Series 2000 - 4G Modem / Router

Models 2455 & 2455X

Quick Start Guide

Document Number: 0013-001-000484
Version: 1.3 (16 December, 2016)

CYBERTEC

Documentation Control

Generation Date: December 16, 2016

Copyright © 2016 Cybertec Pty Limited

All rights Reserved.

Legal Information

More information about Cybertec can be found at the following Internet address: http://www.cybertec.com.au

Contents

1 Introduction

The Cybertec Series 2000 4G Modem / Router is designed for use with 4G LTE & 3G HSPA wireless networks. The Series 2000 4G Modem / Router provides support for download data rates of up to 100Mbps and upload data rates of up to 50Mbps.

This guide will provide an overview of the features and interfaces of the Series 2000 4G Modem / Router Model 2455/2455X. Installation of the unit and antenna will described as well the configuration of the unit for a standard Internet connection. Further information can be obtained from the Series 2000 4G Modem / Router Model 2455/2455X User Manual.

1.1 Default Configuration

Unless otherwise stated this manual assumes the configuration of the Series 2000 4G Modem / Router is in the factory default state. If the modem has previously been configured it may be necessary to perform a configuration reset to return the configuration to the default state, prior to configuring the device. The procedure to perform a configuration reset is described is Section 4.4.

2 Safety

Please observe the general safety precautions outlined in this manual during all phases of operation and service of the Series 2000 4G Modem / Router. If you do not comply with these precautions or with specific safety warnings contained elsewhere in this manual or on the product itself, you will violate the standards of design, manufacture, and intended use of the product. Cybertec does not assume any liability for failure to comply with these precautions.

Read this manual completely and make sure it is understood fully before commencing installation. Check that the intended application does not exceed the safe operating specifications for this unit. This unit should only be installed by qualified personnel. The power supply wiring must be sufficiently fused, and if necessary it must be possible to manually disconnect the unit from the power supply.

3 Care Recommendations

To maintain correct operation of unit and to fulfill the warranty obligations the following care recommendations should be followed. This unit must not be operated with the covers removed. Do not attempt to disassemble the unit, no user serviceable parts are contained within the unit. Do not drop, knock or shake the unit, rough handling may cause damage to internal circuit boards. Do not use harsh chemicals, cleaning solvents or strong detergents to clean the unit. Do not expose the unit to any kind of liquids (rain, beverages, etc), the unit is not waterproof. Keep the unit within the specified humidity levels. Do not use or store the unit in dusty, dirty areas, connectors as well as other mechanical part may be damaged.

4 Indicators and Interfaces

This section describes the indicators and interfaces for each of the Series 2000 4G Modem / Router Model 2455/2455X .

4.1 Front Panel

All connectors and indicators of the Series 2000 4G Modem / Router Model 2455/2455X are located on the front panel of the unit. The location of the connectos and indicators are shown in figure 1.
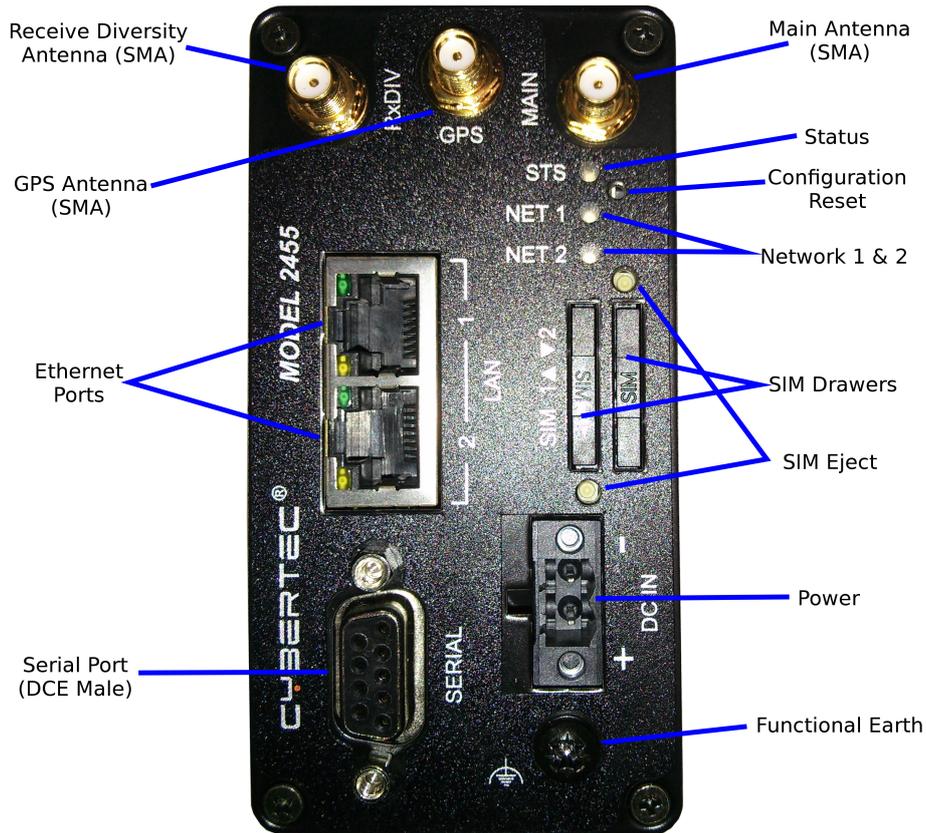

