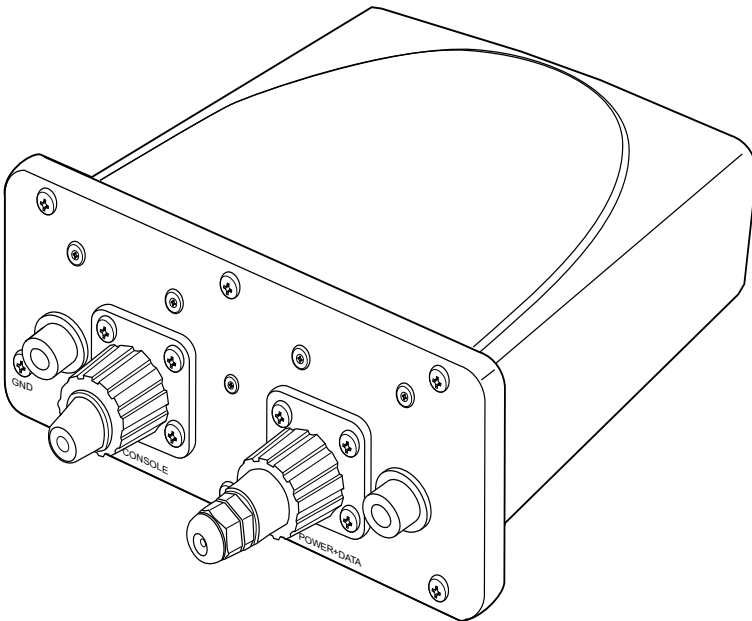


ENGLISH

WiMAX Outdoor CPE **User Manual**






Important Safety Notices

Safety Information

1. Read this user manual and follow all operating and safety instructions.
2. Keep all product information for future reference.
3. Installation of the system must be contracted to a professional installer.
4. The outdoor unit must not be located near power lines or other electrical power circuits.
5. The system must be properly grounded to protect against power surges and accumulated static electricity. It is the user's responsibility to install this device in accordance with the local electrical codes: correct installation procedures for grounding of the outdoor unit, mast, lead-in wire and discharge unit, location of discharge unit, size of grounding conductors and connection requirements for grounding electrodes.
6. This device must be properly grounded using proper wire grounding techniques in accordance with local electric codes:
The cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as is practical.
7. To conform to the over voltage safety requirements of telecommunications cables, a minimum 26 AWG telecommunication line cable must be used.
8. When installing the device using cross-over Ethernet cables:
 - DO NOT press the reset button on the PoE adapter for more than 5 seconds.
 - DO NOT plug in the cross-over cable while the 5 RSSI LEDs on the PoE adapter are blinking.

Lightning Strike and Surge Protection

This device should be properly protected against lightning strikes and power surges.

	CAUTION: ALL WORK MUST BE COMPLETED BY CERTIFIED INSTALLERS.
	CAUTION: INSTALL THE PROTECTION SYSTEM DURING STORM-FREE PERIODS.

For recommendations on the design and installation of lightning-protection systems, please see the following standards:

- LPI-175—Standard of Practice for the Design-Installation-Inspection of Lightning Protection Systems, issued by the Lightning Protection Institute
- NFPA 780—Standard for the Installation of Lightning Protection Systems, issued by the National Fire Protection Association
- UL 96A—Standard for Installation Requirements for Lightning Protection Systems, issued by Underwriters Laboratories (UL) Inc.

Protection System Design

Additionally, the system design must include:


- Grounding system—designed as a result of soil resistivity analysis and including the following considerations:
 - Local Standards compliance as listed above
 - Available space/location
 - Use of suitable grounding rods
- Down conductor route—should avoid other services (parallel routing not closer than 2m or 80 inches), not exceed accepted bending angles (500 mm or 20 inches radius), minimize conductor length, and meet or exceed securing requirements (fixings not more than 1m (or 40 inches) apart for the top 10% of the route and 2m (or 80 inches) for the remaining 90% of the route.
- Terminal—use a terminal suitable to environmental conditions that meet or exceed the mast height and protection level requirements.

Important Warning Symbols


The following symbols may be encountered during installation or troubleshooting.

Note:

The following NOTE symbol is placed after material to offer suggestions or comments for ease of use. See the Note as follows.


	<p>NOTE: Useful information and tips regarding the CPE and networking.</p>
---	---

Warning:

	<p>WARNING: Important information appears before the text it references and should not be ignored as the content may prevent damage to the machine.</p>
---	--

The preceding WARNING is placed before an item of importance that requires attention to prevent damage to equipment or loss of data.

Caution:

	<p>CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, ONLY QUALIFIED SERVICE PERSONNEL SHOULD SERVICE THIS EQUIPMENT.</p>
--	--

The preceding CAUTION symbol is placed before material that requires attention to prevent personal injury or even death.

Conformance Documents

R&TTE Directive 1999/5/EC - Declarations of conformity are available at the following web site address: <http://www.rtte.net/Directive.htm>

Federal Communication Commission Interference Statement

FCC Part 15 Description

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 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this 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.

RF Exposure statement for mobile device without SAR measurement

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Underwriters Laboratories (UL) Information

1. This device must be properly grounded using proper wire grounding techniques in accordance with local electric codes:

The cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as is practical.

2. To conform to the over voltage safety requirements of telecommunications cables, a minimum 26 AWG telecommunication line cable must be used.

R&TTE Directive 1999/5/EC Statements

Installation

The transceiver and antenna equipment must be installed by a qualified professional installer and must be installed in compliance with regional, national, and local regulations. It is the responsibility of the system installer and/or system operator to ensure the installed system does not exceed any operational constraints identified by local regulations. Refer to the sections in this product User Guide for detailed information about the correct installation steps to ensure power and frequency settings are set correctly before connecting the antenna.

National Interface documents may identify, among other parameters, a maximum output power for the system, expressed in terms of an EIRP level that must not be exceeded. Any use of a combination of output power and antenna resulting in an EIRP level above the national limit may be considered illegal and is outside the scope of the R&TTE Directive 1999/5/EC compliance declaration.

WEEE Product Return Process



In accordance with the WEEE (Waste from Electrical and Electronic Equipment) directive, 2002/96/EC, this equipment is marked with the logo shown. The WEEE directive seeks to increase recycling and re-use of electrical and electronic equipment. This symbol indicates that this product should not be disposed of as part of the local municipal waste program.

Important Service Information

1. Refer all repairs to qualified service personnel. Do not remove the covers or modify any part of this device, as this voids the warranty.
2. Disconnect the power to this product and return it for service if the following conditions apply:
 - The unit does not function after following the operating instructions outlined in this manual.
 - The product has been dropped or the housing is damaged.
3. Record the CPE serial numbers for future reference.

Version 1.1.0.0, October 2008

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Product Overview

1.1 Introduction

This CPE is designed for harsh outdoor conditions providing IP-65 grade waterproofing, dust and salt erosion protection, and a cost effective outdoor solution for large WiMAX deployment.

Featuring IEEE 802.16-2005 (802.16e) WiMAX Compliant technology, this CPE supports MIMO (1X2) technology with consistent connection performance operating at 2.3, 2.5, or 3.5 GHz frequency bands, supporting global and long range remote side deployment.



NOTE: The operating frequency band is dependent on the product purchased.

Combining the integrated PoE (Power over Ethernet), wall/pole mount kit and the optional signal detector, the CPE assures ease of deployment in the most challenging of outdoor conditions where power lines are unavailable.

Additionally, the user friendly web-based configuration tool provides simple setup and configuration.

1.1.1 IEEE 802.16 WiMAX Compliance

The IEEE 802.16e-2005 specifications describe a point-to-multipoint (PMP) broadband wireless access standard for devices that operate between the frequencies 2-11 GHz and 10-66 GHz. Both the Media Access Control (MAC) and the physical (PHY) layers descriptions are regulated by IEEE 802.16e-2005 certification.



NOTE: This CPE device compliance applies to a specific revision of the 802.16 standard which is subject to amendment.

This CPE device does not support mesh communication (direct subscriber-to-subscriber).

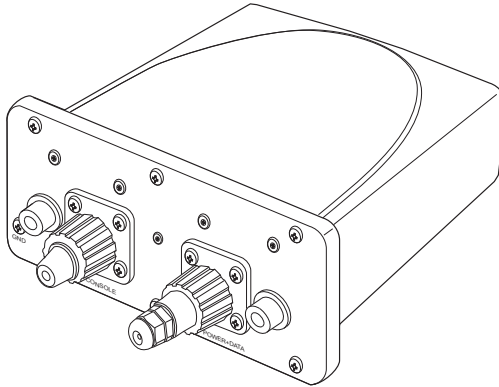
1.2 Main Features

- IEEE 802.16e-2005 compliance
- Operating Frequency 2.3, 2.5, or 3.5 GHz
- Support TDD
- OFDMA modulation, 512 1024 FFT points QPSK, 16QAM, 64QAM
- Security support for 3DES, AES(CCMP), EAP-TLS/EAP-TTLS, PKMv2 and X.509
- IP-65 level waterproof enclosure
- 802.3af compliant Power Over Ethernet (PoE) support
- One RJ-45 Console port
- Two 7dBi dipole antennas
- High output power: Typical 25.5dBm (antenna port)
- Surge protection
- (Optional) Console detector
- MIMO 1Tx/2Rx support
- Ease of use web interface for management and configuration

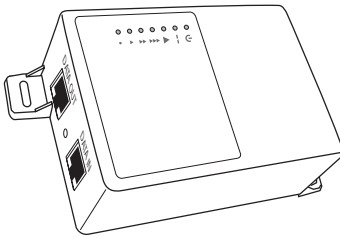
1.3 Package Contents Checklist

Once unpacked, ensure that all contents are included. Refer to the list below for the materials list.

