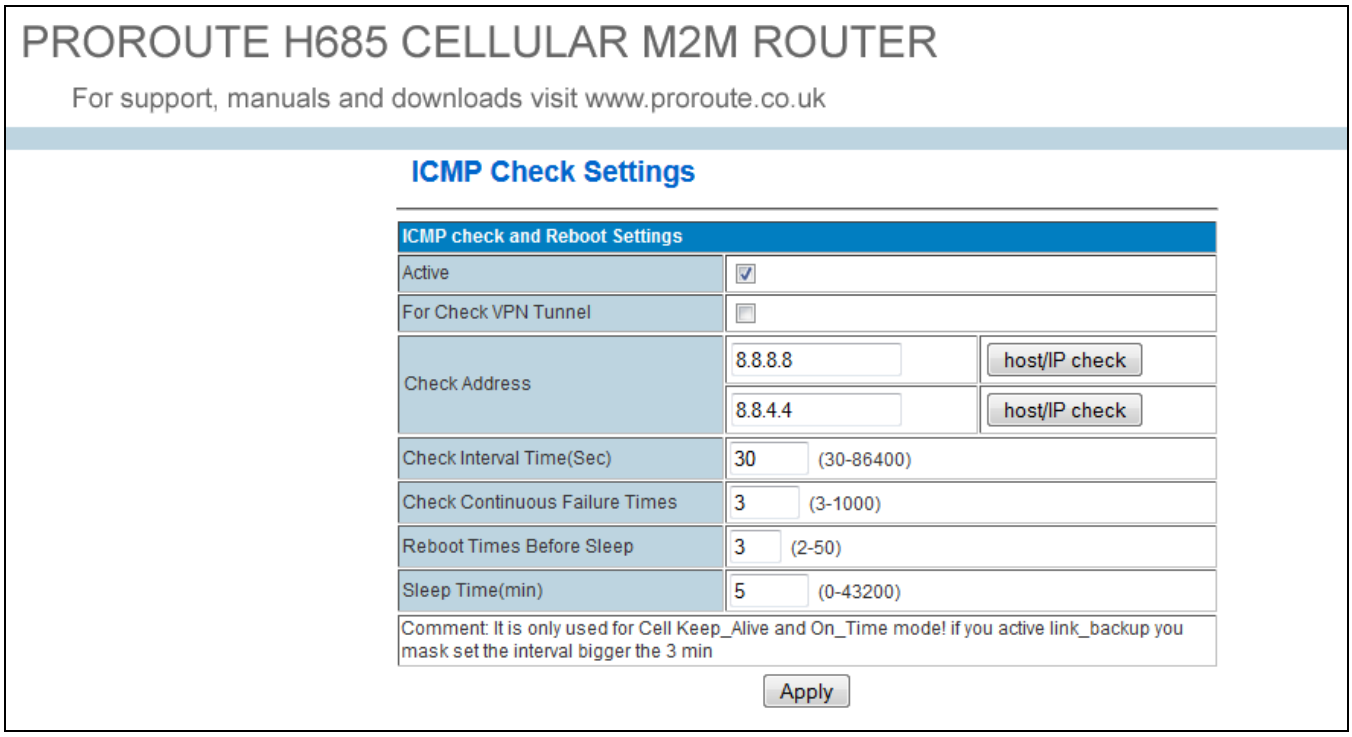
Add the two port forwarding rules as shown above. The first rule named 'Portal' is the IP address of the Portal Plus EWS controller which we will connect to the system later. Any data coming in on port 4001 (WAN) will be forwarded to the device 192.168.8.2 on port 4001 (LAN).

The second rule is to prevent any DNS amplification attacks. These attacks could lead you to unknowingly take part in denial of service attacks on third parties and could incur a large bill for data usage. As the router has no option to switch off the DNS resolver, we can forward any DNS requests to an IP on the LAN which does not exist and in effect disabling the DNS resolver.

KEEP ALIVE

ICMP check is recommended to be active to ensure a reliable, always on connection. Click 'Network Settings' and then 'Cell ICMP Check'

Tick 'Active' and then enter two IP addresses for the router to ping. We recommend using Google's Public DNS servers because we assume these should be available 24/7. 8.8.8.8 and 8.8.4.4. The default time settings should be okay to leave as they are.



OTHER CONSIDERATIONS

It is possible to enable the web management page to be accessed over the internet (WAN). If enabled we highly recommend changing the default credentials (u:admin / p:admin) to stop unauthorized access to your router settings.