Figure 1: Model 2455/2455X front panel.

4.2 Rear Panel

The rear panel contains the DIN rail mounting clip. No connectors or indicators are located on the rear panel. Refer to Section 5 for installation details

4.3 Indicators

The Series 2000 4G Modem / Router Model 2455/2455X has 3 LED indicators on the front panel of the unit, refer to Figure 2 for the locations.
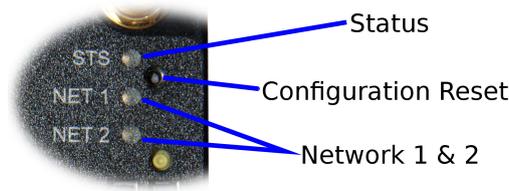
Cybertec Pty Limited
Copyright © 2016

Document: 0013-001-000484
Series 2000 Model 2455/2455X Quick Start Guide

Version: 1.3
16 December, 2016

Figure 2: Front panel indicators

4.3.1 Status Indicator

The status indicator reports the health of the unit. In normal operation the indicator will be green, if a fault is detected either at boot-up or during normal operation the indicator will light red. When the unit is first switched on or is reset the indicator will first light red, then flash red in sequence with the Network Indicator (refer to section 4.3.2), this is normal behaviour during boot-up and does not indicate a fault.

Indicator	Boot-up behaviour	Normal operation
Red	No Fault	Fault
Red Flashing	No Fault	Fault
Green	N/A	No Fault

Table 1: Status Indicator.

The indicator will light red or green a short time after power is applied. If the indicator does not light when power is applied check the power supply voltage and connections, refer to Section 5.4 for details.

4.3.2 Network Indicators

There are network indicators one for each SIM. The indicator reports the status of the connection to the network. When powered up the indicator will be off, the indicator will then flash green whilst the unit searches for a network, once connected to the network the indicator will light green. The possible states are shown in Table 2.

Indicator	Description
Off	Not ready
green flashing (slow)	Searching for network
Green Flashing (sequence)	Indication of received signal strength
Green flashing then Red	Packet connection establishing or fault
Red flashing	SIM card not present or faulty
Red (solid)	RF circuitry initialising or network registration fault

Table 2: Network Indicator.

Once a network connection has been established the Network Indicator reports the level of the received RF signal as well as any network connection faults. The signal strength is indicated by the number of green flashes of the indicator within an indicator period. Each indicator green flash will be followed by a short off time, an extended off time indicates the end of the indicator period. So an indicator period starts with a green flash followed by up to 5 additional flashes, then an extended off time, the cycle will then repeat. The maximum number of flashes in an indicator period is 6.

The indicator may be red during the extended off time following the green flashes, this indicates a network connection fault. The indicator will flash red if a SIM card is not present and will be solid red if the RF circuitry is restarting, network registration has failed or the RF signal level is too low for a connection.

When the unit is first switched on, or is reset the indicator will first light red, then flash red in sequence with the Status Indicator, this is normal behaviour during boot-up and does not indicate a fault.

4.4   Factory Default Reset Switch

The factory default reset switch is used to restore the configuration of the Series 2000 4G Modem / Router Model 2455/2455X to the factory defaults. The switch is accessed through a small hole adjacent to the indicators, refer to Figure 2. To reset the configuration first power down the unit then using a suitable tool depress the factory default reset switch, restore power to the unit ensuring the switch remains depressed for approximately 5 seconds after power is applied. The status and network indicators will flash red then green to indicate the configuration has been reset. The modem will re-boot as normal with the factory default settings.