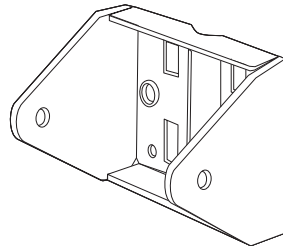
Contents List



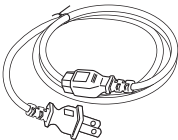
CPE



PoE Adapter



Wall Mounting Bracket



Power Cable

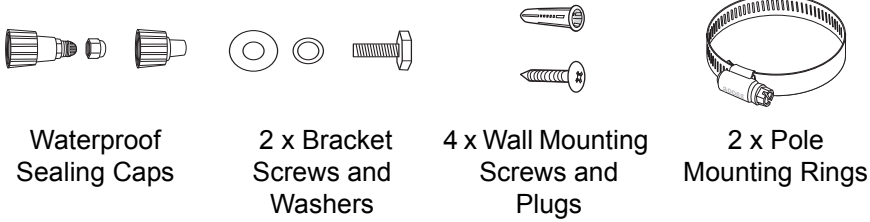


CD containing this
User Manual



Quick Installation Guide

Accessories List



Waterproof Sealing Caps

2 x Bracket Screws and Washers

4 x Wall Mounting Screws and Plugs

2 x Pole Mounting Rings



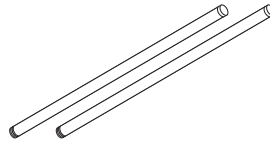
NOTE: Please check that all the listed items are present and in good condition. If there is anything missing or damaged, contact the dealer immediately.

1.3.1 Optional Contents Checklist

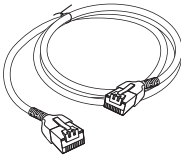
Optional Materials List



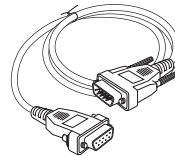
Signal Detector



2 x 7 dBi External Antennas (dependent on model purchased)



RJ-45 Cable (optional)

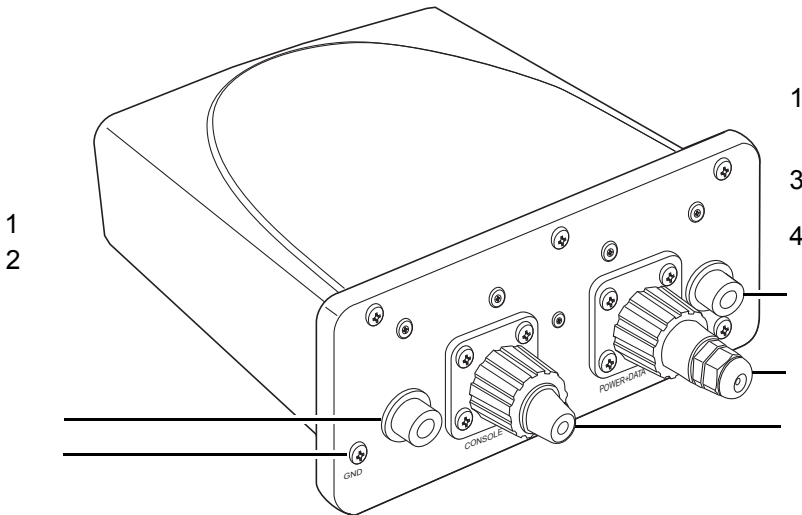


D-Sub9 Cable (optional)



NOTE: Contact the dealer for information on obtaining optional items

1.4 Connection Description



Label	Item	Description
1.	Antenna Connector	Connect the external 7 dBi antennas
2.	Grounding Connector	Route to approved grounding or earth
3.	PoE and Data Port	Insert RJ-45 Ethernet cable and connect to PoE Adapter.
		See <i>Connecting the CPE to the LAN</i> on page 24
4.	Console port	Insert RJ-45 Ethernet cable for configuration and signal testing

This page left blank intentionally.

Basic Installation

This chapter contains information on safety and installation procedures for the CPE. Follow the recommendations outlined in this chapter to ensure the correct operation of the CPE and reduce the risk of damage to the device or personal injury.

2.1 Safety Measures

Before installing and using the CPE, take note of the following precautions:

- Read all instructions carefully
- Use only the Power over Ethernet adapter supplied
- Follow all warnings and cautions in this manual and on the unit case

2.2 System Requirements

Proper installation of the CPE requires the following minimal configuration:

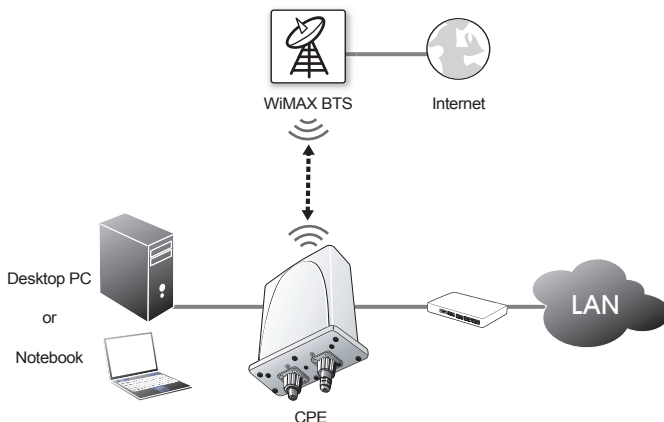
- A PC with an Ethernet (10/100Base-TX) port
- A Web browser installed such as Microsoft Internet Explorer® version 6.0, Firefox® version 2.0, or Safari® version 3.0.3.



NOTE: The browser versions listed are the minimum requirement. Later versions of the software are also acceptable.

2.3 Deployment Models

This section describes the different deployment models supported by the CPE. The subscriber station, in this case the CPE, receives signal directly from the Base Transceiver Station (BTS) providing WAN access to standalone computers or devices on the LAN, whether in a business or residential setup.



2.3.1 Lightning Strike and Surge Protection



CAUTION: THE INFORMATION SUPPLIED HERE IS FOR REFERENCE ONLY. ALL INSTALLATIONS SHOULD BE UNDERTAKEN BY CERTIFIED PROFESSIONALS.

Protection against lightning strikes is an essential consideration when installing any kind of antenna. Lightning strikes fall into two broad categories—Direct and Indirect strikes—and require specific measures to safeguard against damage to property and individuals including the following items:

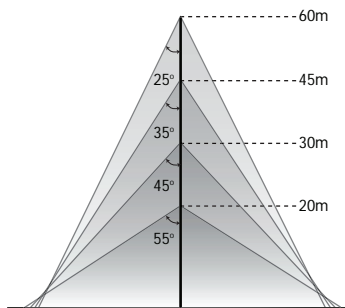
- Grounding system—designed as a result of soil resistivity analysis and including the following considerations:
 - Local Standards compliance as listed below
 - Available space/location
 - Use of suitable grounding rods

- Down conductor route—should avoid other services (parallel routing not closer than 2m or 80 inches), not exceed accepted bending angles (500 mm or 20 inches radius), minimize conductor length, and meet or exceed securing requirements (fixings not more than 1m (or 40 inches) apart for the top 10% of the route and 2m (or 80 inches) for the remaining 90% of the route).
- Terminal—use a terminal suitable to environmental conditions that meet or exceed the mast height and protection level requirements.

For recommendations on the design and installation of lightning-protection systems, please see the following standards:

- LPI-175—Standard of Practice for the Design-Installation-Inspection of Lightning Protection Systems, issued by the Lightning Protection Institute
- NFPA 780—Standard for the Installation of Lightning Protection Systems, issued by the National Fire Protection Association
- UL 96A—Standard for Installation Requirements for Lightning Protection Systems, issued by Underwriters Laboratories (UL) Inc.

The effectiveness of a lightning rod also depends on its height. The protection umbrella narrows as mast height increases. The following illustration describes approximately the height to coverage ratio.



So, for example, at 30 meters mast height the angle of coverage is 45 degrees.

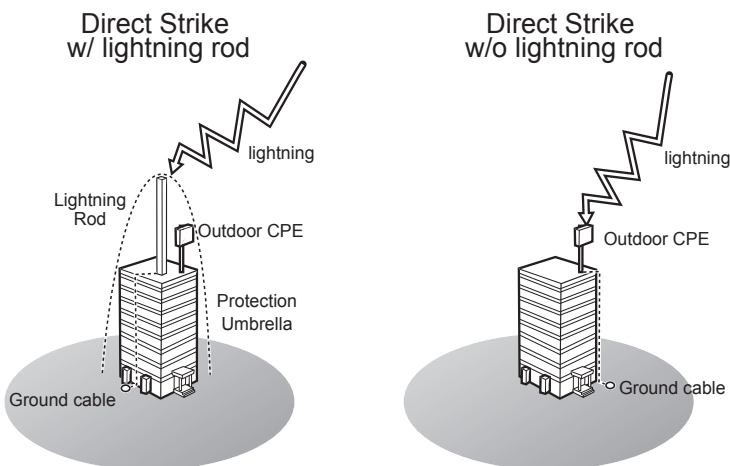
DIRECT STRIKE PROTECTION

A direct lightning strike, as the name suggests, describes an electrical discharge directly to a lightning rod or the CPE itself.

