MP252 Multimedia Home Gateway

User's Manual

MP252BW and MP252WDNB

MediaPack™ 252 Multimedia Home Gateway Series

Version 3.4.0

Document #: LTRT-23504

HD VoIP Sounds Better

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Notice

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Each abbreviation, unless widely used, is spelled out in full when first used. When the term 'device' is used, it refers to MP252.

Regulatory Information

The Regulatory Information can be viewed at www.audiocodes.com/library.

Related Documentation

Document Name
Demo Guide
Multimedia Home Gateway Quick Guide
Release Notes
Routing Performance Technical Application Note

Safety Warnings

Note: Open source software may have been added and/or amended for this product. For further information please visit our website at: http://audiocodes.com/support or contact your AudioCodes sales representative.

Warning: Before connecting MP252 to power:

- Use only the AC/DC power adapter supplied with MP252. Do not use any other power adapter. This power adapter is a 12 VDC +/-10%, tolerance, 2A, limited power source wall-mount Class II power supply adapter.
- Ensure that the VAC ratings match.
- Ensure that you have read the Regulatory Information, obtained from www.audiocodes.com/library.

For Customers in Canada

This Class [B] digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe [B] est conforme à la norme NMB-003 du Canada.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

The County Code Selection feature is disabled for products marketed in the US/Canada.

IC Radiation Exposure Statement

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

Reader’s Notes

1 Introduction

The MediaPack™ 252 (MP252) is a sophisticated, feature-rich, multimedia home gateway for broadband networks with multi-play support. With ADSL2+ modem, multiple antenna wireless LAN connectivity, Digital Enhanced Cordless Telecommunications (DECT) handsets supporting High Definition (HD) Voice-over-IP (VoIP), and optional battery backup, this is a true all-in-one gateway for Multi-play services.

The MP252 is ideal for operators, seeking new revenue generators with state-of- the-art features, such as:

- ADSL/ADSL2+ modem, up to 24 Mbps
- 10/100 Ethernet WAN port (optional connection to cable modem or FTTH ONU)
- Optional ADSL WAN backup using 3G USB dongles
- HD VoIP telephony and PBX capabilities, including flexible configuration of individual SIP accounts per DECT extension
- Four 10/100 Ethernet LAN ports
- High-speed wireless network (802.11 b/g/n), up to 150 Mbps
- Router, Firewall, NAT and advanced traffic prioritization mechanisms
- 2 FXS ports for analog phones and fax machines
- Guaranteed Quality of Service (QoS) for IPTV service
- Print server and File server, accessible from every computer on the home network
- Advanced TR-069 management, interoperable with leading Auto-Configuration Servers (ACS)
- Optional battery backup for up to 4 hours standby

The MP252 is based on AudioCodes' MP-2xx line of Residential Gateways and AudioCodes VoIPerfect™ software architecture. The MP252 is interoperable with various softswitches and supports advanced TR-069 management, working with market leading Auto-Configuration Servers (ACS). Other management tools, such as a friendly HTTP-based Web GUI, and Command Line Interface (CLI) are also available.

The MP252 is available in the following models:

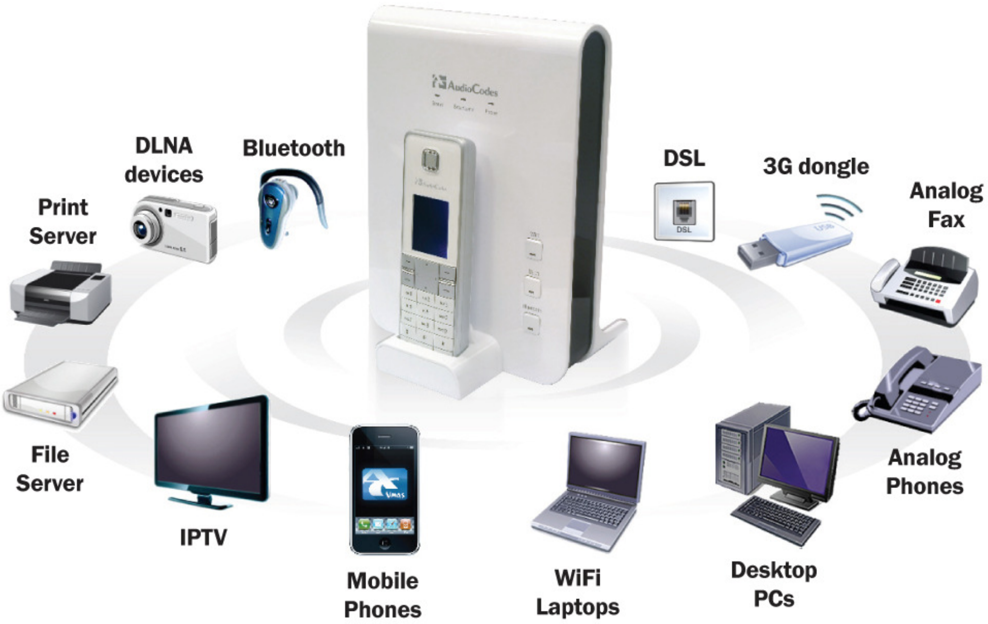
Table 1-1: MP252 Available Models

Model	ADSL + 4 LAN	Wi-Fi 802.11n	DECT HD VoIP	VoIP 2 FXS	USB 2.0
MP252BW	√	√	-	√	1
MP252WDNB	√	√	√	√	3

Note: All DECT and PBX--related functionalities are supported only by the **MP252WDNB**.

The figure below illustrates the typical applications supported by MP252:

Figure 1-1: MP252 Typical Application



2 Package Contents and Prerequisites

The MP252 is shipped with the following items:

- 1 x RJ-11 telephone cable
- 1 x RJ-45 Ethernet cable
- 12V AC/DC power adaptor (use only supplied)
- DECT handset and cradle

Make sure that all these items are included. If any items are missing, contact your sales representative.

The following prerequisites are required (not supplied by AudioCodes):

- A broadband Internet connection
- ADSL cable (if required)
- Analog telephones
- Additional RJ-11 telephone cable (if required)
- Additional RJ-45 Ethernet cables (if required)

Reader's Notes

3 Hardware Description

This section describes the physical description and cabling of the MP252. This includes both models (i.e., MP252BW and MP252WDNB).

3.1 Physical Description

The MP252 provides ports, buttons, and LEDs on its front and rear panels.

3.1.1 Front Panel

The front panel provides LEDs for displaying various operating status and button(s) for activating various features such as Wi-Fi. For more information on the LEDs, see Section 3.1.1.2 on page 29. For more information on the buttons, see Section 3.1.1.1 on page 28.

The figures below display the front panels of the MP252 models.

Figure 3-1: Front Panel of MP252BW

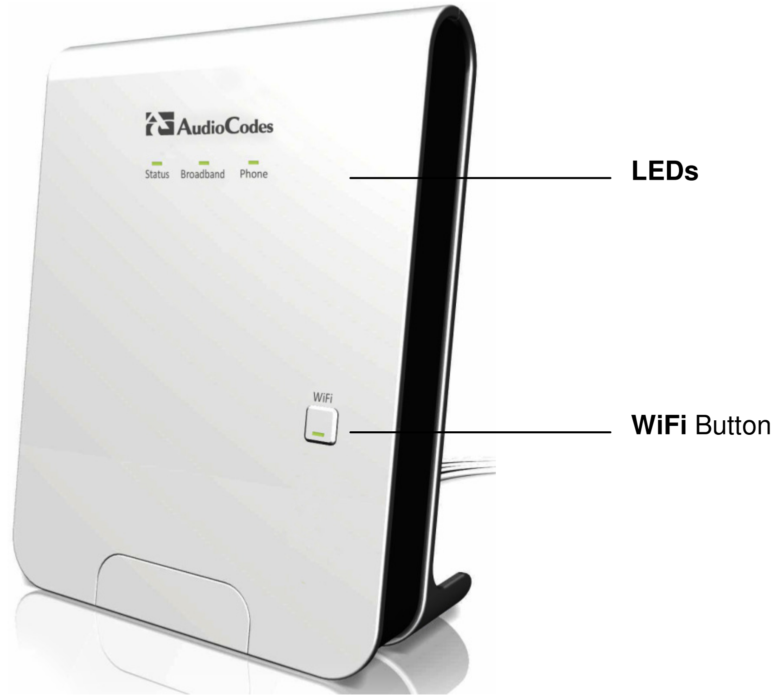
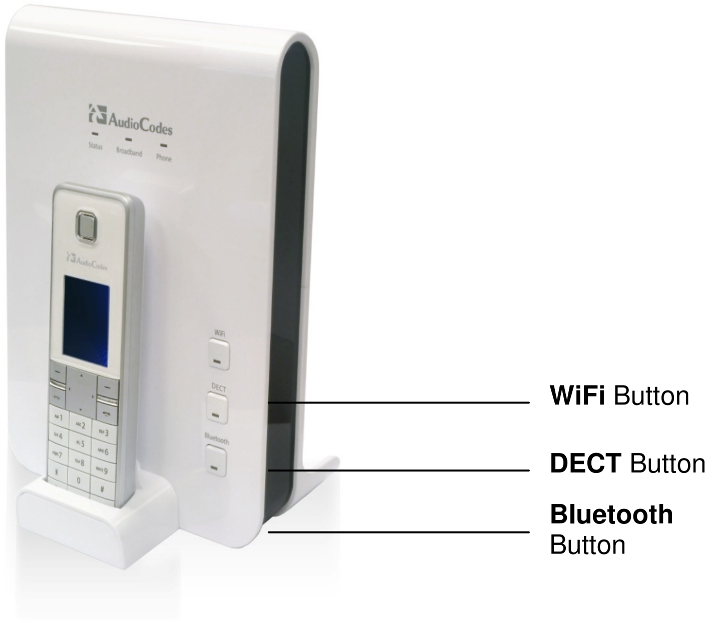


Figure 3-2: Front Panel of MP252WDNB



3.1.1.1 Front-Panel Buttons Description

The button(s) on the front panel are described in the table below:

Table 3-1: Front-Panel Buttons Description

Label	Description
WiFi	Activates or deactivates Wi-Fi connectivity (802.11 b/g/n).
Dect[1]	Registers the handset to the MP252 base unit.
Bluetooth[2]	Currently not supported.

[1] This button is available only on the MP252WDNB model.

[2] This button is available only on the MP252WDNB model.

3.1.1.2 Front-Panel LEDs Description

The LEDs on the front panel are described for general functionality and for the Automatic Dialer feature.

3.1.1.2.1 General Description

The general description of the MP252 front-panel LEDs are described in the table below:

Table 3-2: Front-Panel LEDs Description

LED	Color	State	Description
Status	**Green**	On	Device start-up successful
		Slow Blinking	Software upgrade in progress. **Note:** During software upgrade, the Broadband and Phone LEDs also blink green.
		Slow Blinking	Battery backup is in use and there is no power from the AC electrical outlet.
		Fast Blinking	Battery is low and there is no power from the AC electrical outlet.
	Red	On	Reboot (automatic, by default) or indicates a problem
Broadband	**Green**	On	WAN port is successfully connected and IP address acquired successfully
		Blinking	Software upgrade in process
	Red	On	WAN IP address has not yet been acquired from the ISP (i.e. in the process of acquiring or has failed to acquire).
	-	Off	WAN Ethernet cable is not connected – no WAN link
Phone	**Green**	On	All configured phones are registered to the Proxy server
		Blinking	Software upgrade in process
	Red	On	At least one of the phones failed to register to the Proxy server
	-	Off	No Proxy server is configured
WiFi	**Green**	On	Wi-Fi is enabled and active
	Red	Off	Wi-Fi is disabled

3.1.1.2.2 Automatic Dialer Feature

The table below describes the front-panel LEDs behavior when the Automatic Dialer feature is used (described in detail in Section 7.2).

Table 3-3: Front-Panel LED Descriptions for Automatic Dialer Feature

Stage	LED		
	Status	Broadband	Phone
During boot	Red	Off	Off
Before WAN physical link detection	Green	Blinking Red	Off
During automatic dialer operation	Green	Blinking Green	Off
Automatic dialer success	Green	Green	Green*
Automatic dialer failure	Green	Red	Off

* The **Phone** LED lights green only after MP252 connects to the Internet, downloads its configuration file, and then registers to the VoIP service.

3.1.2 Rear Panel

The rear panel provides the ports for connecting the various interfaces. The figures below display the rear panels of the MP252 models.

Figure 3-3: Rear Panel of MP252BW

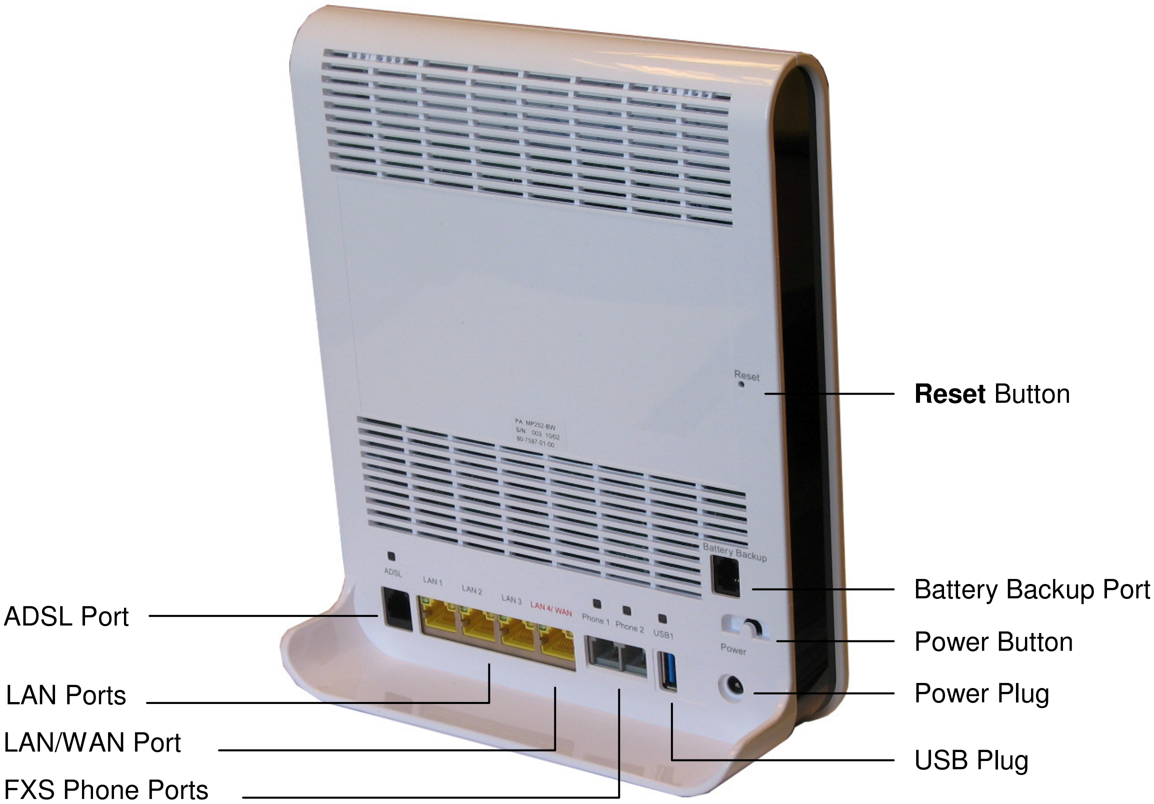
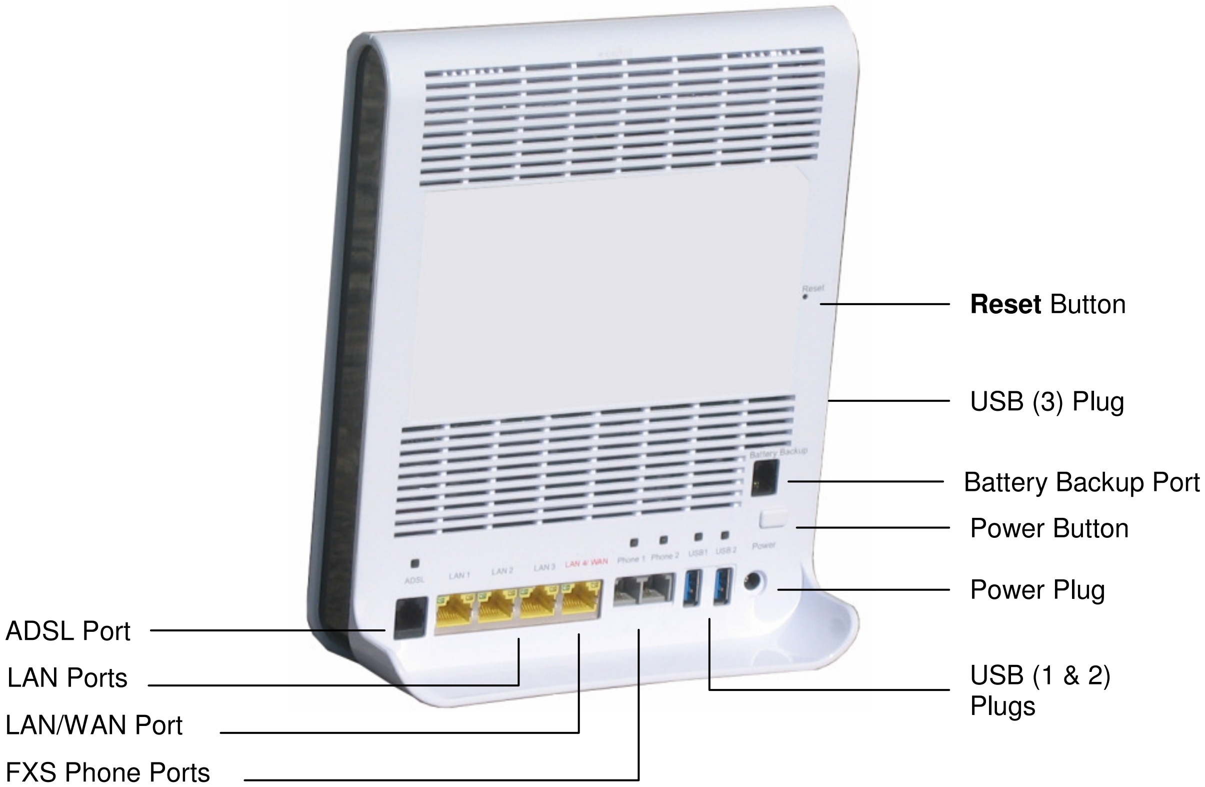


Figure 3-4: Rear Panel of MP252WDNB



3.1.2.1 Rear-Panel Port Description

The ports of the rear panel are described in the table below:

Table 3-4: Rear-Panel Ports Description

Label	Description
ADSL	RJ-11 port for connecting ADSL/ADSL2+ modem (up to 24 Mbps)
LAN	3 x RJ-45 10/100Base-T Ethernet LAN ports
LAN/WAN	1 x RJ-45 10/100Base-T Ethernet LAN or Ethernet WAN port
Phone	2 x RJ-11 FXS ports for connecting analog phones and fax machines
USB[3]	USB Type A port for print or file servers, or for optional WAN backup using a 3G USB dongle
Power	Power plug for connecting the supplied AC/DC power adapter. A button is located above this port to switch on the MP252.
Battery Backup	Port for connecting an optional battery backup, providing up to four hours standby power. (The external battery backup system connects to this port and the Power plug using a splitter cable.)

[3] The MP252WDNB model provides two USB ports in this location.

Label	Description
USB3[4]	USB port (located on the side panel, as shown in Figure 3-4).
Reset	Reset pin button for resetting the MP252.

3.1.2.2 Rear-Panel LEDs Description

The LEDs on the rear panel are described in the table below:

Table 3-5: Rear-Panel LEDs Description

LED	Color	State	Description
ADSL	**Green**	On	ADSL physical link is up
		Slow Blinking	ADSL link is synchronizing
		Fast Blinking	ADSL attempting to train (establishing a connection with the Internet Service Provider)
	-	Off	No physical ADSL link
LAN / WAN	**Green**	Blinking	LAN / WAN connection sending / receiving data at 100 Mbps
	Yellow	Blinking	LAN / WAN connection sending / receiving data at 10 Mbps
	-	Off	No LAN / WAN traffic or Ethernet cable is disconnected
Phone	**Green**	On	Phone is off-hook
		Slow Blinking	Phone is ringing
		Fast Blinking	MP252 is currently being upgraded
	-	Off	Phone is on-hook and not ringing
USB	**Green**	On	USB device is connected
	-	Off	No USB device is connected

[4] This USB port is available on the MP252WDNB model.

3.2 Cabling

The procedure below describes the cabling of the MP252.

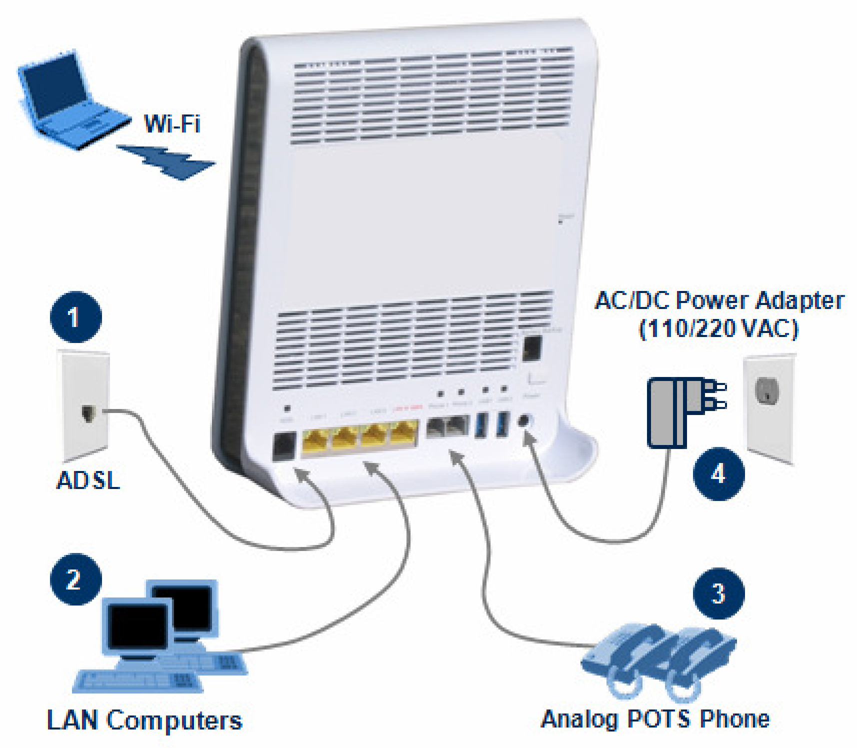
Warning:

- Use **only** the AC/DC power adapter supplied with MP252. Do not use any other power adapter.
- Ensure that the VAC ratings match.
- Ensure that you have read the MP252 Regulatory Information, obtained from www.audiocodes.com/library.

Note: The cabling procedures for the MP252 models are identical and therefore, no distinction is made between the models in this section. However, for convenience, this section uses the MP252WDNB model as an example.

The figure below displays a summary of the cabling procedures.

Figure 3-5: Cabling MP252



➢ To cable MP252:

1. Connect MP252 to the Internet. The cabling depends on the Internet connection:
   - **ADSL:** connect the ADSL port (located on the rear panel and labeled **ADSL**) to the telephone socket, using an RJ-11 telephone cable.
   - **WAN Ethernet:** connect the LAN4/WAN port (located on the rear panel and labeled **LAN 4/WAN**) to an external modem, using a CAT-5 Ethernet cable.

Note: Use minimum 26 AWG wire for cabling the ADSL port to the public switched telephone network (PSTN).

2. Connect the LAN Ethernet ports (labeled **LAN 1 - 4**) to your LAN computers, using RJ-45 CAT-5 Ethernet cables.
3. Connect the telephone ports (labeled **Phone 1 - 2**) to analog telephones, using RJ-11 telephone cables.
4. Connect MP252 to a standard 110/220 VAC electrical wall outlet, using the **supplied** AC/DC power adapter.

When MP252 is powered on, the **Status** LED is lit. After initialization completes (about two minutes), this LED changes from red to green. If no power is received by MP252, press the **Power** button located on the rear panel to switch it on.

3.3 Mounting

You can place MP252 on a desktop or mount it on a wall. For desktop mounting, MP252 provides integrated rubber feet on its base so that it sits firmly on a desktop. Alternatively, you can hang your MP252 on a wall, using the supplied MP252 wall-mounting bracket, as described in this section.

Wall mounting consists of the following main procedural stages:

- Preparing the mounting screws on the wall
- Hanging the mounting bracket on the wall
- Attaching MP252 to the mounting bracket

Before you begin, ensure that you have the following items:

- Wall-mounting bracket (supplied)
- 2 x screws
- 2 x wall anchors
- Screwdriver

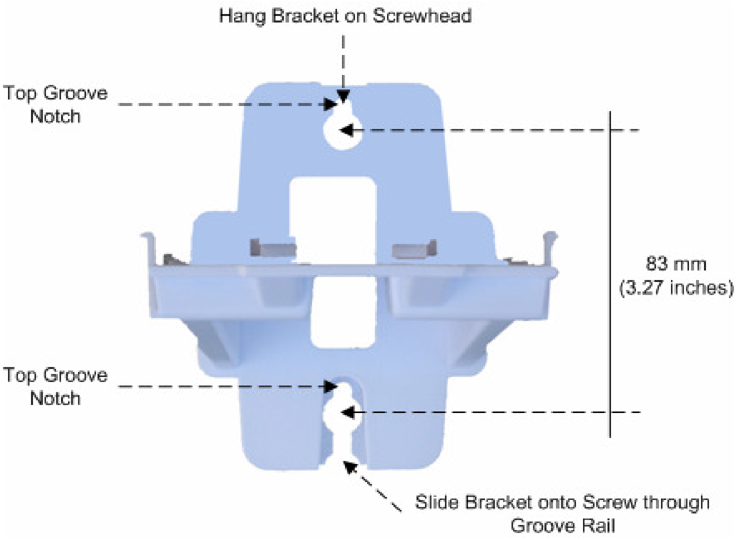
Note: When choosing a wall on which to mount MP252, consider cable limitations and wall structure.

➢ To wall-mount MP252:

1. Prepare the wall-mounting screws:
   a. Drill two holes in the wall according to the wall-mounting bracket dimensions. The vertical distance between the holes should be 83 mm (3.27 inches).
   b. Insert a wall anchor into each hole.

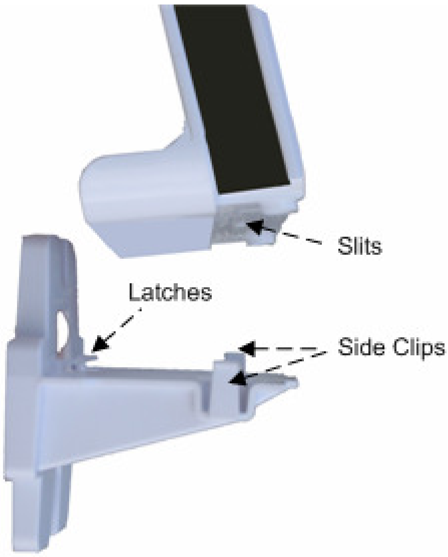
c. Using a screwdriver, drive screws of the appropriate size into the anchors, leaving approximately 4 mm (0.16 inches) of the screw head jutting out. This protrusion will allow you to hang the mounting bracket on the screw head.

Figure 3-6: MP 252 Wall Mount Bracket


Hang Bracket on Screwhead
Top Groove Notch
83 mm (3.27 inches)
Top Groove Notch
Slide Bracket onto Screw through Groove Rail

2. Hang the mounting bracket on the wall screws:
    a. Gently slide the mounting bracket onto the lower screw so that the screw enters the bracket's bottom screw groove rail. As you lower the bracket onto the screw, ensure that the upper screw fits into the bracket's top screw groove.
    b. Gently pull down on the mounting bracket so that both screw heads sit firmly and securely in the top notch of the screw grooves.
3. Attach MP252 to the wall-mounting bracket:
    a. Three slits at the base (bottom) of MP252 are covered by rubber caps. Remove these caps.
    b. With its rear panel facing the mounting bracket, hold MP252 at an angle and slide the base of MP252 under the two latches located on the mounting bracket.
    c. Align the three slits on the MP252 base with the three protruding humps located on the front of the mounting bracket. Align the clip holes on either side of MP252 with the clips on the mounting bracket.
    d. While gently pressing down on MP252, press the clips inwards so that the clips snap into the base of MP252.

Figure 3-7: Attaching Phone Base to Wall Mount



If for any reason, you want to remove MP252 from the wall, follow the procedure below:

➢ To dismount MP252 from the wall:

1. Press the mounting bracket clips inwards.
2. Lift the MP252 base off the mounting bracket.

Part I

Gateway Configuration

Part I describes the configuration of the MP252 router and VoIP functionality analog, and includes the following chapters:

- Setting up an Internet Connection
- Using MP252's Web Interface
- Configuring VoIP Parameters
- Connecting MP252 to a VoIP Service Provider
- Making VoIP Calls
- Quality of Service (QoS)
- LAN Connection
- WAN Connection
- Editing Network Connections and Advanced Configuration
- VLAN Settings
- LAN-WAN Bridge Settings
- Remote MP252 Management
- Security
- Advanced Settings
- System Monitoring

Reader’s Notes

4 Getting Started with the Web Interface

The MP252 embedded Web server (*Web interface*) provides a user-friendly Web-based management tool that allows you to configure and monitor MP252. This chapter describes how to access, navigate in, and configure parameters with the Web interface.

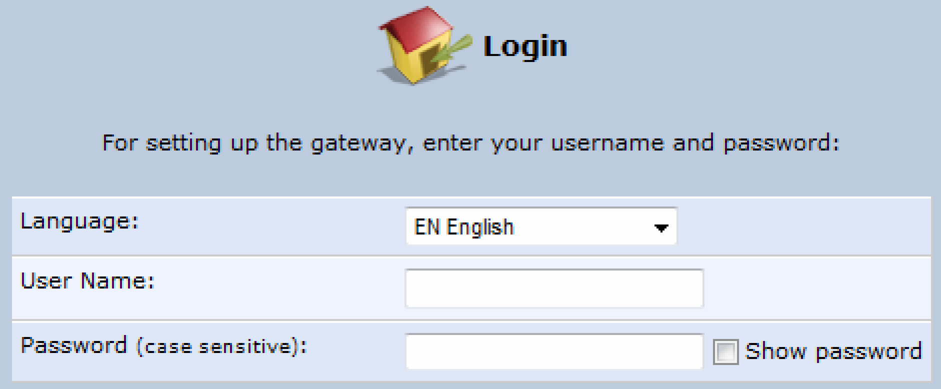
4.1 Logging in to the Web Interface

The procedure below describes how to log in to the MP252 Web interface.

➢ **To log in to the MP252 Web interface:**

1. Connect a PC directly to the LAN port (labeled **LAN 1**) of the MP252.
2. On your PC, open a Web browser (e.g., Internet Explorer) and in the URL field, enter ***http***://**mp252.*home*** (or 192.168.2.1). If your MP252 is already connected to the network and you know its IP address, then enter its IP address instead. The 'Login' screen appears:

Figure 4-1: Login Screen



Login

For setting up the gateway, enter your username and password:

Language:	EN English ▾	
User Name:		
Password (case sensitive):		□ Show password

3. From the 'Language' drop-down list, select the desired language for the Web graphical user interface (GUI) display.
4. In the 'User Name' and 'Password' fields, define a login username and password, respectively. This is applicable only if this is your first time that you are logging in to the Web interface. If you have logged in before, then enter the username and password that you defined previously.
5. Click **Continue**; the 'Quick Setup' screen appears, allowing you to quickly set up an Internet connection (as described in Chapter 5 on page 55).

Notes:

- The default username and password is "admin" (case-sensitive).
- If you wish to view the entered password (instead of asterisks), then select the 'Show password' check box.
- You can later change the username and password as described in Section 4.4 on page 331.
- If the Web interface is inactive for 15 minutes after logging in, the 'Login' screen appears again, prompting you to re-login.

4.2 Menu Bar Description

The Web interface screens are conveniently grouped into related themes under specific menus. These menus are located in the menu bar. The table below describes these menus.

Table 4-1: Menu Description

<table>
<tr><th>Menu</th><th>Description</th></tr>
<tr><td><b>Home</b></td><td>Displays the Map View (refer to Section 5 on page 55).</td></tr>
<tr><td><b>Quick Setup</b></td><td>Displays the 'Quick Setup' screen for quickly setting up an Internet connection with MP252 (see Section 7.1 on page 63).</td></tr>
<tr><td><b>Network Connections</b></td><td>Displays the 'Network Connections' screen for configuring network connections:
- LAN (see Chapter 12.2 on page 151)
- WAN (see Chapter 12 on page 131)
- VLANs (see Chapter 12.4 on page 181)
- LAN-WAN bridging (see Section 12.5 on page 188)</td></tr>
<tr><td><b>Security</b></td><td>Displays the 'Security' screen for configuring security-related features such as Website restrictions (see Chapter 14 on page 225).</td></tr>
<tr><td><b>Voice Over IP</b></td><td>Displays the 'Voice Over IP' screen for configuring the VoIP parameters to use MP252's VoIP functionality to place and receive calls over the Internet using a standard telephone set and DECT handset (see Chapter8 on page 77).</td></tr>
<tr><td><b>QoS</b></td><td>Displays the 'Quality Of Service' screen for configuring Quality of Service (QoS) for MP252 (see Chapter 11 on page 113).</td></tr>
<tr><td><b>Advanced</b></td><td>Displays the 'Advanced' screen for configuring system parameters (e.g., DHCP server and DNS) and for administrative functions (e.g., changing password, setting date and time, and upgrading the system).
<table>
<tr><th>Icon</th><th>Name</th><th>Description</th></tr>
<tr><td>ℹ</td><td><b>About MP252</b></td><td>Displays technical information about MP252, including version number (see Section 18.1 on page 310).</td></tr>
<tr><td></td><td><b>Backup and Restore</b></td><td>Backup user and system data (see Section 18.2 on page 311).</td></tr>
<tr><td></td><td><b>Certificates</b></td><td>Manages digital certificates (see Section 13.3 on page 200).</td></tr>
<tr><td></td><td><b>Configuration File</b></td><td>Loads the Configuration File to MP252 (see Section 18.4 on page 316).
<b>Note:</b> You can hide the <b>Configuration File</b> icon, by running the following CLI command in a Telnet session with MP252: <code>rg_conf_set rmt_config/hide_config_file_page 1</code>. This is useful, for example, in scenarios where you want to prevent a user accessing the Web interface to change the configuration file.</td></tr>
</table></td></tr>
</table>

Menu	Description	
	DNS Server	Alias a dynamic IP address to a static hostname (see Section 15.2 on page 257).
	Diagnostics	Performs networking diagnostics (see Section 19.1 on page 334).
	Disk Management	Manages different disks connected to MP252 (see Section 17.2 on page 272).
	File Server	Creates a file server on MP252 (see Section 17.1 on page 270).
	Firmware Upgrade	Upgrades the MP252 firmware (see Section 18.5 on page 323).
	IP Address Distribution	Modifies the DHCP server for each LAN device and displays a list of DHCP clients in the local network (see Section 15.1 on page 251).
	Network Objects	Defines groups of LAN devices for system rules (see Section 4.5.2 on page 50).
	PPPoE Relay	Enables PPPoE relay on MP252 (see Section 15.5 on page 262).
	Personal Domain Name (Dynamic DNS)	Displays and modifies the DNS hosts table (see Section 15.2 on page 257).
	Print Server	Shares a LAN printer (see Section 17.3 on page 286).
	Protocols	Manages protocols (see Section4.5.3 on page 51).
	Reboot	Restarts MP252 (see Section 18.6 on page 329).
	Regional Settings	Modifies the regional settings (see Section 8.10 on page 105).
	Remote Administration	Configures remote administration privileges (see Section 13.2 on page 197).
	Restore Factory Settings	Restores default factory settings (see Section 18.8 on page 333).

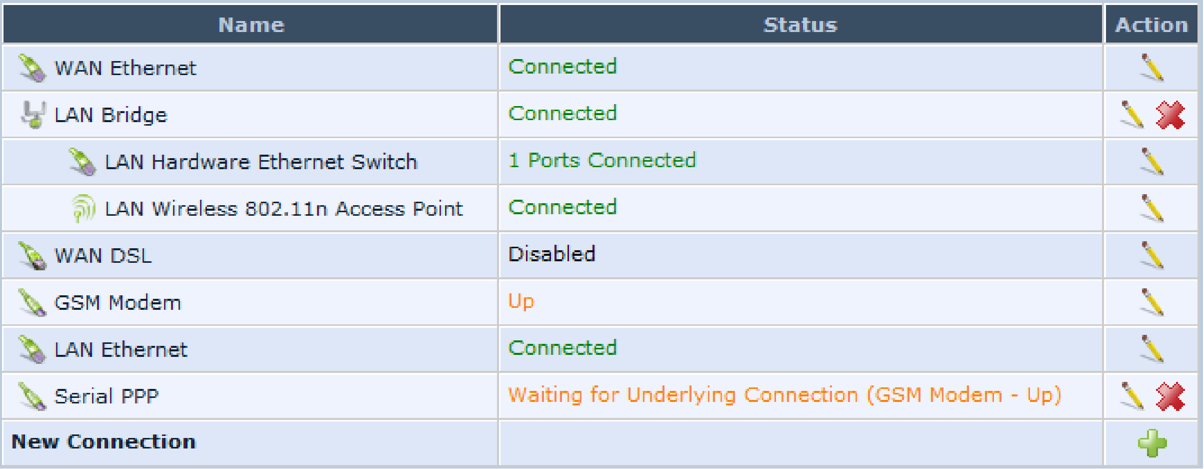
Menu	Description	
	Routing	Manages routing policies (see Section 15.4 on page 261).
	Scheduler	Defines time segments for system rules (see Section 4.5.1 on page 47).
	Simple Network Management Protocol (SNMP)	Configures MP252's SNMP agent (see Section 13.2 on page 197).
	System Settings	Modifies administrator settings, including the MP252 host name (see Section 15.5 on page 262).
	Time Settings	Configures the local date and time (see Section 18.2 on page 311).
	Universal Plug and Play	Configures Universal Plug-and-Play (UPnP) parameters (see Section 16.1 on page 265).
	Users	Configures Users (see Section 4.4 on page 44).
	WINS Server	Registers host names and IP addresses of WINS clients (see Section **Error! Reference source not found.** on page **Error! Bookmark not defined.**).
System Monitoring	Displays the 'System Monitoring' screen for viewing various statuses such as network and traffic statistics (see Chapter 16 on page 265).	
Logout	Logs off the MP252 Web interface.	

4.3 Managing Tables

Tables appear throughout the Web interface for configuring MP252. This section describes the how to use these tables to configure MP252.

The figure below displays a typical table in the Web interface:

Figure 4-2: Typical Table Structure



Name	Status	Action
WAN Ethernet	Connected	✏
LAN Bridge	Connected	✏ ✖
LAN Hardware Ethernet Switch	1 Ports Connected	✏
LAN Wireless 802.11n Access Point	Connected	✏
WAN DSL	Disabled	✏
GSM Modem	Up	✏
LAN Ethernet	Connected	✏
Serial PPP	Waiting for Underlying Connection (GSM Modem - Up)	✏ ✖
New Connection		➕

Each table row denotes an entry in the table. The table also provides 'Action' icons for performing various tasks. These icons are described in the table below.

Table 4-2: Table Action Icons Description

Action Icon	Name	Description
➕	**New**	Adds a new row to the table or opens another screen for adding an entry.
✏	**Edit**	Modifies a row entry in the table.
✖	**Remove**	Deletes a row entry in the table.
💾	**Download**	Downloads a file to a folder on your computer.

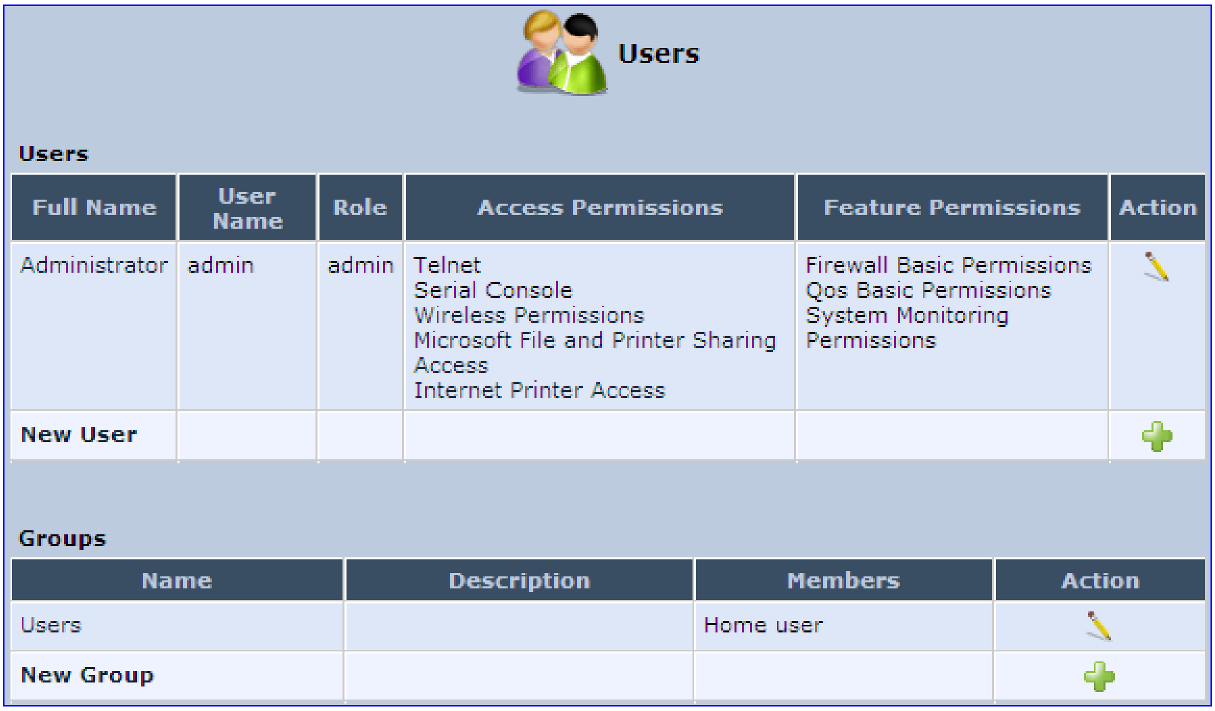
4.4 Configuring Users

The 'Users' screen allows you to add new users and assign login usernames and passwords. You may also group users according to your preferences. The default user is "Administrator" with "admin" (case-sensitive) as the username and password.