> ⚠️ Using the Factory Default Reset Switch will erase all existing configuration settings and restore the factory default settings. This includes the network connection profile settings APN, user name and password.

4.5   Ethernet

The Ethernet ports are on the front of the unit and are marked LAN 1 and LAN 2, each port has a LED indicating the connection speed and a LED indicating activity as shown in Figure 3. Both ports are capable of auto-negotiation, meaning cross-over cables are not required. The Ethernet ports are switched, allowing more than one Ethernet device to be connected to the unit at one time.
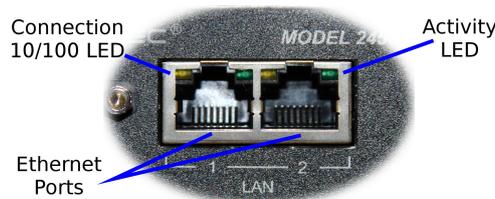

Figure 3: Ethernet ports.

4.6   Modem / DCE Serial Port

The Series 2000 has one Data Communications Equipment (DCE) serial port. The Modem / DCE Serial port is an RS232 level serial port, accessed via the front panel DB9 female connector. Refer to Figure 4 for the connections to this port.

Pin	Name	Direction	Description
1	DCD	Out	Data Carrier Detect
2	RxD	Out	Receive Data
3	TxD	In	Transmit Data
4	DTR	In	Data Terminal Ready
5	SG	-	Signal Ground
6	DSR	Out	Data Set Ready
7	RTS	IN	Request to Send
8	CTS	Out	Clear to Send
9	RI	Out	Ring Indicator

Figure 4: Modem / DCE Serial port connections.

5 Installation

The steps required to install the Series 2000 4G Modem / Router Model 2455/2455X are described.

> ⚠️ The Series 2000 4G Modem / Router Model 2455/2455X should be mounted in a clean and dry location, protected from water, excessive dust, corrosive fumes, extremes of temperature and direct sunlight. The unit uses convection cooling, allow sufficient ventilation to ensure adequate cooling of the modem.

5.1 DIN Rail Mounting

The Series 2000 4G Modem / Router Model 2455/2455X is designed to be DIN rail mounted, using the DIN rail mounting clip attached to the rear panel.

5.2 Installing the SIM Card

> ⚠️ Before removing or inserting the SIM card, ensure that the power has been turned off and the power connector has been removed from the unit.
> Damage may result to the unit if excessive force is used to remove the SIM drawer.
>
> - Do not use excessive force when pressing the SIM drawer eject button.
>
> - Do not press or lever the SIM drawer, press only the SIM drawer eject button to remove the SIM drawer and SIM Card.

The SIM card drawers are located on the front of the unit.

- The SIM card drawer eject button is a small yellow button located next to each SIM drawer of the Series 2000 4G Modem / Router Model 2455/2455X . Refer to the image on the left of Figure 5 for the location of the SIM card eject buttons. To eject the SIM card drawer press the SIM card drawer eject button using a suitable tool and remove the drawer.
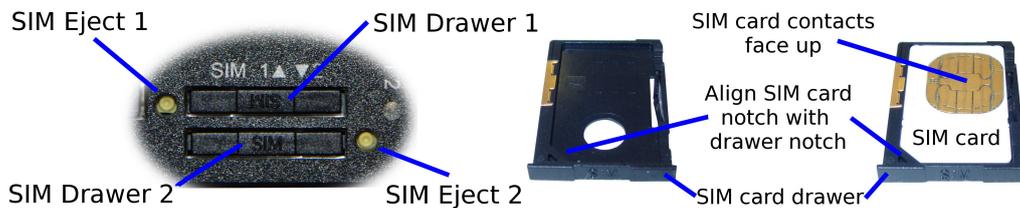

Figure 5: SIM card eject button.

- Insert the SIM card into the SIM card drawer with the contacts facing up, as shown on the right of Figure 5.

- Slid the drawer back into the unit ensuring that it locks into place.

- Optionally a second SIM can be installed in a similar way to the first.

5.3 Antenna

The antenna connectors on the Series 2000 are of SMA type and found on the front of the unit. The supplied antennae are intended for direct mounting to the SMA connectors. Attach the antenna as shown in Figure 6. Ensure that the connecting nut is done up tightly in order to make a good connection.