The CPE must be installed within the lightning rod's protection umbrella or have sufficient grounding and surge protection installed.



DISCLAIMER: CONSULT A QUALIFIED PROFESSIONAL TO DETERMINE THE CORRECT PROTECTION METHOD FOR YOUR INSTALLATION.



See *Grounding Protection* on page 12 for more information on grounding specifications.

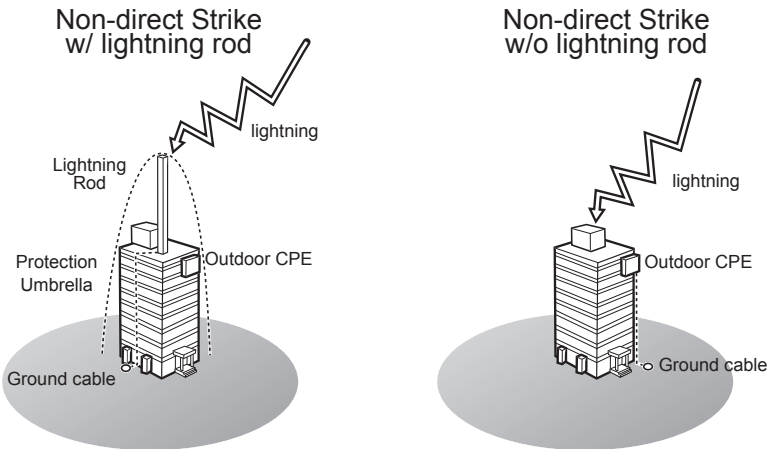
INDIRECT STRIKE PROTECTION

Indirect lightning strikes affect equipment in proximity with the strike, for example devices installed in enclosures or under roofs.

The CPE must be installed within the lightning rod's protection umbrella or have sufficient grounding and surge protection installed.



DISCLAIMER: CONSULT A QUALIFIED PROFESSIONAL TO DETERMINE THE CORRECT PROTECTION METHOD FOR YOUR INSTALLATION.



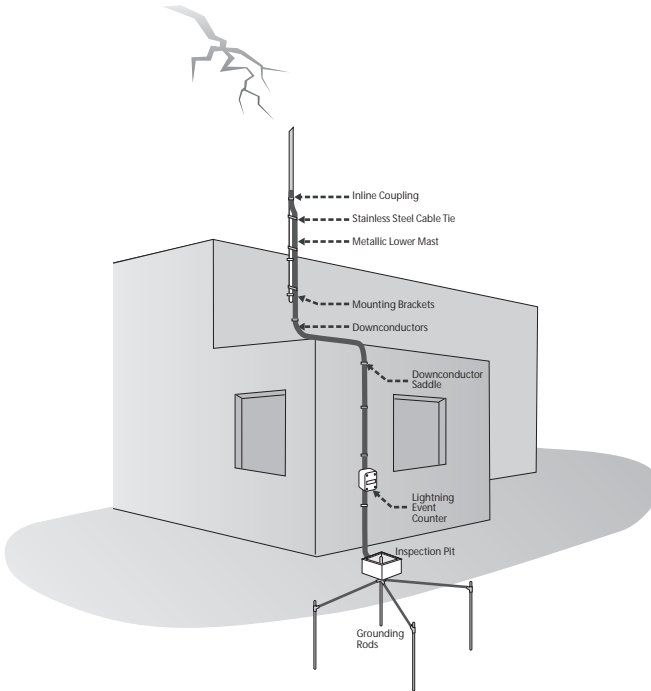
See *Grounding Protection* on page 12 for more information on grounding specifications.

2.3.2 Grounding Protection





CAUTION: THE INFORMATION SUPPLIED HERE IS FOR REFERENCE ONLY. ALL INSTALLATIONS SHOULD BE UNDERTAKEN BY CERTIFIED PROFESSIONALS.

The diagram below describes a typical grounding scenario, including the lightning rod and event counter.



2.4 Hardware Installation

This section describes the proper steps required to install the CPE, and to align the antenna.

	<p>WARNING: Before installing and using this product, see <i>Important Safety Notices</i> on page <i>i</i> of this manual.</p>
	<p>NOTE: Be sure to read the Release Notes file on the product CD as it contains software version and driver information that may not have been available when this document was produced.</p>

2.4.1 Choosing a Location

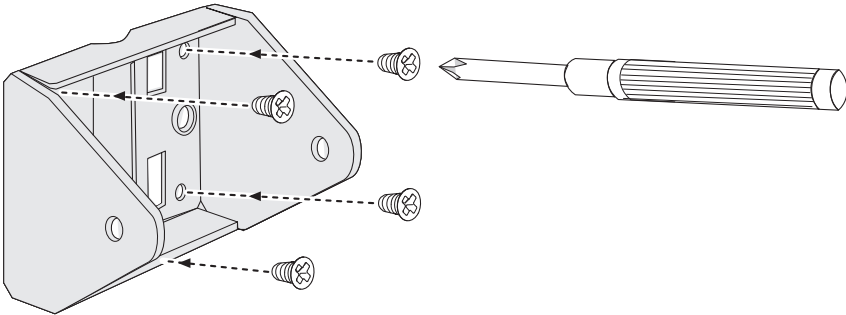
To make optimal use of the CPE, a suitable location is important. The range of the CPE largely depends upon the position of the antenna. It is recommended that an overall survey be performed, observing the following requirements, before installing the CPE:

- Do not place the CPE near the floor or near metal objects, such as drain pipes
- The location must allow easy disconnection of power to the CPE if necessary
- Air must be able to flow freely around the hardware
- The CPE unit must be kept away from vibration and excessive heat
- The installation must conform with national and local electrical codes

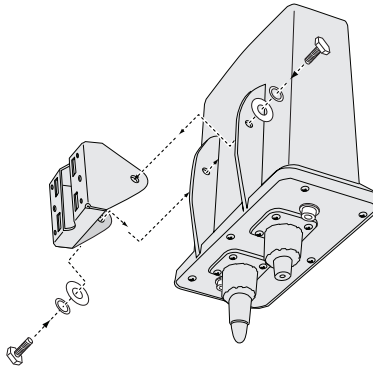
WALL MOUNTING

To wall mount the CPE, perform the following steps:

1. Locate a clean, even wall space with adequate room for cabling.
2. Drill four holes and insert the supplied wall fixing plugs.
3. Insert the supplied screws as shown until flush with the mounting bracket.



4. Align the CPE as shown and secure the four washers and two mounting screws.

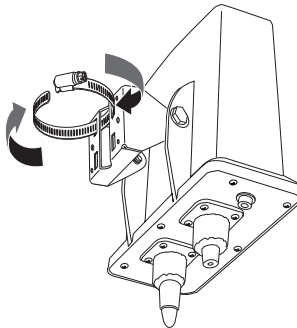


NOTE: Do not over tighten the screws at this stage, the CPE may need adjustment to obtain good signal strength.

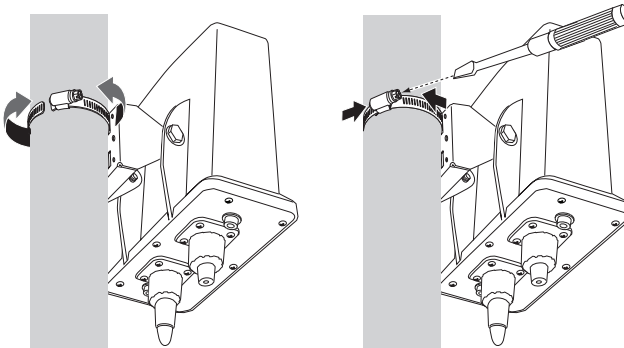
POLE MOUNTING

To pole mount the CPE, perform the following steps:

1. Ensure that the pole intended for installation is securely attached to a solid base.
2. Slide the securing ring through the mounting bracket as shown.



3. Place the securing ring around the pole as shown. Insert the end of the securing ring into the fastening clip and tighten the screw.



NOTE: Do not over-tighten the screws at this stage, the CPE may need adjustment to obtain good signal strength.

- Repeat the process for the second securing ring.



NOTE: The serial number is required to obtain support from the vendor. Maintain this information in a safe place for future reference. The serial number is on the bottom label of the CPE and on the side of the package. If technical assistance is required, the serial number is necessary.

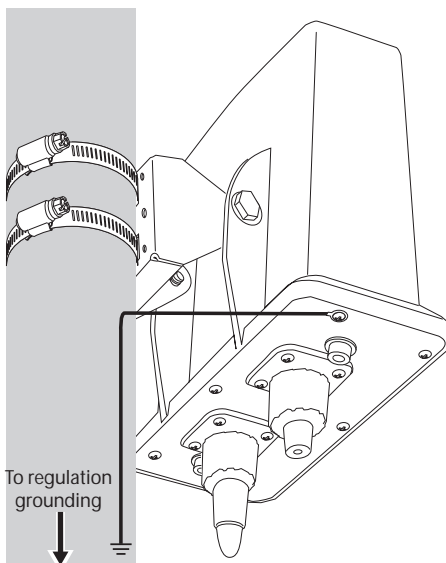
2.4.2 Grounding the CPE

To ensure proper grounding, attach a ground wire of at least 26 AWG stranded to the CPE as shown:



WARNING: Use proper wire grounding techniques in accordance with local electric codes:

The cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as is practical.