➢ To configure users:

1. In the 'Advanced' screen, click the **Users** icon; the 'Users' screen appears.

Figure 4-3: Users Screen



Users

Users

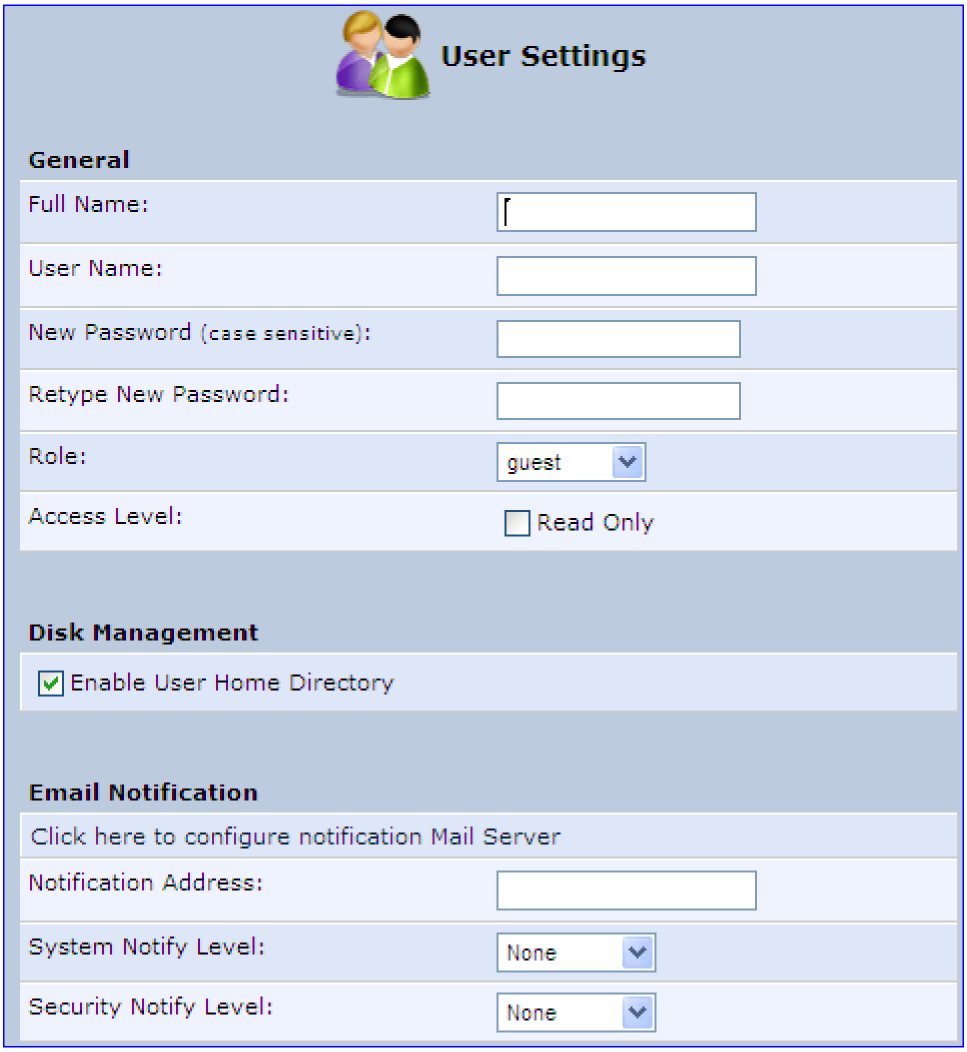
Full Name	User Name	Role	Access Permissions	Feature Permissions	Action
Administrator	admin	admin	Telnet Serial Console Wireless Permissions Microsoft File and Printer Sharing Access Internet Printer Access	Firewall Basic Permissions Qos Basic Permissions System Monitoring Permissions	✎
New User					✚

Groups

Name	Description	Members	Action
Users		Home user	✎
New Group			✚

2. In the **Users** table, click the **New User** ✚ icon; the 'Users Settings' screen appears.

Figure 4-4: Users Settings Screen



User Settings

General

Full Name:	
User Name:	
New Password (case sensitive):	
Retype New Password:	
Role:	guest
Access Level:	□ Read Only

Disk Management

☑ Enable User Home Directory

Email Notification

Click here to configure notification Mail Server

Notification Address:	
System Notify Level:	None
Security Notify Level:	None

3. Add a new user by configuring the following fields:
   a. **Full Name:** Enter a remote user's full name.
   b. **User Name:** Enter a user name to access your home network.
   c. **New Password:** Enter a new password for the remote user. If you do not want to change the remote user's password leave this field empty.
   d. **Retype New Password:** If a new password was assigned, enter it again to verify correctness.
   e. **Role:** User's role indicating privilege level, where "admin" possesses all privileges.
   f. **Access Level – Read Only:** Select this check box if you want this user to have read-only privileges.
   g. **Disk Management:** By default, this option is selected. When activated, it creates a directory for the user in the 'Home' directory of the system storage area. This directory is necessary when using various applications such as the mail server.
   h. **Email Notification:** You can use email notification to receive indications of system events for a predefined severity classification. The available types of events are 'System' or 'Security' events. The available severity of events is 'Error', 'Warning' and 'Information. If the 'Information' level is selected, the user receives notification of the 'Information', 'Warning' and 'Error' events. If the 'Warning' level is selected, the user receives notification of the 'Warning' and 'Error' events etc.

- **Click here to configure notification mail server:** This opens the ‘System Settings’ screen (see Section 15.5 on page 262) where you can define an outgoing mail server.
- **Notification Address:** user’s email address.
- **System Notify Level**: By default, the 'None' option is selected, which means that MP252 does not send notifications to a remote host. To activate the feature, select one of the following notification types:
  - ✓ Error
  - ✓ Warning
  - ✓ Information
- **Security Notify Level:** The remote security notification level can be one of the following:
  - ✓ None
  - ✓ Error
  - ✓ Warning
  - ✓ Information

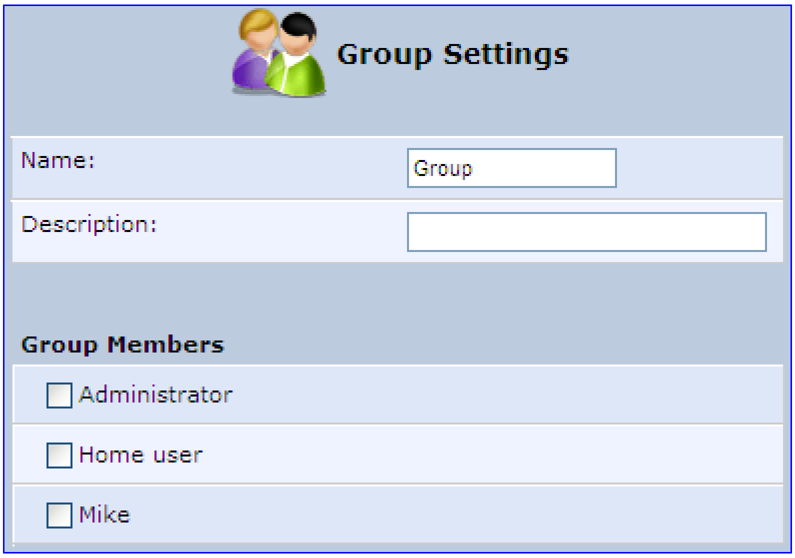
4. Click **OK**.

Note: Modifying any of the user parameters prompts the connection associated with the user to terminate. For changes to take effect, you should activate the connection manually after modifying user parameters.

➢ **To configure user groups:**

1. In the 'Users' screen, under the **Groups** group, click **New Group** ✚ icon; the 'Group Settings' screen appears.

Figure 4-5: Group Settings Screen



Group Settings

Name: Group

Description:

Group Members

□ Administrator

□ Home user

□ Mike

2. In the 'Name' field enter a name for the group.
3. In the 'Description' field, enter a brief description of this group.
4. In the 'Group Members' list, select the users that you want to assign to this group.
5. Click **OK**.

4.5 Defining Associated Elements

You can define certain elements and then use them later when configuring various features throughout the Web interface. This is very convenient in that it eliminates the need to re-configure the same element, especially if used in multiple configuration areas. These elements include the following:

- Scheduler Rules – see Section 4.5.1 on page 47
- Network Objects – see Section 4.5.2 on page 50
- Protocols – see Section 4.5.3 on page 51

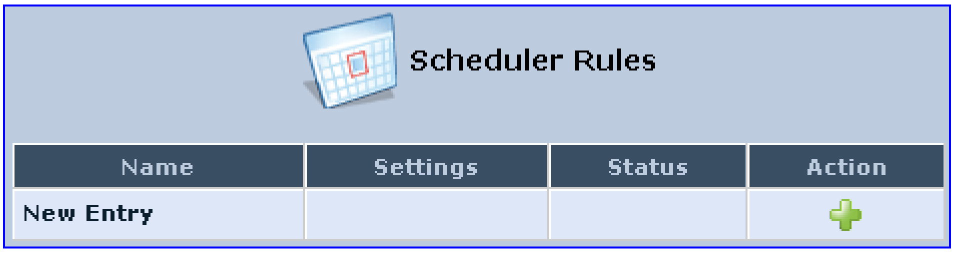
4.5.1 Defining Scheduler Rules

Scheduler rules are used for limiting the activation of firewall rules to specific time periods, specified in days of the week, and hours.

➢ **To define a Rule:**

1. In the 'Advanced' screen, click the **Scheduler** icon; the 'Scheduler Rules' screen appears.

Figure 4-6: Scheduler Rules Screen

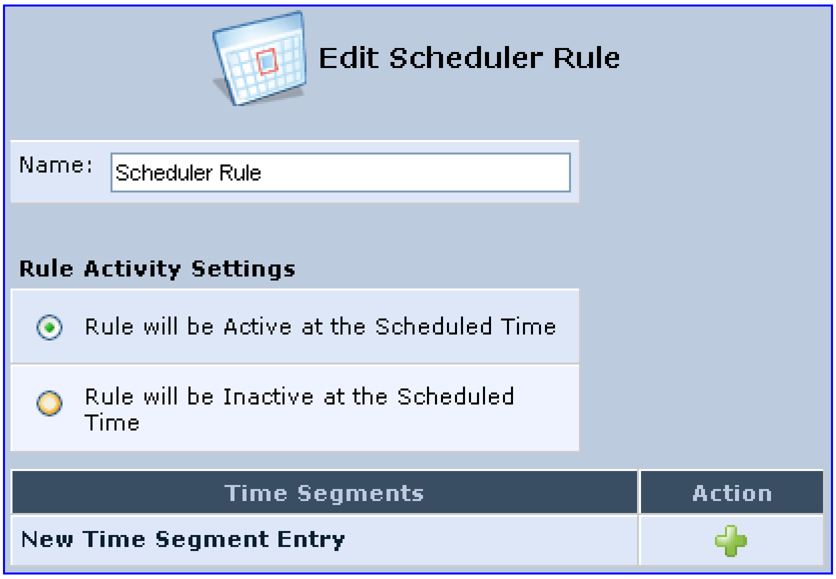


Scheduler Rules

Name	Settings	Status	Action
New Entry			✚

2. Click the **New** ✚ icon; the 'Edit Scheduler Rule' screen appears.

Figure 4-7: Edit Scheduler Rule Screen



Edit Scheduler Rule

Name: Scheduler Rule

Rule Activity Settings

● Rule will be Active at the Scheduled Time

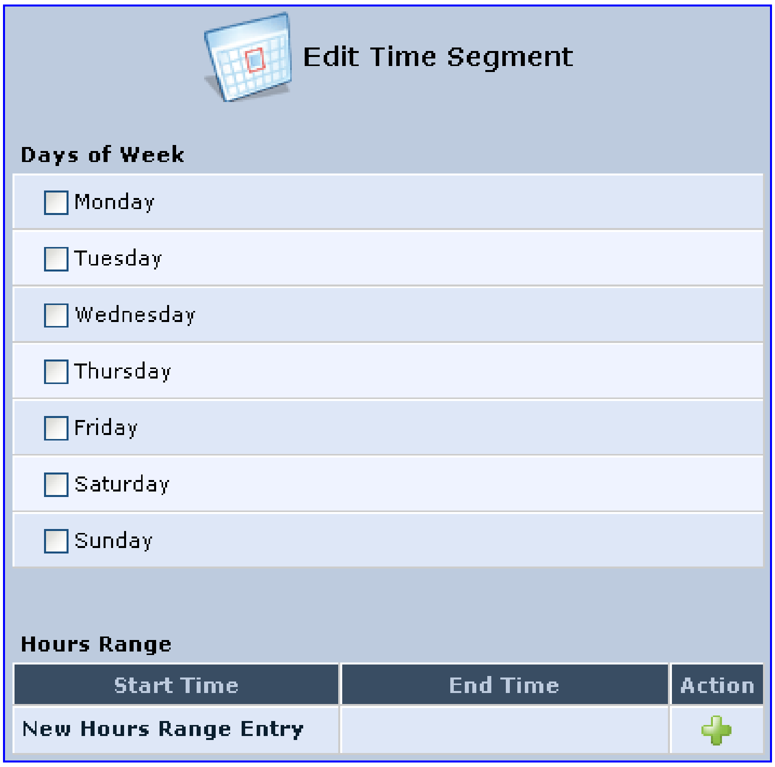
○ Rule will be Inactive at the Scheduled Time

Time Segments	Action
New Time Segment Entry	✚

3. In the 'Name' field, specify a name for the scheduler rule.
4. Under the **Rule Activity Settings** group, specify if the rule is active or inactive during the designated time period, by selecting the appropriate check box.

5. Click the **New** ✚ icon to define the time segment to which the rule applies; the 'Edit Time Segment' screen appears.

Figure 4-8: Edit Time Segment Screen



Edit Time Segment

Days of Week

- □ Monday
- □ Tuesday
- □ Wednesday
- □ Thursday
- □ Friday
- □ Saturday
- □ Sunday

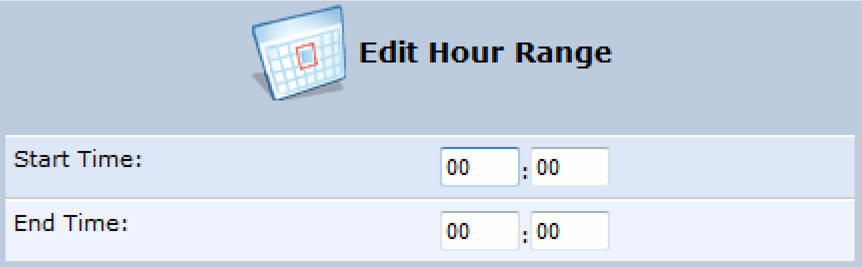
Hours Range

Start Time	End Time	Action
New Hours Range Entry		✚

a. Under the **Days of Week** group, select the days of the week for which you want the rule to be active.

b. In the **Hours Range** table, click the **New** ✚ icon to define an active or inactive hourly range; the ‘Edit Hour Range’ screen appears.

Figure 4-9: Edit Hour Range Screen



Edit Hour Range

Start Time:	00 : 00
End Time:	00 : 00

c. In the ‘Start Time’ and ‘End Time’ field, enter the time interval in which the scheduler rule is active or inactive.

6. Click **OK** to save the settings.

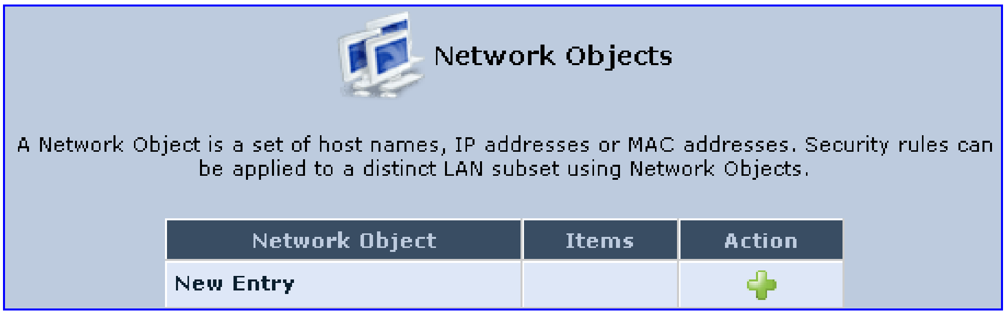
4.5.2 Defining Network Objects

Network objects is a method used to logically define a set of LAN hosts, according to one or more MAC address, IP address, and host name. Defining such a group can assist when configuring other system rules. For example, you can use network objects to apply security rules based on host names instead of IP addresses. This may be useful, since IP addresses change from time to time. Moreover, it is possible to define network objects according to MAC addresses, making rule application more persistent against network configuration settings.

➢ To define a network object:

1. In the 'Advanced' screen, click the **Network Objects** icon; the 'Network Objects' screen appears.

Figure 4-10: Network Objects Screen



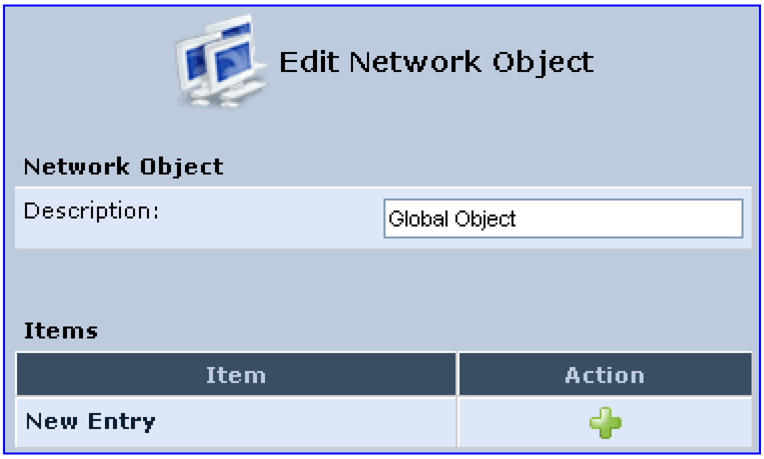
Network Objects

A Network Object is a set of host names, IP addresses or MAC addresses. Security rules can be applied to a distinct LAN subset using Network Objects.

Network Object	Items	Action
New Entry		✚

2. Click the **New** ✚ icon; the 'Edit Network Object' screen appears.

Figure 4-11: Edit Network Objects Screen



Edit Network Object

Network Object

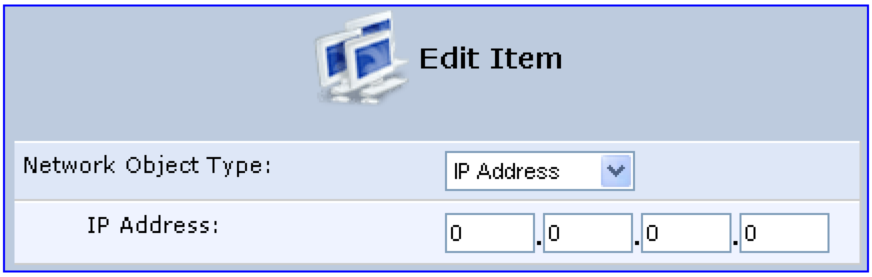
Description: Global Object

Items

Item	Action
New Entry	✚

3. In the 'Description' field, enter a name for the network object, and then click the **New** ✚ icon; the 'Edit Item' screen appears.

Figure 4-12: Edit Item Screen



Edit Item

Network Object Type: IP Address

IP Address: 0 . 0 . 0 . 0

4. From the 'Network Object Type' drop-down lists, select a source address type:
   - IP Address
   - IP Subnet
   - IP Range
   - MAC Address
   - Host Name
   - DHCP Option (supporting options 60, 61, and 77)
   - All Private IP Addresses

   When selecting a method from the drop-down list, the screen refreshes, presenting the respective fields by which to enter the relevant information.
5. Click **OK** to save the settings.

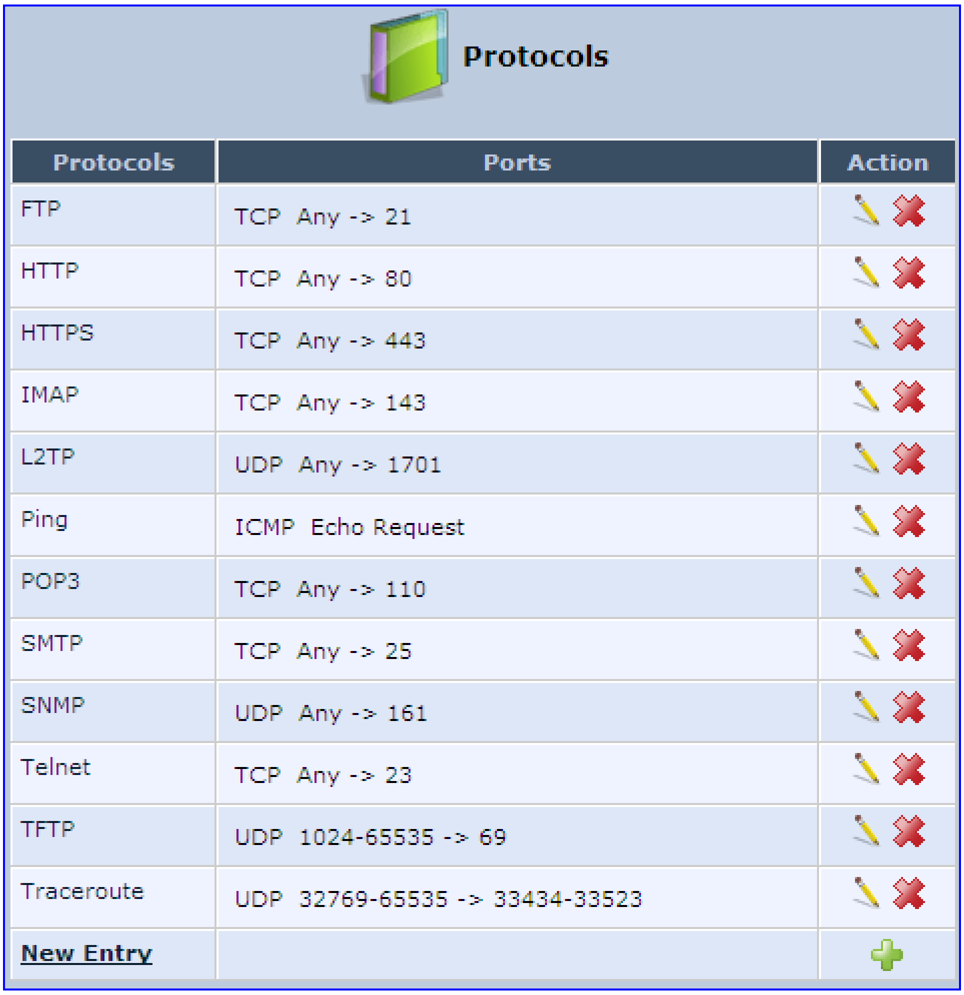
4.5.3 Defining Protocols

The Protocols feature incorporates a list of preset and user-defined applications and common port settings. You can use protocols in various security features such as Access Control and Port Forwarding. You may add new protocols to support new applications or edit existing ones according to your needs.

➢ To define a protocol:

1. In the 'Advanced' screen, click the **Protocols** icon; the 'Protocols' screen appears.

Figure 4-13: Advanced - Protocols

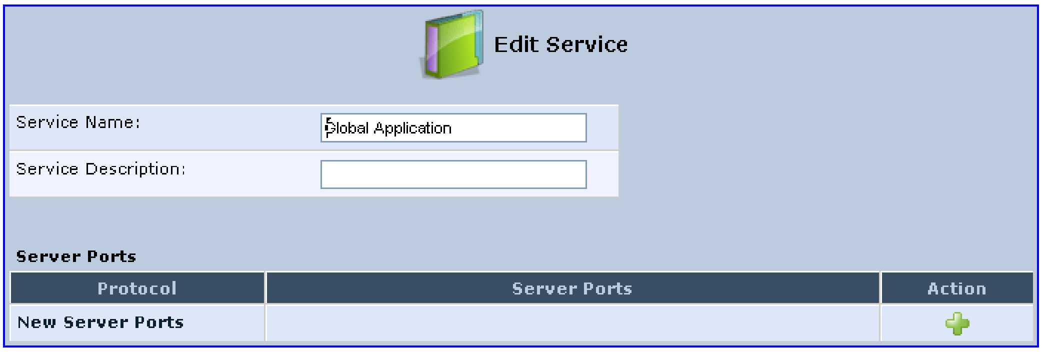


Protocols

Protocols	Ports	Action
FTP	TCP Any -> 21	✎ ✖
HTTP	TCP Any -> 80	✎ ✖
HTTPS	TCP Any -> 443	✎ ✖
IMAP	TCP Any -> 143	✎ ✖
L2TP	UDP Any -> 1701	✎ ✖
Ping	ICMP Echo Request	✎ ✖
POP3	TCP Any -> 110	✎ ✖
SMTP	TCP Any -> 25	✎ ✖
SNMP	UDP Any -> 161	✎ ✖
Telnet	TCP Any -> 23	✎ ✖
TFTP	UDP 1024-65535 -> 69	✎ ✖
Traceroute	UDP 32769-65535 -> 33434-33523	✎ ✖
New Entry		✚

2. Click the **New** ✚ icon; the 'Edit Service' screen appears.

Figure 4-14: Advanced - Protocols - Edit Service



Edit Service

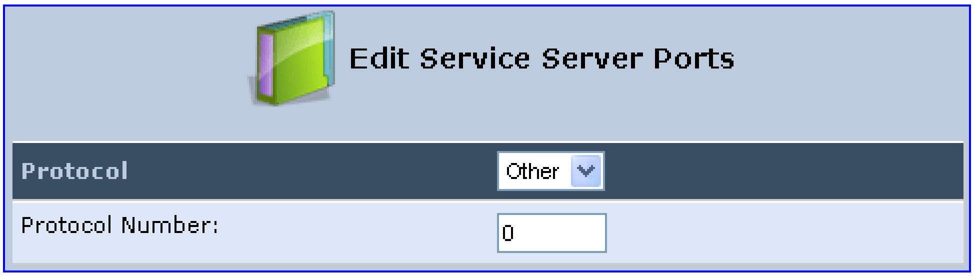
Service Name:	Global Application
Service Description:	

Server Ports

Protocol	Server Ports	Action
New Server Ports		✚

3. In the 'Service Name' field, enter the name of the service, and then click the **New** ✚ icon; the 'Edit Service Server Ports' screen appears.

Figure 4-15: Advanced - Protocols - Edit Service - Server Ports



Edit Service Server Ports

Protocol	Other
Protocol Number:	0

4. You may choose any of the protocols available in the drop-down list, or add a new one by selecting 'Other'. When selecting a protocol from the drop-down list, the screen refreshes, presenting the respective fields by which to enter the relevant information.
5. Select a protocol and enter the relevant information.
6. Click **OK** to save the settings.

4.6 Logging out the Web Interface

To log out the MP252, click the **Logout** menu in the menu bar. When you logged out, the ‘Login’ screen is displayed, allowing you to re-login, if desired.

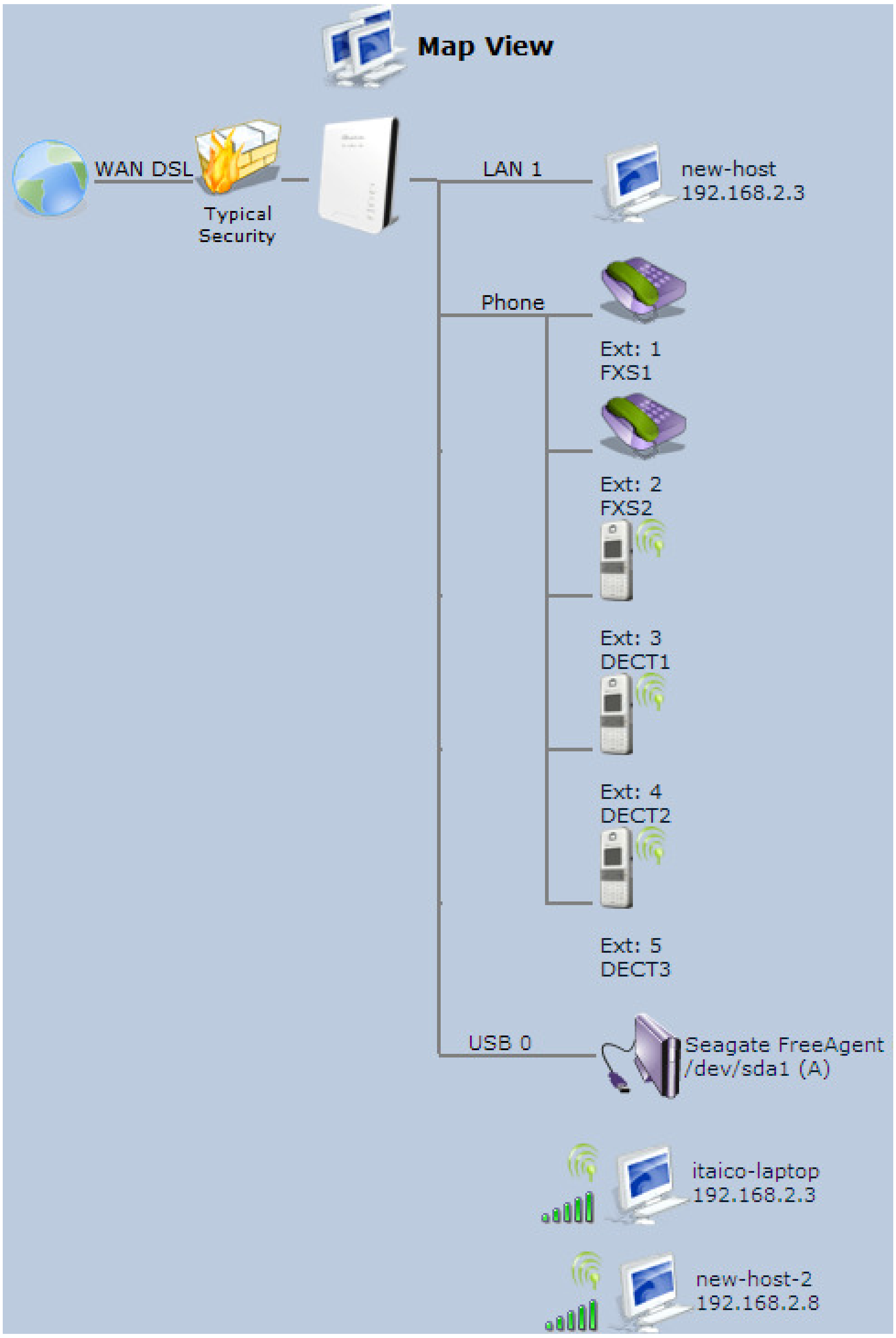
5 Viewing a Graphical Display of the MP252 Network

The Web interface allows you to view a graphical display of the network elements connected to MP252. This is displayed in the ‘Map View’ screen, accessed by clicking the **Home** menu in the menu bar.

You can click a displayed network element icon to access the relevant screen for configuring the element.

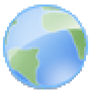
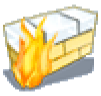
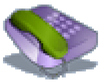
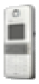
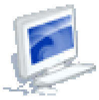
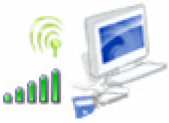
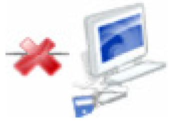
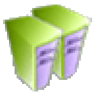
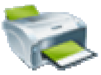
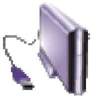
The figure below displays an example of a network map for a deployed MP252:

Figure 5-1: Map View Screen (Example)



The table below describes the possible icons that can be displayed in the 'Map View' screen:

Table 5-1: Map View Icon Description

Icon	Description
	Depicts the Internet connection (e.g., WAN Ethernet). Click this icon to open the 'Quick Setup' screen (see Section 7.1 on page 63).
	Depicts the firewall. The height of the wall (yellow "bricks") corresponds to the security level (Minimum, Typical or Maximum). Click this icon to open the 'General Tab' screen (see Section 14.1 on page 226).
	Depicts MP252 and displays the currently software version. Click this icon to open the 'Quick Setup' screen (see Section 7.1 on page 63).
	Depicts an analog telephone connected to MP252. Click this icon to open the 'Extension Settings' screen (see Section 8.7 on page 102).
	Depicts a DECT handset registered to the MP252. Click this icon to open the 'Extension Settings' screen (see Section 8.7 on page 102).
	Depicts a computer (host) in the MP252 network. Each computer connected to the network appears below the network symbol of the network through which it is connected. This host is either a DHCP client that has received an IP lease from MP252, or a host with a static IP address, auto-detected by MP252. Click this icon to open the 'Host Information' screen, displaying network information of the host. **Note**: MP252 recognizes a physically connected host and displays it in the Network Map only after network activity from that host has been detected (e.g. trying to browse to the Web management or to surf the Internet).
	Depicts a computer connected to the Internet through the MP252 Wi-Fi network. Click this icon to open the 'Host Information' screen, displaying network information of the host.
	Depicts a host whose DHCP lease has expired and not renewed. The DHCP lease is renewed automatically, unless the host is no longer physically connected to MP252. This icon also depicts a static IP host that has no network activity.
	Depicts a file server (hard drive) that is connected to MP252 (typically through the USB port). Click this icon to view the file server configuration.
	Depicts a printer that is connected to MP252 and is shared by network users. Click this icon to view the printer's settings.
	Depicts a USB driver.

Icon	Description
	Depicts a USB disk-on-key that is connected to MP252.
✖	Depicts a disconnected device.

6 Configuring Computers for Connecting to the MP252 Network

This chapter describes how to configure computers to connect to the MP252 network, and includes the following main areas:

- Connecting wired computers – see Section 6.1 on page 59
- Connecting wireless network computers – see Section 6.2 on page 61

6.1 Wired Computers

This section describes how to configure computers that connect to the MP252 network through a LAN cable (i.e., wired).

You can configure the network interface of the computer using one of the following methods:

- Statically define an IP address and DNS address
- Automatically obtain an IP address using the MP252 embedded DHCP server

This section describes how to configure the computers network for the following operating systems (OS):

- Windows XP – see Section 0 on page 59
- Linux – see Section 6.1.2 on page 60

Notes:

- It is recommended to set the computers to automatically obtain their IP addresses (from a DHCP server).
- Refer to the Quick Installation Guide for instructions relating to installation on a Windows™ operating system.

6.1.1 Configuring Computers Running on Windows XP

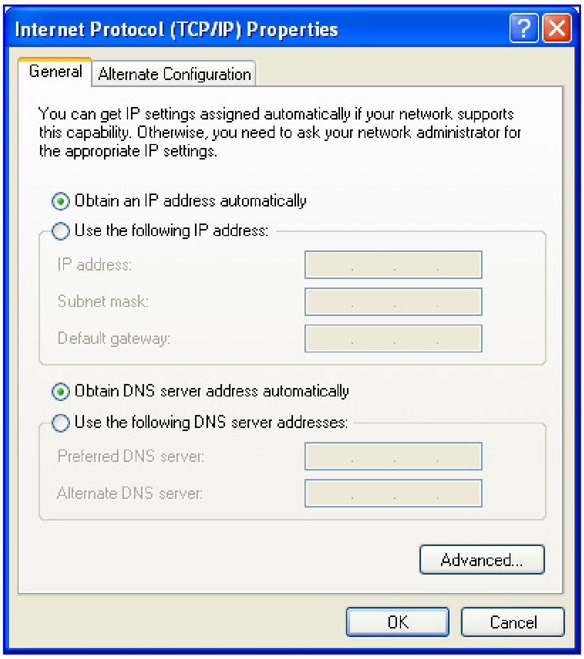
The procedure below describes how to configure a computer running on Windows XP OS to automatically obtain its IP address (from a DHCP server, for example, MP252).

Note: For computers running Windows, the setup procedure is generally unnecessary as Windows' default network settings are to obtain an IP address automatically. However, it is recommended to follow the setup procedure to verify that all communication parameters are valid and that the physical cable connections are correct.

➢ **To configure a computer running Windows XP for dynamic IP addressing:**

1. Access 'Network Connections' from the Control Panel.
2. Right-click the **Ethernet connection** icon, and then choose **Properties**.
3. Under the **General** tab, select the 'Internet Protocol (TCP/IP)' component, and then click the **Properties** button; the 'Internet Protocol (TCP/IP) Properties' dialog box is displayed.

Figure 6-1: Internet Protocol (TCP/IP) Properties Dialog Box



You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

● Obtain an IP address automatically

○ Use the following IP address:

● Obtain DNS server address automatically

○ Use the following DNS server addresses:

4. Select the **Obtain an IP address automatically** option.
5. Select the **Obtain DNS server address automatically** option.
6. Click **OK** to save the settings.

6.1.2 Configuring Computers Running on Linux

The procedure below describes how to configure a computer running on Linux OS to automatically obtain its IP address (from a DHCP server, for example, MP252).

➢ To configure a computer running Linux for dynamic IP addressing:

1. Log in to the system as a super-user, by entering the following command:

```
su
```

2. View the network devices and allocated IP's, by typing the following command:

```
ifconfig
```

3. At the prompt, type the following command:

```
pump -i <dev>
```

   Where *<dev>* is the network device name.

4. View the new allocated IP address, by typing the following command:

```
ifconfig
```

5. Make sure that no firewall is active on the device <dev>.

6.2 Connecting PC to MP252 Wireless Networks

This section describes how to configure the LAN computers to connect to the MP252 wireless network. If your computer has wireless capabilities, Windows automatically recognizes the MP252 wireless network and creates a wireless connection.

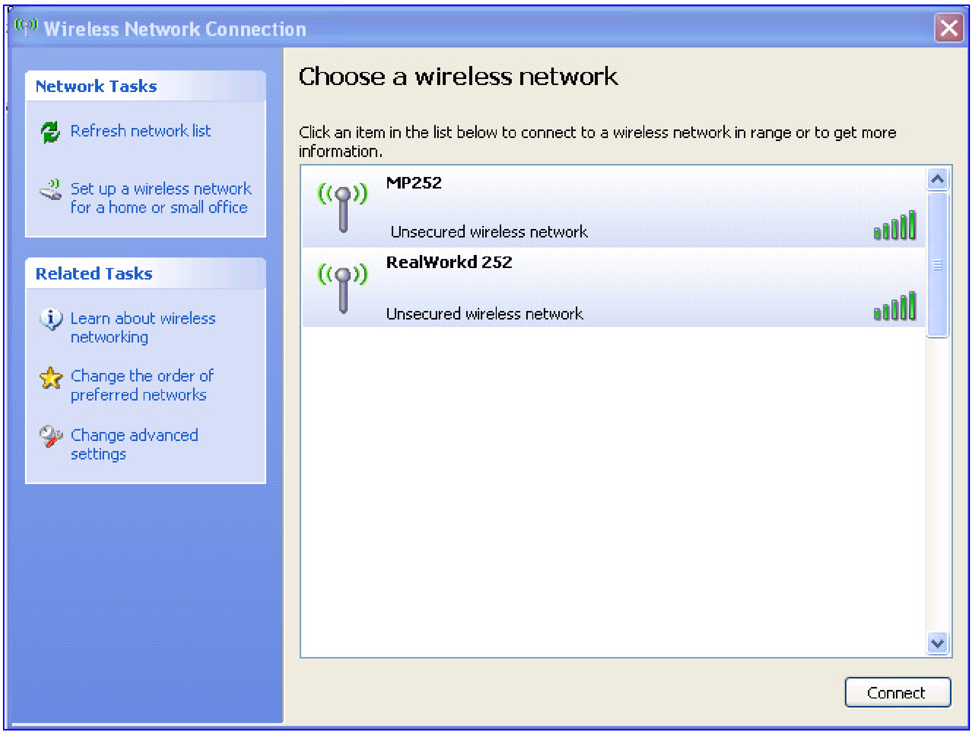
Notes:

- To configure the MP252 LAN wireless connection, see Section 12.2.1 on page 151.
- This section is based on computers running Microsoft Windows XP Professional.

➢ To configure a computer to connect to MP252 wireless network:

1. From your Windows **Start** menu, point to **Settings**, **Control Panel**, **Network Connections**, and then choose **Wireless Connection**; Windows starts enabling the wireless connection.
2. On the Windows taskbar, right-click the **Wireless Network Connection** icon, and then choose **View Available Wireless Connections**;

Figure 6-2: Available Wireless Networks



Wireless Network Connection

Choose a wireless network

Click an item in the list below to connect to a wireless network in range or to get more information.

MP252	Unsecured wireless network
RealWorkd 252	Unsecured wireless network

Network Tasks
Refresh network list
Set up a wireless network for a home or small office
Related Tasks
Learn about wireless networking
Change the order of preferred networks
Change advanced settings
Connect

3. Double-click the MP252 wireless network name (i.e., "**MP252**"); your computer establishes a wireless connection with MP252, indicated by the display of "Connected".

7 Connecting MP252 to the Internet

This section describes how to configure MP252 for connecting it to the Internet (WAN). You can connect MP252 to the Internet using one of the following methods:

- Configuring MP252 through the Web interface – see Section 7.1 on page 63
- Using the MP252 Automatic Internet Dialer Detection feature – see Section 7.2 on page 72

Notes:

- MP252 automatically detects the physical WAN type (i.e., Ethernet or ADSL). To change the WAN type, you must restore MP252 to factory settings (see Section 18.8).
- When connected to ADSL, the **LAN4**/**WAN** Ethernet port can be used for Ethernet LAN interface.
- When connected to an external modem through the Ethernet **LAN4**/**WAN** port and MP252 obtains an IP address, the ADSL interface is disabled.
- If the Automatic Dialer feature is shipped preconfigured (i.e., enabled), then MP252 automatically detects the Internet dialer type and therefore, Internet connection configuration is unnecessary. However, it is recommended to manually configure the Internet connection **after** the Automatic Dialer process has completed (successfully or not). For more information on the Automatic Dialer feature, see Section 7.2 on page 72.

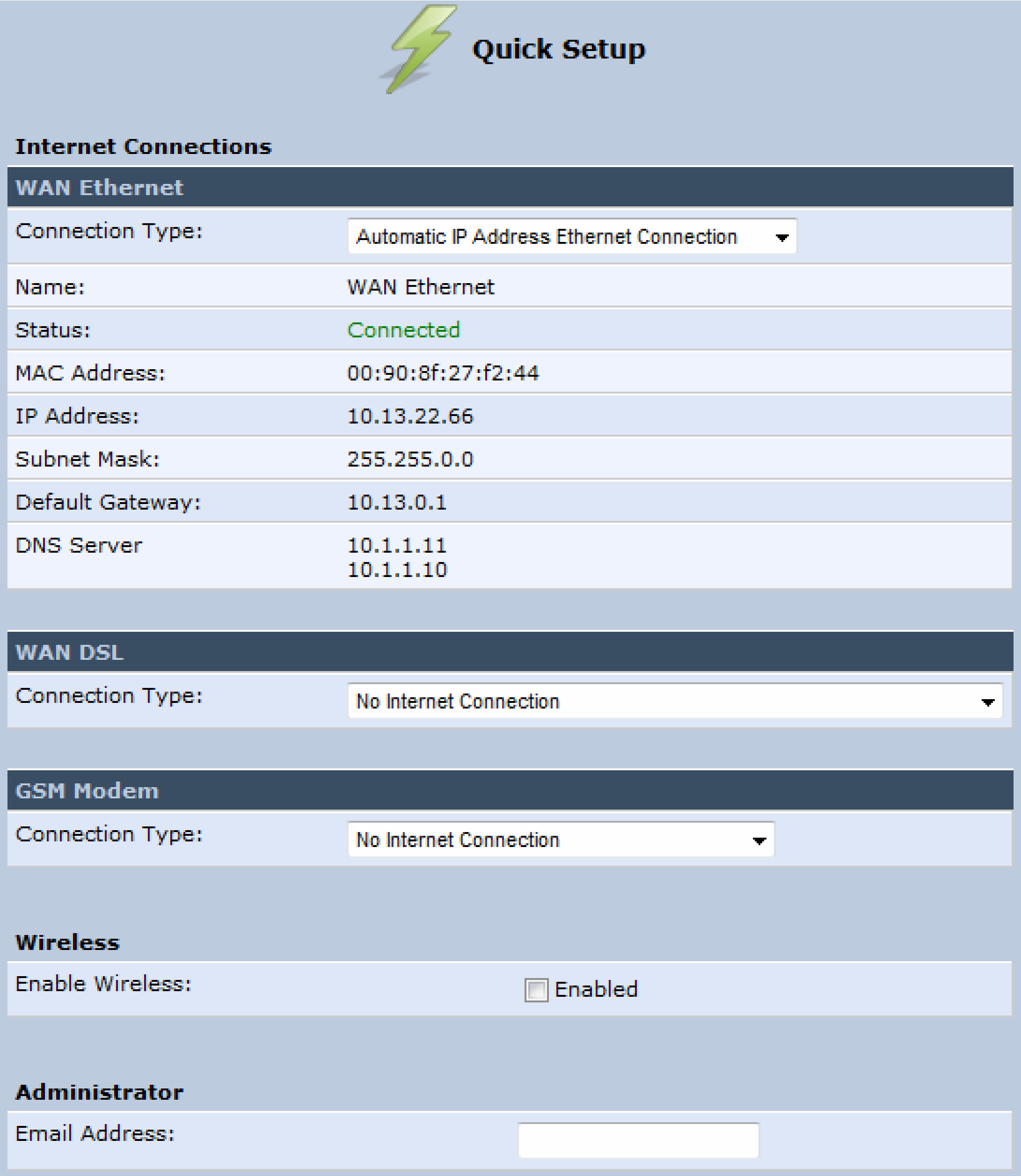
7.1 Quickly Setting up an Internet Connection in the Web Interface

You can quickly and easily set up a basic Internet connection using the Web interface’s 'Quick Setup' screen (as shown in Figure 7-1). This screen is displayed when you log in to the Web interface (or you can click the **Quick Setup** menu from the menu bar).

Notes:

- Before configuring the MP252 Internet connection, ensure that you have obtained relevant technical information on the Internet connection type from your Internet Telephony Service Provider (ITSP). For example, whether you are connected to the Internet using a static or dynamic IP address, or what protocols such as PPTP or PPPoE are used to communicate over the Internet.
- For advanced configuration of the WAN network, use the **Network Connections** menu, as described in Section 12.1 on page 131.
- The ‘Email Address’ field in the ‘Quick Setup’ screen defines the administrator's e-mail. System alerts and notifications are sent to this address (typically, to the telephony carrier technicians). It is recommended that **only** the administrator modify it.

Figure 7-1: Quick Setup Screen



Quick Setup

Internet Connections

WAN Ethernet

Connection Type:	Automatic IP Address Ethernet Connection
Name:	WAN Ethernet
Status:	Connected
MAC Address:	00:90:8f:27:f2:44
IP Address:	10.13.22.66
Subnet Mask:	255.255.0.0
Default Gateway:	10.13.0.1
DNS Server	10.1.1.11 10.1.1.10

WAN DSL

Connection Type:	No Internet Connection

GSM Modem

Connection Type:	No Internet Connection

Wireless

Enable Wireless: □ Enabled

Administrator

Email Address:

You can configure one of two main Internet connection types:

- WAN Ethernet – see Section 7.1.1 on page 64
- WAN DSL – see Section 7.1.2 on page 68

7.1.1 WAN Ethernet

MP252 supports the following WAN Ethernet connection types:

- Manual IP address
- Automatic IP address
- Point-to-Point Protocol over Ethernet (PPPoE)
- Point-to-Point Tunneling Protocol (PPTP)
- Layer 2 Tunneling Protocol (L2TP)

Notes:

- Automatic IP address is the default connection type.
- If you do not need an Internet (WAN Ethernet) connection, then in the 'Quick Setup' screen, from the 'Connection Type' drop-down list, select 'No Internet Connection' .