Figure 6: Antenna connected to SMA connector.

5.4 Power Supply

The Series 2000 requires a DC power source in the voltage range of +10VDC to +60VDC. The power connector accepts a screw terminal plug which should be wired as shown in figure 7 and plugged into the power connector on the front of the unit.

Figure 7: Functional Earth, Power plug wiring and Power connector.

The Series 2000 4G Modem / Router Model 2455/2455X is designed to self protect from permanent damage if the voltage exceeds 60VDC or if reverse polarity is applied. In the case of either event the modem may need to be returned for service.

5.5 Functional Earth

This equipment is intended to be grounded to comply with emission and immunity requirements. Ensure that the functional earth lug is connected to earth ground during normal use. Figure 7 shows the location of the Functional earth termination point.

6 Accessing the Web Interface

All configuration of the Series 2000 4G Modem / Router is performed via the web interface. In order to view the web pages a computer with a fixed IP address, on the same sub-net as the Series 2000 4G Modem / Router, will need to be connected to one of the LAN ports.

- The default IP settings of the Series 2000 4G Modem / Router are:

  ○ IP Address: 10.10.10.10
  ○ Netmask: 255.255.255.0

- The recommended IP settings for the PC used to configure the Series 2000 4G Modem / Router are:

  ○ IP Address: 10.10.10.20
  ○ Netmask: 255.255.255.0
  ○ Default Gateway: 10.10.10.10
  ○ Primary DNS: 10.10.10.10

⚠️ Although it is possible to connect the Series 2000 4G Modem / Router directly to a Local Area Network (LAN) it is recommend that the network configuration as described in this section be performed prior to doing so.

6.1 Windows PC Network Settings

The following describes how to configure the network settings of a Windows XP PC with the IP settings listed above, so that it can access the Series 2000 4G Modem / Router.

⚠️ This procedure will change the network settings of the Windows PC, if the PC is connected to a network the connection should be removed before performing the changes. To restore the network settings of the PC record the current settings at Step 6 in the following procedure, then when the Series 2000 4G Modem / Router has been configured following the procedure again and use the recorded values at Step 6.

---

1. Open the Control Panel by selecting *Start ▷ Control Panel*.

2. Double click the *Network Connections* icon.

3. Double click the Network icon.

4. The *Local Area Connection Status* dialog box will be displayed, as shown on the left of Figure 8, click the *Properties* button.
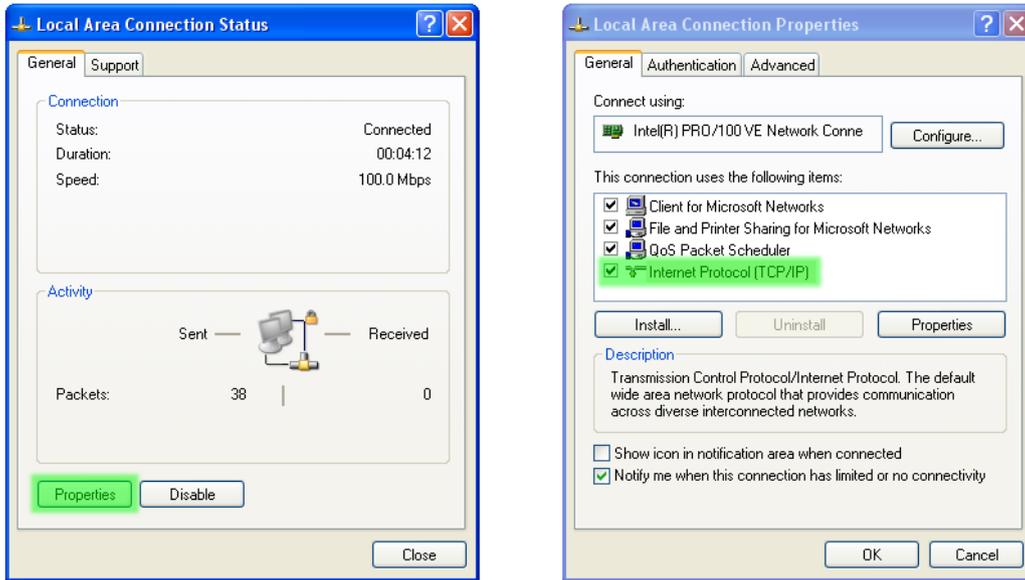

Figure 8: Local Area Connection Status and Properties dialog boxes.