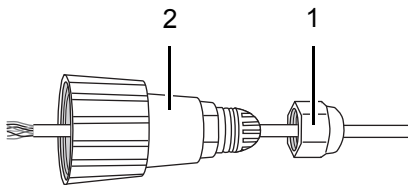
See *Grounding Protection* on page 12 for termination information.

2.4.3 Preparing the Outdoor LAN Cable

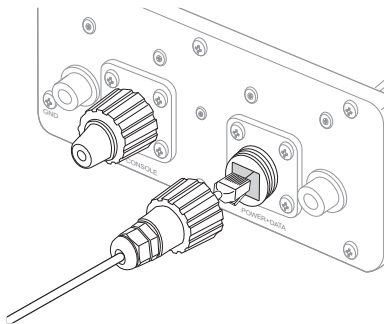
The CPE must be connected using an outdoor-rated 24 AWG CAT5 cable (not supplied) with a diameter between 0.114 and 0.250 inches (2.9 to 6.4 mm) to the Power-over-Ethernet (PoE) adapter.

To prepare the cable and assemble the waterproofing cable cover, perform the following steps:


1. Slide the lock nut (1) and sealing cap (2) over the bare end of the CAT5 cable.

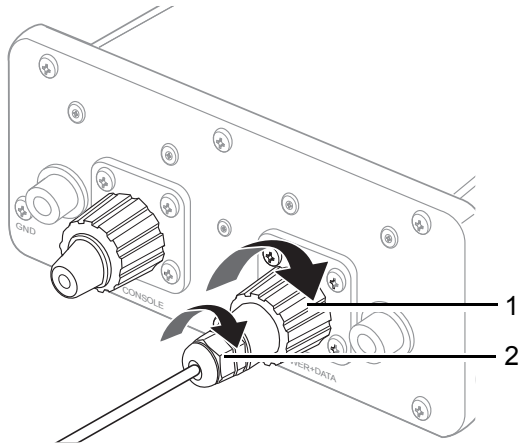


2. Terminate the CAT5 cable with a standard RJ-45 connector.
3. Insert the RJ-45 into the PoE port on the CPE.



4. Tighten the sealing cap (1) first, then the locking nut (2) as shown.

	<p>CAUTION: THE LOCKING NUT (2) MUST NOT BE FULLY TIGHTENED UNTIL THE SEALING CAP (1) HAS BEEN TIGHTENED DURING FINAL INSTALLATION ON PAGE 27; OTHERWISE, THE ETHERNET CABLE MAY TWIST AND DAMAGE.</p>
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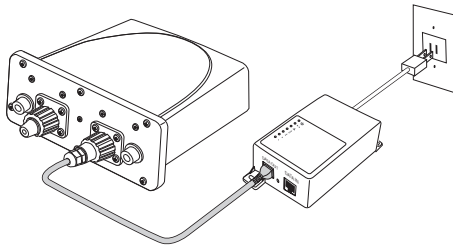


2.5 Aligning the Antenna

Antenna alignment ensures that the best possible link is established between the CPE receiver and base transceiver station (BTS). The antenna alignment process is usually performed during installation and after major repairs.

The PoE adapter is used to align the antenna before continuing with the installation procedure. After locating the CPE, perform the following steps to align the antenna:


1. Plug the CAT5 Ethernet cable from the CPE into the DATA OUT port on the PoE.

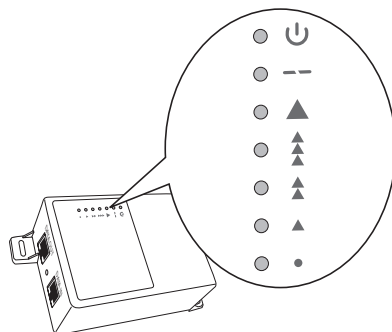









2. Connect the PoE to a power outlet.

After connecting the PoE to an electrical outlet, a diagnostic routine takes place. When startup is complete, the LEDs lights on the PoE display the unit's operational state.

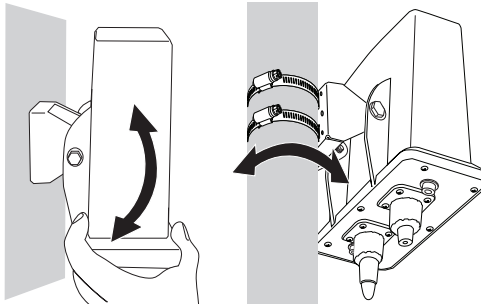
There are a total of seven LEDs. A description of their function is listed as follows:

	<p>CAUTION: WHEN INSTALLING THE DEVICE USING CROSS-OVER ETHERNET CABLES:</p> <ul style="list-style-type: none"> • DO NOT press the reset button on the PoE adapter for more than 5 seconds. • DO NOT plug in the cross-over cable while the 5 RSSI LEDs on the PoE adapter are blinking.
---	---



LED	Description	LED	Description
	Lights green when powered on		Lights green when Ethernet is active
Five RSSI LEDs display connection strength:			Excellent signal
			Strong signal
			Normal signal
			Weak signal
			No signal

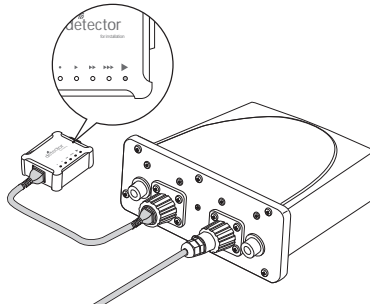
3. Physically adjust the CPE to obtain the strongest possible signal (▲).



4. When the strongest possible signal is received, disconnect the PoE and continue with the installation process.

2.5.1 Using the Optional Signal Detector

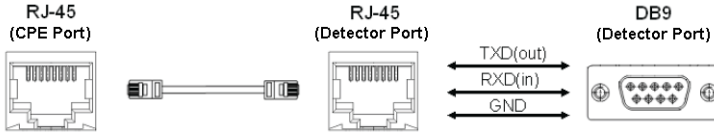
Alternatively, connect the optional signal detector (not supplied) to the configuration port to verify antenna alignment.



LED	Description	LED	Description
⏻	Lights green when powered on	--	Lights green when Ethernet is active
Five RSSI LEDs display connection strength:		▲	Excellent signal
		▲▲	Strong signal
		▲▲▲	Normal signal
		▲▲▲▲	Weak signal
		•	No signal

SIGNAL DETECTOR SPECIFICATIONS

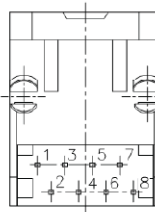
The optional signal detector supports connection to the CPE through either an RJ-45 Ethernet cable or a D-Sub9 cable as shown in the diagram.



Pin Assignment

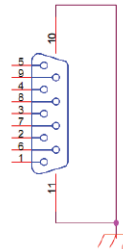
The signal detector pin assignments are as follows.

RJ-45 Ethernet Cable



Pin1- GPIO6
Pin2- 3.3V
Pin3- GPIO7
Pin4- TXD(Out)
Pin5- RXD(In)
Pin6- GND
Pin7- GPIO13
Pin8- GPIO5

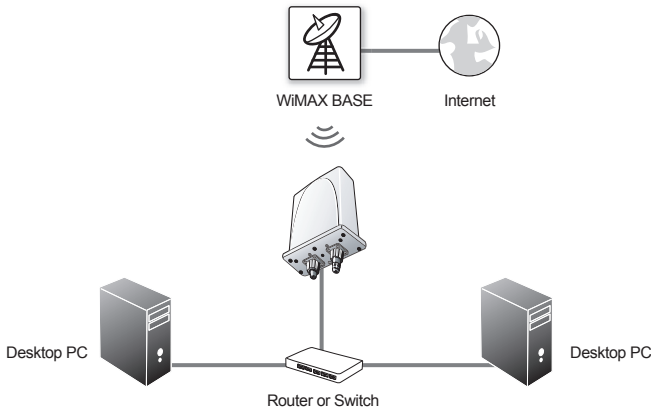
D-Sub9 Cable



Pin2- TXD(out)
Pin3- RXD(in)
Pin5- GND

2.6 Connecting the CPE to the LAN

The following diagram shows a typical CPE setup incorporating a Local Area Network (LAN).



CAUTION: WHEN INSTALLING THE DEVICE USING CROSS-OVER ETHERNET CABLES:

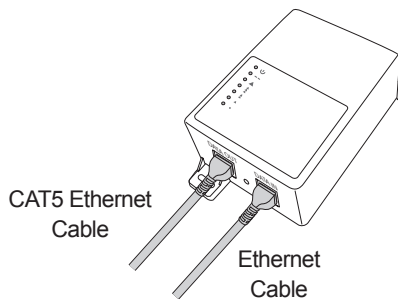
- DO NOT press the reset button on the PoE adapter for more than 5 seconds.
- DO NOT plug in the cross-over cable while the 5 RSSI LEDs on the PoE adapter are blinking.