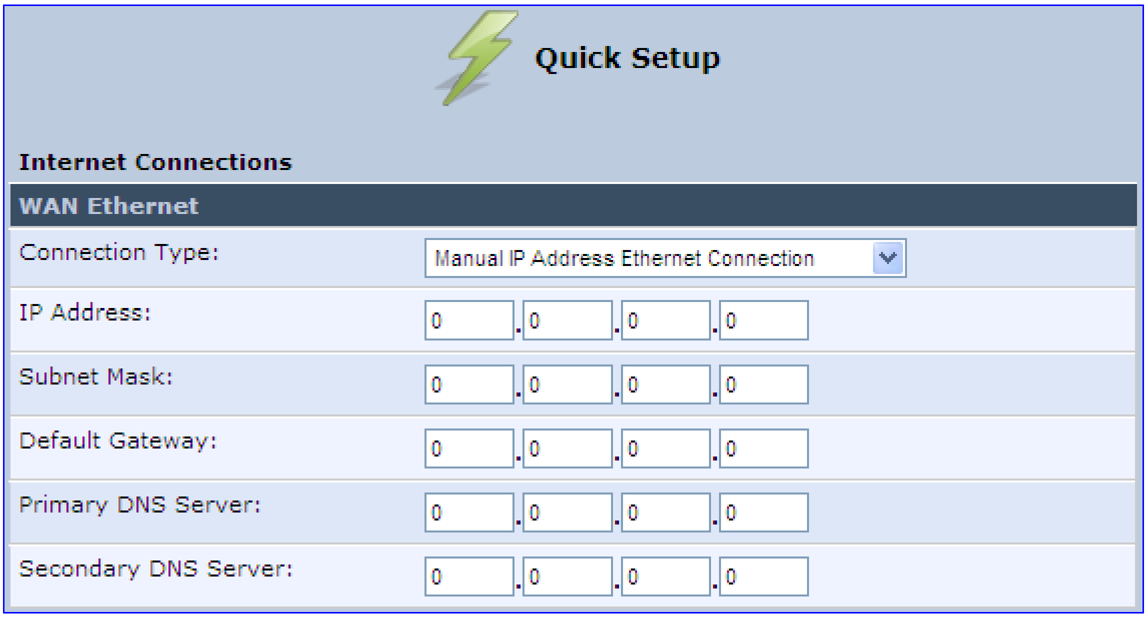
7.1.1.1 Manual IP Address Ethernet Connection

The procedure below describes how to connect to the Internet using a manually defined IP address.

➢ **To configure a manual IP address connection:**

1. Under the **WAN Ethernet** group, from the 'Connection Type' drop-down list, select 'Manual IP Address Ethernet Connection'.

Figure 7-2: Manual IP Address WAN Ethernet Connection



Quick Setup

Internet Connections

WAN Ethernet

Connection Type:	Manual IP Address Ethernet Connection
IP Address:	0 . 0 . 0 . 0
Subnet Mask:	0 . 0 . 0 . 0
Default Gateway:	0 . 0 . 0 . 0
Primary DNS Server:	0 . 0 . 0 . 0
Secondary DNS Server:	0 . 0 . 0 . 0

2. According to your ISP's instructions, specify the following parameters:
   - IP address
   - Subnet mask
   - Default Gateway
   - Primary DNS server
   - Secondary DNS server

7.1.1.2 Automatic IP Address Ethernet Connection

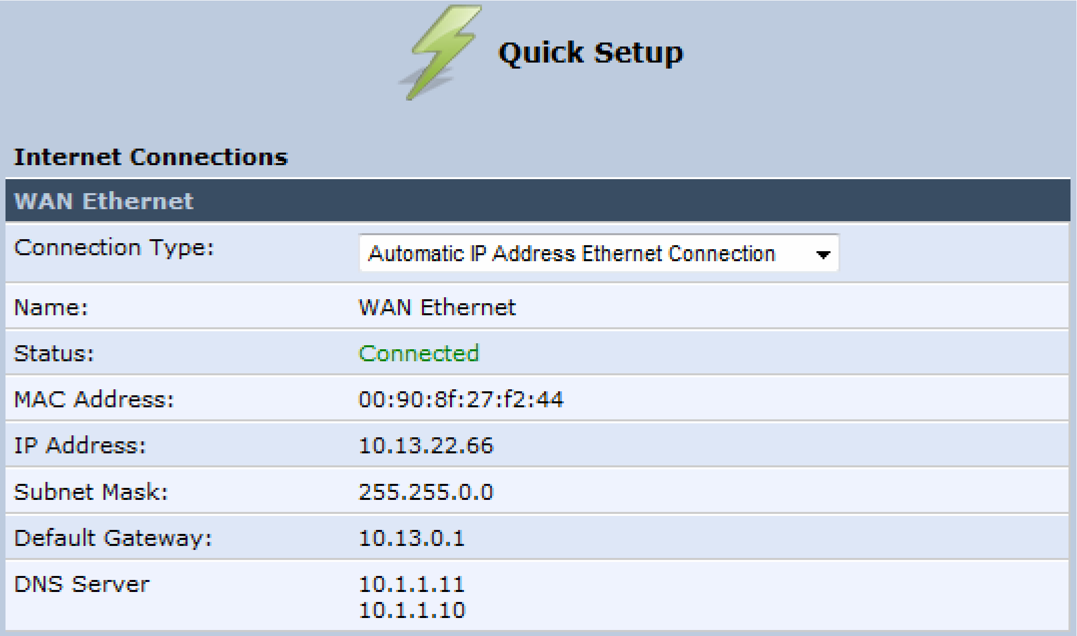
The procedure below describes how to connect to the Internet by automatically obtaining a WAN IP address and DNS IP address from a DHCP server on the WAN. This method is the default connection type.

➢ **To configure automatic IP address connection:**

■ Under the **WAN Ethernet** group, from the 'Connection Type' drop-down list, select

'Automatic IP Address Ethernet Connection'.

Figure 7-3: Automatic IP Address WAN Ethernet Connection



Quick Setup

Internet Connections

WAN Ethernet

Connection Type:	Automatic IP Address Ethernet Connection
Name:	WAN Ethernet
Status:	Connected
MAC Address:	00:90:8f:27:f2:44
IP Address:	10.13.22.66
Subnet Mask:	255.255.0.0
Default Gateway:	10.13.0.1
DNS Server	10.1.1.11 10.1.1.10

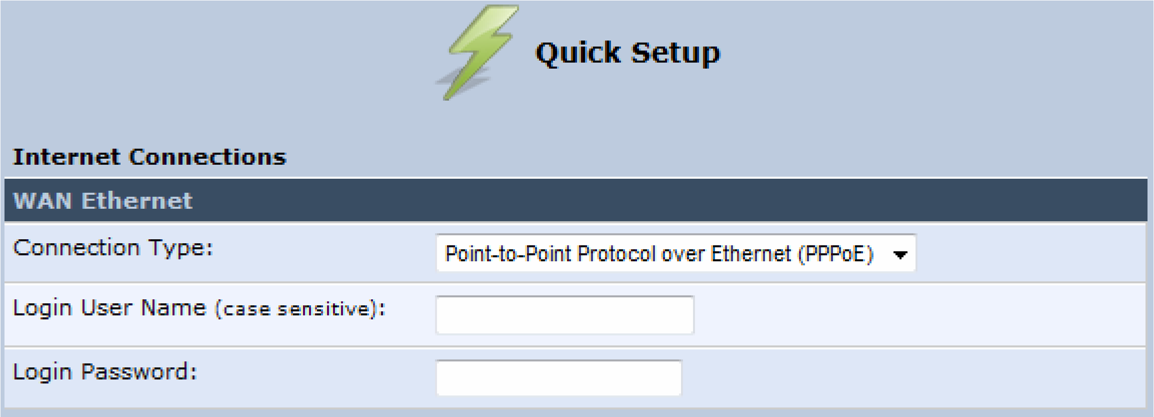
7.1.1.3 PPPoE

The procedure below describes how to connect to the Internet by PPPoE

➢ **To configure PPPoE connection:**

1. Under the **WAN Ethernet** group, from the 'Connection Type' drop-down list, select 'Point-to-Point Protocol over Ethernet (PPPoE)'.

Figure 7-4: PPPoE WAN Ethernet Connection



Quick Setup

Internet Connections

WAN Ethernet

Connection Type:	Point-to-Point Protocol over Ethernet (PPPoE)
Login User Name (case sensitive):	
Login Password:	

2. Configure the PPPoE login username and password (provided by your ITSP).

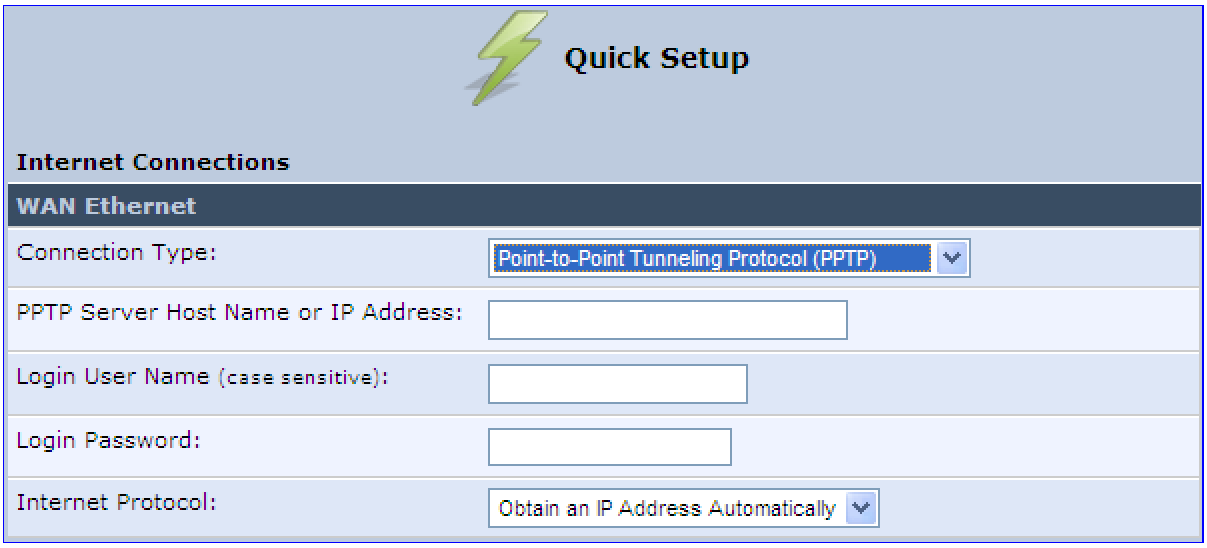
7.1.1.4 PPTP

The procedure below describes how to connect to the Internet by PPTP.

➢ **To configure PPTP connection:**

1. Under the **WAN Ethernet** group, from the 'Connection Type' drop-down list, select 'Point-to-Point Tunneling Protocol (PPTP)'.

Figure 7-5: PPTP WAN Ethernet Connection



Quick Setup

Internet Connections

WAN Ethernet

Connection Type: Point-to-Point Tunneling Protocol (PPTP)

PPTP Server Host Name or IP Address:

Login User Name (case sensitive):

Login Password:

Internet Protocol: Obtain an IP Address Automatically

2. Configure the following (provided by your ITSP):
   - PPTP Server Host Name or IP Address
   - Login user name
   - Login password
3. From the ‘Internet Protocol’ drop-down lists, select the method for assigning an IP address (provided by your ITSP).

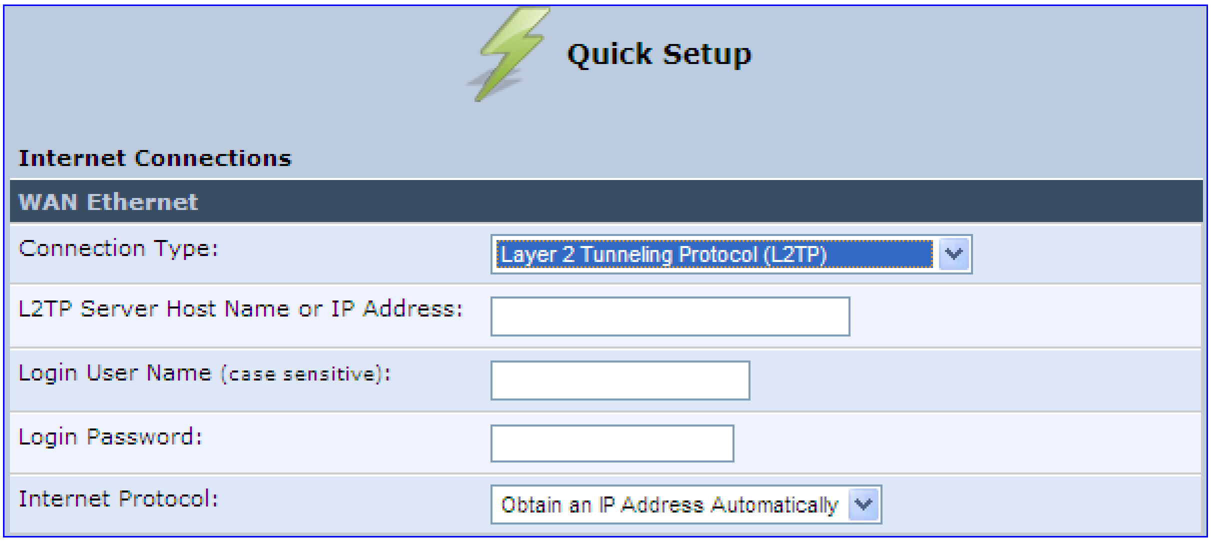
7.1.1.5 L2TP

The procedure below describes how to connect to the Internet by L2TP.

➢ To configure L2TP connection:

1. Under the **WAN Ethernet** group, from the 'Connection Type' drop-down list, select 'Layer 2 Tunneling Protocol (L2TP)'.

Figure 7-6: L2TP WAN Ethernet Connection



Quick Setup

Internet Connections

WAN Ethernet

Connection Type: Layer 2 Tunneling Protocol (L2TP)

L2TP Server Host Name or IP Address:

Login User Name (case sensitive):

Login Password:

Internet Protocol: Obtain an IP Address Automatically

2. Configure the following (provided by your ITSP):
   - L2TP Server Host Name or IP Address
   - Login user name
   - Login password
3. From the 'Internet Protocol' drop-down lists, select the method for assigning an IP address (provided by your ITSP).

7.1.2 WAN DSL

MP252 supports the following WAN DSL connection types:

- PPPoE
- Point-to-Point Protocol over ATM (PPPoA)
- Routed Ethernet Connection over ATM (Routed ETHoA)
- LAN-WAN Bridged Ethernet Connection over ATM (Bridged ETHoA)
- Classical IP over ATM (CLIP)

Note: If you do not need an Internet (WAN DSL) connection, then in the 'Quick Setup' screen, from the 'Connection Type' drop-down list, select ' No Internet Connection' .

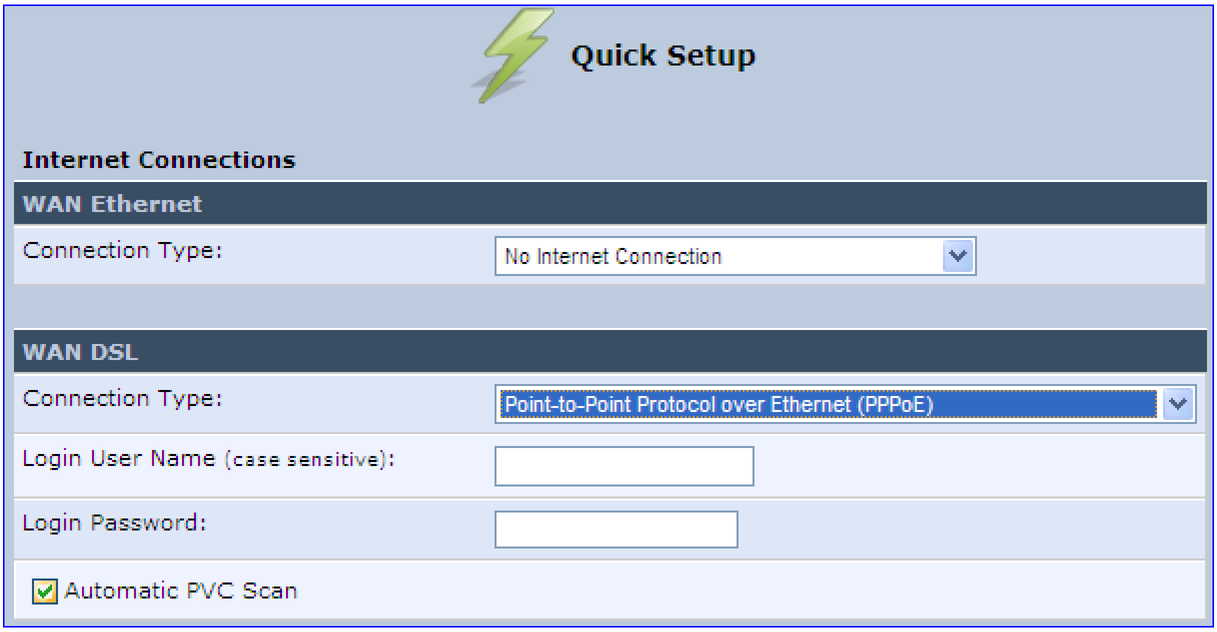
7.1.2.1 PPPoE

The procedure below describes how to connect to the Internet by PPPoE.

➢ To configure PPPoE connection:

1. Under the **WAN DSL** group, from the 'Connection Type' drop-down list, select 'Point-to-Point Protocol over Ethernet (PPPoE)'.

Figure 7-7: PPPoE WAN DSL Internet Connection



Quick Setup

Internet Connections

WAN Ethernet

Connection Type: No Internet Connection

WAN DSL

Connection Type: Point-to-Point Protocol over Ethernet (PPPoE)

Login User Name (case sensitive):

Login Password:

☑ Automatic PVC Scan

2. Configure the following (provided by your ITSP):

- Login user name
- Login password

3. By default, the 'Automatic PVC Scan' check box is selected, which means that MP252 configures the VPI, VCI, and encapsulation parameters automatically. To configure these parameters manually, clear this check box (for more information, see Section 12.1.1.1 on page 133).

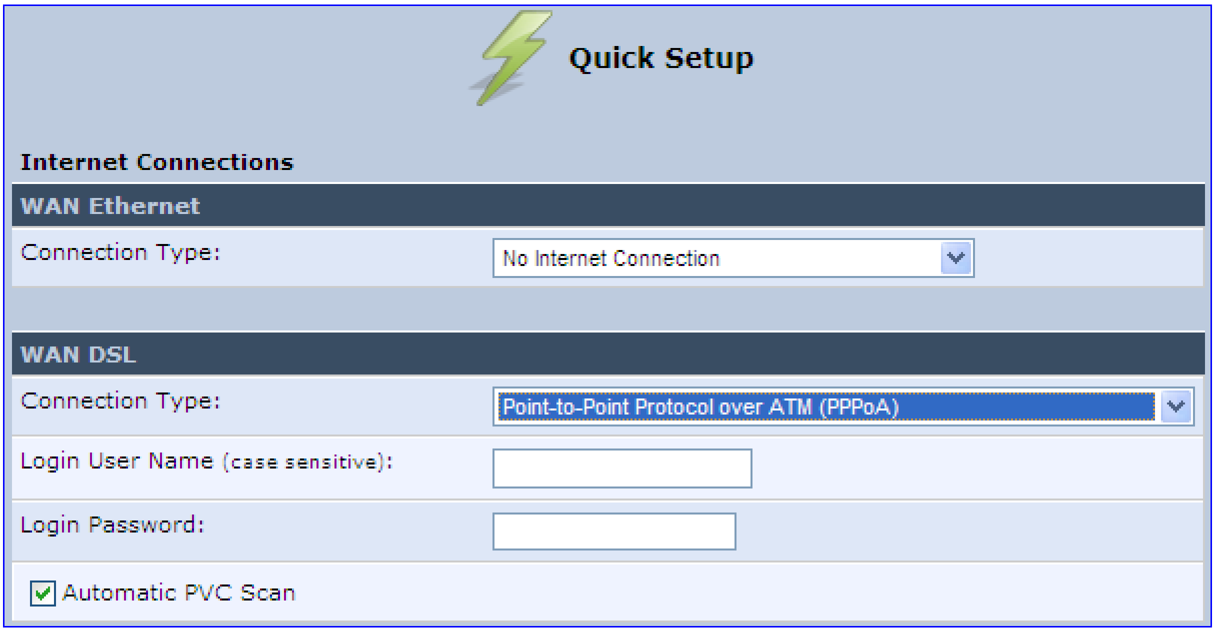
7.1.2.2 PPPoA

The procedure below describes how to connect to the Internet by PPPoA.

➢ **To configure PPPoA connection:**

1. Under the **WAN DSL** group, from the 'Connection Type' drop-down list, select 'Point-to-Point Protocol over ATM (PPPoA)'.

Figure 7-8: PPPoA WAN DSL Internet Connection



Quick Setup

Internet Connections

WAN Ethernet

Connection Type: No Internet Connection

WAN DSL

Connection Type: Point-to-Point Protocol over ATM (PPPoA)

Login User Name (case sensitive):

Login Password:

☑ Automatic PVC Scan

2. Configure the following (provided by your ITSP):
   - Login user name
   - Login password
3. By default, the 'Automatic PVC Scan' check box is selected, which means that MP252 configures the VPI, VCI, and encapsulation parameters automatically. To configure these parameters manually, clear this check box (for more information, see Section 12.1.1.1 on page 133).

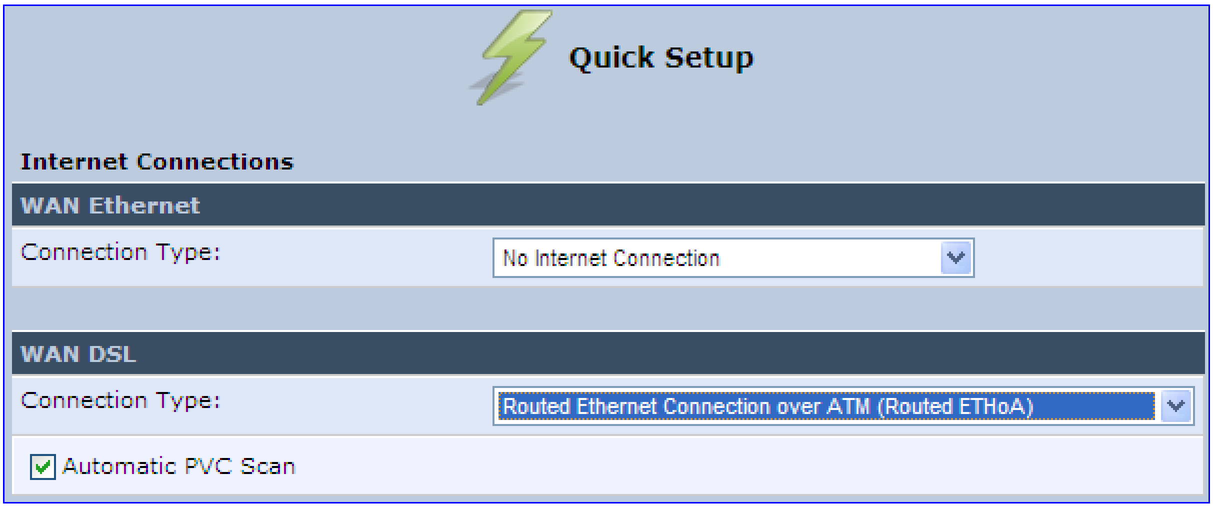
7.1.2.3 Routed ETHoA

The procedure below describes how to connect to the Internet by ETHoA.

➢ **To configure routed ETHoA connection:**

1. Under the **WAN DSL** group, from the 'Connection Type' drop-down list, select ‘Routed Ethernet Connection over ATM (Routed ETHoA)'.

Figure 7-9: Routed ETHoA WAN DSL Internet Connection



Quick Setup

Internet Connections

WAN Ethernet

Connection Type: No Internet Connection

WAN DSL

Connection Type: Routed Ethernet Connection over ATM (Routed ETHoA)

☑ Automatic PVC Scan

2. By default, the 'Automatic PVC Scan' check box is selected, which means that MP252 configures the VPI, VCI, and encapsulation parameters automatically. To configure these parameters manually, clear this check box (for more information, see Section 12.1.1.1 on page 133).

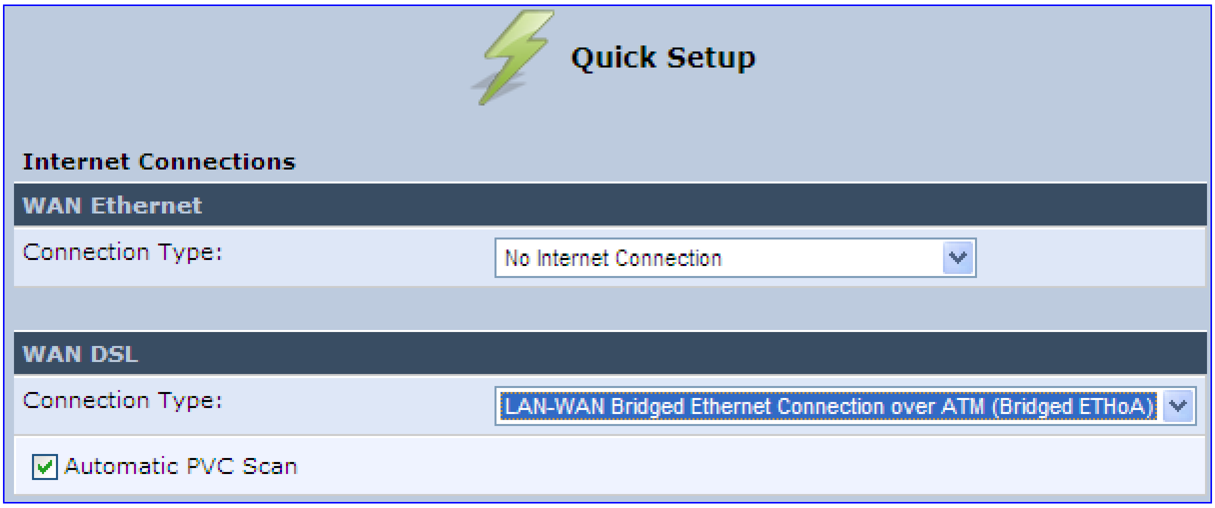
7.1.2.4 Bridged ETHoA

The procedure below describes how to connect to the Internet by bridged ETHoA.

➢ **To configure bridged ETHoA connection:**

1. Under the **WAN DSL** group, from the 'Connection Type' drop-down list, select ‘LAN-WAN Bridged Ethernet Connection over ATM (Bridged ETHoA)'.

Figure 7-10: Bridged ETHoA WAN DSL Internet Connection



Quick Setup

Internet Connections

WAN Ethernet

Connection Type: No Internet Connection

WAN DSL

Connection Type: LAN-WAN Bridged Ethernet Connection over ATM (Bridged ETHoA)

☑ Automatic PVC Scan

2. By default, the 'Automatic PVC Scan' check box is selected, which means that MP252 configures the VPI, VCI, and encapsulation parameters automatically. To configure these parameters manually, clear this check box (for more information, see Section 12.1.1.1 on page 133).

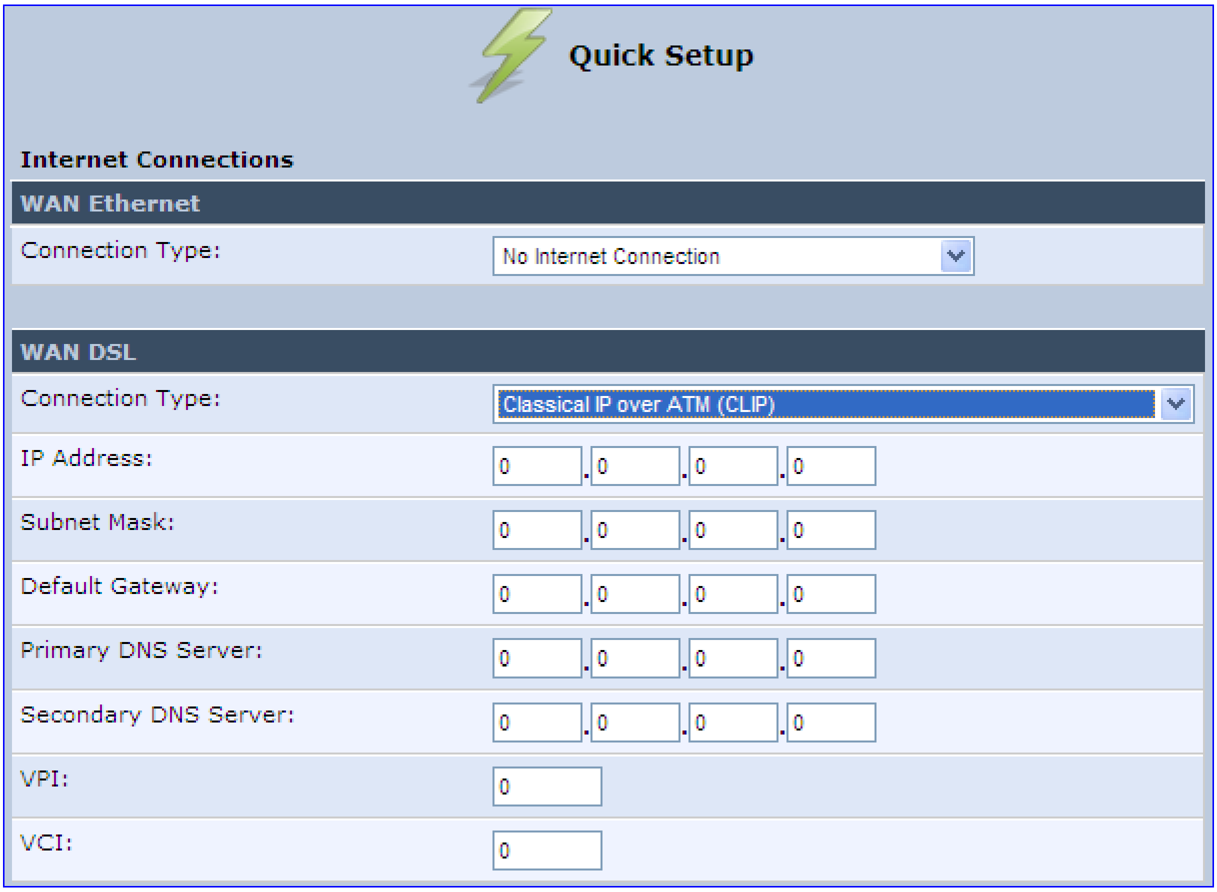
7.1.2.5 CLIP

The procedure below describes how to connect to the Internet by CLIP.

➢ To configure CLIP connection:

1. Under the **WAN DSL** group, from the 'Connection Type' drop-down list, select ‘Classical IP over ATM (CLIP)'.

Figure 7-11: CLIP WAN DSL Internet Connection



Quick Setup

Internet Connections

WAN Ethernet

Connection Type:	No Internet Connection

WAN DSL

Connection Type:	Classical IP over ATM (CLIP)
IP Address:	0 . 0 . 0 . 0
Subnet Mask:	0 . 0 . 0 . 0
Default Gateway:	0 . 0 . 0 . 0
Primary DNS Server:	0 . 0 . 0 . 0
Secondary DNS Server:	0 . 0 . 0 . 0
VPI:	0
VCI:	0

2. Configure the following (provided by your ITSP):
   - IP Address
   - Subnet Mask
   - Default Gateway IP address
   - Primary DNS Server IP address
   - Secondary DNS Server IP address
   - VPI
   - VCI

7.2 Using the Automatic Dialer for Internet Connection

The Automatic Dialer feature allows the service provider to use one type of pre-configured MP252 for all the following Internet connection types:

- WAN Ethernet (DHCP, LT2P or PPPoE)
- WAN ADSL (PPPoE)

In the Private Labeling process, the factory setting is burned with the parameters of the different dialers. When powered-up at the customer site, MP252 first detects the physical WAN type (ADSL or Ethernet) and then attempts the relevant WAN connection methods. The indication for a successful result is connection (i.e., receipt of an IP address) and a ping test.

This section describes the recommended process for using the Automatic Dialer.

Notes:

- If the Automatic Dialer feature is shipped pre-configured (i.e., enabled), then MP252 automatically detects the Internet dialer type and therefore, configuration of the Internet connection is not necessary. However, it is recommended to manually configure the Internet connection **after** the Automatic Dialer process has completed (successfully or not).
- If you manually configure the Internet connection in the Web interface, the Automatic Dialer feature becomes disabled.

7.2.1 Recommended Configuration

The recommended factory settings for the Automatic Dialer feature are shown below:

```
(auto_dialer_detect
    (enabled(1))
    (done(0))
    (connection_type
      (0
        (type(DHCP))
        (enabled(1))
        (max_dialer_conn_time(20))
      )
      (1
        (type(L2TP))
        (enabled(1))
        (server_ip(<Server Name or IP>))
        (username(<User Name>))
        (password(<Password>))
        (max_dialer_conn_time(120))
      )
      (2
        (type(PPPOE))
        (enabled(1))
        (username(<User Name>))
        (password(<Password>))
        (max_dialer_conn_time(120))
      )
    )
    (auto_detect_retries(15))
    (ping_retries(4))
    (ping_retries_timeout(2))
    (ADSL
        (vpi(8))
        (vci(48))
        (encap(LLC))
    )
  )
  (system
    (network
      (internet_url(<Address or Domain Name for Ping Test>))
    )
  )
```

Note: If the ADSL section in the factory settings is omitted, the MP252 performs an automatic PVC scan. When configuring manual PVC values (VPI and VCI), the connection is faster.

.

7.2.2 Setting up and Starting the Automatic Dialer

The procedure below describes how to setup and start the Automatic Dialer feature.

➢ **To setup and start Automatic Dialer:**

1. Power off the MP252.
2. Connect the ADSL or Ethernet cables.

> **Note:** If you are using an ADSL connection, DO NOT connect any cable to the **WAN/LAN4** port. Connecting this port causes the Automatic Dialer to fail.

3. Power on the MP252; the Automatic Dialer begins its operation and you can view the progress status by checking the MP252 LEDs (see Section 3.1.1.2.2 on page 30).

> **Notes:**
>
> - If the connection is ADSL, the Automatic Dialer usually connects in the first iteration (after less than 10 seconds, when configuring manual PVC). In some cases, the Automatic Dialer may connect in the second iteration (up to 4 minutes).
> - If the connection is WAN Ethernet:
>   - For DHCP, the connection is fast.
>   - For L2TP, the connection takes up to ~2 minutes.
>   - For PPPoE, the connection can take up to ~4 minutes.

7.2.3 Quitting Automatic Dialer for Manual Configuration

If, for any reason, you need to manually configure the Internet connection, you first need to stop the Automatic Dialer feature and then manually configure the connection, as described below,

➢ To quit Automatic Dialer and manually configure the Internet connection:

1. Power off the MP252.
2. Disconnect the WAN ADSL or Ethernet cable.
3. Power on the MP252.
4. Wait for the Automatic Dialer process to end (i.e., the **Broadband** LED stops blinking).
5. Log in to the MP252 Web interface.
6. Manually configure the Internet connection using the 'Quick Setup' screen (see Section 7.1 on page 63). This ensures that the Automatic Dialer feature does not re-activate itself after the MP252 resets.

Once the MP252 successfully connects to the Internet, it downloads its configuration file from the server.

Note: The configuration file must include the following parameter to indicate that Automatic Dialer is no longer needed: **auto_dialer_detect/done = 1**.

8 Configuring VoIP Parameters

The VoIP parameters are mainly configured in the 'Voice over IP' screen. This screen is accessed by clicking the **Voice over IP** menu in the side menu bar. The ‘Voice over IP' screen provides tabs for configuring the following:

- Signaling protocol (i.e., Session Initiation Protocol / SIP) – see Section 8.1 on page 77
- Dialing – see Section 8.2 on page 85
- Media streaming – see Section 8.3 on page 90
- Voice and fax – see Section 8.4 on page 91
- Supplementary services – see Section 8.5 on page 95
- Line settings – see Section 8.6 on page 98
- Line extensions – see Section 8.7 on page 101
- Speed dials – see Section 8.9 on page 104
- Telephone interfaces – see Section 8.9 on page 104

In addition to the above, you can select the region in which your MP252 is located so that your analog telephone complies with the line standards (e.g., line impedance) of the area. For more information, see Section 8.10 on page 105.

Notes:

- By default, the ‘Voice over IP’ screens initially display only basic parameters. To view all the parameters, click the **Advanced** button in the required screen.
- Once you have configured the VoIP parameters, you can start using your analog telephones, as described in Chapter 10 on page 109. For using your DECT handset(s), see **Part II**.

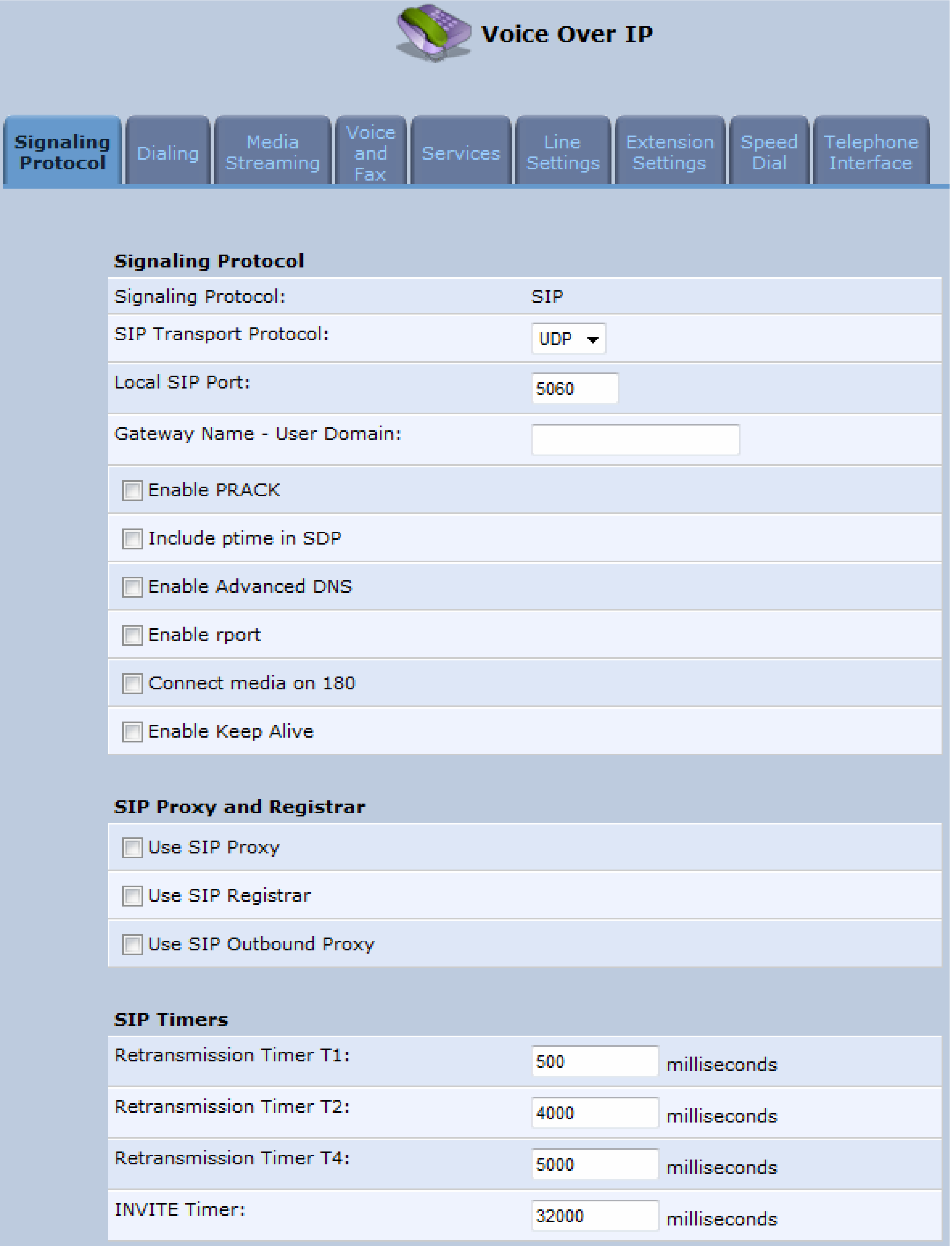
8.1 Configuring the SIP Signaling Protocol

The procedure below describes how to configure the SIP parameters.

➢ To configure SIP parameters:

1. From the menu bar, click the **Voice Over IP** menu; the following screen appears:

Figure 8-1: Signaling Protocol Tab Screen



Signaling Protocol

Signaling Protocol:	SIP
SIP Transport Protocol:	UDP
Local SIP Port:	5060
Gateway Name - User Domain:	

□ Enable PRACK

□ Include ptime in SDP

□ Enable Advanced DNS

□ Enable rport

□ Connect media on 180

□ Enable Keep Alive

SIP Proxy and Registrar

□ Use SIP Proxy

□ Use SIP Registrar

□ Use SIP Outbound Proxy

SIP Timers

Retransmission Timer T1:	500	milliseconds
Retransmission Timer T2:	4000	milliseconds
Retransmission Timer T4:	5000	milliseconds
INVITE Timer:	32000	milliseconds

2. Configure the parameters, as required. For a description of the parameters displayed on this screen, see Table 8-1.
3. Click **OK** to save your settings.

Table 8-1: Signaling Protocol Tab Parameters Description

Parameter	Description
Signaling Protocol Group	
Signaling Protocol	(Read-only field.) Displays the signaling protocol running on the device. **Note:** Currently, only SIP is supported.
SIP Transport Protocol	Defines the SIP transport type - UDP (default), TCP, or TLS. **Note:** This parameter appears only in 'Advanced' mode.
Local SIP Port	Defines the UDP / TCP port on which the SIP stack listens. The default port is 5060. **Note:** This parameter appears only in 'Advanced' mode.
Local SIP TLS Port	Defines the TLS port on which the SIP stack listens. The default port is 5060. **Note:** This parameter appears only if you select 'TLS' as the SIP transport protocol.
Gateway Name - User Domain	Defines the MP252 domain name which is sent in the SIP From header of outgoing INVITE messages. **Note:** This parameter appears only in 'Advanced' mode.
Enable PRACK	When enabled, MP252 replies with a PRACK message upon receipt of a reliable provisional response. MP252 does not initiate reliable provisional responses. **Note:** This parameter appears only in 'Advanced' mode.
Include ptime in SDP	When enabled, MP252 adds the ptime field to the SDP message body. **Note:** This parameter appears only in 'Advanced' mode.
Enable Advanced DNS	
Advanced DNS Type	**Note:** This parameter is available only if the 'Enable Advanced DNS' check box is selected.
Enable rport	When enabled, MP252 adds the rport parameter to the relevant SIP message fields. **Note:** This parameter appears only in 'Advanced' mode.
Connect media on 180	When enabled, media is connected upon receipt of SIP 180, 183, or 200 messages. When this parameter is disabled, media is connected upon receipt of 183 and 200 messages only. **Note:** This parameter appears only in 'Advanced' mode.
Enable Keep Alive	When enabled, a keep-alive notification is sent every user-defined interval to the SIP registrar server. **Note:** This parameter appears only in 'Advanced' mode.
Keep-Alive Type	The type of keep-alive mechanism sent to the SIP registrar: • **Using SIP OPTIONS:** sends SIP OPTIONS messages • **Using an Empty UDP packet:** sends empty UDP packets **Note:** This parameter is available only if the 'Enable Keep Alive' check box is selected.
Keep-Alive Period	Defines the periodic interval for keep-alive messages. **Note:** This parameter is available only if the 'Enable Keep Alive' check box is selected.

Parameter	Description
SIP Proxy and Registrar	
Use SIP Proxy	When checked, outgoing calls are routed to the configured SIP proxy. If the 'Use SIP Proxy IP and Port for Registration' check box is also selected, the configured SIP proxy is also used as the registrar, allowing incoming calls.
Host Name or Address	Defines the IP address or host name of the SIP proxy. **Note:** This parameter is available only if the ‘Use SIP Proxy’ check box is selected.
Proxy Port	Defines the port (UDP, TCP, or TLS) of the SIP proxy. **Note:** This parameter is available only if the ‘Use SIP Proxy’ check box is selected.
Maximum Number of Authentication Retries	Defines how many times authenticated register messages are re-sent if SIP 401 or 407 responses with a different “nonce” are received. **Note:** This parameter is available only if the ‘Use SIP Proxy’ check box is selected.
Use SIP Proxy IP and Port for Registration	When selected (default), the SIP proxy’s IP address and port is also used for registration. When selected, there is no need to configure the address / port of the registrar (only the ‘Register Expires’ and ‘Register Expires Failed’ parameters – described later). **Note:** This parameter is available only if the ‘Use SIP Proxy’ check box is selected.
Sip Security	MP252's firewall can be configured to block incoming packets that have the SIP signaling port as their destination. You can configure up to two SIP entities (for example, the SIP Proxy or an SBC), which are not blocked by the firewall. The default value is ‘Allow all SIP traffic’. **Note:** This parameter is available only if the ‘Use SIP Proxy’ check box is selected.
Address Type	Selects the address type of the additional SIP entity - IP address or host name. **Note:** This parameter is available only if the 'Sip Security' field is set to ‘Allow SIP traffic from Proxy and Additional SIP Entity’.
SIP Entity Address	Defines the address or host name (depending on the settings of the ‘Address Type’ field) of the additional SIP entity. **Note:** This parameter is available only if the 'Sip Security' field is set to ‘Allow SIP traffic from Proxy and Additional SIP Entity’.
Use Redundant Proxy	Enables the use of a redundant proxy. **Note:** This parameter is available only if the 'Use SIP Proxy IP and Port for Registration' check box is selected.
Redundant Proxy Address	Defines the IP address of the redundant proxy. **Note:** This parameter is available only if the 'Use Redundant Proxy’ check box is selected.
Redundant Proxy Port	Defines the port of the redundant proxy. **Note:** This parameter is available only if the 'Use Redundant Proxy’ check box is selected.