5. The Local Area Connection Properties dialog box, as shown on the right of Figure 8, will be displayed. Click on *Internet Protocol (TCP/IP)* to highlight it and then click the *Properties* button.

6. The Internet Protocol (TCP/IP) Properties dialog box, change the settings to match those shown in Figure 9, and then click "OK"
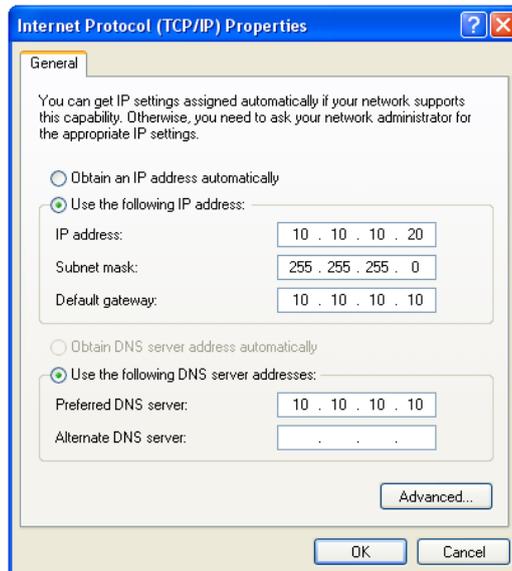

Figure 9: Internet Protocol (TCP/IP) Properties dialog box showing the recommended IP settings.

Note: If a web browser was open prior to making the network changes, then it will need to closed and re-started before attempting to connect to the Series 2000 4G Modem / Router.

6.2 Connecting to the Series 2000 Web Server

- Open a web browser on the PC and browse to 10.10.10.10 (the default Series 2000, IP address) .

- A login box similar to Figure 10 will pop up. If the box fails to display, re-check the cable connections to the unit and the IP address settings of the PC.

- Enter the following login details:

  - User Name: admin
  - Password: admin

- The Status summary page will be displayed, it will be similar to Figure 11.

Note: As the unit has not yet been configured it is likely that some faults will be indicated.

Figure 10: Model 2455/2455X Web login box

Figure 11: Model 2455/2455X Status summary

7   Basic Configuration

The section explains the procedure to configure the Series 2000 4G Modem / Router for basic packet mode functionality. For details on configuring the modem for Circuit Switched mode and for more advanced configuration refer to the Series 2000 4G Modem / Router User Manual.

7.1   Configure the Wireless interface

To access the configuration page for the Wireless interface, click on *Wireless,* the Wireless Network configuration page will be displayed as shown in Figure 12.

Figure 12: Wireless Network configuration.

7.1.1   Network Configuration

The "Network Configuration" section contains the settings for the operational mode of the modem. The default settings with Operating mode set to Packet mode (HSPA/GPRS) will be adequate for a standard Internet type connection.

7.1.2   Setting the SIM card PIN

The SIM card may have a PIN associated with it and my require the PIN to be entered before the modem can access the SIM. To set the SIM PIN click "Edit". A dialog box will be displayed, similar to that shown in figure 13, check Enable to show the additional fileds and enter the PIN in the "PIN" and "Confirm PIN" entry boxes. Then click the "Update" button to save the PIN.

Figure 13: SIM PIN control dialog.

7.1.3 Adding a Network Connection Profile

To access the wireless packet mode settings click on the "Packet mode" tab. The screen shown in Figure 14 will be displayed. The page shows the connection configuration details and is divided into two sections. The first section shows the current connection state and the selected profile and the second section lists the available profiles. A connection profile groups together the settings required to connect to a provider's network, the Series 2000 4G Modem / Router allows multiple profiles to be configured to allow quick changes to the network connection settings. For most applications only one profile is required.
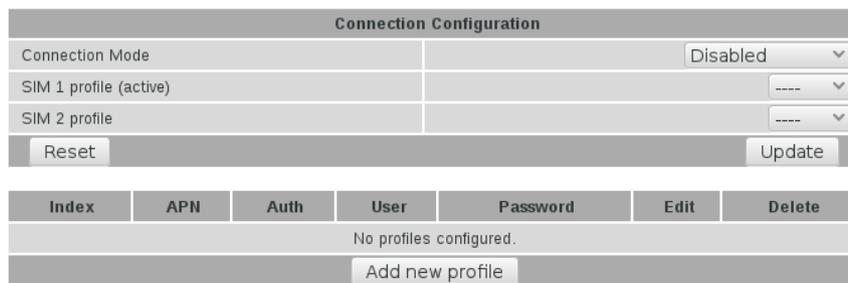

Figure 14: Wireless Interface Packet mode settings.