To connect the CPE through a hub or a switch to a computer, perform the following steps:

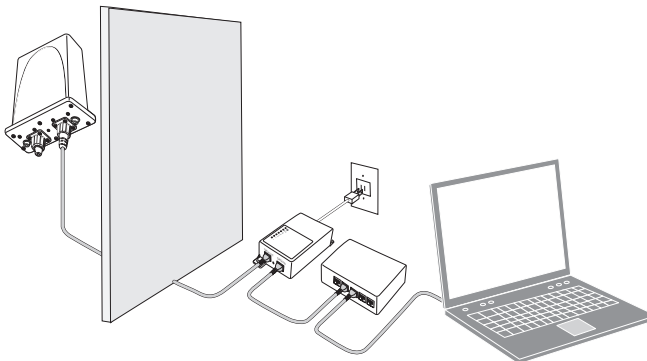


CAUTION: THE PoE (PSE) MUST BE INSTALLED INDOORS.

1. Connect the CAT5 Ethernet cable to the DATA OUT port on the PoE, and a standard Ethernet cable to the DATA IN port.



2. Connect the Ethernet cable from the DATA IN port to the LAN switch or hub as shown.



3. Connect an Ethernet cable between the switch and the computer.
4. Connect the PoE to an electrical outlet.

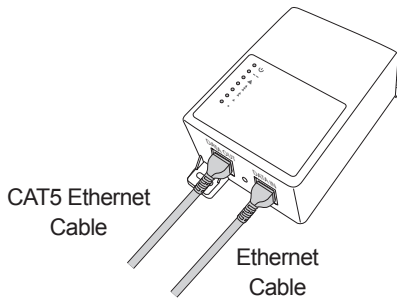
2.6.1 Connecting the CPE to a Stand Alone PC

To connect the CPE directly to a computer, perform the following steps:

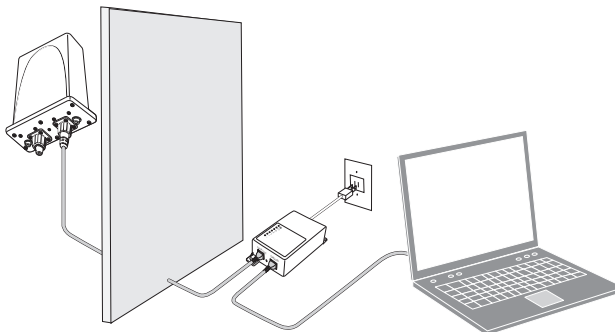


CAUTION: THE PoE (PSE) MUST BE INSTALLED INDOORS.

1. Connect the CAT5 Ethernet cable to the DATA OUT port on the PoE, and a standard Ethernet cable to the DATA IN port.



2. Connect the Ethernet cable from the DATA IN port to the computer as shown.



3. Connect the PoE to an electrical outlet.

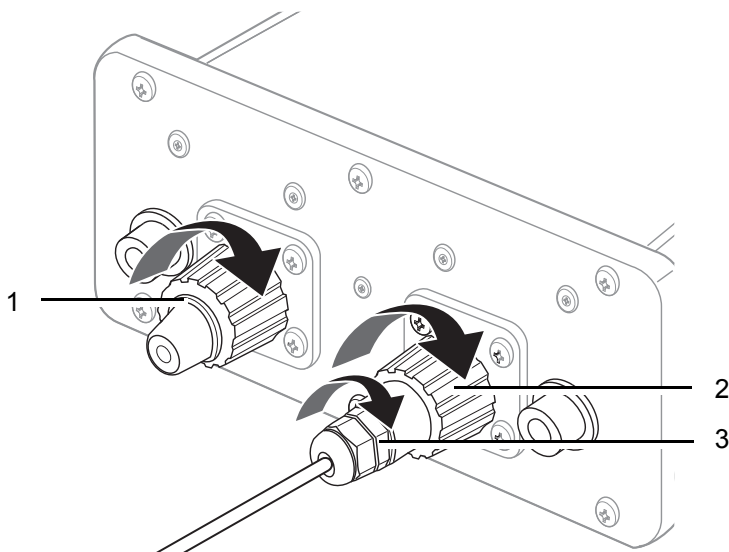
2.7 Completing the Installation

Perform the following steps to complete the initial installation procedure:



CAUTION: DO NOT OVER-TIGHTEN! OVER-TIGHTENING CAN CRUSH THE CAT5 CABLE AND SUBSEQUENTLY DAMAGE THE PoE OR THE CPE.

1. Tighten the sealing cover on the configuration port (1).
2. Tighten the sealing cap (2) on Ethernet port.
3. Tighten the locking nut (3) to secure the sealing cap.

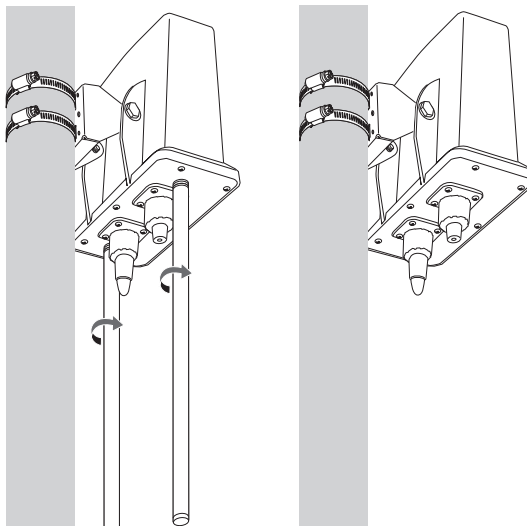


2.8 Installing the Antennas



The CPE is supplied with two antennas to improve signal strength. Once the CPE is correctly installed, perform the following steps to attach the antennas:

1. Locate the two antenna connectors on the underside of the CPE.
2. Attach the antennas by turning clockwise to secure them to the CPE as shown.



External 7 dBi Antenna
Model

2.9 Powering Off the CPE

The CPE does not incorporate a power switch. To remove power, unplug the PoE adapter cable from the electrical outlet or disconnect the RJ-45 connector from the **DATA OUT** port on the PoE adapter.

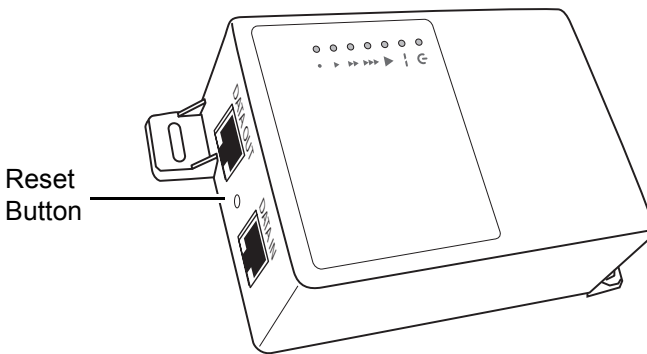
2.10 Rebooting the CPE



CAUTION: WHEN THE DEVICE IS INSTALLED USING CROSS-OVER ETHERNET CABLES:

- DO NOT press the reset button on the PoE adapter for more than 5 seconds.

A dual function reset button is available on the PoE for reset purposes. Press the reset button as shown to reboot the CPE.



2.11 Resetting the CPE



CAUTION: WHEN THE DEVICE IS INSTALLED USING CROSS-OVER ETHERNET CABLES:

- DO NOT press the reset button on the PoE adapter for more than 5 seconds.

Press and hold the reset button for 3 seconds to restart the CPE and restore the factory default settings.

This page left blank intentionally.

Features and Web GUI Configuration

This chapter contains a list of features and connection configuration specifications as well as information on the Web-based Graphical User Interface (GUI).

The CPE's GUI enables quick and simple setup, and the configuration of the following options:

- Connection of the CPE to a WiMAX base station
- Network setting changes, such as internal IP address, IP address pool, DHCP settings, and more
- Internal password change
- Default settings reset
- Firmware updates

3.1 Logging In

To log in to the GUI, perform the following steps:

1. Ensure the installation described in Chapter 2 is complete. Check that the CPE has power and that the signal strength is good.
2. Launch an Internet browser on the administrator's PC.



NOTE: Ensure that an up-to-date browser is installed to correctly display the GUI. Safari® users must install v3.0.3 or later to guarantee functionality.

3. Enter the default IP address **192.168.0.10** in the browser address field and press **Enter**.

The login screen appears.



4. Input the default user name and password and press **Enter**.

Username: **admin**

Password: **admin**

The CPE configuration homepage appears.

The screenshot shows the CPE configuration homepage. At the top right, it displays 'Firmware Version: 1.00.07'. Below this is a navigation bar with links: System, Band, Security, Status, Tools, and Logout. A 'Sections' sidebar on the left lists LAN, NTP, VLAN Tagging, and Corrigenda. The main content area is titled 'The IP address, subnet mask, and default gateway settings that are configured here are used to manage the Subscriber Station through the web interface.' Below this, there are two text boxes: 'The default IP address of the Subscriber Station is 192.168.0.10, if you change the IP address of the Subscriber Station, you may need to adjust your PC's network settings in order to access the web-management again.' The settings panel includes fields for IP Address (192.168.0.10), Subnet Mask (255.255.255.0), and Default Gateway (192.168.0.1). There is also a DHCP Server section with options to Enable or Disable, and fields for Starting IP Address (192.168.0.100), Number of DHCP Users (100), and Client Lease Period (0). DNS and WINS settings are also present. At the bottom right, there are 'Save Settings' and 'Cancel Changes' buttons. A footer at the bottom center reads 'Copyright ©2008. All rights reserved.'