Parameter	Description
Redundant Proxy Keep Alive Period	Defines the interval between keep-alive packets (SIP OPTIONS) which are used by the proxy redundancy mechanism to check the connection status. **Note:** This parameter is available only if the 'Use Redundant Proxy' check box is selected.
Switch back to Primary SIP proxy when available	When selected, MP252 switches back to the primary proxy server when communication with it returns.
Use SIP Registrar	When selected, enables the use of a separate SIP registrar server.
Registrar Address	Defines the IP address or host name of the registrar server. **Note:** This parameter is available only if the 'Use SIP Registrar' check box is selected.
Registrar Port	Defines the port (UDP or TCP) of the registrar server. **Note:** This parameter is available only if the 'Use SIP Registrar' check box is selected.
Register Expires	Defines the registration timeout, in seconds. **Note:** This parameter is available only if the 'Use SIP Registrar' or 'Use SIP Proxy IP and Port for Registration' check box is selected.
Register Failed Expires	Defines the timeout between registration attempts in case of a registration failure (e.g. due to a network problem). **Note:** This parameter is available only if the 'Use SIP Registrar' or 'Use SIP Proxy IP and Port for Registration' check box is selected.
Use SIP Outbound Proxy	When selected (default), an outbound SIP proxy is used (all SIP messages are sent to this server as the first hop). **Note:** This parameter appears only in 'Advanced' mode.
Outbound Proxy IP	Defines the IP address of the outbound Proxy. If this parameter is set, all outgoing messages (including registration messages) are sent to this Proxy according to the Stack behavior. **Note:** This parameter is available only if 'Use SIP Outbound Proxy' is selected.
Outbound Proxy Port	The Port on which the outbound Proxy listens. **Note:** This parameter is available only if 'Use SIP Outbound Proxy' is selected.
SIP Timers **Note:** This group appears only in 'Advanced' mode.	
Retransmission Timer T1	The SIP T1 retransmission timer according to RFC 3261
Retransmission Timer T2	The SIP T2 retransmission timer according to RFC 3261
Retransmission Timer T4	The SIP T4 retransmission timer according to RFC 3261
INVITE Timer	The SIP INVITE timer according to RFC 3261
NAT Traversal	
Enable STUN	When selected, the SIP STUN Manager is enabled. The SIP STUN Manager resolves private addresses to public addresses. **Note:** This parameter appears only in 'Advanced' mode.

Parameter	Description
STUN Server Address	Defines the IP address of the STUN server used to resolve private addresses. **Note:** This parameter is available only if 'Enable STUN' is selected.
STUN Server Port	Defines the port of the STUN server. **Note:** This parameter is available only if 'Enable STUN' is selected.
Subnet Mask	Defines the subnet mask address of the STUN server used to resolve private addresses. **Note:** This parameter is available only if 'Enable STUN' is selected.

8.1.1 Configuring Proxy Redundancy

The Redundant Proxy feature allows the configuration of a backup SIP proxy server to increase Quality of Service (QoS). Once this feature is enabled, MP252 identifies cases where the primary proxy does not respond to SIP signaling messages. In these cases, MP252 registers to the redundant proxy and seamlessly continues normal functionality, without any noticeable connectivity failure or malfunction with the primary proxy.

The Redundant Proxy feature includes two operational modes:

- **Asymmetric mode:** This mode assigns the primary proxy a higher priority for registration over the redundant proxy. Once MP252 is registered to the primary proxy, it sends keep-alive messages (using SIP OPTIONS messages) to the primary proxy. If the primary proxy does not respond, MP252 registers to the redundant proxy, but continues sending keep-alive messages to the primary proxy. If the primary proxy responds to these keep-alive messages, MP252 re-registers to the primary proxy.
- **Symmetric mode:** In this mode, both proxies are assigned the same priority for registration. Once MP252 is registered to a proxy (primary or redundant), it sends keep-alive messages to this proxy. MP252 switches proxies only once the proxy to which it has registered does not respond.

In both modes, the following applies:

- If MP252 is not registered (i.e., if the proxy server - redundant or primary - to which MP252 currently tries to register does not respond), MP252 attempts to register to an alternative proxy. These attempts continue until MP252 successfully registers.
- If this feature is enabled and you reboot MP252, it registers to the last proxy to which it was trying to register (not necessarily to the primary proxy).

➢ To configure proxy redundancy:

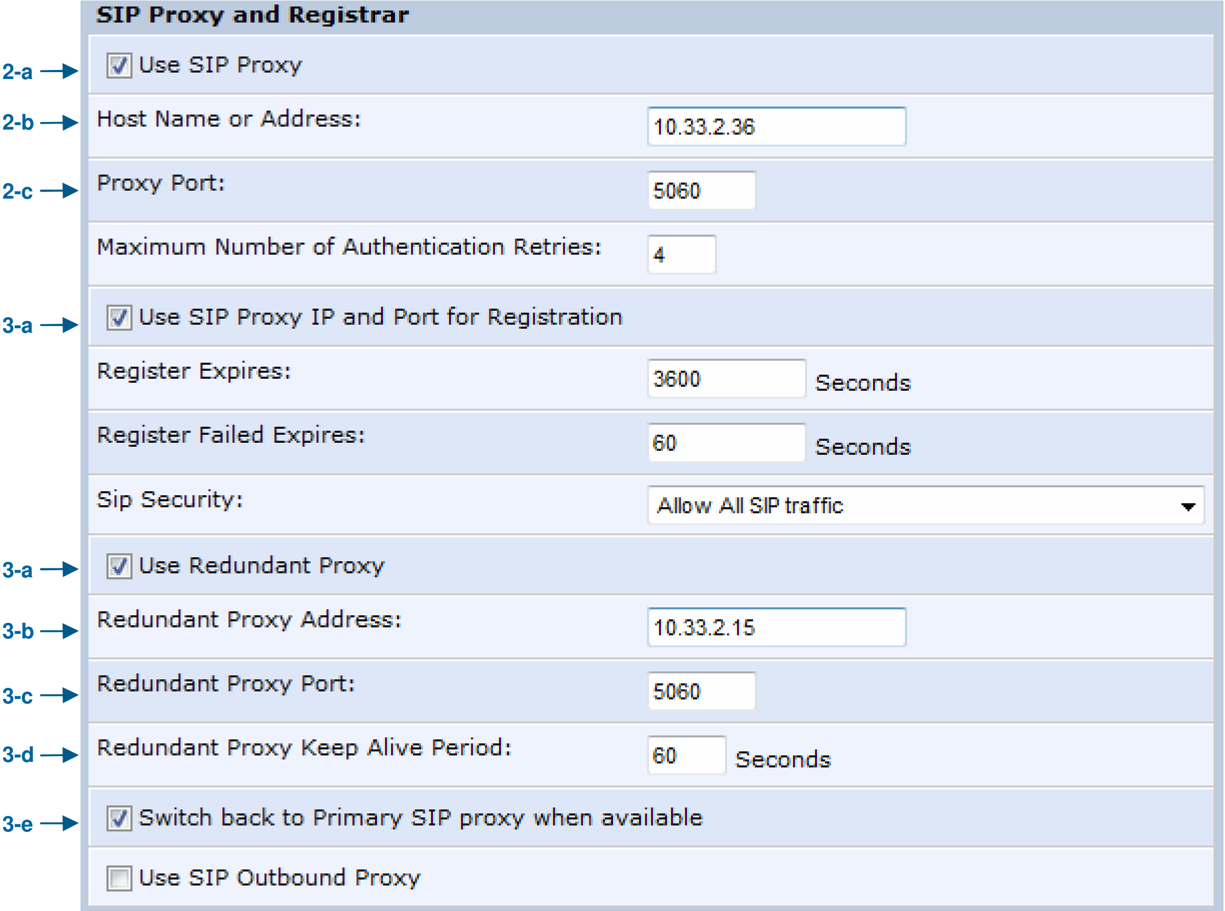
1. From the menu bar, click the **Voice Over IP** menu; the **Signaling Protocol** tab screen appears.
2. Define a primary proxy server (under the **SIP Proxy and Registrar** group):
   a. Select the ‘Use SIP Proxy’ check box.
   b. In the 'Host Name or Address' field, enter the primary proxy's IP address.
   c. In the 'Proxy Port' field, enter the primary proxy's port number.
3. Define a redundancy proxy server (under the **SIP Proxy and Registrar** group):
   a. Select one of the following check boxes: 'Use SIP Registrar' or 'Use SIP Proxy IP and Port for Registration'.
   a. Select the 'Use Redundant Proxy' check box.
   b. In the 'Redundant Proxy Address' field, enter the redundant proxy's IP address or DNS name.
   c. In the 'Redundant Proxy Port' field, enter the redundant proxy's port number.

d. In the 'Redundant Proxy Keep Alive Period' field, enter the rate (in seconds) of the keep-alive messages for sending to the proxy. The valid range is 10 to 86,400 seconds (i.e., 24 hours). The default value is 60 sec.

e. To toggle between Symmetric and Asymmetric modes, use the 'Switch back to Primary SIP proxy when available' check box.

- **Asymmetric mode** - select the check box (i.e., mark it)
- **Symmetric mode** - clear the check box

Figure 8-2: Configuring Proxy Redundancy



SIP Proxy and Registrar

☑ Use SIP Proxy	
Host Name or Address:	10.33.2.36
Proxy Port:	5060
Maximum Number of Authentication Retries:	4
☑ Use SIP Proxy IP and Port for Registration	
Register Expires:	3600 Seconds
Register Failed Expires:	60 Seconds
Sip Security:	Allow All SIP traffic
☑ Use Redundant Proxy	
Redundant Proxy Address:	10.33.2.15
Redundant Proxy Port:	5060
Redundant Proxy Keep Alive Period:	60 Seconds
☑ Switch back to Primary SIP proxy when available	
□ Use SIP Outbound Proxy	

4. Click **OK** to save your settings.

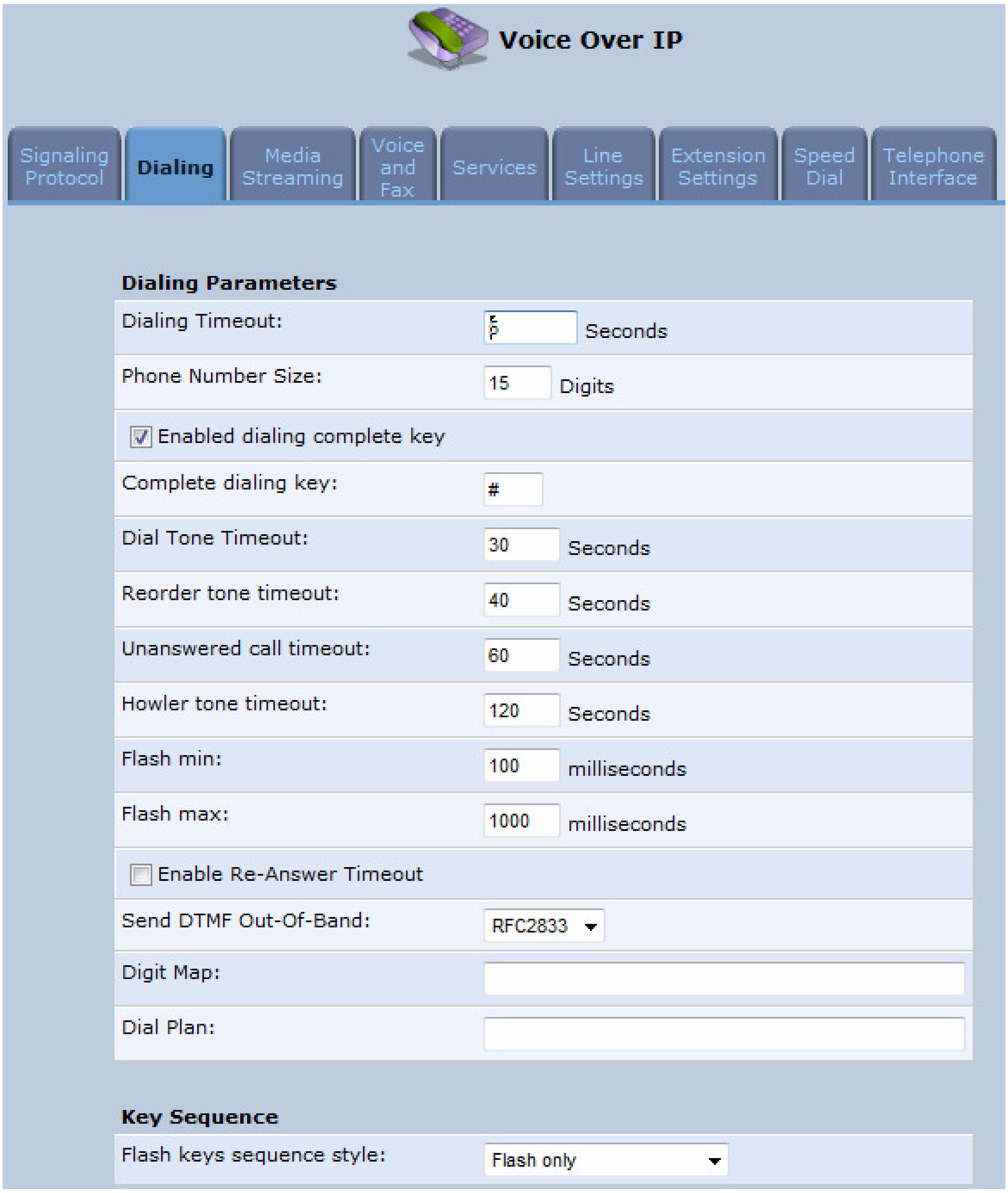
8.2 Configuring Dialing Parameters

The procedure below describes how to configure the dialing parameters.

➢ To configure dialing parameters:

1. In the 'Voice Over IP' screen, click the **Dialing** tab; the following screen appears.

Figure 8-3: Dialing Tab Screen



Voice Over IP

Dialing Parameters

Dialing Timeout:	5 Seconds
Phone Number Size:	15 Digits
☑ Enabled dialing complete key	
Complete dialing key:	#
Dial Tone Timeout:	30 Seconds
Reorder tone timeout:	40 Seconds
Unanswered call timeout:	60 Seconds
Howler tone timeout:	120 Seconds
Flash min:	100 milliseconds
Flash max:	1000 milliseconds
□ Enable Re-Answer Timeout	
Send DTMF Out-Of-Band:	RFC2833
Digit Map:	
Dial Plan:	

Key Sequence

Flash keys sequence style:	Flash only

2. Configure the parameters, as required. For a description of the parameters displayed on this screen, see Table 8-2.
3. Click **OK** to save your settings.

Table 8-2: Dialing Tab Parameters Description

Parameter	Description
Dialing Parameters	
Dialing Timeout	Defines the duration (in seconds) of allowed inactivity between dialed digits. When you work with a proxy, the number you have dialed before the dialing process has timed out is sent to the proxy as the user ID to be called. This is useful for calling remote parties without creating a speed dial entry (assuming the remote party is registered with the proxy).
Phone Number Size	Defines the maximum length of shortcut numbers that you can enter and the maximum number of digits that you can dial.
Enabled dialing complete key	When selected (default), you can define a key that when pressed forces MP252 to make a call to the dialed digits even if there is no match in the dial plan or digit map. The key is defined in the 'Complete dialing key' field, which appears when this parameter is selected. **Note:** This parameter appears only in 'Advanced' mode.
Complete dialing key	Defines the key that when pressed forces MP252 to make a call to the dialed digits even if there is no match in the dial plan or digit map. The default value is the pound (#) key. **Note:** This parameter is available only if the 'Enabled dialing complete key' is selected.
Dial Tone Timeout	Defines the duration of the dial tone (in seconds). If the limit is exceeded, the dial tone stops and you a reorder tone is played.
Reorder Tone Timeout	Defines the duration (in seconds) of the reorder tone. The reorder tone is played, for example, when MP252 receives a SIP 486 response. If the limit is exceeded, the reorder tone stops and a howler tone is played. **Note:** This parameter appears only in 'Advanced' mode.
Unanswered call timeout	Defines the timeout before MP252 automatically sends a SIP CANCEL message. When MP252 makes a call and the other side doesn't answer, MP252 sends a CANCEL message after this timeout. **Note:** This parameter appears only in 'Advanced' mode.
Howler Tone Timeout	Defines the duration (in seconds) of the howler tone. If the limit is exceeded, the howler tone stops playing. The howler tone informs a user that the user's phone has been left in an off-hook state. **Note:** This parameter appears only in 'Advanced' mode.
Flash min	Defines the duration (in ms) after which you can begin to perform a flash hook.
Flash max	Defines the maximum duration (in ms) that the flash hook button can be pressed, after which the call is disconnected.
Enable Re-Answer Timeout	When selected, the 'Re-Answer Timeout' field appears, allowing you to define the timeout after on-hooking an active call and then off-hooking it again. Once this time expires and the phone has not been off-hooked again, the call is disconnected.
Send DTMF Out-Of-Band	Defines how the DTMF tones are sent ('Inband', 'RFC2833', or 'Via SIP'). DTMFs are the tones generated by your telephone's keypad. **Note:** This parameter appears only in 'Advanced' mode.

Parameter	Description
Digit Map	Defines formats (or patterns) for the dialed number. A match to one of the defined patterns terminates the dialed number. For an explanation on digit map syntax, see Section 8.2.1 on page 88. **Note:** This parameter appears only in 'Advanced' mode.
Dial Plan	Defines patterns to translate to specific SIP destination addresses. For dial plan syntax rules for patterns entered to the left of the '=' sign, see Section 8.2.1 on page 88. **Note:** This parameter appears only in 'Advanced' mode.
Key Sequence	
Flash keys sequence style	Defines the key sequence with the flash button: ▪ 'Flash only' (default) = uses only the phone's Flash button. There are three scenarios: ✓ During an existing call, if the user presses Flash, the call is put on hold, a dial tone is heard and the user is able to initiate a second call. Once the second call is established, on-hooking transfers the first (held) call to the second call. ✓ During an existing call, if the user presses Flash, the call is put on hold and a dial tone is heard. The user can initiate a second call and establish a 3-way conference by again pressing Flash after the second call is initiated. ✓ During an existing call, if a call comes in (call waiting), pressing Flash puts the active call on hold and answers the waiting call; pressing Flash again toggles between these two calls. ▪ 'Flash + digits sequence' = Flash button with a key sequence: ✓ Flash + 1 holds a call or toggles between two existing calls. ✓ Flash + 2 makes a call transfer. ✓ Flash + 3 establishes a 3-way conference. ▪ 'Send Flash Hook Via SIP' = you can modify the SIP INFO message that is sent upon Flash. You can change the Content Type header field and Message Body field. **Note:** This parameter appears only in 'Advanced' mode.
SIP INFO Header	When the key sequence is set to 'Send Flash Hook Via SIP', you can modify the Content Type header field of the SIP INFO message. For example: "application/broadsoft; version = 1.0" **Note:** This parameter appears only when the 'Flash keys sequence style' field is set to 'Send Flash Hook Via SIP'.
SIP INFO Body	When the key sequence is set to 'Send Flash Hook Via SIP', you can modify the Message Body field of the SIP INFO message. For example: " event flashhook" **Note:** This parameter appears only when the 'Flash keys sequence style' field is set to 'Send Flash Hook Via SIP'.

8.2.1 Syntax for Digit Maps and Dial Plans

Digit maps and dial plans are defined using special syntax rules, configured in the 'Dialing' screen (see Section 8.2 on page 85).

- **Digit Maps:** A phone's digit map allows MP252 to know when an entered telephone number is complete and therefore, when it should initiate the call. If the phone digit map is defined incorrectly, MP252 might start to dial before the telephone user has entered all the required digits. A digit map is defined either by a (case insensitive) "string" or by a list of strings. Each string in the list is an alternative numbering scheme, specified either as a set of digits or as an expression over which MP252 attempts to find a shortest possible match. The syntax that can be used in each numbering scheme is described in the table below.

- **Dial Plans:** A dial plan translates specific patterns into specific SIP destination addresses. For example, dial plan rule "4xxx=Line_\\\@10.1.2.3" sends a dialed number consisting of the digit “4” followed by any three digits to IP address 10.1.2.3. The syntax of the pattern on the left of the '=' sign is described in the table below.

Table 8-3: Dial Plan (for Left of '=' Sign) and Digit Map Syntax

Type	Syntax
Digit	A digit from "0" to "9".
DTMF	A digit, or one of the symbols "A", "B", "C", "D", "#", or "*". Extensions may be defined.
Wildcard	The symbol "x" which denotes any digit ("0" to "9").
Range	One or more DTMF symbols enclosed between square brackets ("[" and "]").
Sub-range	Two digits separated by a hyphen ("-") which matches any digit between and including the two. The subrange can only be used inside a range construct, i.e., between "[" and "]".
Position	A period (".") which matches an arbitrary number, including zero, of occurrences of the preceding construct.

For example:

[2-9]11|0|100|101|011xxx.|9011xxx.|1[2-9]xxxxxxxxx|91[2-9]xxxxxxxxx|9[2-9]xxxxxx|*xx|[8]xxxx|[2-7]xxx

- **[2-9]11:** 911 rule: 211, 311, 411, 511, 611, 711, 811, 911 are dialled immediately
- **0:** Local operator rule
- **100:** Auto-attendant default extension
- **101:** Voicemail default extension
- **011xxx.:** International rule without prefix
- **9011xxx.:** International rule with prefix
- **1[2-9]xxxxxxxxx:** LD rule without prefix
- **91[2-9]xxxxxxxxx:** LD rule with prefix
- **9[2-9]xxxxxx:** Local call with prefix
- ***xx:** 2-digit star codes
- **[1-7]xx:** A regular 3-digit extension that does not start with 9 or 8 is dialed immediately
- **[2-7]xx:** A regular 3-digit extension that does not start with 9, 8, or 1 is dialed immediately
- **[2-7]xxx:** A regular 4-digit extension that does not start with 9, 8, or 1 is dialed immediately
- **[8]xxx:** A 3-digit extension prefixed with an 8 (routes calls directly to voicemail of extension xxx)
- **[8]xxxx:** A-4 digit extension prefixed with an 8 (routes calls directly to voicemail of extension xxxx)

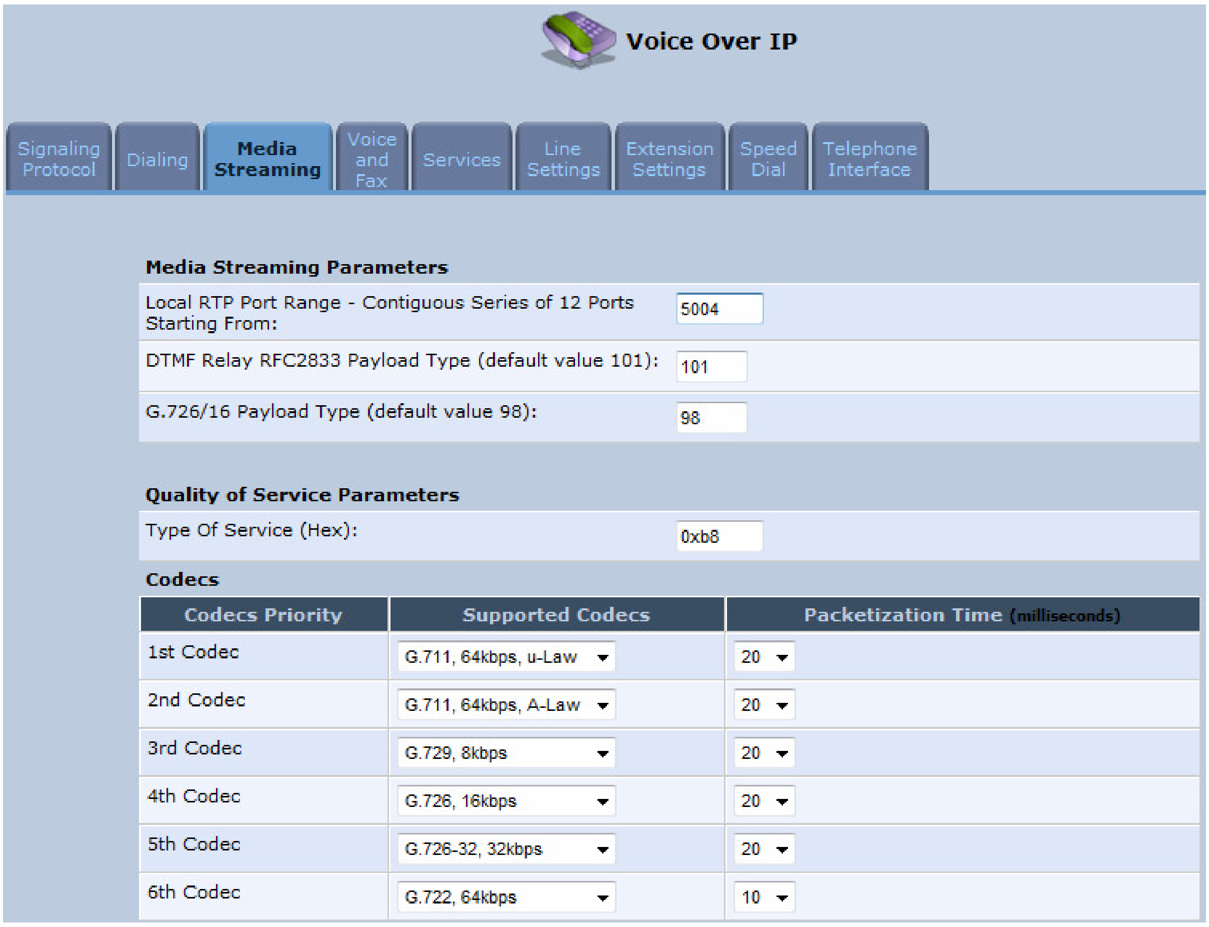
8.3 Configuring Media Streaming

The procedure below describes how to configure the media streaming parameters.

➢ To configure media streaming parameters:

- In the 'Voice Over IP' screen, click the **Media Streaming** tab; following screen appears.

Figure 8-4: Media Streaming Tab Screen



Media Streaming Parameters

Local RTP Port Range - Contiguous Series of 12 Ports Starting From:	5004
DTMF Relay RFC2833 Payload Type (default value 101):	101
G.726/16 Payload Type (default value 98):	98

Quality of Service Parameters

Type Of Service (Hex):	0xb8

Codecs

Codecs Priority	Supported Codecs	Packetization Time (milliseconds)
1st Codec	G.711, 64kbps, u-Law	20
2nd Codec	G.711, 64kbps, A-Law	20
3rd Codec	G.729, 8kbps	20
4th Codec	G.726, 16kbps	20
5th Codec	G.726-32, 32kbps	20
6th Codec	G.722, 64kbps	10

4. Configure the parameters, as required. For a description of the parameters displayed on this screen, see Table 8-4.
5. Click **OK** to save your settings.

Table 8-4: Media Streaming Tab Parameters Description

Parameter	Description
Media Streaming Parameters	
Local RTP Port Range - Contiguous Series of 8 Ports Starting From:	Defines the port range for Real Time Protocol (RTP) voice transport.
DTMF Relay RFC 2833 Payload Type	Defines the RTP payload type used for RFC 2833 DTMF relay packets. The range is 0-255. The default is 101.
G.726/16 Payload Type	Defines the RTP payload type used for 16 kbps G.726 packets. The range is 0-255. The default is 98.

Parameter	Description
Quality of Service Parameters	
Type of Service (Hex)	This is a part of the IP header that defines the type of routing service to be used to tag outgoing voice packets originated from MP252. It is used to inform routers along the way that this packet should get specific QoS. Leave this value as 0xb8 (default) if you are unfamiliar with the Differentiated Services IP protocol parameter.
Codecs	
1st - 6th Codec	Defines the voice codec. For more information, see 8.3.1 on page 91.

8.3.1 Configuring Codecs

Codecs define the method of relaying voice data. Different codecs have different characteristics, such as data compression and voice quality. For example, G.723 is a codec that uses compression, so it is good for use where bandwidth is limited but its voice quality is not as good compared to other codecs such as the G.711.

8.3.1.1 Supported Codecs

To make a call, at least one codec must be enabled. Moreover, all codecs may be enabled for best performance. When you start a call to a remote party, your available codecs are compared against the remote party's to determine the codec used. The priority by which the codecs are compared is according to their order of appearance in the table (descending order). To change the priorities, rearrange the codecs in the required order.

If there is no codec that both parties have made available, the call attempt fails. Note that if more than one codec is common to both parties, you cannot force which of the common codecs that were found are used by the remote party's client. If you do wish to force the use of a specific codec, leave only that codec checked.

8.3.1.2 Packetization Time

The Packetization Time is the length of the digital voice segment that each packet holds. The default is 20 millisecond packets. Selecting 10 millisecond packets reduces the delay but increases the bandwidth consumption.

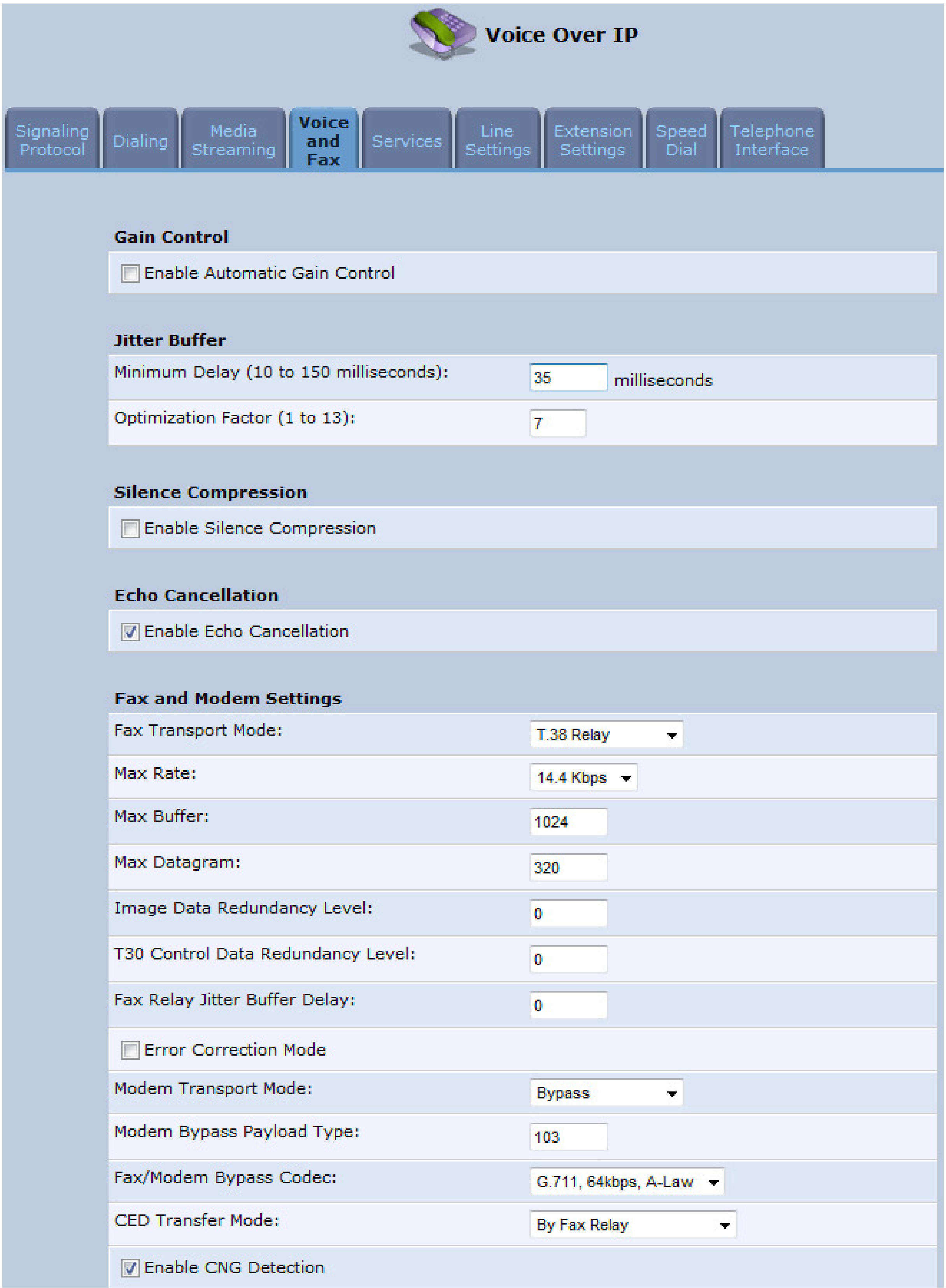
8.4 Configuring Voice and Fax

The procedure below describes how to configure the voice and fax parameters.

➢ **To configure voice and fax parameters:**

1. In the 'Voice Over IP' screen, click the **Voice and Fax** tab; the following screen appears.

Figure 8-5: Voice and Fax Tab Screen



Gain Control

☐ Enable Automatic Gain Control

Jitter Buffer

Minimum Delay (10 to 150 milliseconds):	35 milliseconds
Optimization Factor (1 to 13):	7

Silence Compression

☐ Enable Silence Compression

Echo Cancellation

☑ Enable Echo Cancellation

Fax and Modem Settings

Fax Transport Mode:	T.38 Relay
Max Rate:	14.4 Kbps
Max Buffer:	1024
Max Datagram:	320
Image Data Redundancy Level:	0
T30 Control Data Redundancy Level:	0
Fax Relay Jitter Buffer Delay:	0
☐ Error Correction Mode	
Modem Transport Mode:	Bypass
Modem Bypass Payload Type:	103
Fax/Modem Bypass Codec:	G.711, 64kbps, A-Law
CED Transfer Mode:	By Fax Relay
☑ Enable CNG Detection	

2. Configure the parameters, as required. For a description of the parameters displayed on this screen, see Table 8-5.
3. Click **OK** to save your settings.

Table 8-5: Voice and Fax Tab Parameters Description

Parameter	Description
Gain Control	
Enable Automatic Gain Control	Enables the Automatic Gain Control (AGC) mechanism. The AGC mechanism adjusts the level of the received signal to maintain a steady (configurable) volume level.
Automatic Gain Control Direction	Defines the AGC direction (local or remote user). **Note:** This parameter appears only if the 'Enable Automatic Gain Control' check box is selected.
Target Energy	Defines the signal energy value (in dBm) that the AGC attempts to attain. The range is 0 to -63 dBm. The default value is -19 dBm. **Note:** This parameter appears only if the 'Enable Automatic Gain Control' check box is selected.
Jitter Buffer	
Minimum Delay	Defines the initial and minimal delay of the adaptive jitter buffer mechanism, which compensates for network problems. The value should be set according to the expected average jitter in the network (in milliseconds). The default is 35 msec.
Optimization Factor	Defines the adaptation rate of the jitter buffer mechanism. Higher values cause the jitter buffer to respond faster to increased network jitter. The default is 7.
Silence Compression	
Enable Silence Compression	Enables silence compression, which reduces the network bandwidth consumption. The default is disabled.
Enable G.711/G.726 Comfort Noise	Enables the Comfort Noise generation feature. When enabled and silence is detected, MP252 transmits a series of parameters called Silence Information Descriptor (SID), which are used to reproduce the local background noise at the remote (receiving) side. **Note:** This parameter appears only if the 'Enable Silence Compression' check box is selected.
Echo Cancellation	
Enable Echo Cancellation	Enables (default) echo cancellation (disabling echo cancellation should be done for testing purposes only).
Fax and Modem Settings	
Fax Transport Mode	Selects the way fax calls are handled: ✓ Transparent = Fax is transferred in-band (like a voice call) - can be used if the codec is G.711 ✓ T.38 Relay = Fax is relayed to the remote side according to the T.38 standard ✓ Voice Band Data = Switch to G.711 via SIP messaging ✓ Bypass = An automatic switch to AudioCodes' proprietary payload type (102, 103).
Max Rate	Defines the maximum fax rate. 2.4 Kbps, 4.8 Kbps, 7.2 Kbps, 9.6 Kbps, 12 Kbps or 14.4 Kbps (default). **Note:** This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.

Parameter	Description
Max Buffer	Defines the maximum amount of T.38 data stored on the MP252. The valid range is 128 to 2048. The default is 1024. **Note:** This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.
Max Datagram	Defines the maximum total size of TCP/UDPTL packets that can be received at the remote gateway. The valid range is 160 to 1020. The default is 320. **Note:** This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.
Image Data Redundancy Level	Defines the level for output Image Data (2400…14400 bps). ▪ 0 = No redundancy ▪ 1 to 3 = Redundancy level **Note:** This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.
T30 Control Data Redundancy Level	Defines the redundancy level for output T.30 Control Data (300 bps). ▪ 0 = No redundancy ▪ 1 to 7 = Redundancy level **Note:** This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.
Fax Relay Jitter Buffer Delay	Defines the Fax Relay Jitter Buffer. ▪ 0 = Adaptive Jitter Buffer. The MP252 sets the Jitter Buffer size automatically and then adapts it according to network conditions. ▪ 1 to 511 = Fixed Jitter Buffer size (in msec). **Note:** This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.
Error Correction Mode	Enables (default) fax error correction mode (ECM). **Note:** This parameter appears only if 'Fax Transport Mode' is set to 'T.38 Relay'.
Fax Bypass Payload Type	Defines the payload type for fax in Bypass mode. **Note:** This parameter appears only if 'Fax Transport Mode' is set to 'Bypass'.
Modem Transport Mode	Selects the way modem calls are handled: ▪ Transparent = Data is transferred in-band (like a voice call). This can be used if the codec is G.711. ▪ Voice Band Data = Switch to G.711 via SIP messaging. ▪ Bypass = An automatic switch to AudioCodes' proprietary payload type (102, 103). **Note:** If the Fax transport mode is Bypass or VBD, it must match the Modem transport mode.
Modem Bypass Payload Type	Defines the payload type for modems in Bypass mode. **Note:** This parameter appears only if 'Modem Transport Mode' is set 'Bypass'.
Fax/Modem Bypass Codec	Defines the codec for the VBD and Bypass modes. PCMA (default) or PCMU. G.711 64 kbps A-Law -OR- G.711 64 kbps u-Law

Parameter	Description
CED Transfer Mode	▪ By Fax Relay: When MP252 is the receiver side, Switch to Fax relay is enabled upon CED. This allows a high reliable fax-over-IP call establishment at the beginning of CED tone. ▪ In Voice Or PCM Bypass: When MP252 is the receiver side, to avoid possible conflicts with low-speed modems, the CED (ANS) relay by FoIP protocol may be disabled by setting the CED transfer mode to 'In Voice Or PCM Bypass'. In this case, MP252 does not initiate the Fax Relay on detecting CED tone in absence of CNG, but switches to VBD or remains in voice mode (depends on the Modem Transport Mode). MP252 switches to FoIP later when it defines exactly that a monitored call is the fax call (CED and CND or V.21 Preamble).
Enable CNG Detection	Enables detection of the fax CNG signal. When the local fax machine connected to MP252 receives a fax, MP252 switches to T.38 fax relay upon detection of the CED signal from the remote fax. If the local fax machine sends a fax, MP252 switches to T.38 only after detecting the CNG signal from the local side and the CED signal from the remote side. If this check box is selected, MP252 switches to T.38 relay immediately upon detection of the CNG signal from the local side, without waiting for the CED signal from the remote side. The default is disabled.
Switch To Fax Only By The Answering Side	Typically, switching to fax mode is the responsibility of the answering side. However, in some cases, the sending machine can also switch to fax mode. If this check box is marked, the sending machine does not switch to fax, but allows the answering side to detect the fax and switch to fax mode.

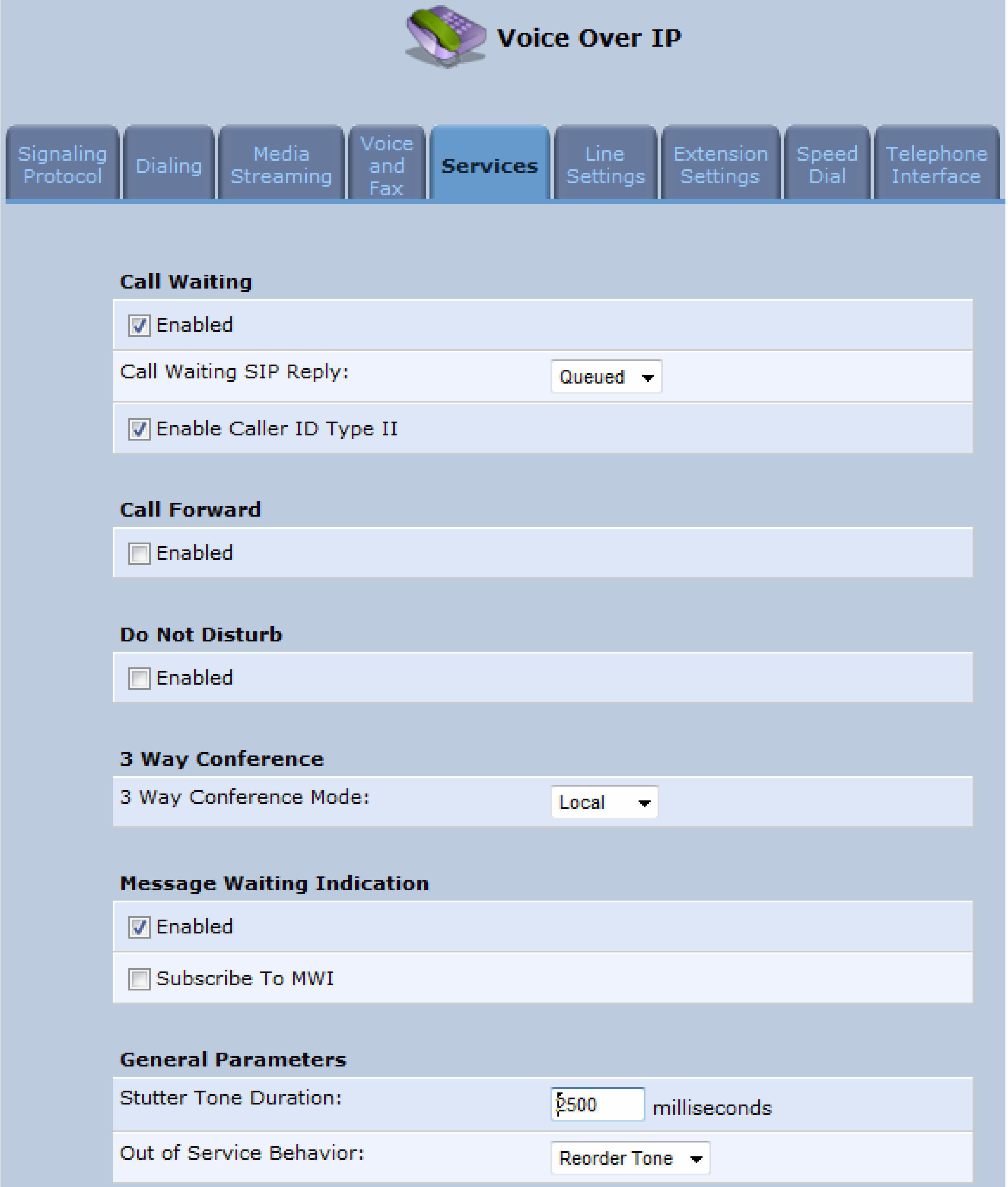
8.5 Configuring Supplementary Services

The procedure below describes how to configure the services parameters.

➢ To configure supplementary services:

1. In the 'Voice Over IP' screen, click the **Services** tab; the following screen appears.

Figure 8-6: Services Tab Screen



Call Waiting

☑ Enabled

Call Waiting SIP Reply: Queued

☑ Enable Caller ID Type II

Call Forward

□ Enabled

Do Not Disturb

□ Enabled

3 Way Conference

3 Way Conference Mode: Local

Message Waiting Indication

☑ Enabled

□ Subscribe To MWI

General Parameters

Stutter Tone Duration: 2500 milliseconds

Out of Service Behavior: Reorder Tone

2. Configure the parameters, as required. For a description of the parameters displayed on this screen, see Table 8-6.
3. Click **OK** to save your settings.

Table 8-6: Services Tab Parameters Description

Parameter	Description
Call Waiting	
Enabled	Enables the Call Waiting feature.