To configure a network profile click the "Add new profile" button, a page similar to Figure 15 will be displayed. The network provider will normally provide the conection profile details. A standard "Internet" type connection will usually only require the APN. The values provided should be entered into the appropriate fields.

APN (Access Point Name): Required for all connection types.

Authentication (None / PAP / CHAP): Only required when Username and Password are set.

Username: Required for connections which require authentication.

Password: Required for connections which require authentication. In order to set a password click the check-box marked New. The password can now be entered in the text field. The password is visible as it is being typed so that it can be checked for errors prior to being set. Once set the password will no longer be visible.
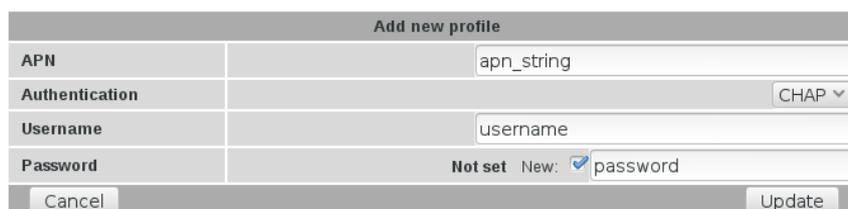

Figure 15: Adding a new profile.

> ⚠ The network service provider may not supply a username and password if network authentication is not required. In this case set the Authentication to "None", leave the username blank and do not set a password.

Once the data has been entered click the "Update" bottom to add the profile. The screen will now change to show the newly added profile as this is the only profile entered it will be automatically selected as the current profile and the profile entry will be shaded green to indicate that it is the selected profile.

7.1.4 Enable the Wireless Connection

To complete the configuration of the wireless connection, set the Connection state to "Always connect" and click the "Update" button to save the changes. Once the changes have been set, the Series 2000 4G Modem / Router will attempt to establish a connection to a wireless network. The connection time will vary and may take several minutes to complete. Figure 16 shows the completed wireless configuration.

Figure 16: Completed wireless configuration.

7.1.5 Connection Status

To check the status of the connection select "Status" from the top level menu and then select "Wireless" from the second level menu. The Wireless status page will be displayed. The status of the connection will change as the modem connects to the network, first it will report "Checking" then "Connecting" and finally "Connected". To see the value changing the page will need to be refreshed. Once connected the Wireless status page will look similar to that shown in Figure 17.

Wireless

Network Status	
Network Registration	Yes
RF Level (RSSI)	23 / 30 (-67 dBm)
SNR	1.6%-3.2%
Active SIM	SIM 1
Provider	Provider UMTS (Location: 1234 / Cell ID: FFFF)
Connection Status	
Status	Up
Current Session Time	00:00:11
Total Session Time	00:00:11
IP Address	120.157.123.136
Session Statistics	
Packets Received	4
Bytes Received	58 B
Packets Transmitted	5
Bytes Transmitted	86 B
Connection Maintenance	
Outstanding Request	No
Interface Restarts	0
Active Poll	disabled

Figure 17: Wireless Status showing a modem in the connected state.

⚠️ During initialisation the status may be reported as "Error" while the connection is being established. If the error persists check the profile settings have been entered correctly. Refer to Section 7.1.3.

With the Wireless network connection established the Status Alarms page should now indicate no faults as shown in Figure 18.

Alarms   14:27:04 01/08/2014

System	
Power On Self Test	Passed
Temperature (°C)	now: 34.75, min: 34.50, max: 36.25
Uptime	02:06:24
Wireless	
Network Status	No Fault
Connection Status	No Fault
Network	
LAN	No Fault
Loopback	No Fault
Services	
DHCP Server	Disabled
VPN	Disabled
Serial Server	Disabled

Figure 18: Status Alarms page.

7.2   Configure the LAN interface and DHCP Server

To access the configuration page for the LAN interface and DHCP Server, select Interfaces from the top level menu the LAN interface screen similar to that shown in Figure 19 will be shown.