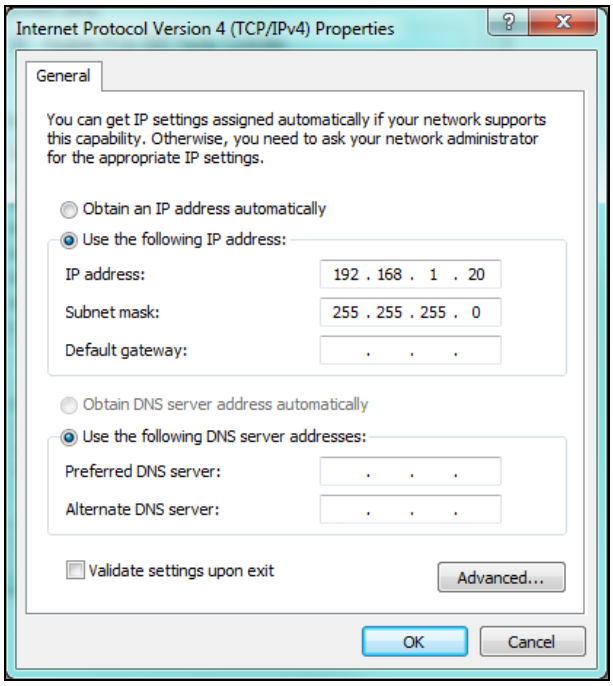
It is recommended to setup MAC or IP filtering to allow access from only authorized devices over the internet. In this case it would be the public IP (WAN) of the computer communicating with the EWS controller.

The location of the Antenna is probably the most critical consideration and understanding which operators offer the optimum signal strength in the area. As an initial check we recommend visiting the **Ofcom** website: http://www.ofcom.org.uk and follow the onsite links to their online mobile coverage tool. This tool will advise on the best coverage for the main network providers and other general queries that you may have about the service provider.

EWS CONTROLLER CONFIGURATION

Portal Plus EWS controllers have a factory default IP address of 192.168.1.100.

Set your PC network card to have a static IP address of 192.168.1.20 and a subnet mask of 255.255.255.0 as shown.