Parameter	Description
Call Waiting SIP Reply	Defines the SIP response (180 Ringing or 182 Queued - default) sent when another call arrives while a call is in progress. **Note:** This parameter appears only if Call Waiting is enabled.
Enable Caller ID Type II	Enables caller ID of a waiting call (Called Caller ID type 2). **Note:** This parameter appears only if Call Waiting is enabled.
Call Forward	
Enabled	Enables call forwarding. The Call Forward feature permits a user to redirect incoming calls addressed to another number. The user's ability to originate calls is unaffected by Call Forward. **Note:** The Call Forward feature is functional only when MP252 is registered to a proxy.
Call Forward Type	Defines the type of call forwarding: ▪ **Unconditional:** Incoming calls are forwarded independently of the status of the endpoint. ▪ **Busy:** Incoming calls are forwarded only if the endpoint is busy, i.e., if all lines are active. ▪ **No Reply:** Incoming calls are forwarded only if the endpoint does not answer before a user-defined timeout (see 'Time for No Reply Forward' parameter). **Note:** This parameter appears only if Call Forward is enabled.
Time for No Reply Forward	Defines the timeout after which the call is forwarded if the endpoint does not answer. If you specify 5 seconds, for example, and 'No Reply' is selected for parameter 'Call Forward Type' (see above), incoming calls are forwarded only after 5 seconds lapse. **Note:** This parameter is available only when 'No Reply' is selected for the parameter 'Call Forward Type'.
Key Sequence	The default is *72 but users can modify to any sequence of up to 2 digits, i.e., *n or *nm.
Do Not Disturb	
Enabled	Enables the Do Not Disturb (DND) feature. This feature allows you to prevent incoming calls from ringing at your phone. When enabled, callers receive a busy signal or an announcement. The DND is activated using the phone keypad. The default is disabled.
Key Sequence	Defines the key sequence to activate and deactivate the DND feature.
3 Way Conference	
3 Way Conference Mode	Selects how 3-way conference calls are handled: ▪ **Local:** locally by MP252 ▪ **Remote:** by a remote media server (RFC 4240)
Media Server Address	The address of the remote media server that handles conference calls. **Note:** This parameter is available only when 'Remote' is selected for the parameter '3 Way Conference Mode'.

Parameter	Description
Message Waiting Indication	
Enabled	If a user has an unheard voice mail message, a stutter dial tone is heard when the user picks up the phone. In addition, MP252 generates an FSK signal to the phone to indicate that a message is waiting. If the telephone connected to MP252 supports this feature, an MWI 'envelope icon' is displayed.
Subscribe to MWI	Select this check box if you must register with a MWI subscriber server. If so, configure the three parameters below.
MWI Server IP Address or Host Name	Defines the IP address or host name of the MWI server. **Note:** This parameter is available only when the check box 'Subscribe to MWI' is selected.
MWI Server Port	Defines the port number of the MWI server. **Note:** This parameter is available only when the check box 'Subscribe to MWI' is selected.
MWI Subscribe Expiration Time	Defines the interval between registrations. **Note:** This parameter is available only when the check box 'Subscribe to MWI' is selected.
General Parameters	
Stutter Tone Duration	When you enable message waiting and an unheard message exists, a stutter tone is played to the phone for the duration configured by this parameter and/or when you activate the call forwarding feature (see Section 10.6 on page 111).
Out of Service Behavior	Defines the tone which is played instead of a dial tone if the user configured a registrar IP and the registration failed. When the Reorder tone is selected, a Reorder tone is played instead of a dial tone. If "No Tone" is selected, then no tone is played.

8.6 Configuring Line Settings

Before you can make phone calls, you need to configure lines. Lines are SIP logical ID numbers (i.e., telephone numbers), which are registered to the SIP proxy server, and for which you are charged for calls you make on it.

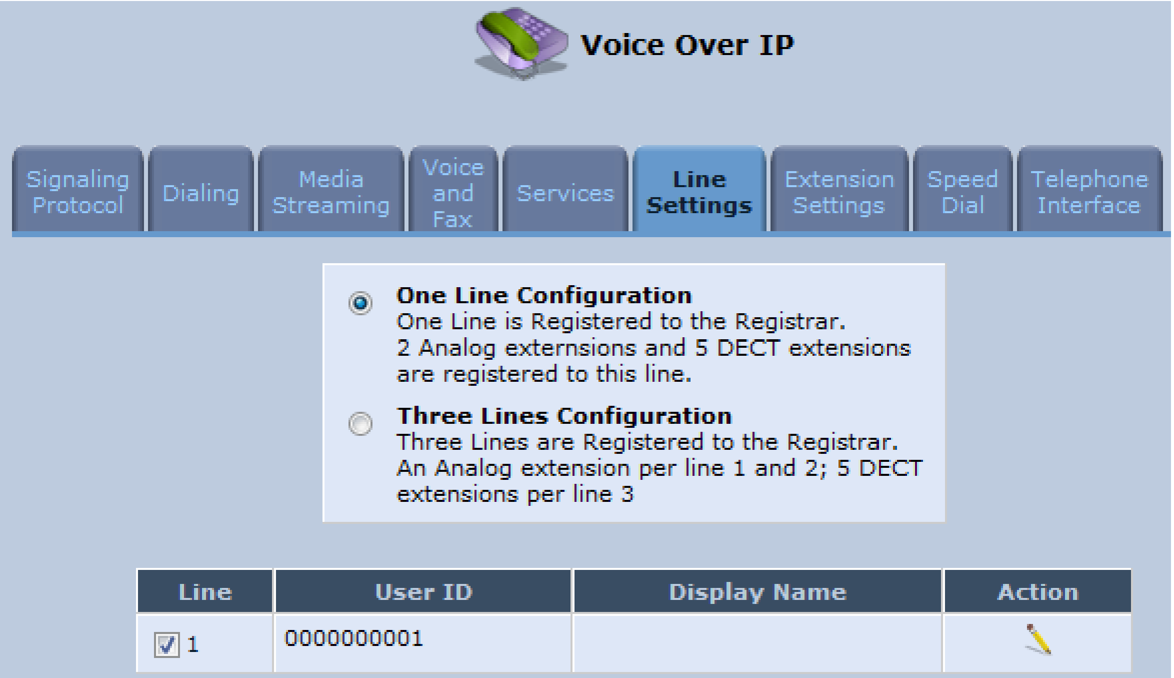
MP252 supports two line-configuration modes:

- **One-Line Configuration:** In this mode, only one line is configured to represent all the physical telephone extensions on MP252 (i.e., two analog phones and five DECT handsets):
  - When you receive an incoming call, all the extensions on the line ring, and you can answer from any one of them. When you do answer, the other extensions stop ringing.
  - If you receive another incoming call when you already have an established call on one extension, all the idle extensions ring, and the busy extension hears a call waiting tone.
  - You can make outgoing calls from any of the extensions.
  - You can make multiple concurrent calls (i.e., each extension makes a call to a different destination and at the same time).
- **Three-Lines Configuration:** In this mode, three lines can be configured:
  - Line 1 for the analog telephone connected to the MP252 port labeled **Phone 1**
  - Line 2 for the analog telephone connected to the MP252 port labeled **Phone 2**
  - Line 3 for all the DECT handsets (up to five)

➢ To configure lines:

1. In the 'Voice Over IP' screen, click the **Line Settings** tab; the following screen appears.

Figure 8-7: Line Settings Tab Screen



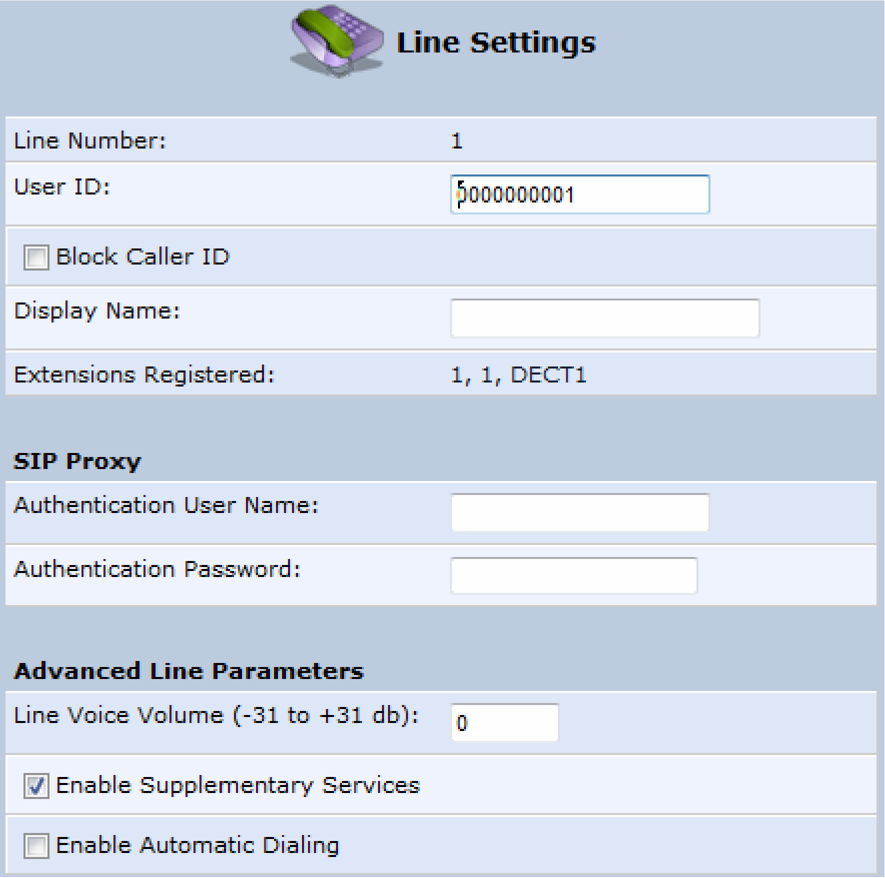
● **One Line Configuration**
One Line is Registered to the Registrar.
2 Analog externsions and 5 DECT extensions are registered to this line.

○ **Three Lines Configuration**
Three Lines are Registered to the Registrar.
An Analog extension per line 1 and 2; 5 DECT extensions per line 3

Line	User ID	Display Name	Action
☑ 1	0000000001		✎

2. Select the configuration mode options – **One Line Configuration** or **Three Lines Configuration**; the table lists the lines according to the selected line configuration mode.
3. For each line, click the corresponding **Edit** ✎ icon to configure the line; the following screen appears:

Figure 8-8: Line Settings Screen for a New Line



Line Settings

Line Number:	1
User ID:	5000000001
□ Block Caller ID	
Display Name:	
Extensions Registered:	1, 1, DECT1

SIP Proxy

Authentication User Name:	
Authentication Password:	

Advanced Line Parameters

Line Voice Volume (-31 to +31 db):	0
☑ Enable Supplementary Services	
□ Enable Automatic Dialing	

The screen displays the following read-only information:

- **Line Number:** line number
- **Extensions Registered:** extensions registered to this line

4. In the ‘User ID’ field, enter phone's VoIP user ID used for identification to initiate and accept calls.
5. To hide the phone’s ID from the remote party, select the ‘Block Caller ID’ check box.
6. In the ‘Display Name’ field, enter a name to intuitively identify the line. This is also displayed to remote parties as your caller ID.
7. Under the **SIP Proxy** group, define the SIP proxy server:
   a. In the ‘Authentication User Name’ field, enter the user name received from your VoIP service provider. This is used when sending a response to Unauthorized or Proxy Authentication Requested (401/407).
   b. In the ‘Authentication Password’ field, enter the password received from your VoIP service provider. This is used when sending a response to Unauthorized or Proxy Authentication Requested (401/407).
8. In the ‘Line Voice Volume’ field, enter the voice volume of the line (i.e., the gain from the network toward the local phone). The default is 0 dB.
9. To enable supplementary services on this line, select the ‘Enable Supplementary Services’ check box.
10. To enable automatic dialing (which automatically dials a user-defined phone number when the line is off-hooked longer than a user-defined time), do the following:
    c. Select the ‘Enable Automatic Dialing’ check box.

d. In the ‘Automatic Dialing Timeout’ field, enter the time after which automatic dialing is activated if the user has not started dialing before this timeout. When set to 0, automatic dialing is performed immediately.

e. In the ‘Automatic Dialing Destination’ field, enter the destination that is automatically dialed. This can be a phone number or a domain name (for example, user@101.10.13.2 or user@domain name).

11. Click **OK** to save your settings.

8.7 Configuring Line Extensions

Extensions are the physical telephony extensions on MP252. These can either be FXS ports (for analog telephones) or cordless DECT handsets.

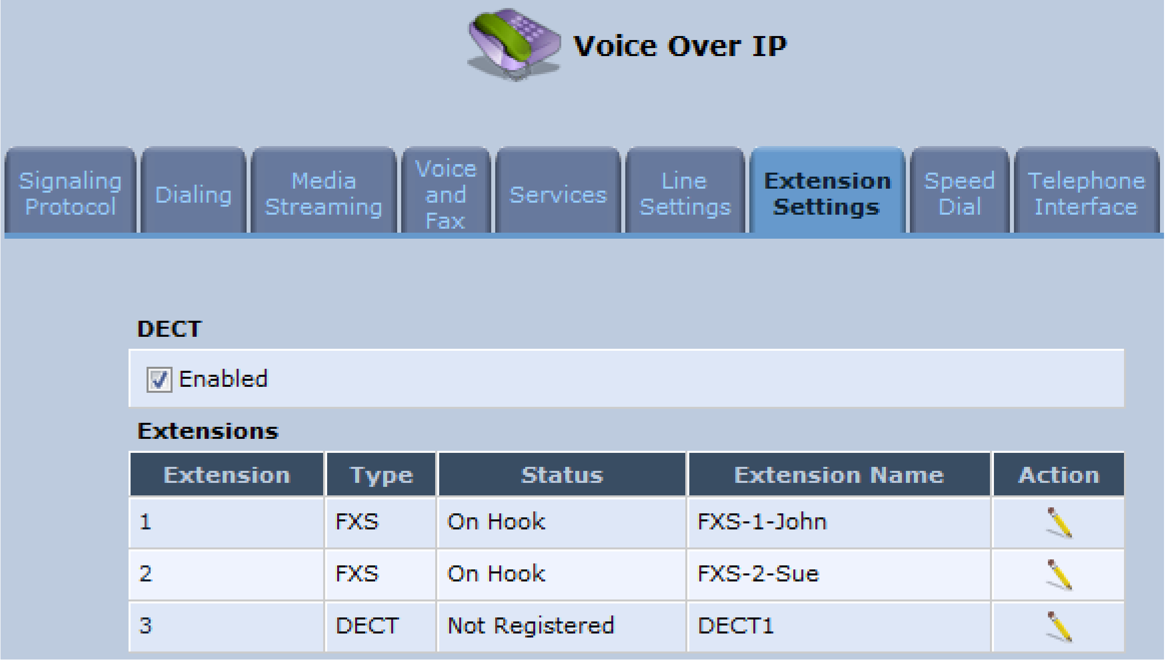
Once you have defined your lines, you can do the following:

- Define an arbitrary name for each extension (to help you identify the extension).
- Initiate the registration process of the lines with the proxy server (and DECT with base unit)

➢ To configure line extensions:

1. In the 'Voice Over IP' screen, click the **Extension Settings** tab; the following screen appears.

Figure 8-9: Extension Settings Tab Screen



DECT

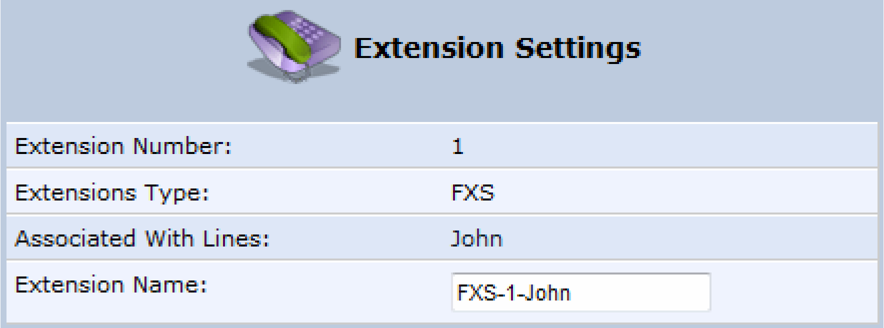
☑ Enabled

Extensions

Extension	Type	Status	Extension Name	Action
1	FXS	On Hook	FXS-1-John	✎
2	FXS	On Hook	FXS-2-Sue	✎
3	DECT	Not Registered	DECT1	✎

2. For each line extension, click the corresponding **Edit** ✎ icon to define a name for the extension; the following screen appears:

Figure 8-10: Extension Settings Screen



Extension Number:	1
Extensions Type:	FXS
Associated With Lines:	John
Extension Name:	FXS-1-John

3. Click **OK** to save your settings.

➢ To register the lines:

4. In the ‘Extension Settings Tab; screen; click the **Register** button.

8.8 Configuring Speed Dialing

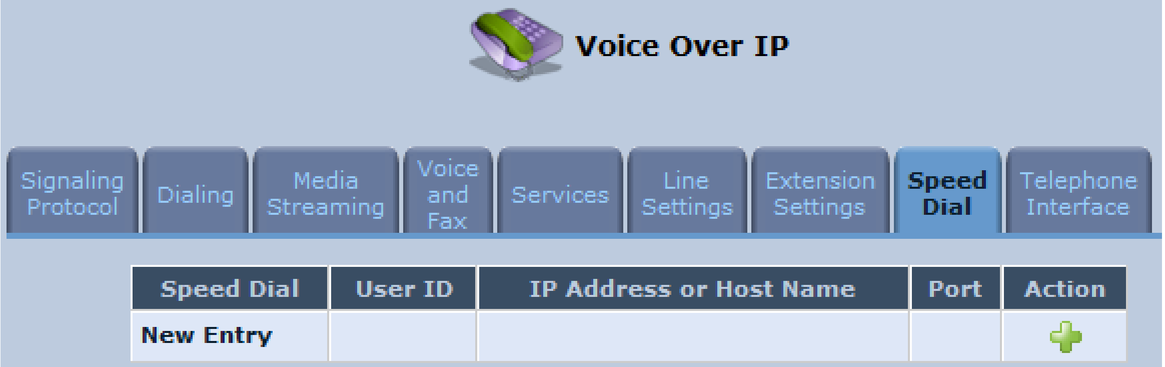
Use the 'Speed Dial Settings' screen to associate a called party's contact parameters (including the IP address of his/her ATA and Line ID) with a number that you'll dial to call the called part. The number of speed-dialing codes that can be defined is unlimited. Use the screen to define a destination type: Proxy, Local Line or Direct Call.

Note: When connecting MP252 to a World-Wide SIP Server (see 'Connecting MP252's VoIP to a VoIP Service Provider' on page 107), you don't need to configure 'Speed Dial Settings'.

➢ To configure speed dialing:

1. In the 'Voice Over IP' screen, click the **Speed Dial** tab; the following screen appears:

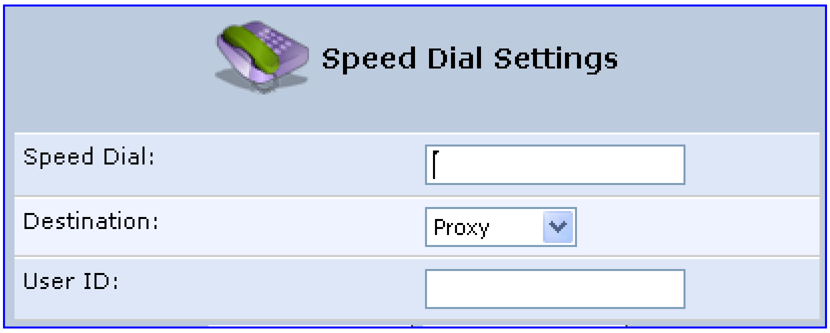
Figure 8-11: Speed Dial Tab Screen



Speed Dial	User ID	IP Address or Host Name	Port	Action
New Entry				✚

2. Click the **New** ✚ icon; the 'Speed Dial Settings' screen appears.

Figure 8-12: Speed Dial Settings Screen (Proxy Destination)



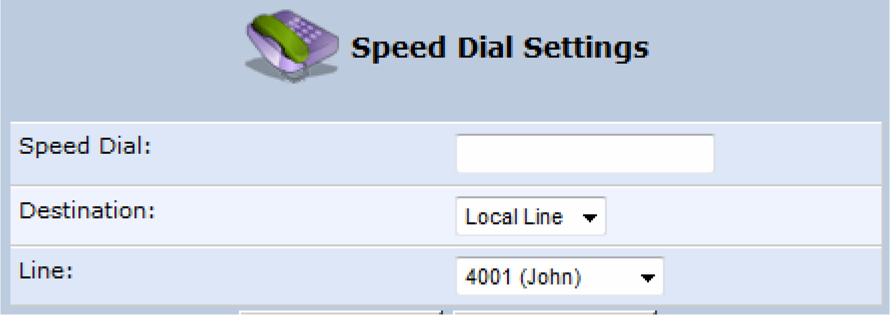
Speed Dial:	
Destination:	Proxy
User ID:	

3. In the ‘Speed Dial’ field, enter the shortcut number (i.e., speed dial) which you dial to call the party defined below.

4. From the ‘Destination’ drop-down list, select the destination type.

   - **Proxy:** If you select this option (as shown in the figure above), then in the ‘User ID’ field, enter the user ID to call.
   - **Local Line:** If you select this option, then from the ‘Line’ drop-down list, select the configured local line on your MP252.

Figure 8-13: Speed Dial Settings Screen (Local Line Destination)

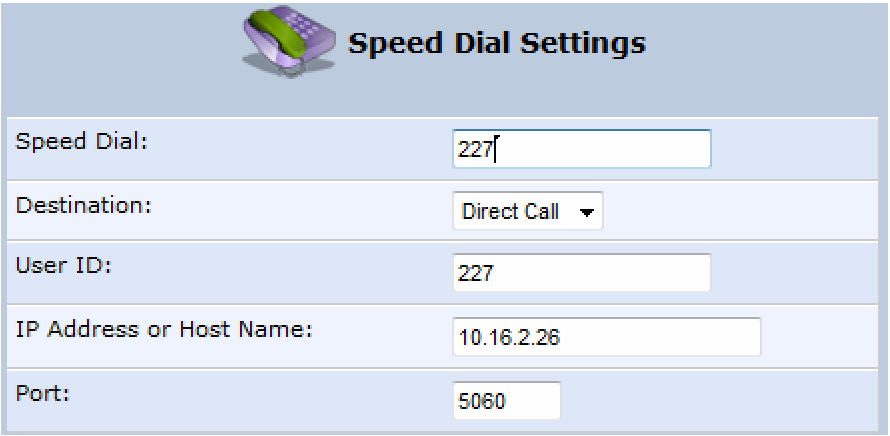


Speed Dial Settings

Speed Dial:	
Destination:	Local Line
Line:	4001 (John)

- **Direct Call:** if you select this option, then configure the following:
  a. In the 'User ID' field, enter the user ID to call.
  b. In the 'IP Address or Host Name' field, enter the remote party's IP address or host name.
  c. In the 'Port' field, enter the SIP UDP or TCP port of the remote party.

Figure 8-14: Speed Dial Settings Screen (Direct Call Destination)



Speed Dial Settings

Speed Dial:	227
Destination:	Direct Call
User ID:	227
IP Address or Host Name:	10.16.2.26
Port:	5060

5. Click **OK** to save your settings.

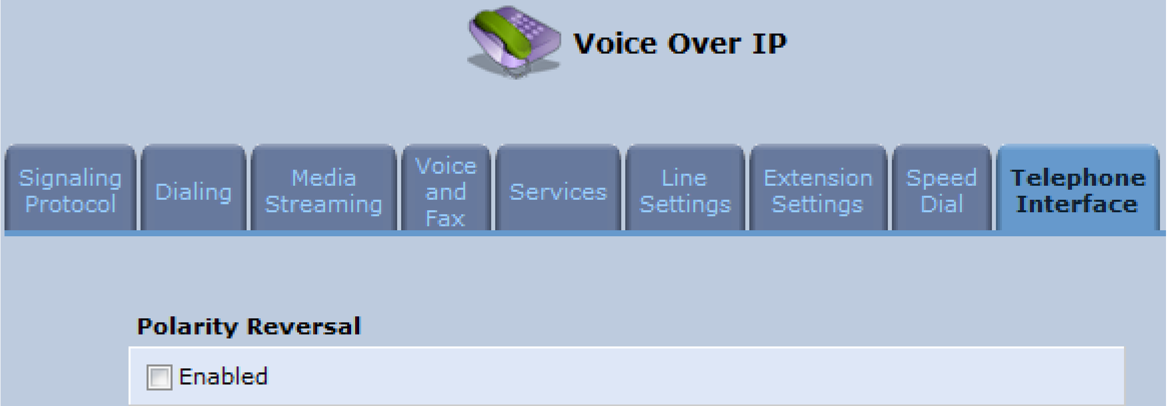
8.9 Enabling Polarity Reversal

The procedure below describes how to enable polarity reversal. When this feature is enabled, the analog port (FXS) interface polarity is reversed to indicate the start of a VoIP session, and is reversed back when the VoIP session ends.

➢ To enable polarity reversal:

1. In the 'Voice Over IP' screen, click the **Telephone Interface** tab; the following screen appears:

Figure 8-15: Telephone Interface Tab Screen



Polarity Reversal

□ Enabled

2. Select the 'Enabled' check box to enable the Polarity Reversal feature.
3. Click **OK** to apply your settings.

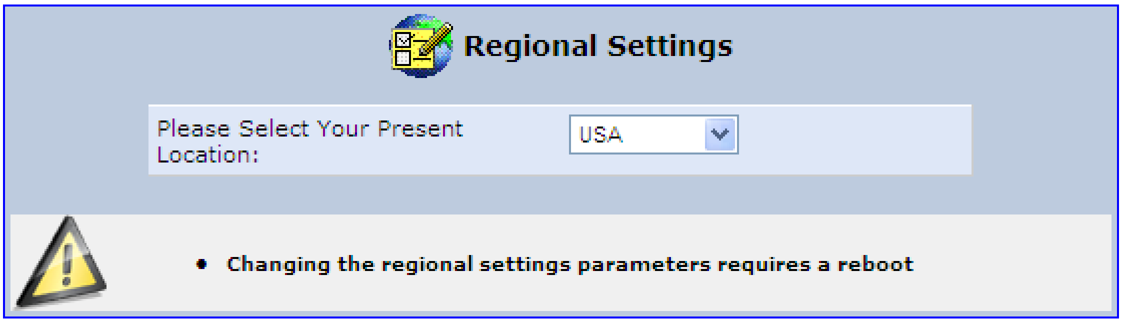
8.10 Selecting Regional Settings for Analog Lines

The behavior and parameters of analog telephones lines vary between countries. The set of Call Progress Tones, the protocol used for caller ID and the analog line impedance are all location-specific. MP252 enables users to select the country they reside in and MP252 automatically selects the correct regional settings.

➢ To select your present location:

1. In the 'Advanced' screen, click the **Regional Settings** icon; the 'Regional Settings' screen appears.
2. Select the country from the drop-down list. If your current location is not listed, contact your service provider.

Figure 8-16: Regional Settings Screen



Please Select Your Present Location: USA

- Changing the regional settings parameters requires a reboot

3. Click **OK**.
4. Reboot MP252 for your settings to take effect.

9 Connecting MP252 to an ITSP

The MP252 VoIP capabilities allow you to connect to a remote SIP server or Internet Telephony Service Provider (ITSP) and conduct phone calls over the Internet (i.e., VoIP).

This chapter describes how to place a VoIP call utilizing MP252's VoIP capabilities over a SIP server. Verify that your MP252 and telephone are correctly connected and that your WAN connection is up.

9.1 Opening a SIP Account

Before you can connect to a SIP server, it is necessary that you obtain a SIP account.

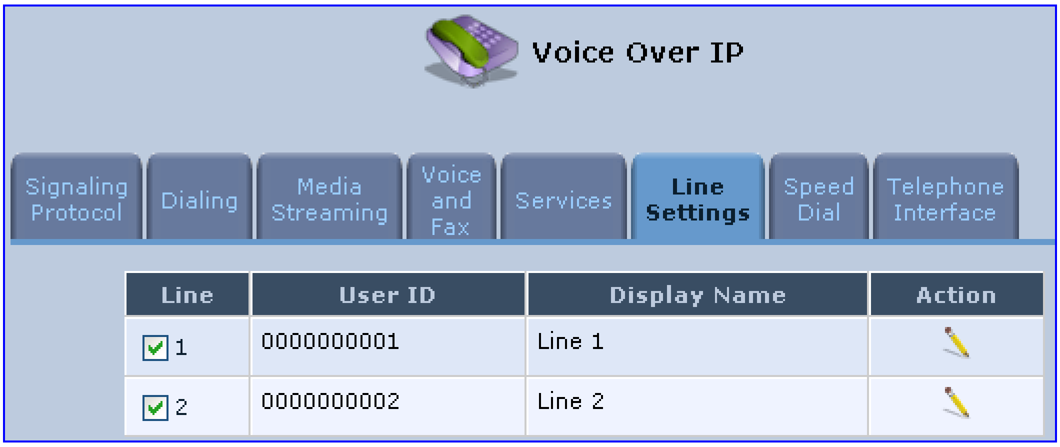
9.2 Configuring VoIP Parameters

Note: This section describes the minimal set of changes required to connect to a VoIP Service Provider. Other configuration changes might be required to connect to some Service Providers.

➢ To configure VoIP parameters:

1. In the menu bar, click the menu **Voice Over IP**; the 'Voice Over IP' screen appears.
2. Click the **Line Settings** tab. Enable only the lines that you are using, by selecting the check box, and then click **Apply**.

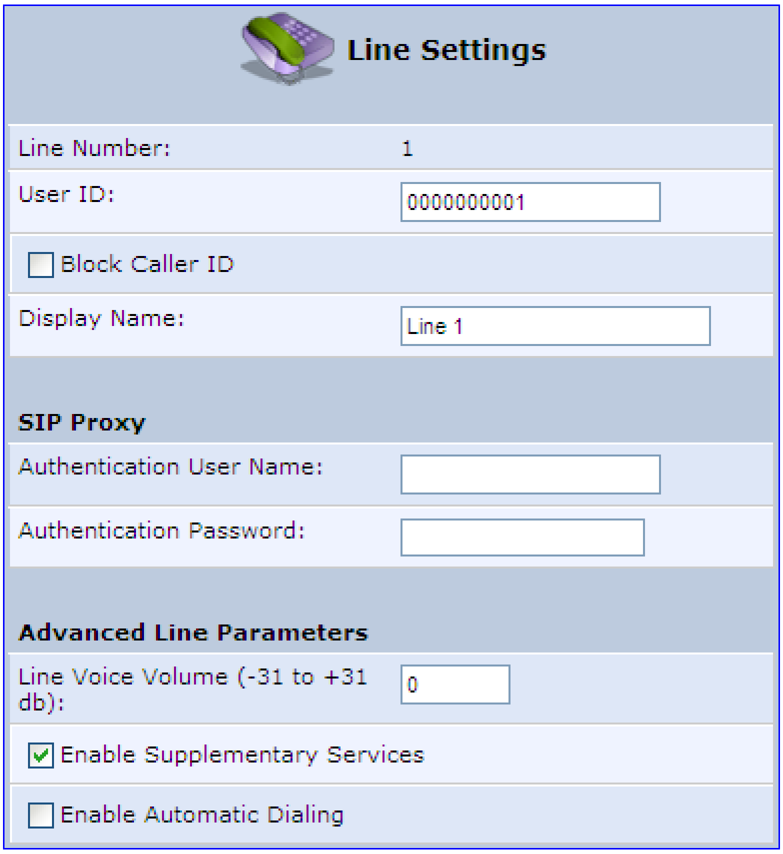
Figure 9-1: Voice Over IP - Line Settings Screen



Line	User ID	Display Name	Action
☑ 1	0000000001	Line 1	✎
☑ 2	0000000002	Line 2	✎

3. Click the **Edit** ✎ icon corresponding to the line that you want to configure (example, line 1); the 'Line Settings' screen appears. Use the configuration values provided by your ISP to configure the parameters in this screen.

Figure 9-2: VoIP - Line Settings - Defining a New Line



Line Settings

Line Number:	1
User ID:	0000000001
□ Block Caller ID	
Display Name:	Line 1

SIP Proxy

Authentication User Name:	
Authentication Password:	

Advanced Line Parameters

Line Voice Volume (-31 to +31 db):	0
☑ Enable Supplementary Services	
□ Enable Automatic Dialing	

4. Click the **Signaling Protocol** tab and then select the 'Use SIP Proxy' check box (see 'Configuring Signaling Protocol Parameters' on page 77).
5. In the field 'Proxy IP Address or Host Name', define the ISP's SIP proxy, provided by the ISP (see 'Configuring Signaling Protocol Parameters' on page 77).
6. Click **OK** or **Apply** to complete the VoIP configuration.

Note: To verify successful registration with the proxy server, ensure that the **Phone** LED is lit green or in the **Voice over IP** tab (**System Monitoring** menu), the entry 'SIP Registration' displays "Registered" for the configured lines.

10 Making VoIP Calls with your Analog Telephones

Analog telephone users that are connected to MP252 can place calls, put calls on hold, transfer calls, and establish three-way conferences. This chapter describes how to perform these operations.

Note: For information on using the DECT phone, see **Part II**.

10.1 Making a Call

The procedure below describes how to make a call.

➢ To make a call:

1. Pick up the phone.
2. Make sure that you can hear a dial tone
3. Dial the remote party's number or the user-defined speed dial number (if configured in Section 8.8 on page 103).

10.2 Answering a Waiting Call

The procedure below describes how to answer a waiting call. This depends on how you configured the flash-hook functionality, using the ‘Flash keys sequence style’ parameter in Section 8.2 on page 86. To enable call waiting, see Section 8.5 on page 95.

➢ To answer a waiting call when 'Flash only' is set:

1. When you hear a call waiting tone (during a call), press the flash key button on your phone; the active call is put on hold and switches to the waiting call.
2. To return to the original call, press the flash button again. You can toggle from one party to another by pressing the flash button.

➢ To answer a waiting call when 'Flash + digits sequence' is set:

1. When you hear the call waiting tone (during a call), press the flash key button on your phone and then press the '1' key; the original call is put on hold and switches to the waiting call.
2. To return to the original call, press flash + 1 again. You can toggle from one party to another by pressing flash + 1.

10.3 Placing a Call on Hold

The procedure below describes how to place a call on hold. This depends on how you configured the flash-hook functionality, using the ‘Flash keys sequence style’ parameter in Section 8.2 on page 86.

➢ To place the remote party on hold when 'Flash only' is set:

- During a call, press the flash key button on your phone; a dial tone is heard. At this point you can initiate a second call by dialing another party's number.

> **Note:** If you press the flash key button again before the second party answers, the call is established with the original call. If, however, the second party answers and you press the flash key button, a 3-way conference is established.

➢ To place the remote party on hold when 'Flash + digits sequence' is set:

1. Press the flash key button key and then press the '1' key on your phone; the phone plays a dial tone. At this point you can initiate a second call by dialing another party's number.
2. To cancel the hold state and resume the previous phone call, press the flash key button and then press '1'.

10.4 Transferring a Call

The procedure below describes how to transfer an established call to another destination. This depends on how you configured the flash-hook functionality, using the ‘Flash keys sequence style’ parameter in Section 8.2 on page 86.

➢ To transfer a call when 'Flash only' is set:

1. During a call with party B, press the flash key button on your phone; party B is placed on hold and a dial tone is heard.
2. Dial party C's number.
3. You can wait for C to answer or not.
4. On-hook your phone; party B is now transferred to party C.

➢ To transfer a call when 'Flash + digits sequence' is set:

1. During a call with party B, press the flash key button and then press the '1' key on the phone; party B is placed on hold and a dial tone is heard.
2. Dial party C's number.
3. You can wait for C to answer or not.
4. Press the flash key button key and then press '2'; party B is transferred to party C (and a warning tone is heard).

10.5 Establishing a 3-Way Conference Call

The procedure below describes how to establish a 3-way conference call. The method for doing this depends on how you configured the flash-hook functionality, using the ‘Flash keys sequence style’ parameter in Section 8.2 on page 86. In addition, to configure 3-way conferencing, see Section 8.5 on page 95.

➢ To establish a 3-way conference call when 'Flash only' is set:

1. During a call with party B, press the flash key button on your phone; Party B is placed on hold and a dial tone is heard.
2. Dial party C's number and wait until the call is established.
3. Press the flash key button again to add parties B and C to a 3-way conference call.
4. To end the 3-way conference call, on-hook your phone (or alternatively, press the flash key button again).

➢ To establish a 3-way conference call when 'Flash + digits sequence' is set:

1. During a call with party B, press the flash key button on your phone and then press the '1' key; Party B is placed on hold and a dial tone is heard.
2. Dial party C's number and wait until the call is established.
3. Press the flash key button and then press the '3' key to add B and C to a 3-way conference call.
4. To end the 3-way conference call, on-hook your phone (or alternatively, press the flash key button and then press the '3' key).

10.6 Forwarding Calls to another Phone

The procedure below describes how to automatically forward incoming (received) calls to another phone. Before you can forward calls, you need to enable and configure call forwarding as described in Section 8.5 on page 95.

Note: The Call Forward feature is functional only when MP252 is registered to a proxy.

➢ To forward calls to another phone:

1. Pick up the phone and make sure that you can hear a dial tone.
2. Dial the call forward key sequence (according to your configuration), for example, *32; a dial tone is heard.
3. Dial the number of the phone to where you want calls forwarded; a stutter tone is heard.
4. Replace the receiver; all incoming calls are forwarded. Every time you pick up the phone receiver, a stutter tone is played (for the length of time, as you configured for the 'Stutter Tone Duration' parameter).

➢ To deactivate call forwarding:

1. Pick up the phone; a stutter tone is heard.
2. Dial the call forward key sequence.
3. Replace the receiver.
4. To make sure that call forwarding has been de-activated, pick up the phone again; a regular dial tone should be heard (not the stutter tone).

11 Quality of Service

Network-based applications and traffic are growing at a high rate, producing an ever-increasing demand for bandwidth and network capacity. For obvious reasons, bandwidth and capacity cannot be expanded infinitely, requiring that bandwidth-demanding services be delivered over existing infrastructure, without incurring additional, expansive investments.

The next logical means of ensuring optimal use of existing resources are Quality of Service (QoS) mechanisms for congestion management and avoidance. QoS refers to the capability of a network device to provide better service to selected network traffic. This is achieved by shaping the traffic and processing higher priority traffic before lower priority traffic.

As QoS is dependent on the "weakest link in the chain", failure of but a single component along the data path to assure priority packet transmission can easily cause a VoIP call or a Video on Demand (VoD) broadcast to fail miserably. QoS must therefore obviously be addressed end-to-end.

The following are the potential bottleneck areas that need be taken into consideration when implementing an end-to-end QoS-enabled service.

- **The Local Area Network:** LANs have finite bandwidth, and are typically limited to 100 Mbps. When given the chance, some applications consume all available network bandwidth. In business networks, a large number of network-attached devices can lead to congestion. The need for QoS mechanisms is more apparent in wireless LANs, where bandwidth is even more limited (typically no more than 20 Mbps on 802.11g networks).
- **The Broadband Router:** All network traffic passes through and is processed by the broadband router. It is therefore a natural focal point for QoS implementation. Lack of sufficient buffer space, memory or processing power, and poor integration among system components can result in highly undesirable real-time service performance. The only way to assure high QoS is the use of proper and tightly-integrated router operating system software and applications, which can effectively handle multiple real-time services simultaneously.
- **The Broadband Connection:** Typically, the most significant bottleneck of the network, this is where the high speed LAN meets limited broadband bandwidth. Special QoS mechanisms must be built into routers to ensure that this sudden drop in connectivity speed is taken into account when prioritizing and transmitting real-time service-related data packets.
- **The Internet:** Internet routers typically have a limited amount of memory and bandwidth available to them, so that congestions may easily occur when links are over-utilized, and routers attempt to queue packets and schedule them for retransmission. One must also consider the fact that while Internet backbone routers take some prioritization into account when making routing decisions, all data packets are treated equally under congested conditions.

Note: For recommended QoS configuration see Section 11.7 on page 128.

11.1 QoS Wizard

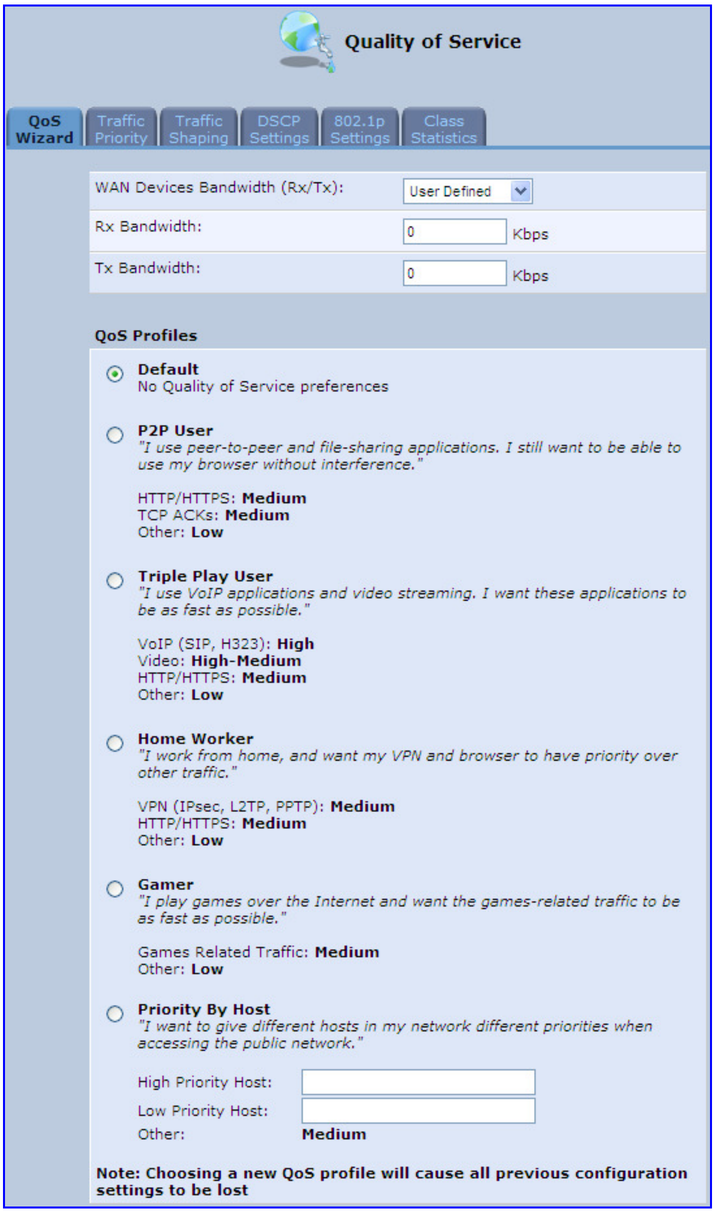
The QoS wizard allows you to configure your QoS parameters according to predefined profiles, with just a few clicks. A chosen QoS profile automatically defines QoS rules, which you can view and edit in the rest of the QoS tab screens.

The QoS wizard also allows you to define the WAN bandwidth.

➢ To use the QoS Wizard:

1. From the menu bar, click the **QoS** menu link; the 'Quality of Service' screen appears with the **QoS Wizard** tab selected by default.

Figure 11-1: QoS Wizard Tab Screen



WAN Devices Bandwidth (Rx/Tx):	User Defined	
Rx Bandwidth:	0	Kbps
Tx Bandwidth:	0	Kbps

QoS Profiles

● **Default**
No Quality of Service preferences

○ **P2P User**
"I use peer-to-peer and file-sharing applications. I still want to be able to use my browser without interference."

HTTP/HTTPS: **Medium**
TCP ACKs: **Medium**
Other: **Low**

○ **Triple Play User**
"I use VoIP applications and video streaming. I want these applications to be as fast as possible."

VoIP (SIP, H323): **High**
Video: **High-Medium**
HTTP/HTTPS: **Medium**
Other: **Low**

○ **Home Worker**
"I work from home, and want my VPN and browser to have priority over other traffic."

VPN (IPsec, L2TP, PPTP): **Medium**
HTTP/HTTPS: **Medium**
Other: **Low**

○ **Gamer**
"I play games over the Internet and want the games-related traffic to be as fast as possible."

Games Related Traffic: **Medium**
Other: **Low**

○ **Priority By Host**
"I want to give different hosts in my network different priorities when accessing the public network."

High Priority Host:
Low Priority Host:
Other: **Medium**

Note: Choosing a new QoS profile will cause all previous configuration settings to be lost

2. Define bandwidth limitation. From the 'WAN Devices Bandwidth (Rx/Tx)' drop-down list, select 'User Defined' if you want to define specific Rx and Tx bandwidth limitations, or select the Rx/Tx optional values provided in the drop-down list.

3. In the **QoS Profiles** group, select a QoS profile.
4. Click **OK**.

Note: Selecting a new QoS profile deletes all previous QoS settings.

11.2 Traffic Shaping

Traffic Shaping is the solution for managing and avoiding congestion where a high speed LAN meets limited broadband bandwidth. A user may have, for example, a 100 Mbps Ethernet LAN with a 100 Mbps WAN interface router. The router may communicate with the ISP using a modem with a bandwidth of 2 Mbps. This typical setup makes the modem, having no QoS module, the bottleneck. The router sends traffic as fast as it is received, while its well-designed QoS algorithms are left unused. Traffic shaping limits the bandwidth of the router, artificially forcing the router to be the bottleneck.