LAN

Figure 19: LAN Interface configuration

7.2.1 Setting the IP Address

If it is desired to change the IP address of the LAN port, follow the steps below:

- Enter the new IP address and netmask in the *Interface Configuration* table.

- Click *Update* to set the changes. Once the changes have been set, the IP address of the Series 2000 4G Modem / Router will change. Enter the new address in the browser on the PC. It will be necessary to login again, following the procedure described in the previous section.

7.2.2 Enabling DHCP

The DHCP server allows clients on the local network to be automatically allocated IP addresses from the Series 2000 4G Modem / Router. DHCP also provides the clients with network settings such as default route and location of DNS servers.

By default the DHCP server is disabled however it has been configured to serve IP addresses in the range 10.10.10.100 through 10.10.10.200, and the Default and Maximum lease times have been set to 1440 minutes. So if these values are consistent with the network to which the Series 2000 4G Modem / Router is connected, then the DHCP server can be enabled by setting the Enabled field to 'Yes' and clicking the Update button.

If the standard settings are not applicable for the connected network, then refer to Figure 20 and follow the steps below, to configure the DHCP server:

- Choose a group of available IP addresses on the local network. For example, if the IP address of the Series 2000 4G Modem / Router is 10.10.10.10 with a netmask of 255.255.255.0, a group chosen could be 10.10.10.100 to 10.10.10.200. This will provide 101 addresses for clients.

- Under the *DHCP Server Configuration* table,

  - Set the *Enabled* option to *Yes*.
  - Enter the first address of the group in the *Start Address* box.
  - Enter the last address of the group in the *End Address* box.
  - Enter a lease time for the Default Lease time.
  - Enter a lease time for the Maximum Lease time.

- Click *Update* to set the changes.

Figure 20: DHCP configuration.

7.3   Configure clients to use the Series 2000 4G Modem / Router

The Series 2000 4G Modem / Router will act as a gateway for connections destined over the wireless interface. The default configuration will provide Network Address Translation and firewalling to protect clients on the local network.

To configure clients to use the Series 2000 4G Modem / Router as the default gateway:

- If the clients have a DHCP address allocated by the Series 2000 4G Modem / Router, they will have learned the necessary settings. No further configuration is needed.

- If clients have static IP addresses, set their default route and DNS server to the IP address of the Series 2000 4G Modem / Router .

8 Troubleshooting

The following is a list a potential problems and possible causes. If after the checking through the list a problem persists refer to the Series 2000 User Manual for further information.

8.1 Series 2000 does not start.

- Check the power indicator (Refer to Section 4.3.1) is lit green. If not check the power supply is the correct voltage and the connector is wired correctly. Refer to section 5.4.

- Check the front panel indicators for a fault condition, particularly the Status indicator. Refer to Section 4.3.

8.2 Cannot connect to web pages

- Check the Ethernet cabling between the PC and the Series 2000 and check that the connection LED on the Series 2000 Ethernet port is lit. Refer to Section 4.5.

- Check the IP address settings of the computer have been set correctly. Refer to section 6.

- The IP address of the Series 2000 Modem/Router may have been changed from the default value. If this is the case then:
  - Make sure the IP address settings of the computer are correct for the IP address chosen and the correct IP address has been entered in the web browser, or
  - If the IP Address of the Series 2000 Modem/Router is not know then a factory reset will reset the IP address to the default value. Refer to section 4.4 for details.

- The password may have been changed from the default, if the new password is not know then a factory reset will set the password to the default. Refer to section 4.4 for details.

8.3 Network Status Fault

Check the Wireless Status page for a list of possible faults.

8.3.1 SIM Card Absent or Faulty

- Check that the SIM card has been installed correctly. Refer to Section 5.2.

- Check with the Network provider to ensure that the SIM card has been activated.

- Check that the SIM PIN has been entered correctly. Refer to Section 7.1.2

- The SIM card may be faulty, if possible test using an alternative SIM card.

8.3.2 Network Registration Fault

- Check that the antenna has been installed and connected correctly. Refer to Section 5.3.

- If the signal strength is low check the antenna alignment. Refer to Section 5.3.

- Check that the connection profile details have been entered correctly. Refer to section 7.1.3.

8.4 Connection Status Fault

8.4.1 Status Disabled

- Check that the Connection State is set to enabled on the Wireless Packet Mode page. Refer to Section 7.1.4

- Check the profile, APN, Username and password have been set correctly. Refer to section 7.1.3.

CYBERTEC