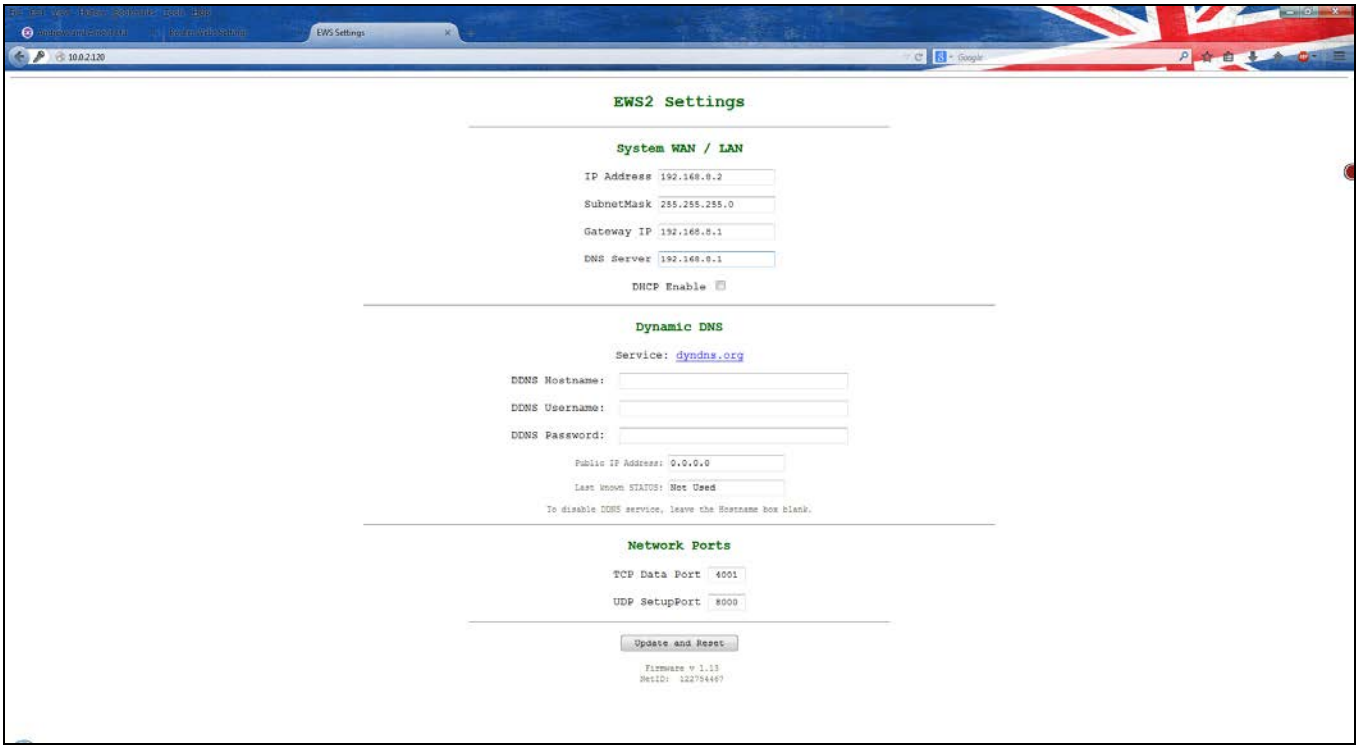


Connect your PC to the EWS controller via an RJ-45 crossover cable. Power up the EWS controller.

Within a web browser type http://192.168.1.100 and hit the 'enter' key. When prompted enter the default credentials:

Username: **admin**
Password: **00000000**

Reconfigure the EWS network configuration with the details shown below, and press 'Update and Reset'



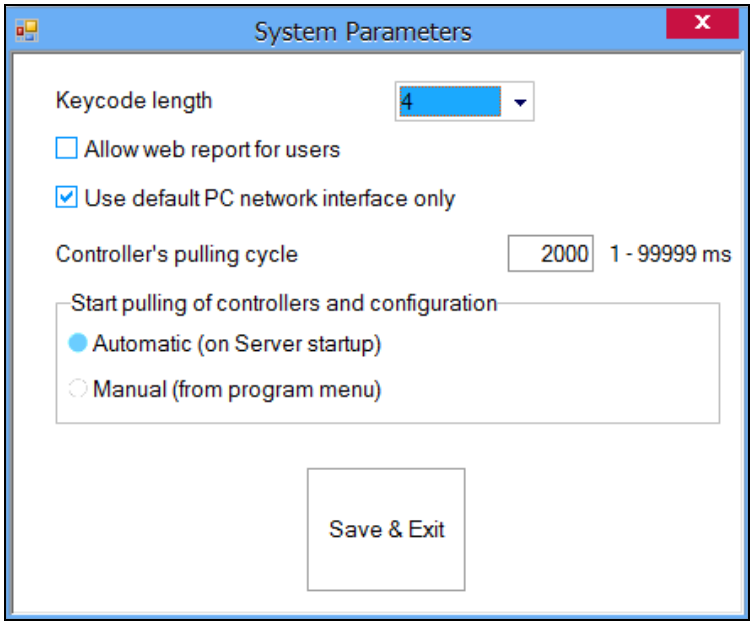
IP address 192.168.8.2, Subnet Mask 255.255.255.0, Gateway 192.168.8.1, DNS Server 192.168.8.1

Using a RJ45 cable, plug the EWS directly in to the LAN port of the PRO Route H685.

PROS SOFTWARE CONFIGURATION

Install the PRO'S CS software (client and server applications) on a PC connected to the internet. Using the client, connect to the server software using the default credentials (admin / admin).

Click the 'Settings' menu and select 'System Parameters' and change the controllers Pulling cycle to 2000ms and set the pulling mode to 'Automatic'. The PRO'S software will request a single event from each controller in turn, every 2 seconds (2000ms). This helps reduce the total data transferred over the 3G link. The time can be set between 1 and 99 seconds depending on the size of the system and the number / frequency of events.



The controllers pulling cycle may also be set to 'Manual' instead of 'Automatic'. When manual is selected, the pulling of events is controlled by a 'stop pulling' and 'start pulling' button located at the top of the main PRO's client window. When 'stop pulling' is selected, the PRO'S software will not request events from controllers until 'start pulling' is activated.

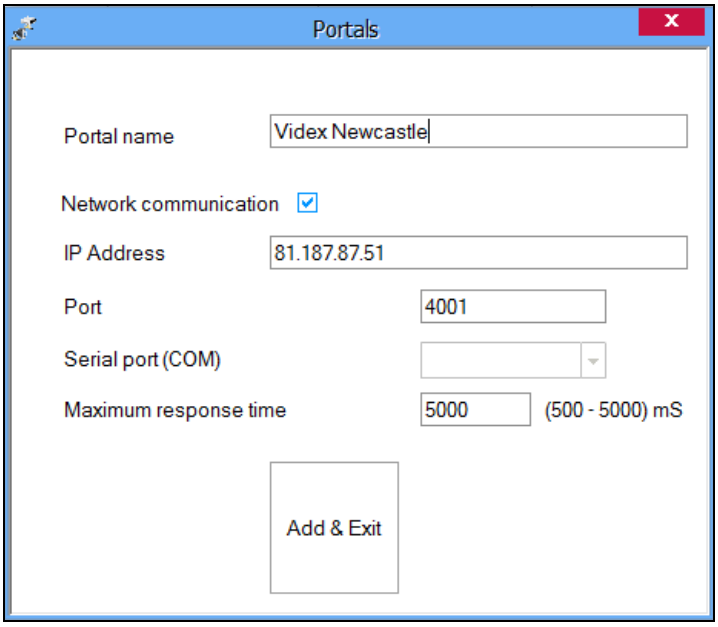
ADDING THE CONTROLLER

Within the main PRO's client, locate the hardware section at the top left of the window.