A traffic shaper is essentially a regulated queue that accepts uneven and/or bursty flows of packets and transmits them in a steady, predictable stream so that the network is not overwhelmed with traffic.

While Traffic Priority allows basic prioritization of packets, Traffic Shaping provides more sophisticated definitions such as:

- Bandwidth limit for each device
- Bandwidth limit for classes of rules
- Prioritization policy
- TCP serialization on a device

You can also define QoS traffic shaping rules for a default device. These rules are used on a device that has no definitions of its own. This enables the definition of QoS rules on Default WAN, for example, and their maintenance even if the PPP or bridge device over the WAN is removed.

MP252 also supports dynamic traffic shaping during a call. Traffic shaping is critical in residential VoIP gateways because of the bottleneck created in the ADSL or Cable modem, mainly in the upload direction. Dynamic traffic shaping ensures a minimum bandwidth for VoIP calls. Without dynamic traffic shaping, traffic shaping limits the bandwidth at all times, even if the user is not making a VoIP call and therefore, the service provider needs to configure the QoS traffic shaping transmit (Tx) bandwidth according to the user's specific upload bandwidth. Configuring a lower value results in a lower upload bandwidth (not only during VoIP calls).

Dynamic traffic shaping enables the service provider to configure two upload traffic shaping bandwidth parameters:

- "Tx Bandwidth" - for all traffic
- "Tx Bandwidth during Call" - for VoIP calls

MP252 normally uses the "Tx Bandwidth" value. When the user makes a VoIP call (i.e. any phone/s connected to MP252 is ringing or off-hook), MP252 switches to use the "Tx Bandwidth during Call" value.

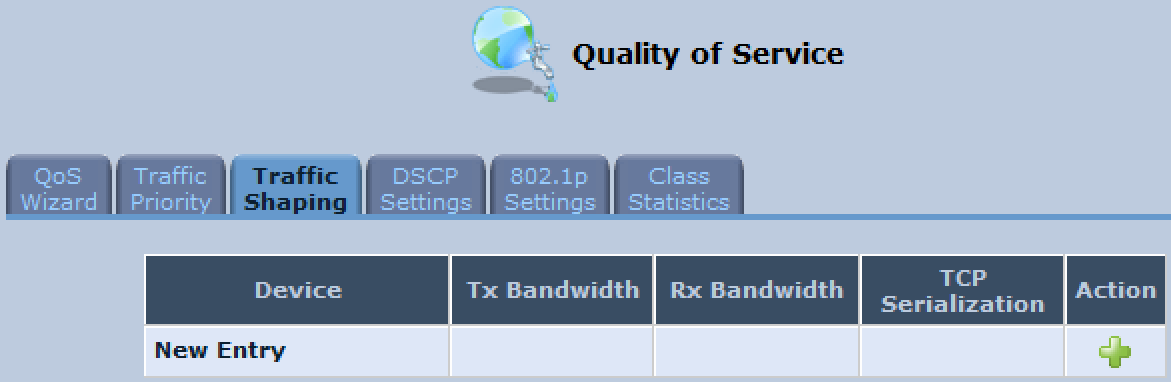
11.2.1 Device Traffic Shaping

The procedure below describes how to configure traffic shaping.

➢ **To add a traffic shaping device:**

1. From the menu bar, click the **QoS** menu, and then click the **Traffic Shaping** tab.

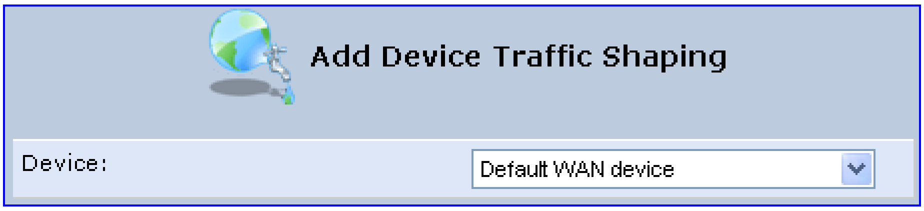
Figure 11-2: Quality of Service – Traffic Shaping Screen



Device	Tx Bandwidth	Rx Bandwidth	TCP Serialization	Action
New Entry				✚

2. Click the **New** ✚ icon; the 'Add Device Traffic Shaping' screen appears.

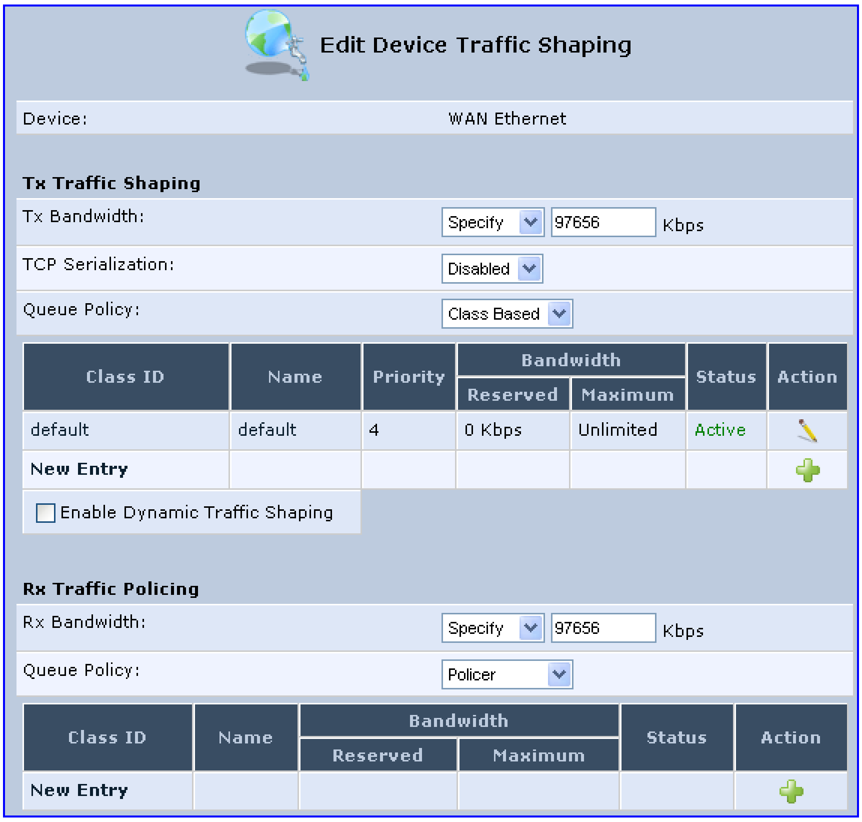
Figure 11-3: Add Device Traffic Shaping Screen



Device:	Default WAN device

3. From the 'Device' drop-down list, select the device for which you want to shape traffic. The list includes all interfaces (e.g., All LAN Devices, All WAN Devices) and VPNs such as PPoE, PPTP and L2TP (if defined). For example, select 'WAN Ethernet', and then click **OK**; the 'Edit Device Traffic Shaping' screen appears.

Figure 11-4: Edit Device Traffic Shaping Screen



Device:	WAN Ethernet

Tx Traffic Shaping

Tx Bandwidth:	Specify 97656 Kbps
TCP Serialization:	Disabled
Queue Policy:	Class Based

Class ID	Name	Priority	Bandwidth		Status	Action
			Reserved	Maximum		
default	default	4	0 Kbps	Unlimited	Active	✎
New Entry						✚

□ Enable Dynamic Traffic Shaping

Rx Traffic Policing

Rx Bandwidth:	Specify 97656 Kbps
Queue Policy:	Policer

Class ID	Name	Bandwidth		Status	Action
		Reserved	Maximum		
New Entry					✚

4. Under the **Tx Traffic Shaping** group, from the 'Tx Bandwidth' drop-down list, select 'Specify' and define the MP252's maximum transmission bandwidth rate in the corresponding field. The purpose is to limit the bandwidth of the WAN interface to that of the weakest outbound link, for instance, the DSL speed provided by the ISP. This forces MP252 to be the network bottleneck, where sophisticated QoS prioritization can be performed. If the device's bandwidth is not limited correctly, the bottleneck is an unknown router or modem on the network path, rendering MP252 QoS useless. To configure unlimited bandwidth, select 'Unlimited'.
5. Under the **Rx Traffic Policing** group, from the 'Rx Bandwidth' drop-down list, select 'Specify' and define the MP252's maximum receive bandwidth rate in the corresponding field. This limits MP252's bandwidth receipt rate to that of the DSL modem.
6. From the 'TCP Serialization' drop-down list, select whether to enable TCP serialization. The screen refreshes, displaying the 'Maximum Delay' field. This allows you to define the maximum allowed transmission time frame (in milliseconds) of a single packet. Any packet that requires a longer time to be transmitted is fragmented to smaller sections. This avoids transmission of large, bursty packets that may cause delay or jitter for real-time traffic such as VoIP.
7. Select the 'Enable Dynamic Traffic Shaping' check box if you want to configure traffic shaping specifically for VoIP calls (see Section 11.2 on page 115). When selected, the 'Tx Bandwidth During VoIP Call' field appears. Enter the bandwidth for VoIP calls. MP252 normally uses the "Tx Bandwidth" parameter value. When the user makes a VoIP call (i.e. any phone connected to MP252 is ringing or off-hook), MP252 switches to use the "Tx Bandwidth during Call" parameter value.

11.2.2 Shaping Classes

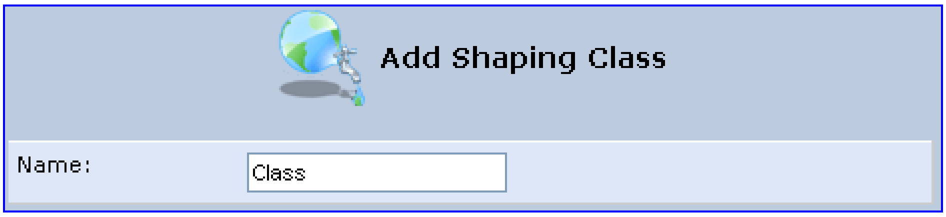
The bandwidth of a device can be divided to reserve constant portions of bandwidth to user-defined traffic types. Such a portion is known as a *Shaping Class*. When not used by its user-defined traffic type or owner (for example, VoIP), the class is then available to all other traffic. However when needed, the entire class is reserved solely for its owner. Moreover, you can limit the maximum bandwidth that a class can use even if the entire bandwidth is available.

When a shaping class is defined for a specific traffic type, two shaping classes are created. The second class is the 'Default Class', responsible for all the packets that do not match the defined shaping class or any other classes that may be defined on the device. This can be viewed in the Class Statistics screen.

➢ To add a shaping class:

1. From the menu bar, click the **QoS** menu, and then click the **Traffic Shaping** tab.
2. Click the **Edit** ✎ icon corresponding to the added Device (e.g., WAN); the 'Edit Device Traffic Shaping' screen appears.
3. Under the **Tx Traffic Shaping** group, click the **New** ✚ icon; the 'Add Shaping Class' screen appears.

Figure 11-5: Add Shaping Class Screen



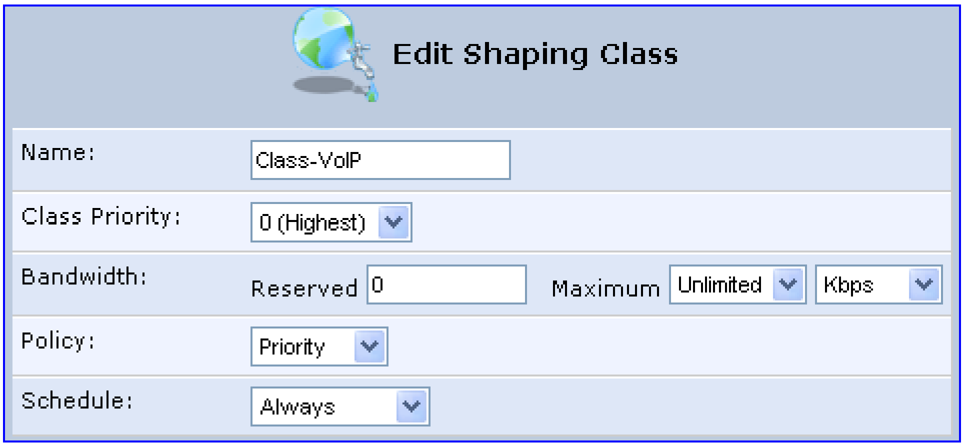
Add Shaping Class

Name: Class

4. In the 'Name' field, enter a name for the class, and then click **OK**; the 'Edit Device Traffic Shaping' screen appears.

5. Edit the newly added shaping class, by clicking the corresponding **Edit** ✎ icon; the 'Edit Shaping Class' screen appears.

Figure 11-6: Edit Shaping Class



Edit Shaping Class

Name:	Class-VoIP
Class Priority:	0 (Highest)
Bandwidth:	Reserved 0 Maximum Unlimited Kbps
Policy:	Priority
Schedule:	Always

6. In the ‘Name’ field, modify the class name, if required.
7. From the ‘Class Priority’ drop-down list, select the priority level for the class, where zero is the highest and seven the lowest.
8. In the ‘Bandwidth’ field, define the bandwidth for the class:
   - **Reserved:** reserved (i.e., guaranteed) bandwidth (Committed Information Rate / CIR) in kbps.
   - **Maximum:** specify the maximum bandwidth
9. From the ‘Policy’ drop-down list, select the policy for routing packets within the class:
   - **Priority:** Priority queuing uses multiple queues so that traffic is distributed among queues based on priority. This priority is defined according to packet priority, which can be defined explicitly by a DSCP value or an 802.1p value.
   - **FIFO:** First In First Out. This priority queue ignores any previously-marked packet priority.
   - **Fairness:** The fairness algorithm ensures no starvation by granting all packets a certain level of priority.
   - **RED:** Random Early Detection. Utilizes statistical methods to drop packets in a ‘probabilistic’ way before queues overflow. Dropping packets in this way slows a source down enough to keep the queue steady and reduces the number of packets that would be lost when a queue overflows and a host is transmitting at a high rate.
10. From the ‘Schedule’ drop-down list, select the scheduler rule (defined in Section 4.5.1 on page 47) that defines the time segments during which the class can be active. By default, the class is always active.
11. Click **OK** to save your settings.

11.2.2.1 Class Rules

Class rules define which packets belong to the class. Without class rules, the shaping class has no effect. Each class can have outbound and inbound rules for outgoing and incoming traffic respectively. For example, you can define that all outgoing packets from computer A in your LAN belong to your VoIP class. These packets are limited to the class settings (bandwidth, schedule, etc.). In addition, you can define the traffic protocol and priority for each rule (this is not mandatory as in Traffic Priority rules).

11.2.2.1.1Inbound and Outbound Data

MP252 can control outgoing data easily. It can queue packets, delay them, give precedence to other packets, or drop them. This helps in resolving upload (Tx) traffic bottlenecks and in most cases is sufficient. However, in the case of download (Rx) traffic bottlenecks, the ability to control the flow is much more limited. MP252 cannot queue packets, since in most cases the LAN is much faster than the WAN and when MP252 receives a packet from the WAN, it passes it immediately to the LAN.

QoS for ingress data has the following limitations, which do not exist for outgoing data:

- QoS can only be applied to TCP streams (UDP streams cannot be delayed)
- No borrowing mechanism
- When reserving Rx bandwidth, it is strictly taken from the bandwidth of all other classes

In addition, MP252 cannot control the behavior of its WAN (usually the ISP), which may not have proper QoS handling. Let's look at a scenario of downloading a large file and surfing the Internet at the same time. Downloading the file is distinguished by small requests, followed by very large responses. This may result in blocking HTML traffic at the ISP. A solution for such a scenario is limiting the bandwidth of low-priority TCP connections (such as file download).

To add outbound and inbound class rules, see 11.3 on page 120.

Note: The hierarchy of the class rules is determined by the order of their addition to the class. For example, if your first rule is match packets with any source address, any destination address, and any protocol to this class; then all packets traversing MP252 are associated with the specific class. Any rules defined later do not have any effect.

11.3 Traffic Priority

Traffic Priority allows you to manage and avoid traffic congestion by defining inbound and outbound priority rules for each device on your MP252. These rules determine the priority assigned to packets traveling through the device. QoS parameters (DSCP marking and packet priority) are set per packet, on an application basis.

You can set QoS parameters using flexible rules, according to the following parameters:

- Source/destination IP address, MAC address or host name
- Device
- Source/destination ports
- Limit the rule to specific days and hours

MP252 supports two priority marking methods for packet prioritization:

- DSCP
- 802.1p Priority

The matching of packets by rules is connection-based, known as Stateful Packet Inspection (SPI), using the same connection-tracking mechanism used by the firewall. Once a packet matches a rule, all subsequent packets with the same attributes receive the same QoS parameters, both inbound and outbound.

A packet can match more than one rule, and therefore:

- The first class rule has precedence over all other class rules (scanning is stopped once the first rule is reached).
- The first traffic-priority (classless) rule has precedence over all other traffic-priority rules.
- There is no prevention of a traffic-priority rule conflicting with a class rule. In this case, the priority and DSCP setting of the class rule (if given) takes precedence.

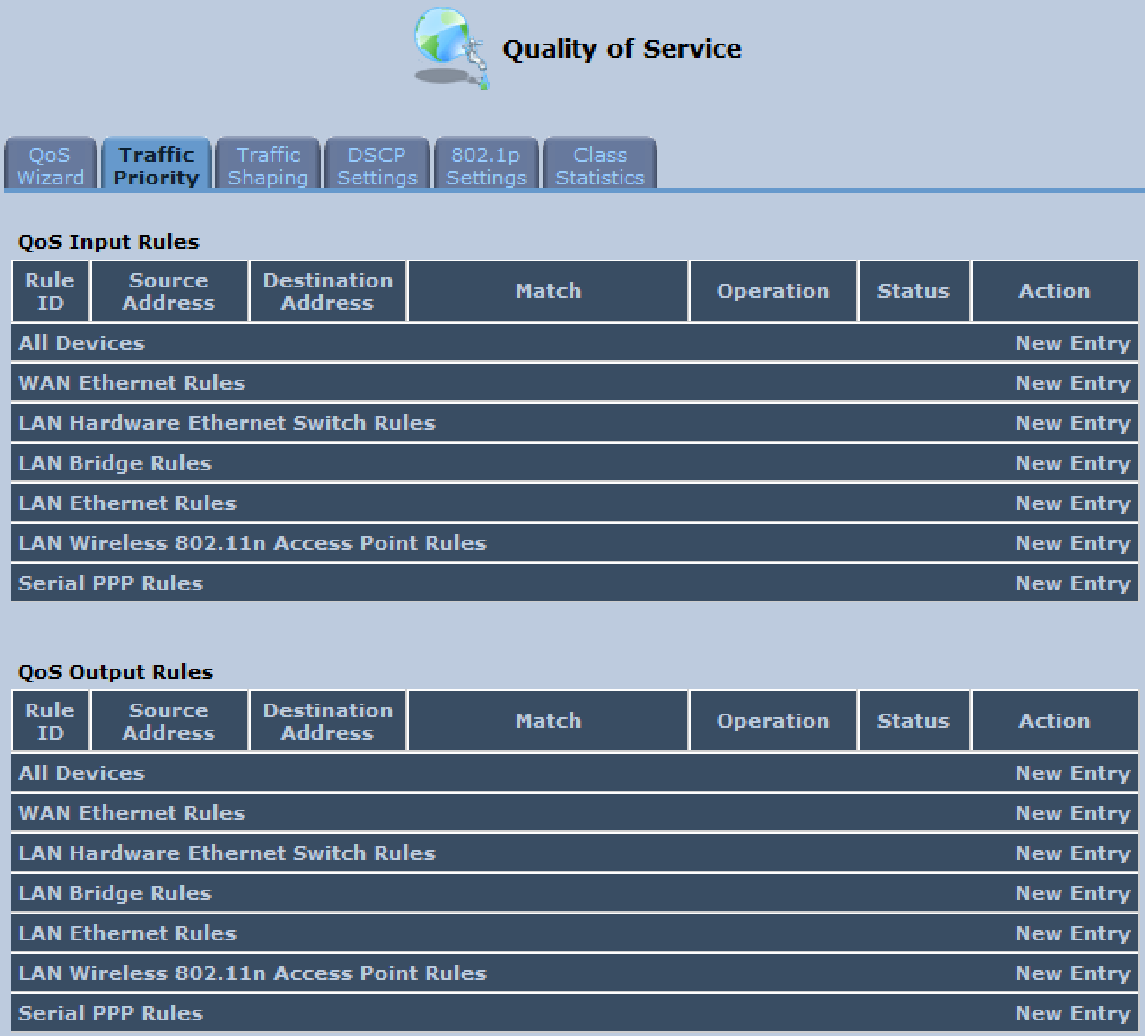
Connection-based QoS also allows inheriting QoS parameters by some of the applications that open subsequent connections. For instance, you can define QoS rules on SIP and the rules then apply to both control and data ports (even if the data ports are unknown). This feature applies to all applications that have ALG at firewall:

- Any
- User Defined (FTP, HTTP, HTTPS, TFTP, IMAP, PING, POP3, SNMP, SMTP, Telnet, L2TP, Traceroute or any other protocol)

➢ To set traffic priority rules:

1. From the menu bar, click the **QoS** menu, and then select the **Traffic Priority** tab; the 'Traffic Priority' screen appears.

Figure 11-7: Traffic Priority Screen



QoS Input Rules

Rule ID	Source Address	Destination Address	Match	Operation	Status	Action
All Devices						New Entry
WAN Ethernet Rules						New Entry
LAN Hardware Ethernet Switch Rules						New Entry
LAN Bridge Rules						New Entry
LAN Ethernet Rules						New Entry
LAN Wireless 802.11n Access Point Rules						New Entry
Serial PPP Rules						New Entry

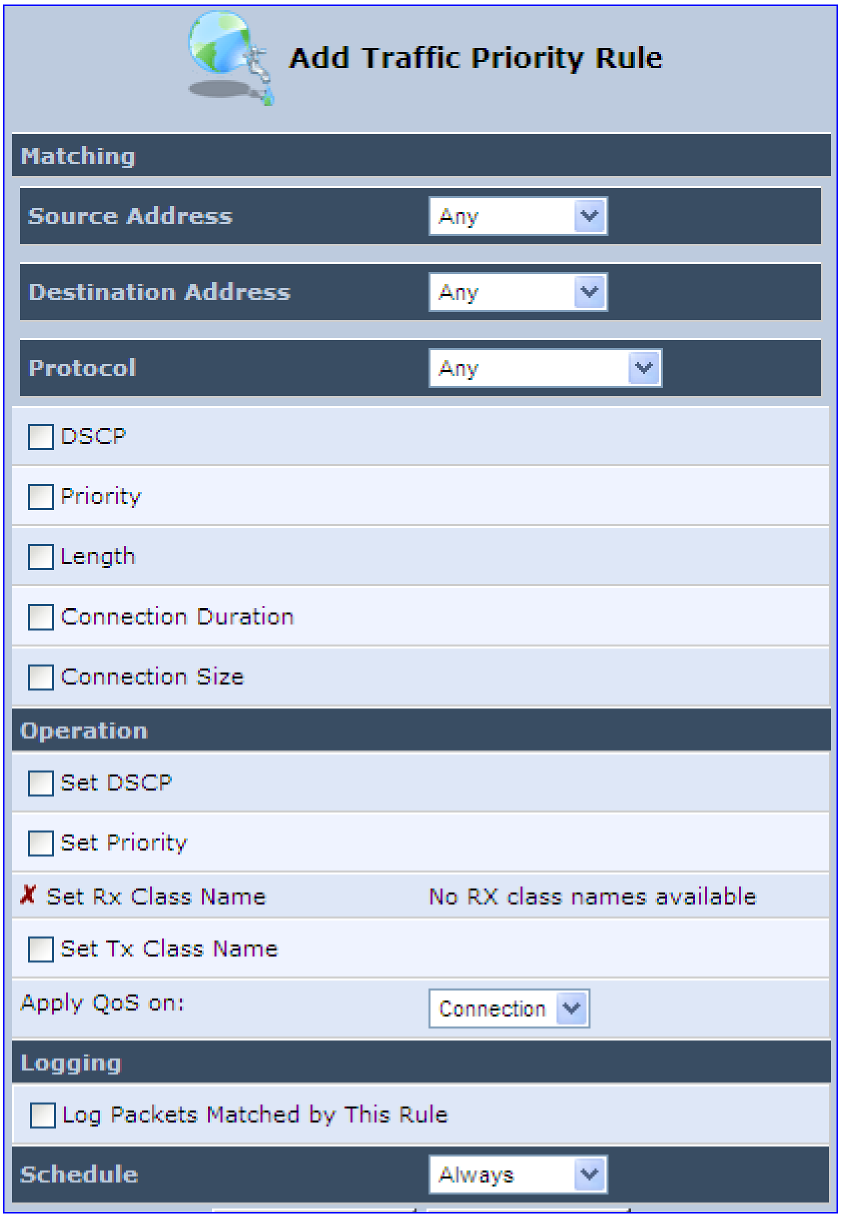
QoS Output Rules

Rule ID	Source Address	Destination Address	Match	Operation	Status	Action
All Devices						New Entry
WAN Ethernet Rules						New Entry
LAN Hardware Ethernet Switch Rules						New Entry
LAN Bridge Rules						New Entry
LAN Ethernet Rules						New Entry
LAN Wireless 802.11n Access Point Rules						New Entry
Serial PPP Rules						New Entry

This screen is divided into two identical groups - ’QoS Input Rules’ and ’QoS Output Rules’ - for prioritizing inbound and outbound traffic respectively. Each group lists all the devices on which rules can be set. You can set rules on all devices at once by clicking the **New Entry** link corresponding to 'All Devices'

2. After clicking the appropriate **New Entry** link, the 'Add Traffic Priority Rule' screen appears.

Figure 11-8: Add Traffic Priority Rule Screen



Add Traffic Priority Rule

Matching

Source Address: Any

Destination Address: Any

Protocol: Any

□ DSCP

□ Priority

□ Length

□ Connection Duration

□ Connection Size

Operation

□ Set DSCP

□ Set Priority

✗ Set Rx Class Name — No RX class names available

□ Set Tx Class Name

Apply QoS on: Connection

Logging

□ Log Packets Matched by This Rule

Schedule: Always

3. Under the **Matching** group, configure the matching characteristics:
   a. From the ‘Source Address’ drop-down list, select 'Any', 'User Defined' or the host as the source address of the packets sent to or received from the network object. If you have created network objects (see Section 4.5.2 on page 50), then these are also displayed in the list (or you can create one by selecting ‘User Defined’).
   b. From the ‘Destination Address’ drop-down list, select the network object for the destination address of the packets sent to or received from the network object. See Step 3 above for a detailed explanation on the options.
   c. From the ‘Protocol’ drop-down list, select the protocol. You can apply the rule to all protocols (i.e., ‘Any’) or select an already defined protocol. You can create a new protocol by selecting ‘User Defined’, and then following the procedure described in Section 4.5.3 on page 51.
   d. To match DSCP, select the ‘DSCP’ check box, and then enter the DSCP markings.
   e. To match priority, select the ‘Priority’ check box, and then select the priority of the packets.

   f. To match the Device, select the ‘Device’ check box, and then select the Device interface.
   g. To match packet or data length, select the ‘Length’ check box, and then enter the data or packet length.
   h. To match connection duration, select the ‘Connection Duration’ check box, and then enter the duration of the connection (greater or less than).
   i. To match connection size, select the ‘Connection Size’ check box, and then enter the connection size.

4. Under the **Operation** group, configure the QoS operation:
   a. Select the ‘Set DSCP’ check box to mark a DSCP value on packets matching this rule and then enter the hexadecimal value of the DSCP.
   b. Select the ‘Set Priority’ check box to add a priority to the rule and then select the priority level (where 0 is the lowest and 7 the highest). This sets the priority of a packet on the connection matching the rule, while routing the packet.
   c. Select the ‘Tx Class Name’ check box, and then select the class name that you defined.
   d. From the ‘Apply QoS on’ drop-down list, select whether you want to apply the QoS rule on the connection or on the packet.
5. Select the ‘Log Packets Matched by This Rule’ check box to log the first packet from a connection that matches by this rule.
6. From the ‘Schedule’ drop-down list, select the time segments during which the rule may be active. By default, the rule is always active (i.e., ‘Always’). If you have defined Scheduler rules (see Section 4.5.1 on page 47), then these are also displayed as options. To define a new one Scheduler rule, select ‘User Defined’.
7. Click **OK** to save the settings.

11.4 DSCP Mapping

To understand Differentiated Services Code Point (DSCP), one must first be familiarized with the Differentiated Services (DiffServ) model. DiffServ is a Class of Service (CoS) model that enhances best-effort Internet services by differentiating traffic by users, service requirements and other criteria. Packets are specifically marked, allowing network nodes to provide different levels of service, as appropriate for voice calls, video playback or other delay-sensitive applications, via priority queuing or bandwidth allocation, or by choosing dedicated routes for specific traffic flows.

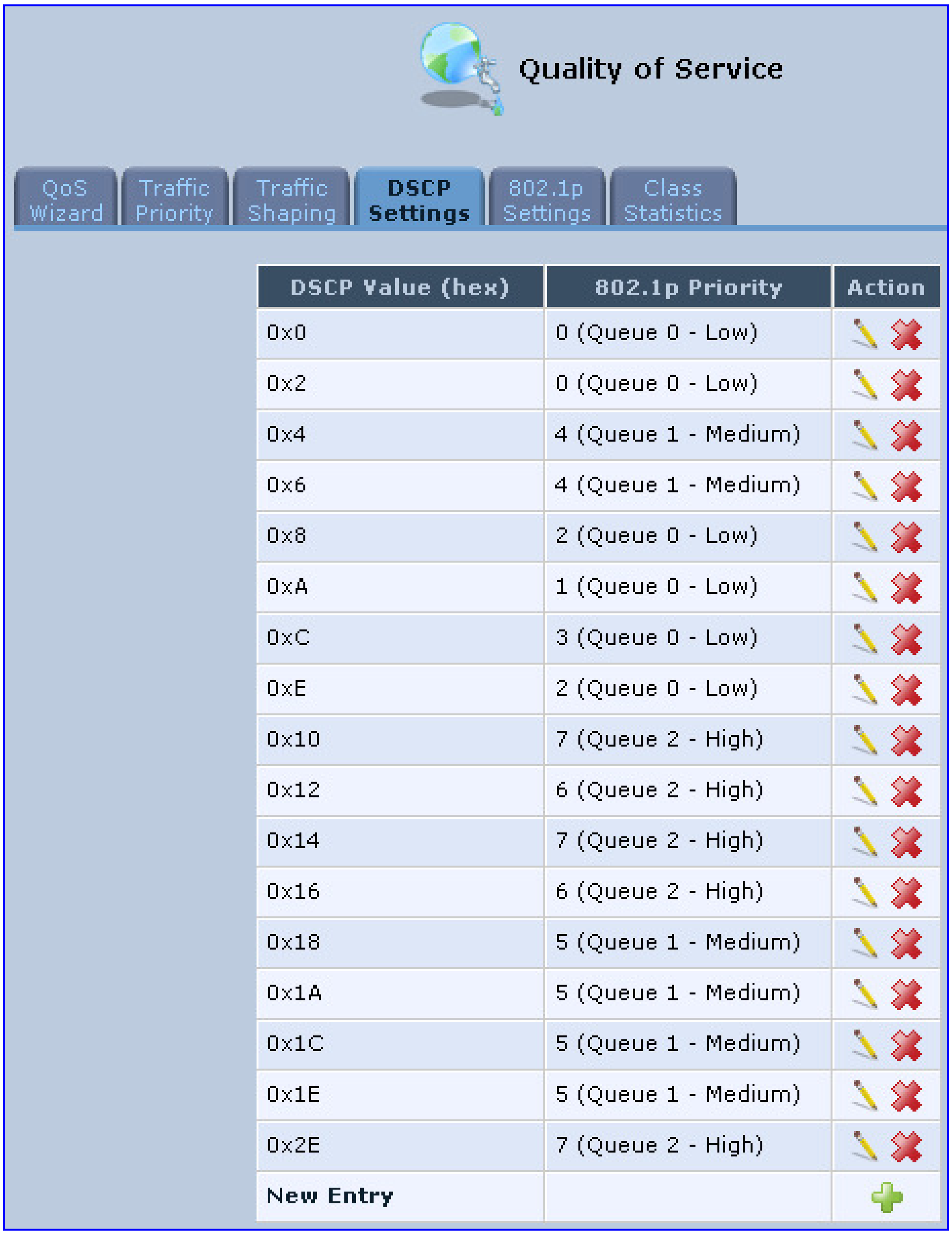
DiffServ defines a field in IP packet headers referred to as DSCP. Hosts or routers passing traffic to a DiffServ-enabled network typically mark each transmitted packet with an appropriate DSCP. The DSCP markings are used by DiffServ network routers to appropriately classify packets and to apply particular queue handling or scheduling behavior.

MP252 provides a table of predefined DSCP values, which are mapped to 802.1p priority marking method. You can edit or delete any of the existing DSCP setting, as well as add new entries.

➢ To view and set DSCP rules:

1. From the menu bar, click the **QoS** menu link, and then click the **DSCP Settings** tab; the following screen appears:

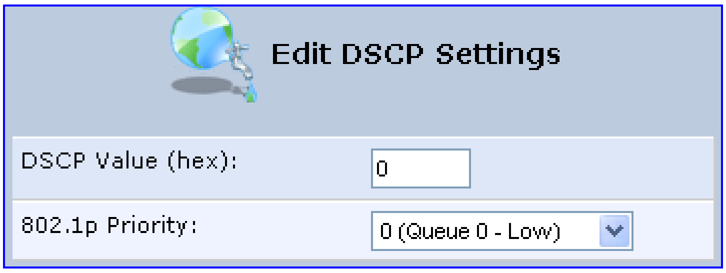
Figure 11-9: DSCP Settings Screen



DSCP Value (hex)	802.1p Priority	Action
0x0	0 (Queue 0 - Low)	✎ ✖
0x2	0 (Queue 0 - Low)	✎ ✖
0x4	4 (Queue 1 - Medium)	✎ ✖
0x6	4 (Queue 1 - Medium)	✎ ✖
0x8	2 (Queue 0 - Low)	✎ ✖
0xA	1 (Queue 0 - Low)	✎ ✖
0xC	3 (Queue 0 - Low)	✎ ✖
0xE	2 (Queue 0 - Low)	✎ ✖
0x10	7 (Queue 2 - High)	✎ ✖
0x12	6 (Queue 2 - High)	✎ ✖
0x14	7 (Queue 2 - High)	✎ ✖
0x16	6 (Queue 2 - High)	✎ ✖
0x18	5 (Queue 1 - Medium)	✎ ✖
0x1A	5 (Queue 1 - Medium)	✎ ✖
0x1C	5 (Queue 1 - Medium)	✎ ✖
0x1E	5 (Queue 1 - Medium)	✎ ✖
0x2E	7 (Queue 2 - High)	✎ ✖
New Entry		✚

2. To edit an existing entry, click its corresponding **Edit** ✎ icon. To add a new entry, click the **New** ✚ icon. In both cases, the 'Edit DSCP Settings' screen appears:

Figure 11-10: Edit DSCP Settings



Edit DSCP Settings

DSCP Value (hex):	0
802.1p Priority:	0 (Queue 0 - Low)

3. In the 'DSCP Value (hex)' field, enter a hexadecimal number for the DSCP value.
4. In the '802.1p Priority' drop-down list, select an 802.1p priority level (each priority level is mapped to low, medium, or high priority).
5. Click **OK** to save your settings.

Note: The DSCP value overriding the priority of incoming packets with an unassigned value (priority 0, assumed to be a no-priority-set) is '0x0'. By default, this value is mapped to 802.1p priority level '0 -Low', which means that such packets receive the lowest priority.

11.5 802.1p Mapping

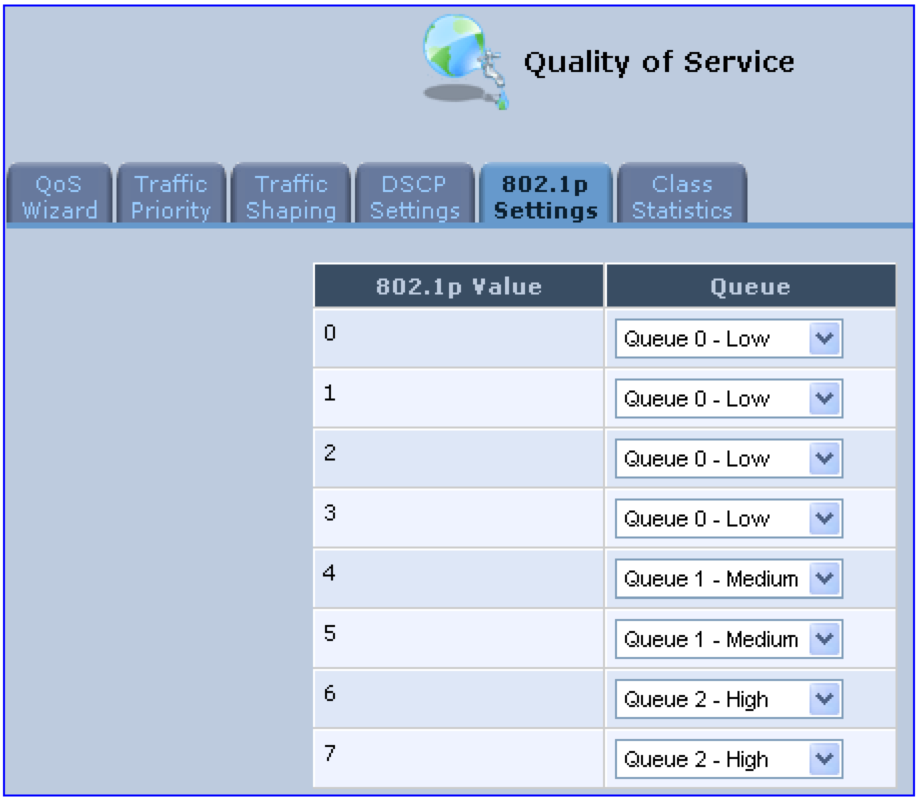
The IEEE 802.1p priority marking method is a standard for prioritizing network traffic at the data link/MAC sub-layer. 802.1p traffic is simply classified and sent to the destination, with no bandwidth reservations established.

The 802.1p header includes a 3-bit prioritization field, which allows packets to be grouped into eight levels of priority. MP252 maps these eight levels to three main priorities: high, medium and low. By default, values six and seven are mapped to high priority, which may be assigned to network-critical traffic. Values four and five are mapped to medium priority, which may be applied to delay-sensitive applications, such as interactive video and voice. Values three to zero are mapped to low priority, which may range from controlled-load applications down to ‘loss eligible’ traffic. The zero value is normally used for best-effort traffic. It is the default value for traffic with unassigned priority.

➢ To set 802.1p rules:

1. From the menu bar, click the **QoS** menu link, and then click the **802.1p Settings** tab; the following screen appears:

Figure 11-11: 802.1p Settings Screen



802.1p Value	Queue
0	Queue 0 - Low
1	Queue 0 - Low
2	Queue 0 - Low
3	Queue 0 - Low
4	Queue 1 - Medium
5	Queue 1 - Medium
6	Queue 2 - High
7	Queue 2 - High

2. The eight 802.1p values are pre-configured with the three priority levels: high, medium and low. You can change these levels for each of the eight values in their respective drop-down list.
3. Click **OK** to save the settings.

11.6 Class Statistics

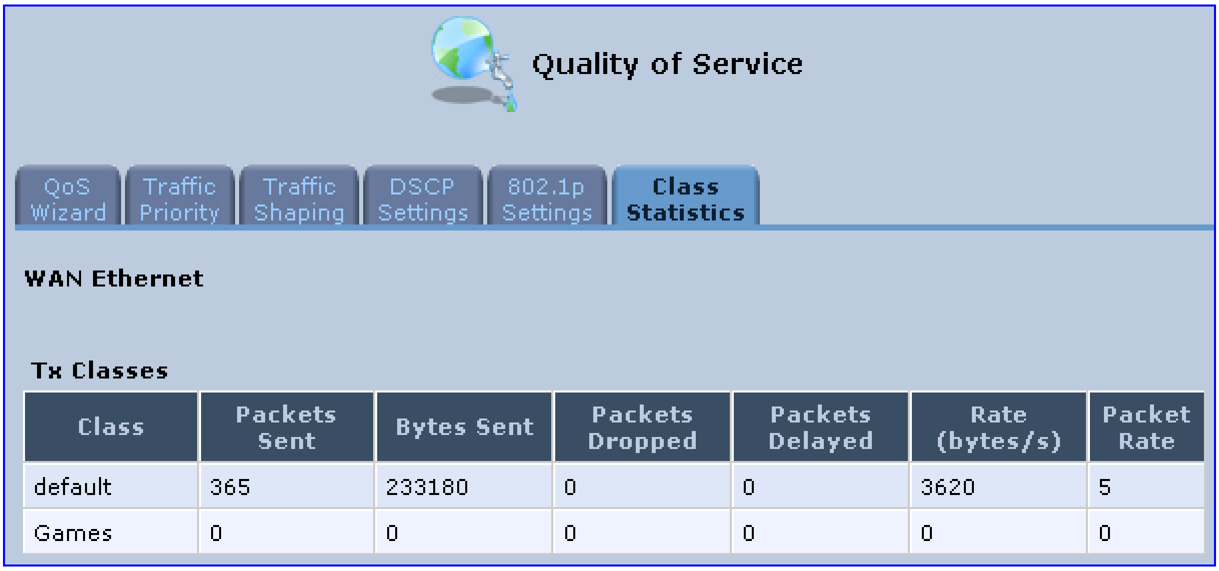
MP252 provides accurate, real-time information on the traffic passing through your defined device classes. For example, the amount of packets sent, dropped, or delayed are just a few of the parameters that you can monitor per each shaping class.

Note: Class statistics are available only if you have defined at least one class (otherwise no information is displayed).

➢ To view your class statistics:

- From the menu bar, click the **QoS** menu link, and then click the **Class Statistics** tab; the following screen appears:

Figure 11-12: Class Statistics Screen



WAN Ethernet

Tx Classes

Class	Packets Sent	Bytes Sent	Packets Dropped	Packets Delayed	Rate (bytes/s)	Packet Rate
default	365	233180	0	0	3620	5
Games	0	0	0	0	0	0

11.7 Configuring Basic VoIP QoS

The 'Traffic Shaping' feature only ensures priority to calls that originate from *inside* MP252. When giving VoIP priority over data, the bottleneck is effectively moved from the Cable / ADSL modem into MP252. To give priority to calls from the LAN, you must define a traffic priority rule (for SIP and RTP from the device on the LAN).

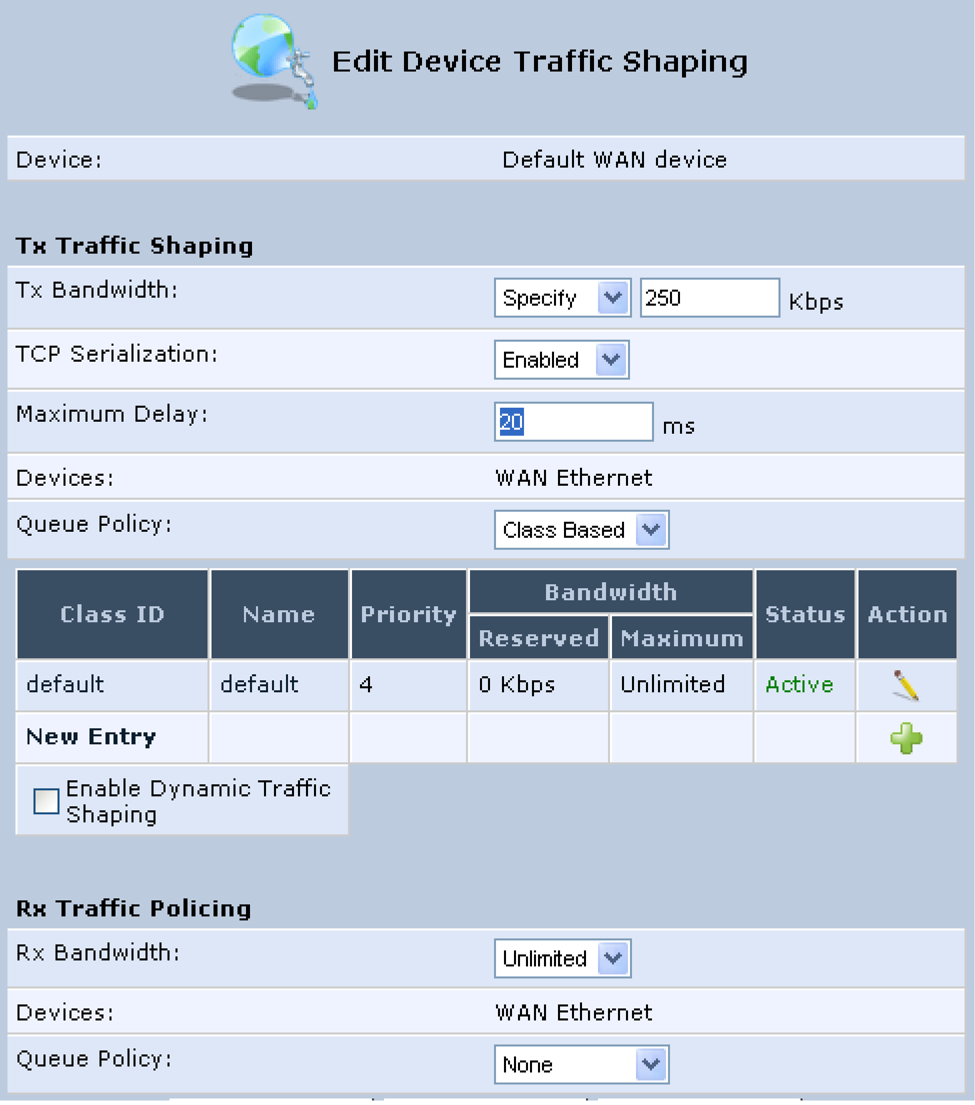
This section recommends a minimal QoS configuration that ensures sufficient QoS for VoIP calls when MP252 is connected behind a broadband (cable or DSL) modem with limited uplink bandwidth and the user runs bandwidth-consuming applications on the PC.