1 — Sections sidebar
 2 — System » Band » Security » Status » Tools » Logout
 3 — The IP address, subnet mask, and default gateway settings that are configured here are used to manage the Subscriber Station through the web interface.
 4 — The default IP address of the Subscriber Station is 192.168.0.10, if you change the IP address of the Subscriber Station, you may need to adjust your PC's network settings in order to access the web-management again.
 5 — Save Settings | Cancel Changes

The Web configuration homepage shows:

No.	Item	Description
1.	Navigation Bar	Select the desired submenu.
2.	Menu Bar	Select the desired main menu.
3.	Description Panel	A brief description of the current menu and settings.
4.	Settings Panel	Enter or modify configuration settings.
5.	Action Buttons	Perform context sensitive actions.



NOTE: Only one administrator at a time can log into the CPE to make changes to settings.

3.2 Using the System Page

The System page is used to configure CPE basic settings such as the CPE's LAN address, DHCP settings, CPE time and date synchronization, and available managed VLAN devices.

3.2.1 LAN Settings

LAN Settings is the default GUI page after logon. The default IP address, subnet mask, default gateway, and DHCP/DNS settings are displayed in the LAN Settings page.



NOTE: Making changes to the default IP address may cause GUI connection problems.

Firmware Version : 1.06.87

» System » Band » Security » Status » Tools » Logout

Sections

- LAN
- NTP
- VLAN Tagging
- Corrigenda

The IP address, subnet mask, and default gateway settings that are configured here are used to manage the Subscriber Station through the web interface.

The default IP address of the Subscriber Station is 192.168.0.10. If you change the IP address of the Subscriber Station, you may need to adjust your PC's network settings in order to access the web-management again.

IP Address : . . .

Subnet Mask : . . .

Default Gateway : . . .

DHCP Server : Enable Disable

Starting IP Address : . . .

Number of DHCP Users : 192.168.0.100 ~ 192.168.0.199

Client Lease Period : Minutes, 0 as one day.

DNS 1 : . . .

DNS 2 : . . .

DNS 3 : . . .

WINS : . . .

[Save Settings](#) | [Cancel Changes](#)

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To make changes to the default settings, perform the following steps:

1. Make any desired modifications to the IP, subnet mask, and default gateway fields.
2. Click **Save Settings**.

DHCP SERVER SETTINGS

Disabled by default, Dynamic Host Configuration Protocol (DHCP) assigns reusable IP addresses to DHCP client devices connected to the LAN. Enable or Disable DHCP by selecting the appropriate button.



NOTE: If the CPE DHCP function is enabled and a DHCP server is already present on the LAN, either disable the DHCP function on the CPE or DHCP server, or ensure that the available IP Pools do not overlap. If both the CPE and the existing DHCP server are active, both devices may fail to provide services to the network.

To configure DHCP, enter the following information:

1. Starting IP Address—enter the starting range of IP addresses available for distribution. The default value is 192.168.0.100.
2. Number of DHCP Users—enter the maximum number of available IP addresses for distribution. The default value is 100.

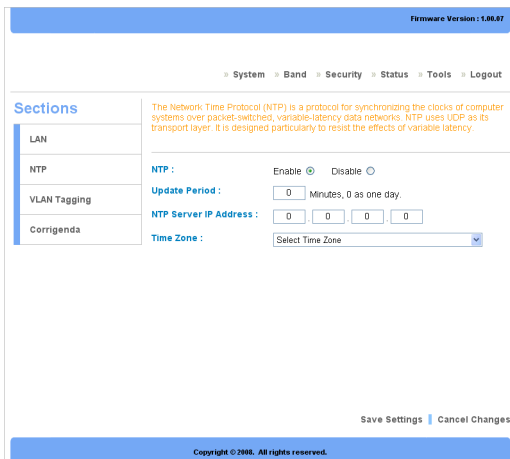


NOTE: The full range displays to the right of the field, 192.168.0.100 - 192.168.0.199 in the example.

3. Client Lease Period—enter the length of time (minutes) that the DHCP server reserves IP addresses before recycling them. The default period is one day, represented by 0.
4. DNS 1 to 3—enter Domain Name System (DNS) information in the supplied fields. The ISP may supply this information.
5. WINS—enter Windows Internet Name Service (WINS) information in the supplied field. The ISP may supply this information.
6. Click **Save Settings**.

3.2.2 NTP Settings

Network Time Protocol (NTP) is used to synchronize the CPE date and time with a third party NTP server. Synchronization is automatic, updating at specific time intervals. NTP is disabled by default.



Firmware Version: 1.00.07

» System » Band » Security » Status » Tools » Logout

Sections

- LAN
- NTP**
- VLAN Tagging
- Corrigenda

The Network Time Protocol (NTP) is a protocol for synchronizing the clocks of computer systems over packet-switched, variable-latency data networks. NTP uses UDP as its transport layer. It is designed particularly to resist the effects of variable latency.

NTP : Enable Disable

Update Period : Minutes, 0 as one day

NTP Server IP Address :

Time Zone :

Save Settings | Cancel Changes

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To configure NTP, perform the following steps:

1. Select **Enable** to access the configuration fields.
2. Enter a synchronization update period in minutes, or enter 0 to synchronize once every 24 hours.
3. Enter an NTP Server IP Address in the fields provided. Many third party NTP service providers are available. Contact the ISP for more details.
4. Select the current time zone from the drop down menu.
5. Click **Save Settings**.

3.2.3 VLAN Tagging

Virtual LAN (VLAN) describes a group of devices on one or more LANs that are configured (using management software) to communicate as if they were located on the same network segment, regardless of their actual network location. VLAN Tagging is disabled by default.

Virtual LAN(VLAN) is a group of devices on one or more LANs that are configured (using management software) so that they can communicate as if they were attached to the same network segment, when in fact they are located on a number of different LAN segments. Because VLANs are based on logical instead of physical connections, they are extremely flexible.

VLAN : Enable Disable

VLAN ID : (0 ~ 4095)

Save Settings | Cancel Changes

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To configure VLAN, perform the following steps:

1. Select **Enable** to access the configuration fields.
2. Enter a unique **VLAN ID** in the field provided.
3. Click **Save Settings**.

3.3 Using the Band Page

The Band page is used to set WiMAX scan frequencies as provided by the ISP, and to set the Fast Fourier Transform rate.

3.3.1 Band Settings

Band Settings are used to enter the frequencies and bandwidths supplied by the ISP, allowing the CPE to connect successfully to the BTS. The Scanning List describes the bandwidths and frequencies currently scanned for connection.

Firmware Version : 1.00.07

» System » Band » Security » Status » Tools » Logout

Sections

- Band
- FFT

The Band setting will allow you to specify several frequencies and bandwidth for scanning.

The table lists the current frequencies and bandwidth that are being scanned by the Subscriber Station. These values should be provided by your ISP.

You can also decide to insert a new channel to scan before or after an existing entry of the list. In that case, all the index of the next channels in the list will be incremented by 1.

Bandwidth : kHz

Frequency : kHz (2500000kHz to 2700000kHz)

Frame Duration : 5 ms 10 ms

Scanning List :

Index	Bandwidth (kHz)	Frequency (kHz)	Frame Duration (ms)	
1	10000	2550000	5	<input type="button" value="Remove Entry"/>

Save Settings | Cancel Changes

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To enter band settings manually, perform the following steps:

1. Select a bandwidth from the drop down menu as supplied by the ISP.
2. Enter a frequency between 2500000 and 2700000 KHz or 3400000 and 3600000 KHz as supplied by the ISP.



NOTE: The operating frequency band is dependent on the product purchased.

3. Select the Frame Duration in milliseconds as supplied by the ISP.
4. Click **Add Entry** to refresh the Scanning List.
5. Click **Save Settings**.

3.3.2 FFT Settings

Fast Fourier Transform (FFT) scaling to the current channel bandwidth helps keep the carrier spacing constant across different channel bandwidths, resulting in higher spectrum efficiency in wide channels and cost reductions in narrow channels. The default FFT size is 1024.

Firmware Version: 1.00.07	
System > Band > Security > Status > Tools > Logout	
Sections	Scaling of the FFT (Fast Fourier Transform) to the channel bandwidth in order to keep the carrier spacing constant across different channel bandwidths. Constant carrier spacing results in a higher spectrum efficiency in wide channels, and a cost reduction in narrow channels.
Band	
FFT	FFT Size : 512 <input type="radio"/> 1024 <input checked="" type="radio"/>
Save Settings Cancel Changes	
Copyright © 2006. All rights reserved.	


Select **512** or **1024** as instructed by the ISP and click **Save Settings**.