Right click 'Portals' and select 'Add Portal'.
Input the following details as shown in the image:

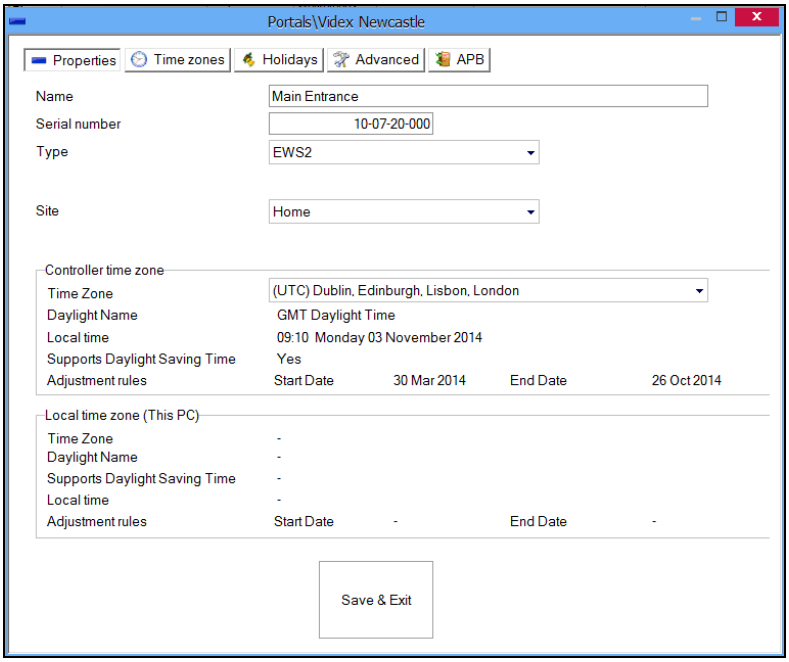
Portal Name (Site Location)
IP Address (WAN IP of 3G router)
Maximum response time – 5000ms

Click 'Add & Exit'. The hardware section should now list the portal, and an event showing the controller online within the events window should appear.



Right click the recently added portal and select ‘Add controller’ followed by EWS2. The window as shown should appear. Enter the controller name and serial number followed by the ‘Save & Exit’ button.

The controller should now be listed underneath the portal and showing online.



ADDITIONAL NOTES

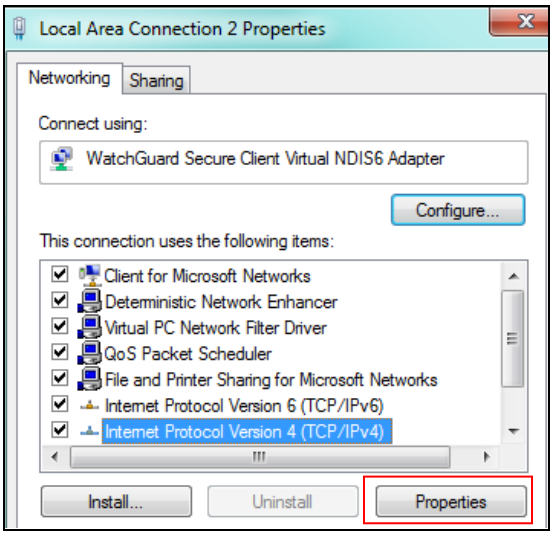
Please ensure the portal and controller firmware is updated to the latest release. Updates may be carried out by right clicking the relevant device in the hardware list and selecting ‘Firmware Update’.

APPENDICIES

Appendix A – Setting network adapter to obtain automatic IP configuration.

In Windows, browse to the control panel and select “Network and Sharing Center”. Within here click “Change adapter settings” and locate the network connection that will be used to hardwire in to the 3G router (usually labelled as “Local Area Connection”). Right click the icon and select the properties menu.

Scroll down and select
“Internet Protocol Version 4 (TCP/IPv4)” followed by the properties button.



Select “Obtain an IP address automatically” followed by the “Ok” button.