Since most modems do not have any priority mechanisms, the Tx bandwidth of MP252 should be limited according to the modem’s uplink bandwidth. Since MP252 automatically gives higher priority to VoIP packets (in its internal queues), it is not necessary to define traffic shaping classes.

➢ To configure basic QoS for VoIP:

1. From the menu bar, click the **QoS** menu link, and then click the **Traffic Shaping** tab; the ‘Traffic Shaping’ screen appears.
2. Click the **New** ✚ icon; the screen 'Add Device Traffic Shaping' appears.
3. From the 'Device' drop-down list, select 'Default WAN Device' (or your PPTP/L2TP connection you have created), and then click **OK**; the 'Edit Device Traffic Shaping' screen appears.
4. Limit the Tx bandwidth (in the 'Tx Bandwidth' field) according to your modem’s uplink bandwidth.
5. To prevent jitter in outgoing RTP packets, from the 'TCP Serialization' drop-down list, select 'Enabled', and then in the 'Maximum Delay' field, define the maximum allowed delay (e.g. 20 milliseconds). This causes long TCP packets to be fragmented when there is an active voice call.

Figure 11-13: Edit Device Traffic Shaping



Edit Device Traffic Shaping

Device: Default WAN device

Tx Traffic Shaping

Tx Bandwidth:	Specify 250 Kbps
TCP Serialization:	Enabled
Maximum Delay:	20 ms
Devices:	WAN Ethernet
Queue Policy:	Class Based

Class ID	Name	Priority	Bandwidth		Status	Action
			Reserved	Maximum		
default	default	4	0 Kbps	Unlimited	Active	✎
New Entry						✚

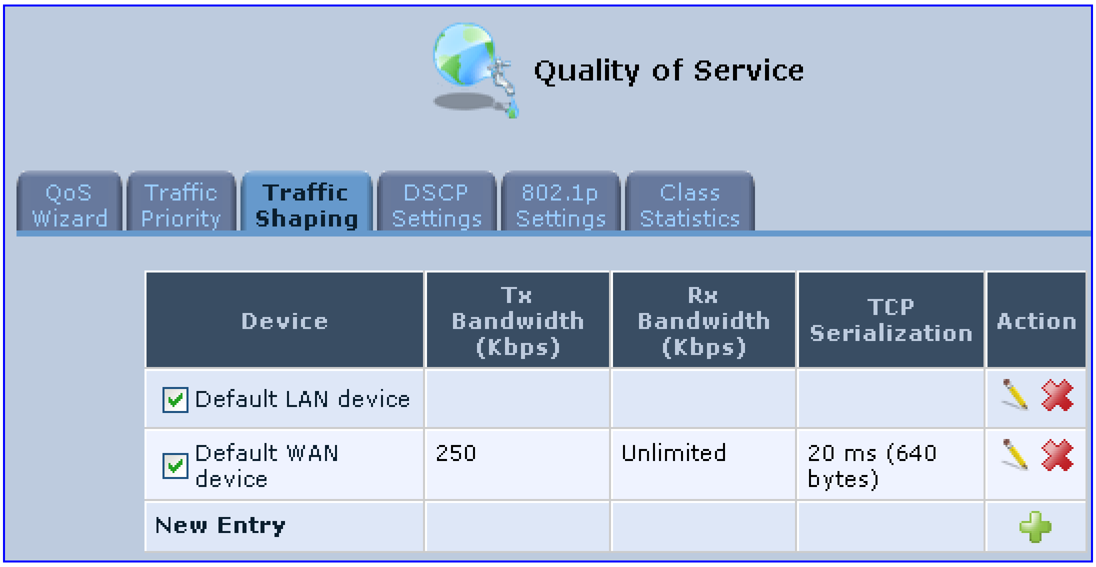
□ Enable Dynamic Traffic Shaping

Rx Traffic Policing

Rx Bandwidth:	Unlimited
Devices:	WAN Ethernet
Queue Policy:	None

6. Click **OK** to apply the new definition.

Figure 11-14: QoS - Edit Device Traffic Shaping - Submitting the Configuration



Device	Tx Bandwidth (Kbps)	Rx Bandwidth (Kbps)	TCP Serialization	Action
☑ Default LAN device				
☑ Default WAN device	250	Unlimited	20 ms (640 bytes)	
New Entry				

7. Click **OK** again.

12 Network Connections

This chapter provides a detailed description on how to configure the following network connections:

- WAN – see Section 12.1 on page 131
- LAN – see Section 12.2 on page 151
- VLANs – see Section 12.4 on page 181
- LAN-WAN Bridging – see Section 12.5 on page 188

12.1 Configuring a WAN Connection

This section describes how to configure your WAN Internet (WAN Ethernet or WAN DSL) connection.

The WAN connection is configured in the 'Network Connections' screen, which provides a connection wizard that guides you through the network configuration stages.

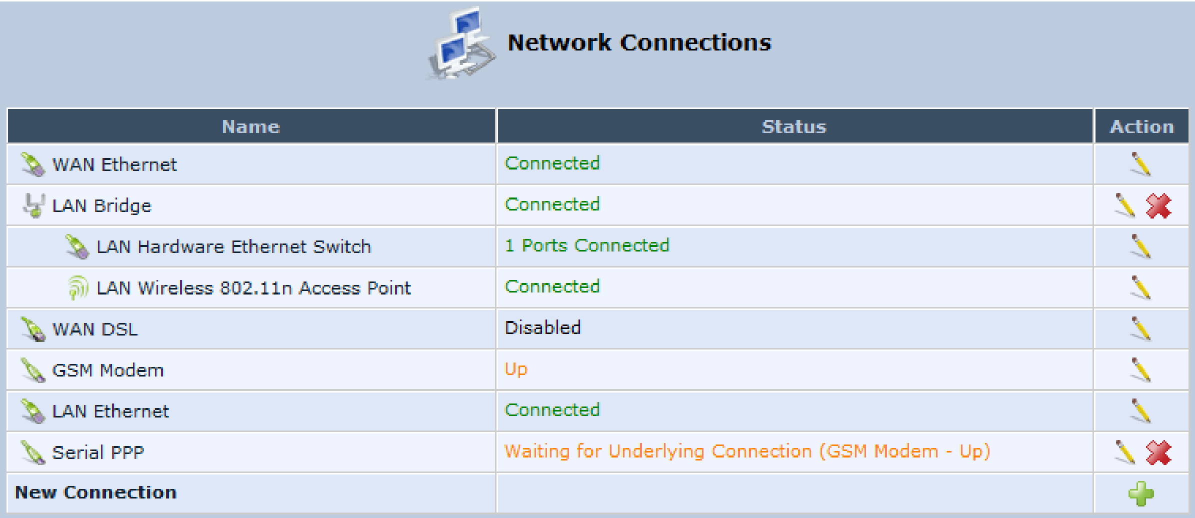
Notes:

- To quickly configure a basic WAN connection, use the 'Quick Setup' screen, as described in Section 7.1 on page 63.
- Before configuring the MP252 Internet connection, ensure that you have obtained relevant technical information on the Internet connection type from your Internet Telephony Service Provider (ITSP). For example, whether you are connected to the Internet using a static or dynamic IP address, or what protocols such as PPTP or PPPoE are used to communicate over the Internet.
- MP252 automatically detects the physical WAN type (i.e., Ethernet or ADSL). To change the WAN type, you must restore MP252 to factory settings (see Section 18.8).
- When connected to ADSL, the **LAN4**/**WAN** Ethernet port can be used for Ethernet LAN interface.
- When connected to an external modem through the Ethernet **LAN4**/**WAN** port and MP252 obtains an IP address, the ADSL interface is disabled.
- If the Automatic Dialer feature is shipped preconfigured (i.e., enabled), then MP252 automatically detects the Internet dialer type and therefore, Internet connection configuration is unnecessary. However, it is recommended to manually configure the Internet connection **after** the Automatic Dialer process has completed (successfully or not). For more information on the Automatic Dialer feature, see Section 7.2 on page 72.

➢ To start the Connection Wizard:

1. From the menu bar, click the **Network Connections** menu; the 'Network Connections' screen appears.

Figure 12-1: Network Connections Screen

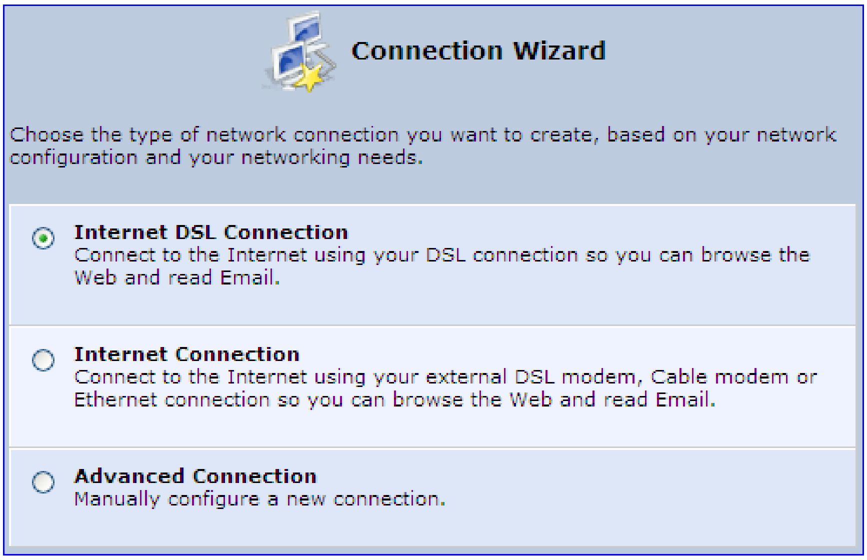


Network Connections

Name	Status	Action
WAN Ethernet	Connected	✎
LAN Bridge	Connected	✎ ✖
LAN Hardware Ethernet Switch	1 Ports Connected	✎
LAN Wireless 802.11n Access Point	Connected	✎
WAN DSL	Disabled	✎
GSM Modem	Up	✎
LAN Ethernet	Connected	✎
Serial PPP	Waiting for Underlying Connection (GSM Modem - Up)	✎ ✖
New Connection		✚

1. Click the **New** ✚ icon; the ‘Connection Wizard’ screen appears:

Figure 12-2: Connection Wizard Screen



Connection Wizard

Choose the type of network connection you want to create, based on your network configuration and your networking needs.

● **Internet DSL Connection**
Connect to the Internet using your DSL connection so you can browse the Web and read Email.

○ **Internet Connection**
Connect to the Internet using your external DSL modem, Cable modem or Ethernet connection so you can browse the Web and read Email.

○ **Advanced Connection**
Manually configure a new connection.

2. Select the required network connection group:
   - **Internet DSL Connection:** configures an Internet connection when using the MP252 integrated DSL modem (see Section 12.1.1 on page 133)
   - **Internet Connection:** configures an Internet connection when using an external DSL modem, Cable modem or Ethernet connection modem (see Section 12.1.2 on page 143)
   - **Advanced Connection:** configures the WAN connection types as well as network bridging and VLANs

Notes:

- For configuring VLANS, see Section 12.4 on page 181.
- For configuring network bridging, see Section 12.5 on page 188.

12.1.1 WAN DSL Connections

You can configure the following WAN DSL connection types:

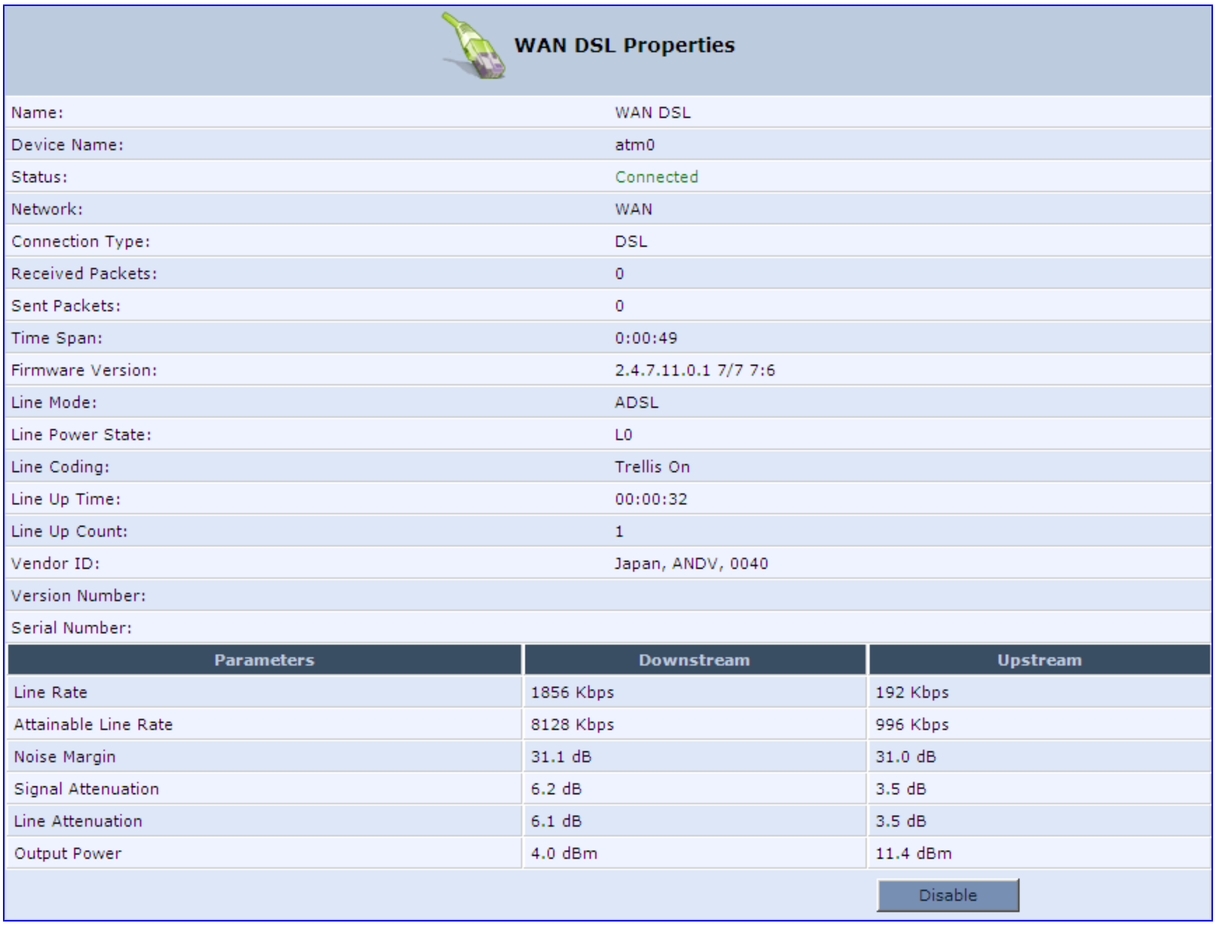
- Determine Protocol Type Automatically (PVC scan) – see Section 12.1.1.1 on page 133
- Point-to-Point Protocol over Ethernet (PPPoE) – see Section 12.1.1.2 on page 134
- Point-to-Point Protocol over ATM (PPPoA) – see Section 12.1.1.3 on page 136
- Routed Ethernet Connection over ATM (Routed ETHoA) – see Section 12.1.1.4 on page 138
- LAN-WAN Bridged Ethernet Connection over ATM (Bridged ETHoA) – see Section 12.1.1.4 on page 138
- Classical IP over ATM (CLIP) – see Section 12.1.1.5 on page 140
- Routed IP over ATM (IPoA) – see Section 12.1.1.6 on page 142

If you have established a WAN DSL connection, you can view the properties of this connection as described below.

➢ To view the WAN DSL properties:

- In the 'Network Connections' screen, click the **Edit** ✎ icon corresponding to the **WAN DSL** network connection; the 'WAN DSL Properties' screen appears:

Figure 12-3: WAN DSL Properties Screen



WAN DSL Properties

Name:	WAN DSL
Device Name:	atm0
Status:	Connected
Network:	WAN
Connection Type:	DSL
Received Packets:	0
Sent Packets:	0
Time Span:	0:00:49
Firmware Version:	2.4.7.11.0.1 7/7 7:6
Line Mode:	ADSL
Line Power State:	L0
Line Coding:	Trellis On
Line Up Time:	00:00:32
Line Up Count:	1
Vendor ID:	Japan, ANDV, 0040
Version Number:	
Serial Number:	

Parameters	Downstream	Upstream
Line Rate	1856 Kbps	192 Kbps
Attainable Line Rate	8128 Kbps	996 Kbps
Noise Margin	31.1 dB	31.0 dB
Signal Attenuation	6.2 dB	3.5 dB
Line Attenuation	6.1 dB	3.5 dB
Output Power	4.0 dBm	11.4 dBm

12.1.1.1 Determine Protocol Type Automatically (PVC Scan)

The Determine Protocol Type Automatically (PVC Scan) connection type automatically scans for a VPI/VCI pair, necessary when connecting to DSL. If such a pair is not found, your service provider should supply you with one.

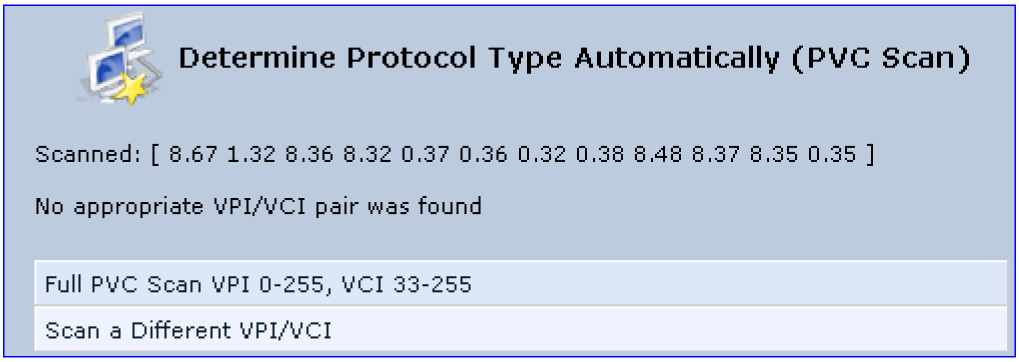
➢ To automatically scan for a VPI / VCI pair:

1. In the 'Network Connections' screen, click the **New** ✚ icon; the 'Connection Wizard' screen appears.
2. Select the **Internet DSL Connection** option, and then click **Next**; the 'Internet DSL Connection' screen appears.

> **Note:** You can also create a PVC connection using the **Advanced Connection** option.

3. Select the **Determine Protocol Type Automatically (PVC Scan)** option, and then click **Next**; the scan begins, refreshing the screen every few seconds to display the progress.

Figure 12-4: Determine Protocol Type Automatically (PVC Scan) Screen



Determine Protocol Type Automatically (PVC Scan)

Scanned: [8.67 1.32 8.36 8.32 0.37 0.36 0.32 0.38 8.48 8.37 8.35 0.35]

No appropriate VPI/VCI pair was found

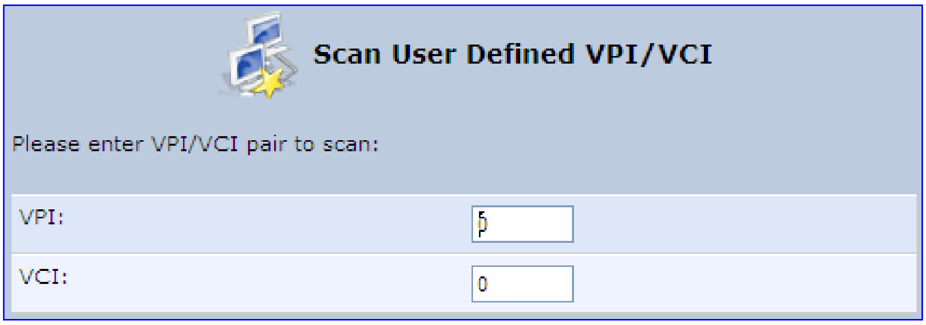
Full PVC Scan VPI 0-255, VCI 33-255

Scan a Different VPI/VCI

You can click the following links:

- **Full PVC Scan VPI 0-255, VCI 33-255:** initiates a longer, more thorough scan, between VPI 0-255 and VCI 33-255.
- **Scan a Different VPI/VCI:** scans for specific VPI/VCI pair. The 'Scan User Defined VPI/VCI' screen appears (as shown below). Enter the VPI/VCI pair you wish to scan and then click **OK**.

Figure 12-5: Scan User Defined VPI/VCI Screen



Scan User Defined VPI/VCI

Please enter VPI/VCI pair to scan:

VPI: 5

VCI: 0

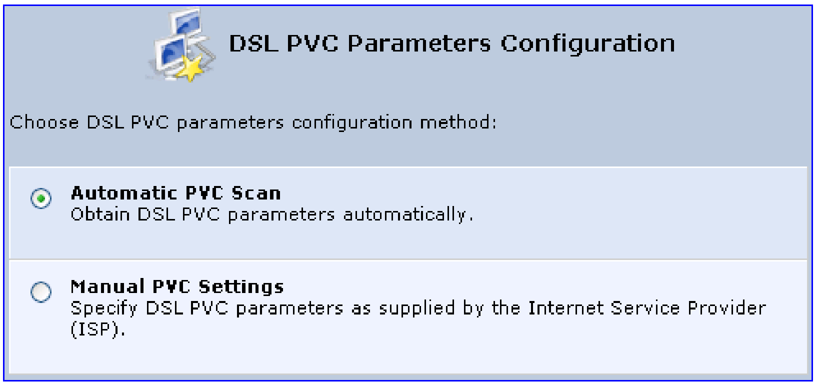
12.1.1.2 PPPoE

PPPoE relies on two widely accepted standards, PPP and Ethernet. PPPoE enables your home network PCs that communicate on an Ethernet System network to exchange information with PCs on the Internet. PPPoE supports the protocol layers and authentication widely used in PPP and enables a point-to-point connection to be established in the normally multipoint architecture of Ethernet. A discovery process in PPPoE determines the Ethernet MAC address of the remote device to establish a session.

➢ To create a PPPoE connection:

1. In the 'Network Connections' screen, click the **New** ✚ icon; the 'Connection Wizard' screen appears.
2. Select the **Internet DSL Connection** option, and then click **Next**; the 'Internet DSL Connection' screen appears.
3. Select the **Point-to-Point Protocol over Ethernet (PPPoE)** option, and then click **Next**; the 'DSL PVC Parameters Configuration' screen appears.

Figure 12-6: DSL PVC Parameters Configuration Screen



DSL PVC Parameters Configuration

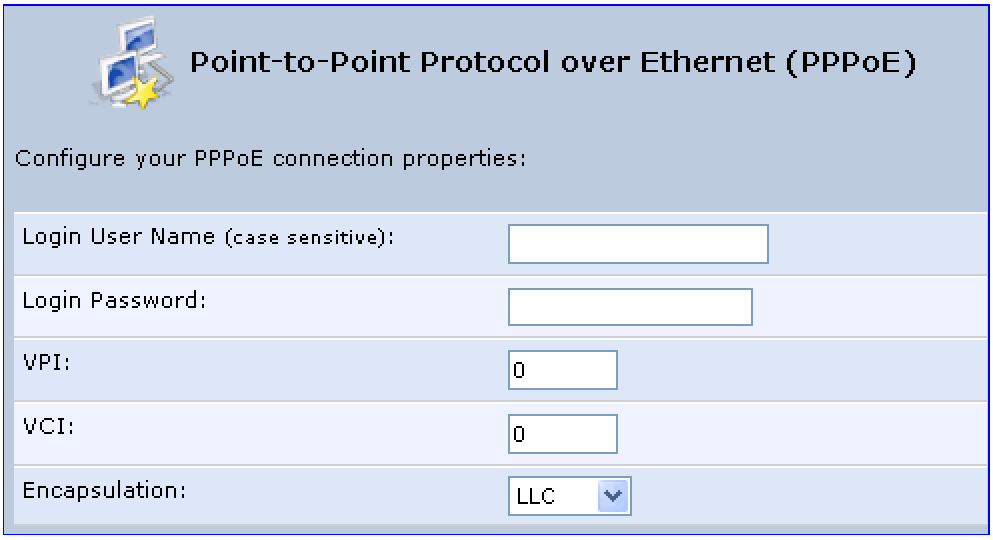
Choose DSL PVC parameters configuration method:

● **Automatic PVC Scan**
Obtain DSL PVC parameters automatically.

○ **Manual PVC Settings**
Specify DSL PVC parameters as supplied by the Internet Service Provider (ISP).

4. Select one of the following options:
   - **Automatic PVC Scan:** If you want to obtain the DSL PVC parameters automatically
   - **Manual PVC Settings:** If you do not want to obtain the DSL PVC parameters automatically
5. Click **Next**; the 'Point-to-Point Protocol over Ethernet (PPPoE)' screen appears.

Figure 12-7: Point-to-Point Protocol over Ethernet (PPPoE) Screen



Point-to-Point Protocol over Ethernet (PPPoE)

Configure your PPPoE connection properties:

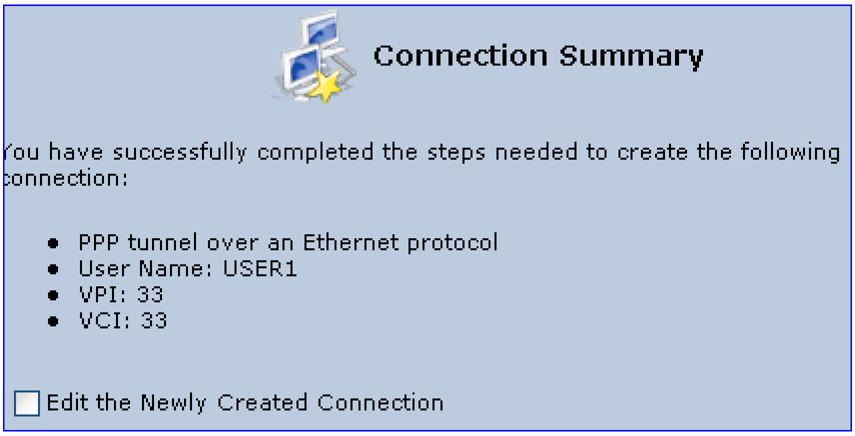
Login User Name (case sensitive):	
Login Password:	
VPI:	0
VCI:	0
Encapsulation:	LLC

6. Enter your PPPoE login username and password (provided by your ITSP).
7. If you selected the **Manual PVC Settings** option in the previous step, you also need to configure the following:
   - VPI and VCI pair of identifiers.
   - Encapsulation method - LLC, VCMux, or VCMux HDLC.

Asynchronous Transfer Mode (ATM) is a network technology based on transferring data in cells or packets of a fixed size. The cell used with ATM is relatively small compared to units used with other technologies. The small, constant cell size allows the transmission of video, audio, and computer data, assuring that no single type of data consumes the connection. ATM addressing consists of two identifiers that identify the virtual path (VPI) and the virtual connection (VCI). A virtual path consists of multiple virtual channels to the same endpoint.

8. Click **Next**; the 'Connection Summary' screen appears:

Figure 12-8: Connection Summary Screen



Connection Summary

You have successfully completed the steps needed to create the following connection:

- PPP tunnel over an Ethernet protocol
- User Name: USER1
- VPI: 33
- VCI: 33

□ Edit the Newly Created Connection

9. Select the 'Edit the Newly Created Connection' check box if you want to perform additional configurations after clicking **Finish**.
10. Click **Finish** to save the settings; the new PPPoE connection is added to the ‘Network Connections’ screen.

12.1.1.3 PPPoA

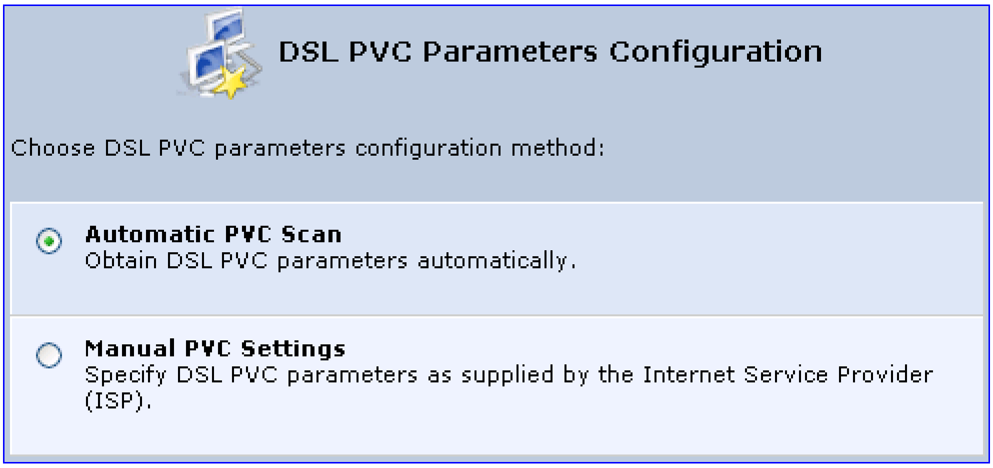
PPPoA is a standard for incorporating the popular PPP protocol into a DSL connection that uses ATM as its networking protocol. From the PC, IP packets travel over an Ethernet connection to the MP252, which encapsulates the PPP protocol to the IP packets and transports them to the service provider's DSLAM over ATM.

➢ **To create a PPPoA connection:**

1. In the 'Network Connections' screen, click the **New** ✚ icon; the 'Connection Wizard' screen appears.
2. Select the **Internet DSL Connection** option, and then click **Next**; the 'Internet DSL Connection' screen appears.

3. Select the **Point-to-Point Protocol over ATM (PPPoA)** option, and then click **Next**; the 'DSL PVC Parameters Configuration' screen appears.

Figure 12-9: DSL PVC Parameters Configuration Screen



DSL PVC Parameters Configuration

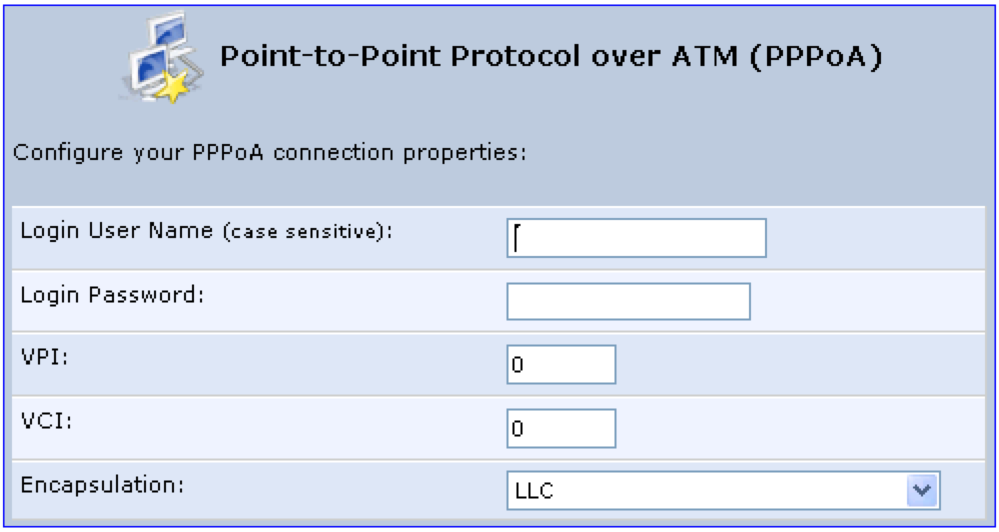
Choose DSL PVC parameters configuration method:

● **Automatic PVC Scan**
Obtain DSL PVC parameters automatically.

○ **Manual PVC Settings**
Specify DSL PVC parameters as supplied by the Internet Service Provider (ISP).

4. Select one of the following options:
   - **Automatic PVC Scan:** If you want to obtain the DSL PVC parameters automatically
   - **Manual PVC Settings:** If you do not want to obtain the DSL PVC parameters automatically
5. Click **Next**; the 'Point-to-Point Protocol over ATM (PPPoA)' screen appears.

Figure 12-10: Point-to-Point Protocol over ATM (PPPoA) Screen



Point-to-Point Protocol over ATM (PPPoA)

Configure your PPPoA connection properties:

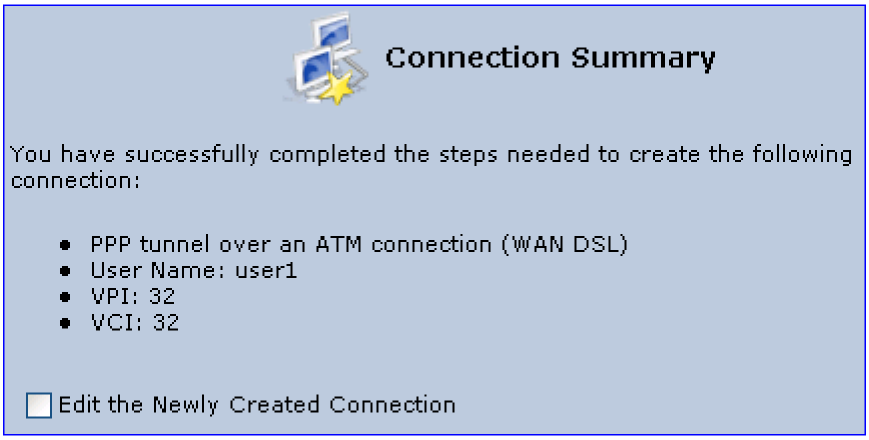
Login User Name (case sensitive):	
Login Password:	
VPI:	0
VCI:	0
Encapsulation:	LLC

6. Enter your PPPoA login username and password (provided by your ITSP).
7. If you selected the **Manual PVC Settings** option in the previous step, you also need to configure the following:
   - VPI and VCI pair of identifiers.
   - Encapsulation method - LLC, VCMux, or VCMux HDLC.

Asynchronous Transfer Mode (ATM) is a network technology based on transferring data in cells or packets of a fixed size. The cell used with ATM is relatively small compared to units used with other technologies. The small, constant cell size allows the transmission of video, audio, and computer data, assuring that no single type of data consumes the connection. ATM addressing consists of two identifiers that identify the virtual path (VPI) and the virtual connection (VCI). A virtual path consists of multiple virtual channels to the same endpoint.

8. Click **Next**; the 'Connection Summary' screen appears:

Figure 12-11: Connection Summary Screen



Connection Summary

You have successfully completed the steps needed to create the following connection:

- PPP tunnel over an ATM connection (WAN DSL)
- User Name: user1
- VPI: 32
- VCI: 32

□ Edit the Newly Created Connection

9. Select the 'Edit the Newly Created Connection' check box if you want to perform additional configurations after clicking **Finish**.
10. Click **Finish** to save the settings; the new PPPoA connection is added to the ‘Network Connections’ screen.

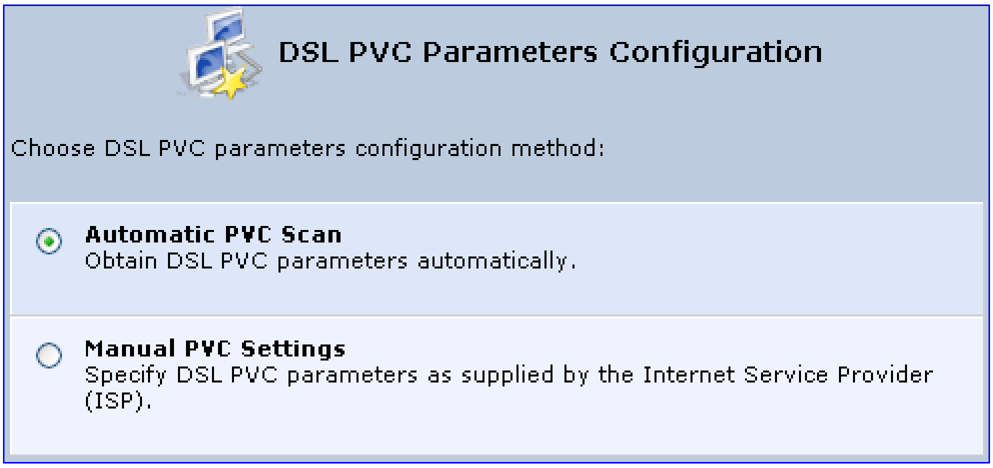
12.1.1.4 Routed ETHoA or Bridged ETHoA

The Ethernet over ATM (ETHoA) connection allows transport of Ethernet frames on DSL connections. When creating an ETHoA connection, it is bridged to the LAN. You must configure a dialup connection on the LAN computer with your ITSP’s user name and password.

➢ To create an ETHoA connection:

1. In the 'Network Connections' screen, click the **New** ✚ icon; the 'Connection Wizard' screen appears.
2. Select the **Internet DSL Connection** option, and then click **Next**; the 'Internet DSL Connection' screen appears.
3. Select one of the following options:
   - **Routed Ethernet Connection over ATM (Routed ETHoA):**
     a. Click **Next**; the 'DSL PVC Parameters Configuration' screen appears.

Figure 12-12: DSL PVC Parameters Configuration Screen



DSL PVC Parameters Configuration

Choose DSL PVC parameters configuration method:

● **Automatic PVC Scan**
Obtain DSL PVC parameters automatically.

○ **Manual PVC Settings**
Specify DSL PVC parameters as supplied by the Internet Service Provider (ISP).

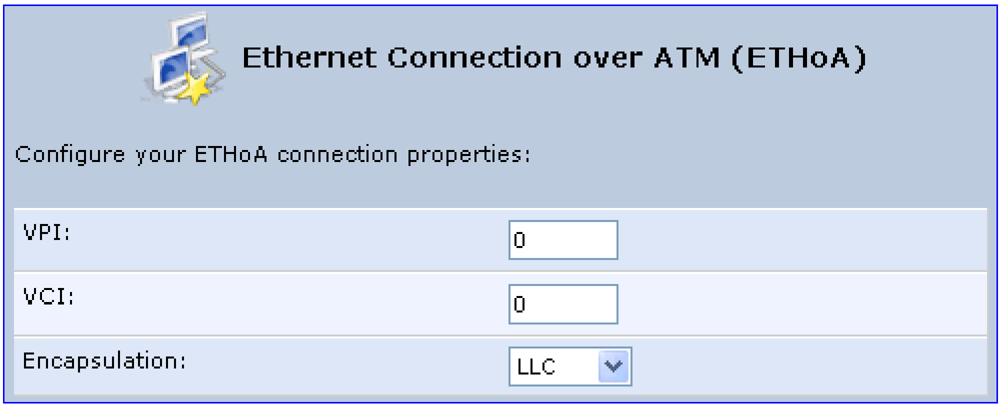
b. Select one of the following options:

- ✓ **Automatic PVC Scan:** If you want to obtain the DSL PVC parameters automatically
- ✓ **Manual PVC Settings:** If you do not want to obtain the DSL PVC parameters automatically

- **LAN-WAN Bridged Ethernet Connection over ATM (Bridged ETHoA):**

a. Click **Next**; the 'Ethernet Connection over ATM (ETHoA)' screen appears.

Figure 12-13: Ethernet Connection over ATM (ETHoA) Screen



Ethernet Connection over ATM (ETHoA)

Configure your ETHoA connection properties:

VPI:	0
VCI:	0
Encapsulation:	LLC

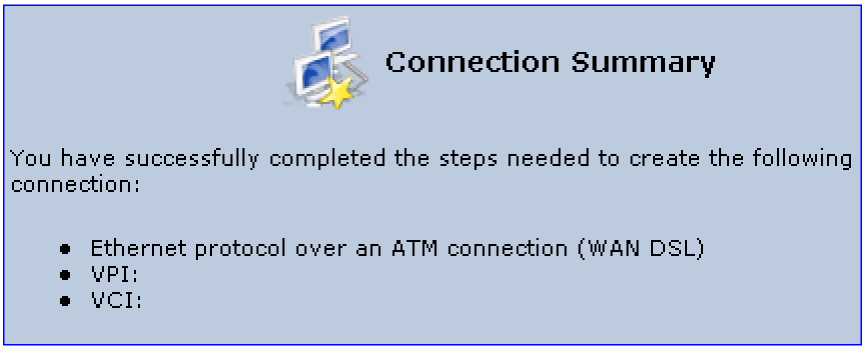
4. If you selected the **Manual PVC Settings** option, you also need to configure the following:

- VPI and VCI pair of identifiers.
- Encapsulation method - LLC, VCMux, or VCMux HDLC.

Asynchronous Transfer Mode (ATM) is a network technology based on transferring data in cells or packets of a fixed size. The cell used with ATM is relatively small compared to units used with other technologies. The small, constant cell size allows the transmission of video, audio, and computer data, assuring that no single type of data consumes the connection. ATM addressing consists of two identifiers that identify the virtual path (VPI) and the virtual connection (VCI). A virtual path consists of multiple virtual channels to the same endpoint..

5. Click **Next**; the 'Connection Summary' screen appears:

Figure 12-14: Connection Summary Screen



Connection Summary

You have successfully completed the steps needed to create the following connection:

- Ethernet protocol over an ATM connection (WAN DSL)
- VPI:
- VCI:

6. Select the 'Edit the Newly Created Connection' check box if you want to perform additional configurations after clicking **Finish**.
7. Click **Finish** to save the settings; the new ETHoA connection is added to the 'Network Connections' screen.

12.1.1.5 CLIP

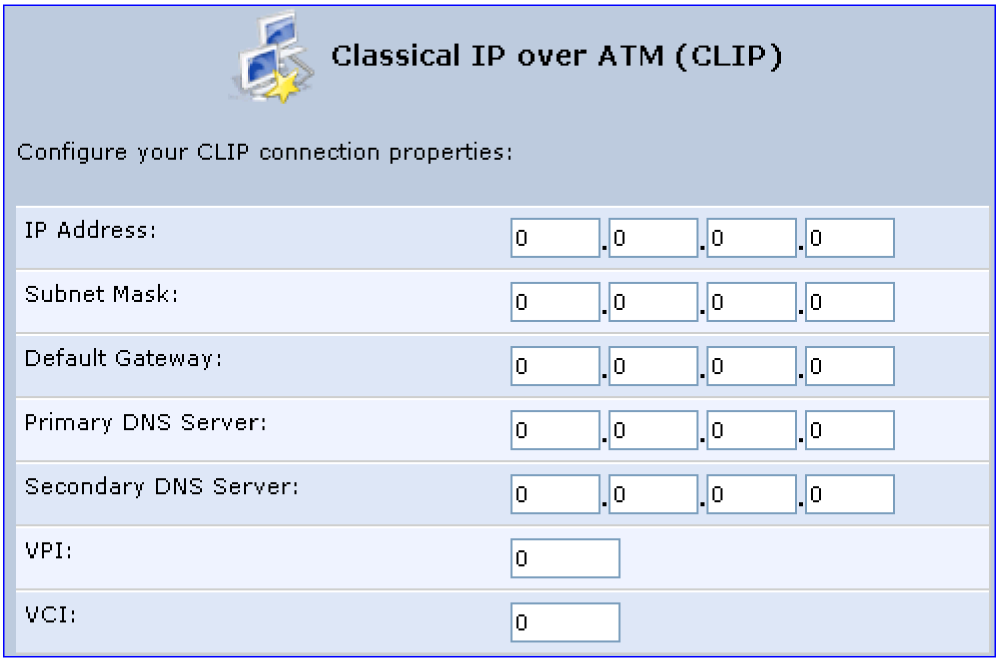
CLIP is a standard for transmitting IP traffic in an ATM network. IP protocols contain IP addresses that have to be converted into ATM addresses, and Classical IP performs this conversion, as long as the destination is within the same subnet. Classical IP does not support routing between networks. The Classical IP-enabled driver in the end station sends out an ARP request to a Classical IP-enabled ARP server, which returns the ATM address.

➢ To create a CLIP connection:

1. In the 'Network Connections' screen, click the **New** ➕ icon; the 'Connection Wizard' screen appears.
2. Select the **Internet DSL Connection** option, and then click **Next**; the 'Internet DSL Connection' screen appears.

3. Select the **Classical IP over ATM (CLIP)** option, and then click **Next**; the ‘Classical IP over ATM (CLIP)' screen appears.