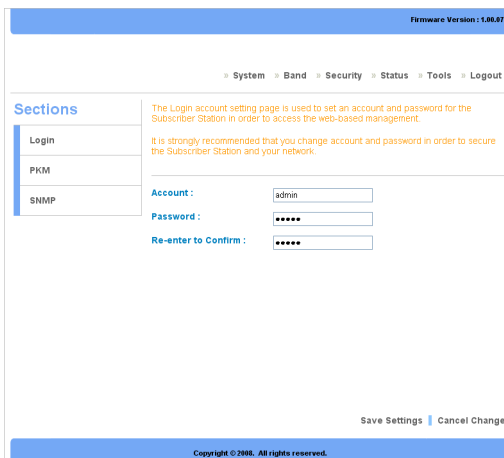
3.4 Using the Security Page

The Security page is used to manage all aspects of CPE access security, including login details, Privacy Key Management (PKM), and Simple Network Management Protocol (SNMP).

3.4.1 Changing Login Details

The CPE GUI management login details are modified using the Login page.

	<p>WARNING: It is strongly recommended that the login user name and password are changed after the first instance of login in order to secure the CPE and network.</p>
---	---



The screenshot shows the 'Security' page in the CPE GUI. At the top right, it says 'Firmware Version : 1.00.07'. Below that is a breadcrumb trail: 'System > Band > Security > Status > Tools > Logout'. On the left, there is a 'Sections' menu with 'Login', 'PKM', and 'SNMP'. The 'Login' section is selected. The main content area contains the following text and form fields:

The Login account setting page is used to set an account and password for the Subscriber Station in order to access the web-based management.

It is strongly recommended that you change account and password in order to secure the Subscriber Station and your network.

Account :

Password :

Re-enter to Confirm :

At the bottom right, there are buttons for 'Save Settings' and 'Cancel Changes'. At the very bottom, it says 'Copyright © 2000. All rights reserved.'

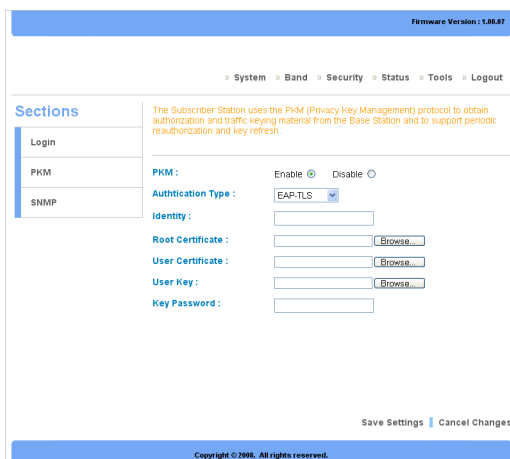
To change the login details, perform the following steps:

1. Enter an account name or use the default **admin**.
2. Enter a new password and re-enter it in the confirm field.
3. Click **Save Settings**.

3.4.2 PKM Settings

The CPE uses Privacy Key Management (PKM) to obtain authorization and traffic key material from the BTS and to periodically reauthorize and refresh the user key and certificates. PKM is disabled by default.

The ISP provides all the necessary PKM information as well as the required certificates.



To configure PKM, perform the following steps:

1. Select **Enable** to access the configuration fields.
2. Select the **Authentication Type** from the drop down menu.
3. Enter the **Identity** as supplied by the ISP.
4. Click **Browse** to locate the **Root Certificate**, **User Certificate**, **User Key**, and **Key Password** supplied by the ISP.
5. Click **Save Settings**.

Contact the ISP for more information.

3.5 Using the Status Page

The Status page displays useful information in the form of easy to read tables including System, LAN, Forwarding, and Connection Status pages.

3.5.1 System Status

The System Status page displays the current status of the CPE including firm-ware version, software version, date and time, and total running time.

The screenshot shows the 'System Status' page. At the top right, it displays 'Firmware Version : 1.00.07'. Below this is a navigation menu: » System » Band » Security » Status » Tools » Logout. The main content area is divided into 'Sections' on the left and a list of system parameters on the right. The 'System' section is selected. The parameters listed are:

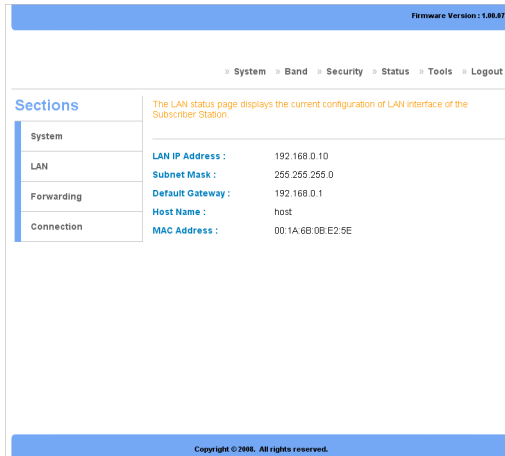
System	Firmware Version :	1.00.07
LAN	Hardware Version :	2.25.7
Forwarding	BSP Version :	1.27
Connection	Software Version :	4.4.1-13799
	MAC Version :	06.00.0000
	PHY Frontend Version :	06.00.0000
	PHY Backend Version :	06.00.0000
	Microcode Version :	5.5.1.1-3629
	System Current Time :	16:52:44, 1 Jan, 1970
	System UP Time :	16 Hour 52 Min 44 Sec

At the bottom of the page, it says 'Copyright © 2008. All rights reserved.'

Information on the System Status page is read only, it is not possible to modify the display.

3.5.2 LAN Status

The LAN Status page displays the current LAN information including IP address, Host Name (if applicable), and MAC address.



Firmware Version: 1.00.07

System > Band > Security > Status > Tools > Logout

Sections

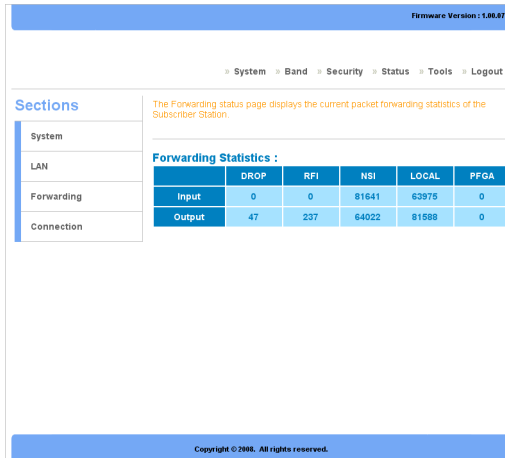
System	
LAN	LAN IP Address : 192.168.0.10 Subnet Mask : 255.255.255.0
Forwarding	Default Gateway : 192.168.0.1 Host Name : host
Connection	MAC Address : 00:1A:6B:0B:E2:5E

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Information on the LAN Status page is read only, it is not possible to modify the display.

3.5.3 Forwarding Status

The Forwarding Status page displays the current packet forwarding statistics of the CPE. Both incoming and outgoing statistics are displayed.



Firmware Version : 1.00.07

» System » Band » Security » Status » Tools » Logout

Sections

- System
- LAN
- Forwarding
- Connection

The Forwarding status page displays the current packet forwarding statistics of the Subscriber Station.

Forwarding Statistics :

	DROP	RFI	NSI	LOCAL	PFGA
Input	0	0	81641	63975	0
Output	47	237	64022	81588	0

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The column headings are described as follows:

- DROP—the total number of packets discarded.
- RFI—the total number of requests for information (RFI).
- NSI—the total number of network side interface (NSI) packets.
- LOCAL—the total number of local packets forwarded.
- PFGA—the total number of PFGA packets forwarded.

Information on the Forwarding Status page is read only, it is not possible to modify the display.

3.5.4 Connection Status

The Connection Status page displays the current connection status of the CPE including the frequency, bandwidth, and signal strength (RSSI).



Firmware Version: 1.00.07

System > Band > Security > Status > Tools > Logout

Sections

- System
- LAN
- Forwarding
- Connection

The Connection status page displays the current connection status of the Subscriber Station, this indicates the frequency and bandwidth setting and the strength of radio signal.

Frequency :	2500000 kHz - 2700000 kHz
RSSI :	0.00 dBm
CINR :	0.00 dBm
DL Adaptation Protection Margin :	0.00 dBm
DL Adaptation Hysteresis Margin :	0.00 dBm

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Information on the Connection Status page is read only, it is not possible to modify the display.

3.6 Using the Tools Page

The Tools page is used to perform maintenance tasks and upgrades including rebooting the CPE and resetting the CPE to the factory supplied defaults.

3.6.1 Upgrading the Firmware

The Firmware Upgrade page is used to upload newer versions of the firmware to the CPE. Firmware upgrades are released from time-to-time to correct bugs or add functionality to devices.

	<p>WARNING: To avoid major system malfunction, ensure the selected firmware version is newer than the currently installed version.</p>
---	---

Firmware Version : 1.00.07

[» System](#) » [Band](#) » [Security](#) » [Status](#) » [Tools](#) » [Logout](#)

Sections

- Firmware Upgrade
- Reset to Default
- Reboot

The Firmware Upgrade page is used to upgrade the firmware of the Subscriber Station to the latest version in order to add features, and improve the functionality and performance.

Ensure that you have obtained the appropriate firmware for upgrading.

Upgrading firmware may take a few minutes, please don't turn off the power or press the reset button while upgrading.

Firmware File :


Upgrade

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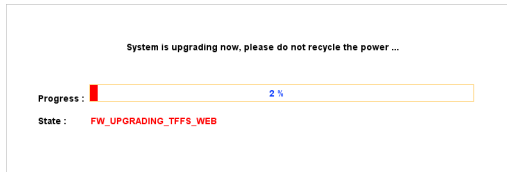
To upgrade the CPE firmware, perform the following steps:

1. Enter the file path of the firmware upgrade or click **Browse** to locate the file.

2. Click **Upgrade** to start the firmware upload.

	WARNING: The upgrade may take a few minutes: Do not power off or reset the CPE during the upgrade procedure.
---	---


A progress page displays the upgrade status.

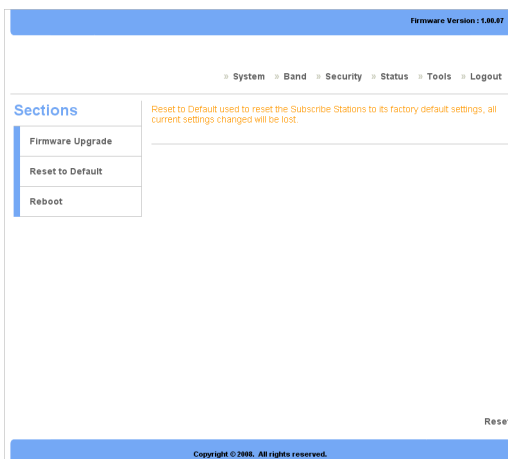


3. Follow the onscreen prompts to complete the upgrade.

3.6.2 Restoring Factory Defaults

The Restore Factory Defaults screen is used to restore the CPE to the factory supplied defaults.

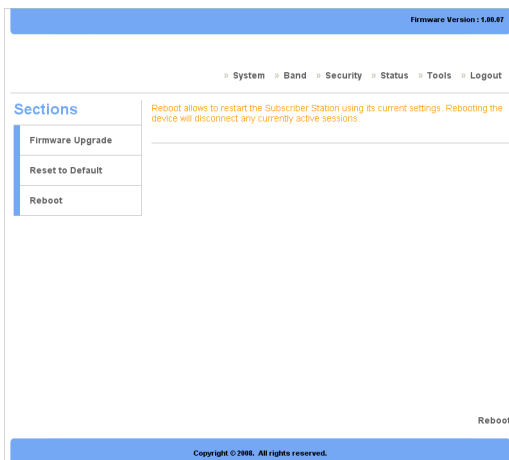
	<p>WARNING: All settings changes are lost when factory defaults are restored.</p>
---	--



To reset the CPE to the factory defaults, click **Reset** and follow the onscreen prompts.

3.6.3 Rebooting the CPE

The Reboot screen is used to reboot the CPE from a desktop computer without disconnecting the power or pressing reset. Restarting the CPE does not affect any configuration changes.



To reboot the CPE, click **Reboot** and follow the onscreen prompts.

This page left blank intentionally.

Troubleshooting

This appendix contains troubleshooting and fault finding information for the CPE in the form of common questions and answers.

Before beginning, perform the following basic troubleshooting sequence to confirm all the hardware is functioning correctly:

1. Make sure that the CPE is powered on. The Power LED should be green and not flashing.
2. If the Power LED is flashing, then power off all network devices, including the modem and computers.
3. Power on each device in the following order:
 - Router or switch (if present)
 - CPE
 - Computer(s)
4. Check all cable connections.

4.1 Common Issues

Why can't I connect to the CPE to perform web configuration?

1. Check if the device is properly connected to the power adapter.
2. Ensure the PC IP address is in the same network segment as the device address. For example, the PC IP address is 192.168.0.x while the default device's IP address is 192.168.0.10.
3. Restore the factory default settings and re-log onto the CPE's web-based configuration page.

How do I reset my password if I've forgotten it?

- Call the Internet service provider (ISP).

How do I restore my CPE to the factory default settings?

1. Launch an Internet browser and access the CPE configuration webpage at the default address: <http://192.168.0.10>
2. Go to **Tools**→ **Reset to Default** and follow the on screen prompts.

How can I find out the CPE's MAC address?

1. Launch an Internet browser and access the CPE configuration webpage at the default address: <http://192.168.0.10>
2. The MAC address is displayed under **Status**→ **LAN** on the status page.

How do I set up an IP Address for my PC with Windows XP/2000 installed?

1. The CPE is set to DHCP server enabled by default.



NOTE: If the CPE DHCP function is enabled and a DHCP server is already present on the LAN, either disable the DHCP function on the CPE or DHCP server, or ensure that the available IP Pools do not overlap. If both the CPE and the existing DHCP server are active, both devices may fail to provide services to the network.

2. Ensure that the target PC is set to obtain an IP address automatically by going to **Start**→ **Control Panel**→ **Network Connections**→ **Local Area Connection**→ **Properties**→ **Internet Protocol (TCP/IP)**→ **Properties** and select Obtain an IP address automatically,

OR

1. Go to **Properties** as described in step 2 above and select **Use the following IP address**.
2. Enter a static IP address in the same segment of the device's address. For example, the PC IP address is 192.168.0.x while the default device's IP address is 192.168.0.10.

How can I login to the GUI if DHCP cannot assign my computer an IP address?

- If the default log in IP address doesn't respond, use 169.254.1.1 as an alternative.

Why can't I use LAN ports to connect to the Internet?

1. Check if the device is properly connected to the power adapter.
2. Check the CPE RSSI LED and make sure the WiMAX signal strength is good.
3. Configure the PC with a static IP address within the same segment of the device's address. For example, the PC IP address is 192.168.0.x while the default device's IP address is 192.168.0.10.
4. Log in to the web configuration page and go to **Status** → **Connection**. Check that Connection Status is good between the device and the WiMAX base transceiver station (BTS). If the connection is not OK, contact the ISP.
5. If the WiMAX connection is OK in the above step, but devices still can not connect to the Internet, ensure DHCP service is enabled and correctly configured in **System Setting** → **DHCP Server**.

Why can't my computer connect wirelessly to the network?

- Check the computer wireless security method and key is the same as the CPE.

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Glossary

This section defines or identifies technical terms, abbreviations, and acronyms used through out this document.

Administrator

An administrator performs the service of maintaining a network. In the case of this CPE, the person who sets up the network connections and makes changes to the settings.

BTS

Base Transceiver Station. The WiMAX service provider base transmitter providing the WiMAX signal.

Client

A device on the network that uses the services of the CPE, for example a computer accessing the internet.

DHCP

Dynamic Host Configuration Protocol. When enabled, this protocol automatically configures the TCP/IP settings of every computer on the network.

Dial-Up

A connection which uses the public telephone network.

DNS Server Address

DNS stands for Domain Name System, which allows Internet host computers to have a domain name and one or more IP addresses (such as 192.168.0.20). A DNS server keeps a database of host computers and their respective domain names and IP addresses, so that when a domain name is requested (as in typing easyDNS.com into an Internet browser), the user is sent to the proper IP

address. The DNS server address used by the computers on the home network is the location of the DNS server the ISP has assigned.

DSL Modem

DSL stands for Digital Subscriber Line. A DSL modem uses an existing phone lines to transmit data at high speeds.

Ethernet

A standard for computer networks. Ethernet networks are connected by special cables and hubs, and move data around at up to 10 million bits per second (Mbps).

Firewall

An electronic boundary that prevents unauthorized users from accessing certain files or computers on a network.

Firmware

Software stored in memory. Essential programs that remain even when the system is turned off. Firmware is easier to change than hardware but more permanent than software stored on a disk.

IP Address

IP stands for Internet Protocol. An IP address consists of a series of four numbers separated by periods, that identifies a single, unique Internet computer host. Example: 192.34.45.8

ISP

Internet Service Provider. An ISP is a business that provides connectivity to the Internet for individuals and other businesses or organizations.

LAN

Local Area Network. A LAN is a group of computers and devices connected together in a relatively small area (such as a house or an office). A home network is considered a LAN.

MAC Address

MAC stands for Media Access Control. A MAC address is the hardware address of a device connected to a network.

MTU

Maximum Transmission Unit. The largest unit of data that can be transmitted on any particular physical medium.

NAT

Network Address Translation. This process allows all of the computers on the home network to use one IP address. Using the NAT capability of the HomeConnect home network gateway, access is available to the Internet from any computer on the home network without having to purchase more IP addresses from the ISP.

Port

A logical channel that is identified by its unique port number. Applications listen on specific ports for information that may be related to it.

SNTP

Simple Network Time Protocol. A communication standard that allows for the transmission of real time information over a network or the Internet.

SPI

Stateful Packet Inspection. SPI is the type of corporate-grade Internet security provided by a HomeConnect home network gateway. Using SPI, the gateway acts as a firewall, protecting the network from computer hackers.

Subnet Mask

A subnet mask, which may be a part of the TCP/IP information provided by the ISP, is a set of four numbers configured like an IP address. It is used to create IP address numbers used only within a particular network (as opposed to valid IP address numbers recognized by the Internet, which must assigned by InterNIC).

TCP

Transmission Control Protocol. The most common Internet transport layer protocol. TCP is connection-oriented and stream-oriented, and provides for reliable communication over packet-switched networks.

TCP / IP

Transmission Control Protocol over Internet Protocol. This is the standard protocol for data transmission over the Internet.

UDP

User Datagram Protocol. Communications protocol for the Internet network layer, transport layer, and session layer, which makes it possible to send a datagram message from one computer to an application running in another computer. Unlike TCP, UDP is connectionless and does not guarantee reliable communication; the application itself must process any errors and check for reliable delivery.

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