Figure 12-15: Classical IP over ATM (CLIP) Screen



Classical IP over ATM (CLIP)

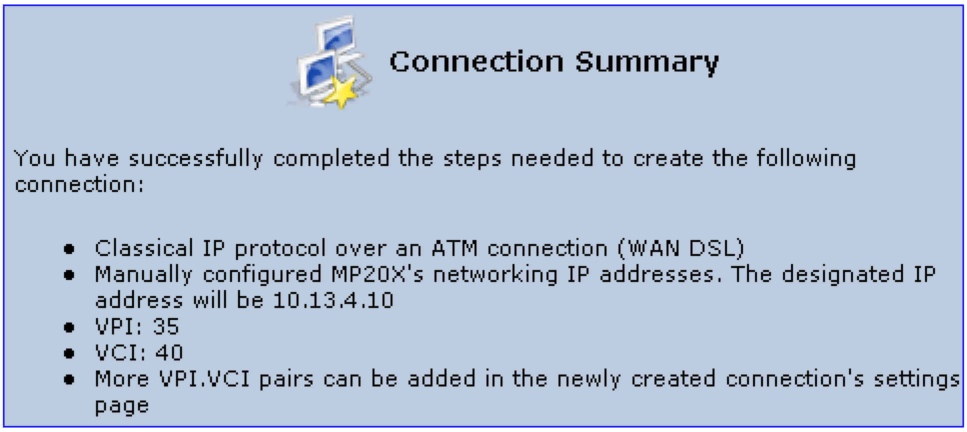
Configure your CLIP connection properties:

IP Address:	0 . 0 . 0 . 0
Subnet Mask:	0 . 0 . 0 . 0
Default Gateway:	0 . 0 . 0 . 0
Primary DNS Server:	0 . 0 . 0 . 0
Secondary DNS Server:	0 . 0 . 0 . 0
VPI:	0
VCI:	0

4. Enter the following information (provided by your ITSP):
   - IP Address
   - Subnet Mask
   - Default Gateway
   - Primary DNS Server
   - Secondary DNS Server
   - VPI and VCI pair of identifiers

5. Click **Next**; the 'Connection Summary' screen appears.

Figure 12-16: Connection Summary Screen



Connection Summary

You have successfully completed the steps needed to create the following connection:

- Classical IP protocol over an ATM connection (WAN DSL)
- Manually configured MP20X's networking IP addresses. The designated IP address will be 10.13.4.10
- VPI: 35
- VCI: 40
- More VPI.VCI pairs can be added in the newly created connection's settings page

6. Select the 'Edit the Newly Created Connection' check box if you want to perform additional configurations after clicking **Finish**.

7. Click **Finish** to save the settings; the new CLIP connection is added to the ‘Network Connections’ list.

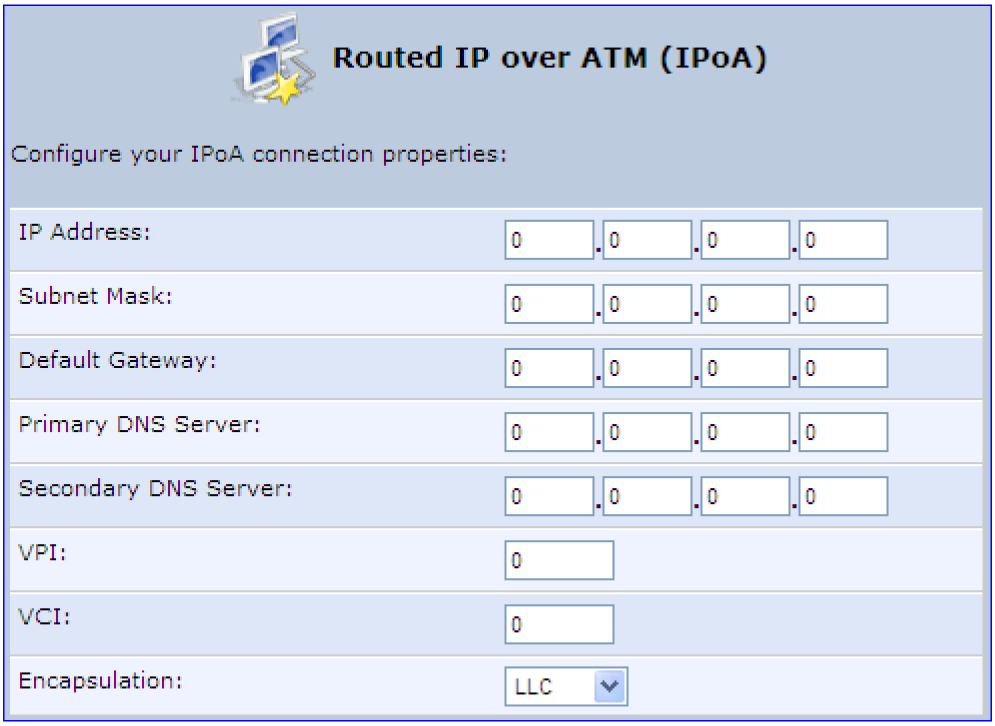
12.1.1.6 IPoA

Routed IP over ATM (IPoA) is a standard for transmitting IP traffic in an ATM network.

➢ **To create an IPoA connection:**

1. In the 'Network Connections' screen, click the **New** ✚ icon; the 'Connection Wizard' screen appears.
2. Select the **Advanced Connection** option, and then click **Next**; the 'Advanced Connection' screen appears.
3. Select the **Routed IP over ATM (IPoA)** option, and then click **Next**; the 'Routed IP over ATM (IPoA)' screen appears.

Figure 12-17: Routed IP over ATM (IPoA) Screen



Routed IP over ATM (IPoA)

Configure your IPoA connection properties:

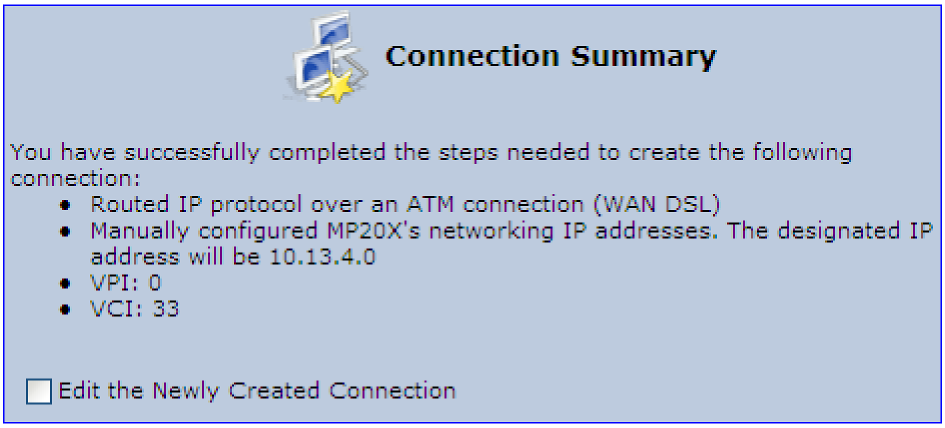
IP Address:	0 . 0 . 0 . 0
Subnet Mask:	0 . 0 . 0 . 0
Default Gateway:	0 . 0 . 0 . 0
Primary DNS Server:	0 . 0 . 0 . 0
Secondary DNS Server:	0 . 0 . 0 . 0
VPI:	0
VCI:	0
Encapsulation:	LLC

4. Enter the IP address and networking parameters.
5. Enter the following parameters:
   - VPI and VCI pair of identifiers.
   - Encapsulation method: LLC, VCMux, or VCMux HDLC.

   ATM is a network technology based on transferring data in cells or packets of a fixed size. The cell used with ATM is relatively small compared to units used with other technologies. The small, constant cell size allows the transmission of video, audio, and computer data, assuring that no single type of data consumes the connection. ATM addressing consists of two identifiers that identify the virtual path (VPI) and the virtual connection (VCI). A virtual path consists of multiple virtual channels to the same endpoint.

6. Click **Next**; the 'Connection Summary' screen appears:

Figure 12-18: Connection Summary Screen



Connection Summary

You have successfully completed the steps needed to create the following connection:

- Routed IP protocol over an ATM connection (WAN DSL)
- Manually configured MP20X's networking IP addresses. The designated IP address will be 10.13.4.0
- VPI: 0
- VCI: 33

□ Edit the Newly Created Connection

7. Select the 'Edit the Newly Created Connection' check box if you want to perform additional configurations after clicking **Finish**.
8. Click **Finish** to save the settings; the new connection is added to the 'Network Connections' screen.

12.1.2 WAN Ethernet Connections

You can configure the following WAN Ethernet connection types:

- MP252 connected to an external DSL modem and using PPPoE – see Section 12.1.2.1 on page 143
- MP252 connected to an external Cable modem without authentication – see Section 12.1.2.2 on page 144
- MP252 connected to an external Cable modem using PPTP – see Section 12.1.2.3 on page 145
- MP252 connected to an external Cable modem using L2TP – see Section 12.1.2.4 on page 147
- Automatic IP address using DHCP – see Section 12.1.2.5 on page 149
- Manual IP address – see Section 12.1.2.6 on page 150

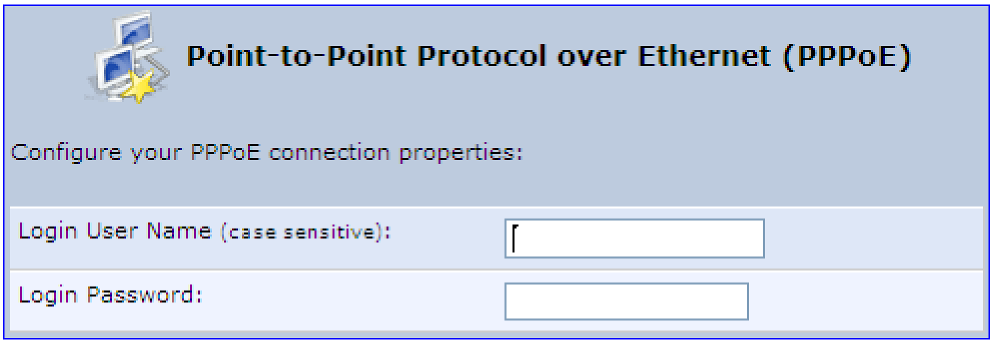
12.1.2.1 External DSL Modem using PPPoE

The procedure below describes how to configure an Internet connection using PPPoE when MP252 is connected to an external DSL modem.

➢ **To create a PPPoE connection for external DSL modem:**

1. In the 'Network Connections' screen, click the **New** ✚ icon; the 'Connection Wizard' screen appears.
2. Select the **Internet Connection** option, and then click **Next**; the 'Internet Connection' screen appears.
3. Select the **External DSL Modem** option, and then click **Next**; the 'Point-To-Point Protocol over Ethernet (PPPoE)' screen appears.

Figure 12-19: Point-to-Point Protocol over Ethernet (PPPoE) Screen



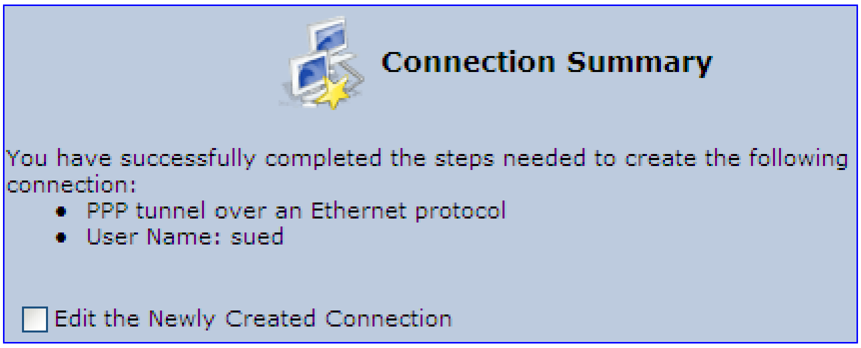
Point-to-Point Protocol over Ethernet (PPPoE)

Configure your PPPoE connection properties:

Login User Name (case sensitive):	
Login Password:	

4. Enter the login PPPoE username and password.
5. Click **Next**; the screen 'Connection Summary' opens.

Figure 12-20: PPPoE Connection Summary



Connection Summary

You have successfully completed the steps needed to create the following connection:

- PPP tunnel over an Ethernet protocol
- User Name: sued

□ Edit the Newly Created Connection

6. Select the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking **Finish**.
7. Click **Finish** to save the settings; the new PPPoE connection is added to the ‘Network Connections’ screen.

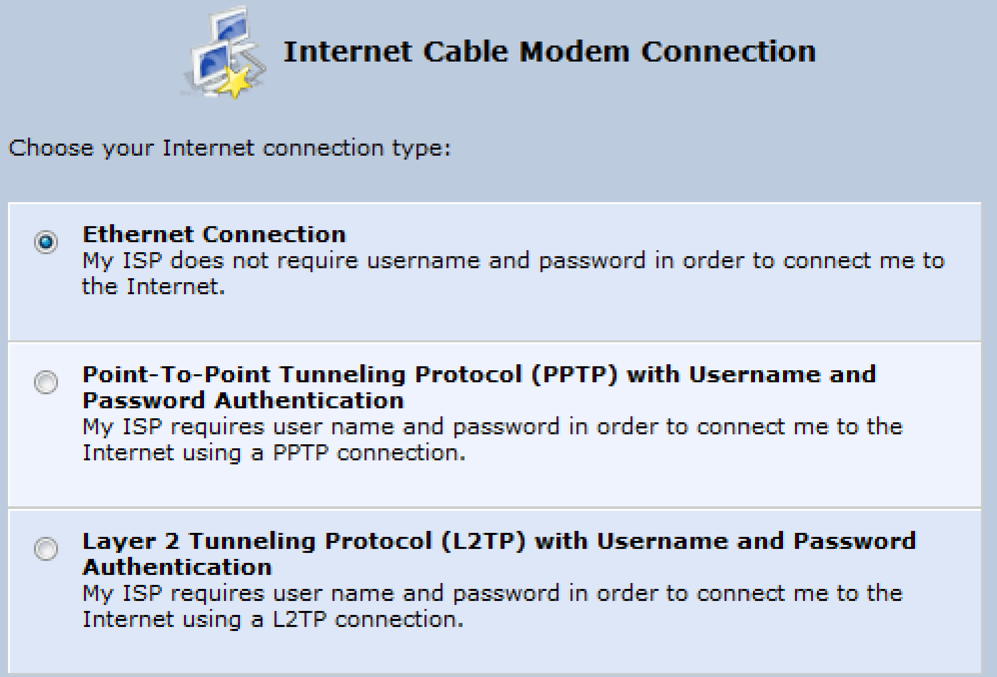
12.1.2.2 External Cable Modem without Authentication

The procedure below describes how to configure an Internet connection when MP252 is connected to an external Cable modem and the ITSP does not require a username nor password to connect.

➢ **To create an Ethernet connection for external Cable modem:**

1. In the 'Network Connections' screen, click the **New** ✚ icon; the 'Connection Wizard' screen appears.
2. Select the **Internet Connection** option, and then click **Next**; the ‘Internet Connection’ screen appears.
3. Select the **External Cable Modem** option, and then click **Next**; the ‘Internet Cable Modem Connection' screen appears.

Figure 12-21: Internet Cable Modem Connection Screen



Internet Cable Modem Connection

Choose your Internet connection type:

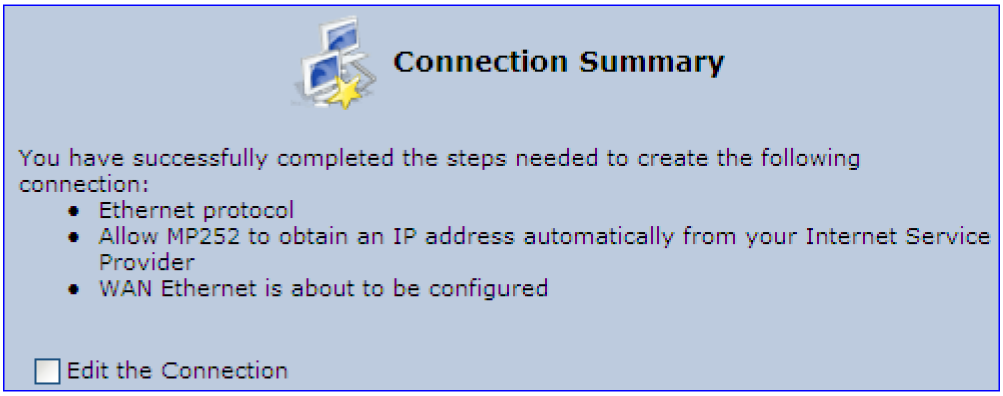
● **Ethernet Connection**
My ISP does not require username and password in order to connect me to the Internet.

○ **Point-To-Point Tunneling Protocol (PPTP) with Username and Password Authentication**
My ISP requires user name and password in order to connect me to the Internet using a PPTP connection.

○ **Layer 2 Tunneling Protocol (L2TP) with Username and Password Authentication**
My ISP requires user name and password in order to connect me to the Internet using a L2TP connection.

4. Select the **Ethernet Connection** option; the 'Connection Summary' screen appears.

Figure 12-22: Ethernet Connection Summary



Connection Summary

You have successfully completed the steps needed to create the following connection:

- Ethernet protocol
- Allow MP252 to obtain an IP address automatically from your Internet Service Provider
- WAN Ethernet is about to be configured

□ Edit the Connection

5. Select the 'Edit the Connection' check box if you wish to be routed to the new connection's configuration screen after clicking **Finish**.
6. Click **Finish** to save the settings; the new connection is added to the 'Network Connections' screen.

12.1.2.3 External Cable Modem with PPTP

The procedure below describes how to configure an Internet connection when MP252 is connected to an external Cable modem and using the PPTP protocol.

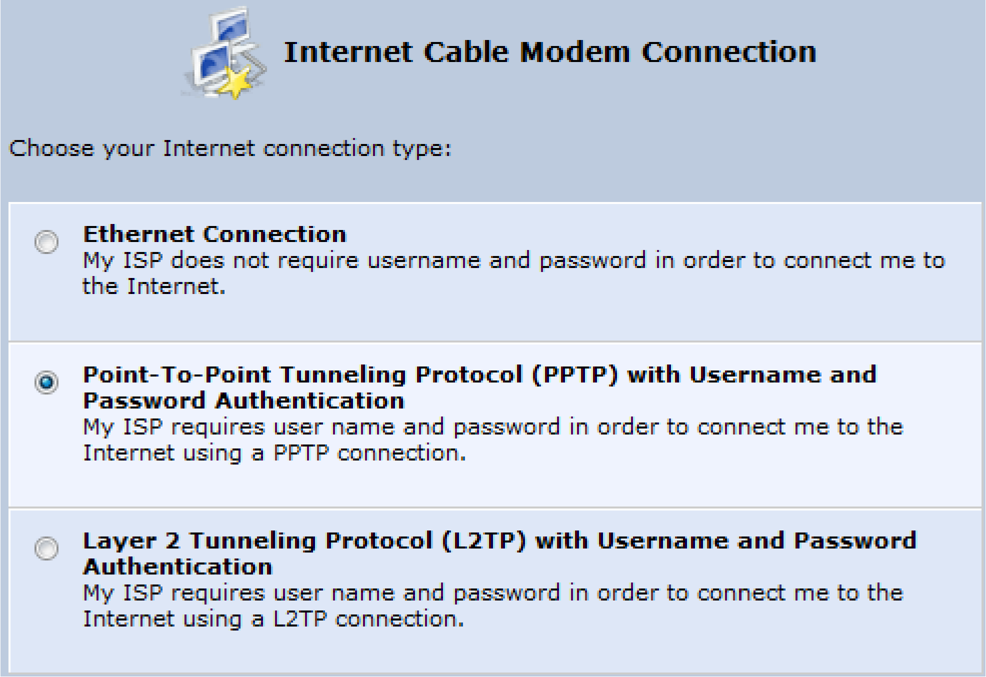
Point-to-Point Tunneling Protocol (PPTP) is a protocol developed by Microsoft targeted at creating VPN connections over the Internet. This enables remote users to access MP252 via any ISP that supports PPTP on its servers. PPTP encapsulates network traffic, encrypts content using Microsoft's Point-to-Point Encryption (MPPE) protocol that is based on RC4, and routes using the generic routing encapsulation (GRE) protocol.

➢ To create PPTP for external Cable modem:

1. In the 'Network Connections' screen, click the **New** ✚ icon; the 'Connection Wizard' screen appears.

2. Select the **Internet Connection** option, and then click **Next**; the 'Internet Connection' screen appears.
3. Select the **External Cable Modem** option, and then click **Next**; the 'Internet Cable Modem Connection' screen appears.

Figure 12-23: Internet Cable Modem Connection Screen



Internet Cable Modem Connection

Choose your Internet connection type:

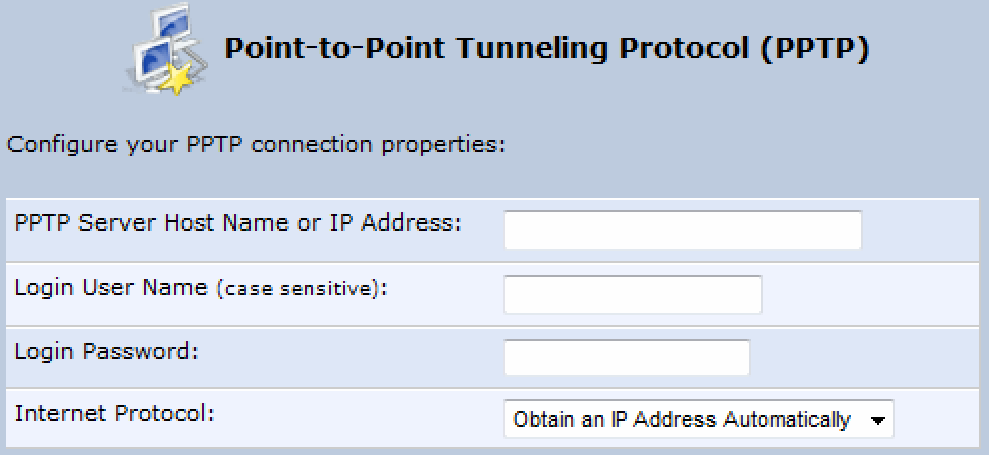
○ **Ethernet Connection**
My ISP does not require username and password in order to connect me to the Internet.

● **Point-To-Point Tunneling Protocol (PPTP) with Username and Password Authentication**
My ISP requires user name and password in order to connect me to the Internet using a PPTP connection.

○ **Layer 2 Tunneling Protocol (L2TP) with Username and Password Authentication**
My ISP requires user name and password in order to connect me to the Internet using a L2TP connection.

4. Select the **Point-To-Point Tunneling Protocol (PPTP) with Username and Password Authentication** option; the 'Point-to-Point Tunneling Protocol (PPTP)' screen appears.

Figure 12-24: Point-to-Point Tunneling Protocol (PPTP) Screen



Point-to-Point Tunneling Protocol (PPTP)

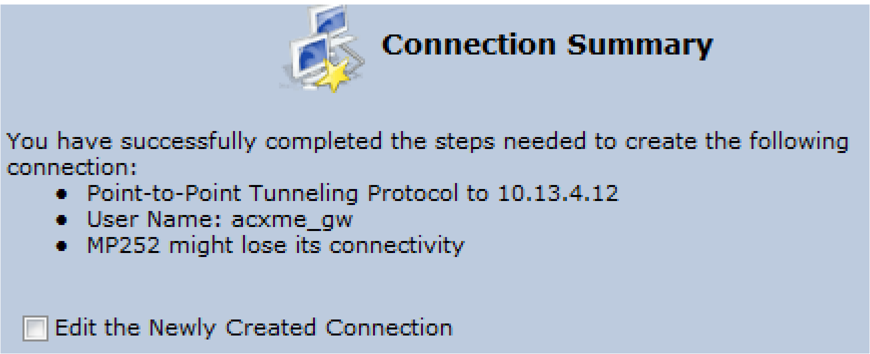
Configure your PPTP connection properties:

PPTP Server Host Name or IP Address:	
Login User Name (case sensitive):	
Login Password:	
Internet Protocol:	Obtain an IP Address Automatically ▾

5. Enter the PPTP server host name or IP address provided by your ITSP.
6. Enter the login user name and password provided by the administrator of the network you are trying to access.
7. From the 'Internet Protocol' drop-down list, select whether the IP address is obtained automatically or select 'Use the Following IP Address' and define the IP address.

8. Click **Next**; the screen 'Connection Summary' opens.

Figure 12-25: PPTP Connection Summary



Connection Summary

You have successfully completed the steps needed to create the following connection:

- Point-to-Point Tunneling Protocol to 10.13.4.12
- User Name: acxme_gw
- MP252 might lose its connectivity

□ Edit the Newly Created Connection

9. Select the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking **Finish**.
10. Click **Finish** to save the settings; the new connection is added to the ‘Network Connections’ screen.

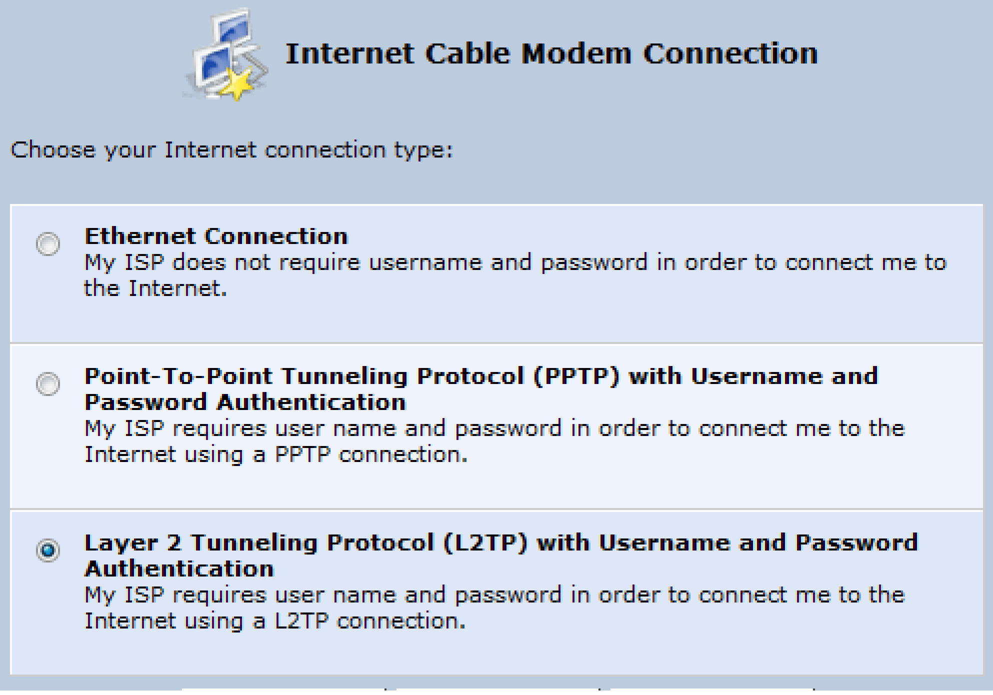
12.1.2.4 External Cable Modem with L2TP

You can connect MP252 to the Internet using an external cable modem where the connection is L2TP. L2TP is an extension to the PPP protocol, enabling MP252 to create VPN connections. Derived from Microsoft's PPTP and Cisco's Layer 2 Forwarding (L2F) technology, L2TP encapsulates PPP frames into IP packets either at the remote user's PC or at an ISP that has an L2TP Remote Access Concentrator (LAC). The LAC transmits the L2TP packets over the network to the L2TP Network Server (LNS) at the corporate side

➢ To create L2RP for external Cable modem:

1. In the 'Network Connections' screen, click the **New** ✚ icon; the 'Connection Wizard' screen appears.
2. Select the **Internet Connection** option, and then click **Next**; the ‘Internet Connection’ screen appears.
3. Select the **External Cable Modem** option, and then click **Next**; the ‘Internet Cable Modem Connection' screen appears.

Figure 12-26: Internet Cable Modem Connection Screen



Internet Cable Modem Connection

Choose your Internet connection type:

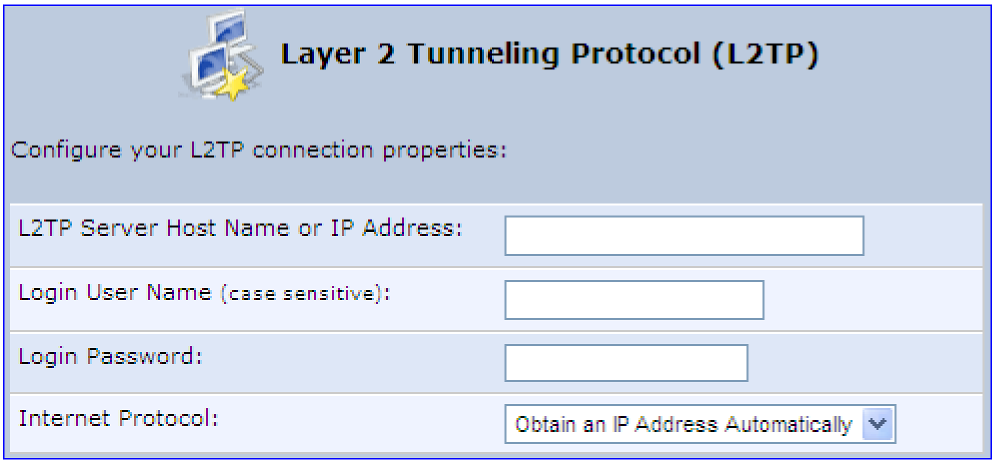
○ **Ethernet Connection**
My ISP does not require username and password in order to connect me to the Internet.

○ **Point-To-Point Tunneling Protocol (PPTP) with Username and Password Authentication**
My ISP requires user name and password in order to connect me to the Internet using a PPTP connection.

● **Layer 2 Tunneling Protocol (L2TP) with Username and Password Authentication**
My ISP requires user name and password in order to connect me to the Internet using a L2TP connection.

4. Select the L**ayer 2 Tunneling Protocol (L2TP) with Username and Password Authentication** option; the 'Layer 2 Tunneling Protocol (L2TP)' screen appears.

Figure 12-27: Layer 2 Tunneling Protocol (L2TP) Screen



Layer 2 Tunneling Protocol (L2TP)

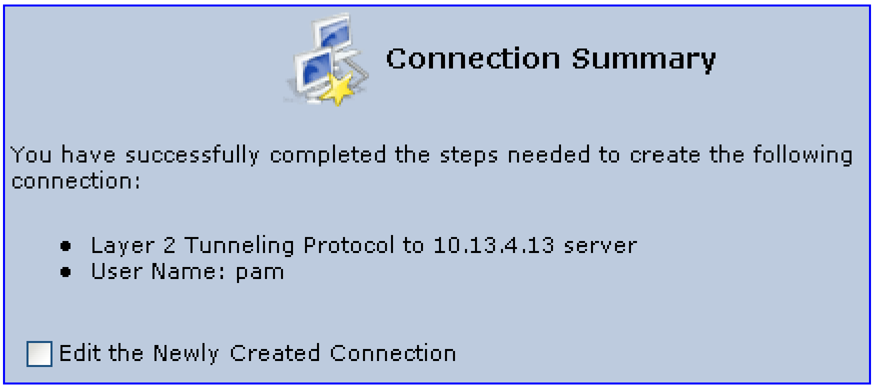
Configure your L2TP connection properties:

L2TP Server Host Name or IP Address:	
Login User Name (case sensitive):	
Login Password:	
Internet Protocol:	Obtain an IP Address Automatically

5. Enter the L2TP server host name or IP address provided by your ITSP.
6. Enter the login user name and password provided by the administrator of the network you are trying to access.
7. From the ‘Internet Protocol’ drop-down list, select whether the IP address is obtained automatically or select ‘Use the Following IP Address’ and define the IP address.

8. Click **Next**; the screen 'Connection Summary' opens.

Figure 12-28: L2TP Connection Summary



Connection Summary

You have successfully completed the steps needed to create the following connection:

- Layer 2 Tunneling Protocol to 10.13.4.13 server
- User Name: pam

□ Edit the Newly Created Connection

9. Select the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking **Finish**.
10. Click **Finish** to save the settings; the new connection is added to the 'Network Connections' screen.

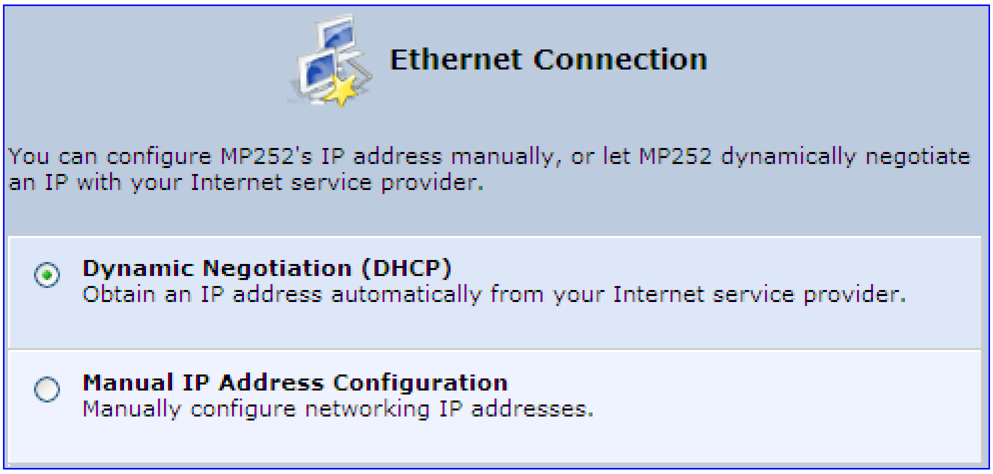
12.1.2.5 DHCP

The Dynamic Host Configuration Protocol (DHCP) connection for the physical WAN Ethernet, allows MP252 to obtain an IP address automatically from the service provider when connecting to the Internet.

➢ To create a DHCP connection:

1. In the 'Network Connections' screen, click the **New** ✚ icon; the 'Connection Wizard' screen appears.
2. Select the **Internet Connection** option, and then click **Next**; the 'Internet Connection' screen appears.
3. Select the **Ethernet Connection** option, and then click **Next**; the 'Ethernet Connection' screen appears.

Figure 12-29: Ethernet Connection Screen



Ethernet Connection

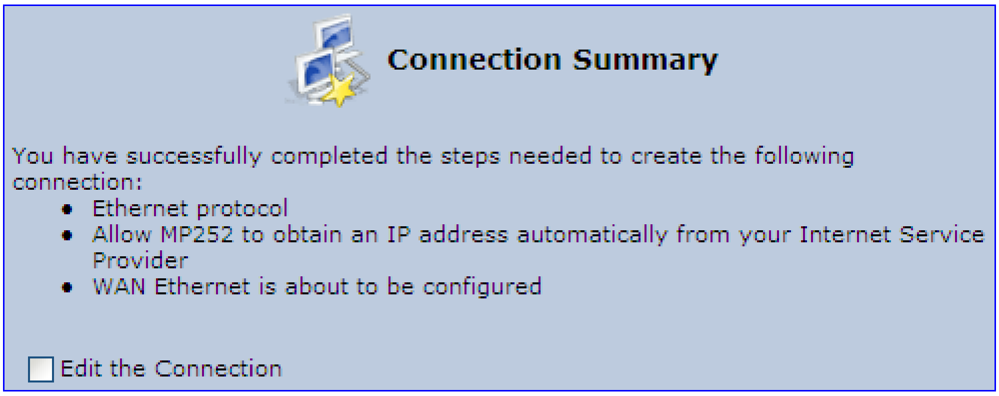
You can configure MP252's IP address manually, or let MP252 dynamically negotiate an IP with your Internet service provider.

● **Dynamic Negotiation (DHCP)**
Obtain an IP address automatically from your Internet service provider.

○ **Manual IP Address Configuration**
Manually configure networking IP addresses.

4. Select the Dynamic Negotiation (DHCP) option, and then click **Next**; the screen 'Connection Summary' opens.

Figure 12-30: DHCP Connection Summary



Connection Summary

You have successfully completed the steps needed to create the following connection:

- Ethernet protocol
- Allow MP252 to obtain an IP address automatically from your Internet Service Provider
- WAN Ethernet is about to be configured

□ Edit the Connection

5. Select the 'Edit the Connection' check box if you wish to be routed to the new connection's configuration screen after clicking **Finish**.
6. Click **Finish** to save the settings; the new connection is added to the 'Network Connections' screen.

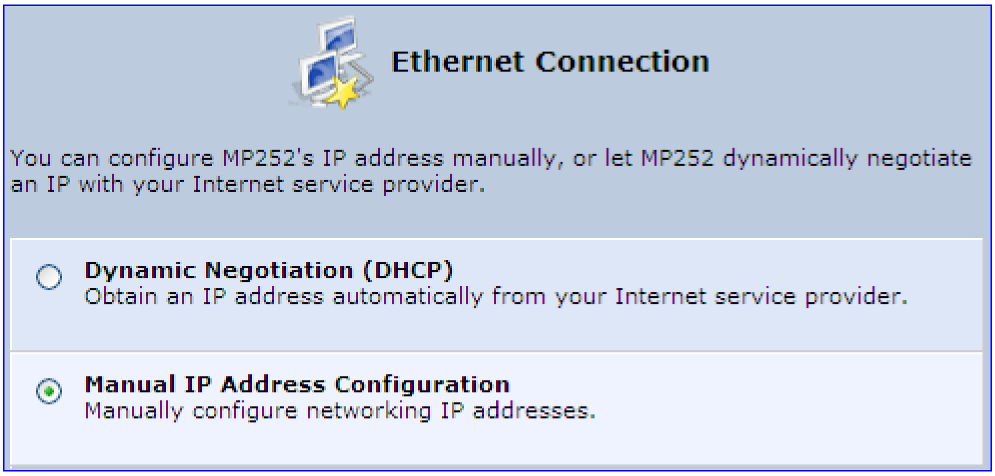
12.1.2.6 Manual IP Address

The Manual IP Address feature is used to manually configure the networking IP addresses when connecting to the Internet.

➢ To manually configure the IP address:

1. In the 'Network Connections' screen, click the **New** ✚ icon; the 'Connection Wizard' screen appears.
2. Select the **Internet Connection** option, and then click **Next**; the 'Internet Connection' screen appears.
3. Select the **Ethernet Connection** option, and then click **Next**; the 'Ethernet Connection' screen appears.

Figure 12-31: Ethernet Connection Screen



Ethernet Connection

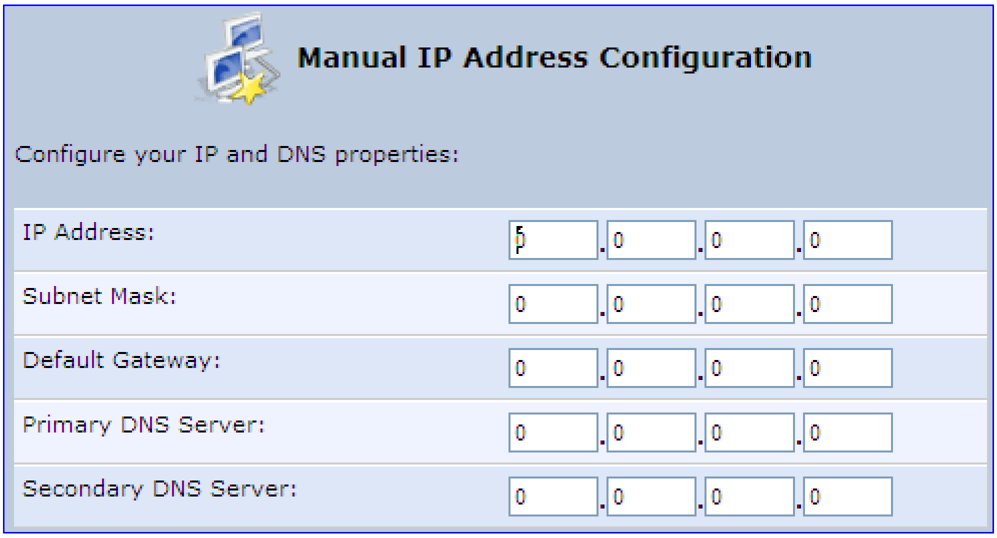
You can configure MP252's IP address manually, or let MP252 dynamically negotiate an IP with your Internet service provider.

○ **Dynamic Negotiation (DHCP)**
Obtain an IP address automatically from your Internet service provider.

● **Manual IP Address Configuration**
Manually configure networking IP addresses.

4. Select the **Manual IP Address Configuration** option, and then click **Next**; the screen 'Manual IP Address Configuration' opens.

Figure 12-32: Manual IP Address Configuration Screen



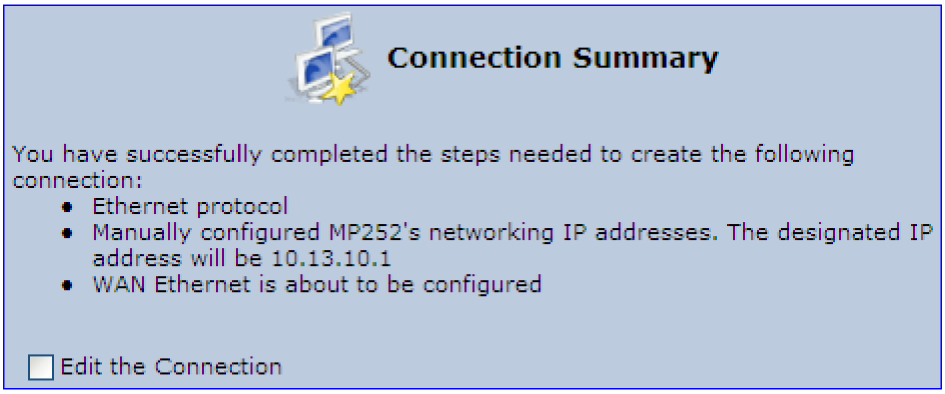
Manual IP Address Configuration

Configure your IP and DNS properties:

IP Address:	0 . 0 . 0 . 0
Subnet Mask:	0 . 0 . 0 . 0
Default Gateway:	0 . 0 . 0 . 0
Primary DNS Server:	0 . 0 . 0 . 0
Secondary DNS Server:	0 . 0 . 0 . 0

5. Configure the IP address and other network parameters, and then click **Next**; Select the Manual IP Address Configuration option, and then click **Next**; the 'Connection Summary' screen appears.

Figure 12-33: Manual IP Connection Summary



Connection Summary

You have successfully completed the steps needed to create the following connection:

- Ethernet protocol
- Manually configured MP252's networking IP addresses. The designated IP address will be 10.13.10.1
- WAN Ethernet is about to be configured

□ Edit the Connection

6. Select the 'Edit the Connection' check box if you wish to be routed to the new connection's configuration screen after clicking **Finish**.

7. Click **Finish** to save the settings; the new connection is added to the 'Network Connections' screen.

12.2 LAN Connection

This section describes how to configure the following MP252 LAN connections:

- Wireless LAN
- LAN hardware Ethernet switch

12.2.1 Wireless LAN

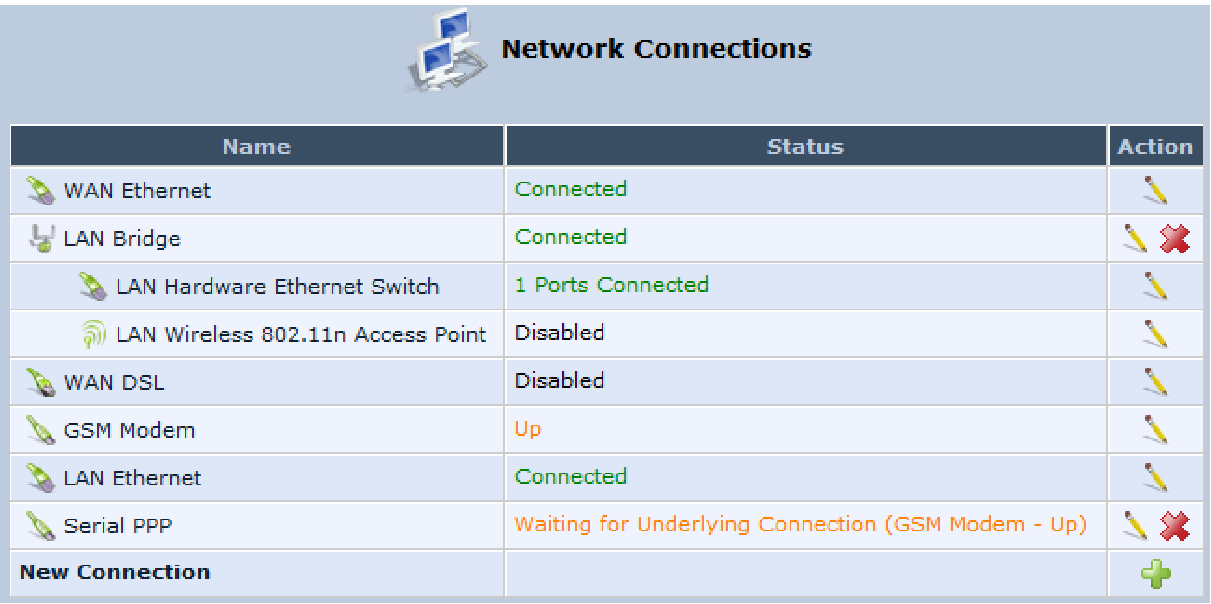
This section describes how to configure the MP252 wireless network. This network is configured in the 'Network Connections' screen, which provides a connection wizard that guides you through the network configuration stages.

Note: To establish a wireless network connection between a PC and the MP252, you must also configure the PC for wireless connectivity (see Section 6.2 on page 61).

➢ To configure the Wireless LAN:

1. From the menu bar, click the **Network Connections** menu; the 'Network Connections' screen appears.

Figure 12-34: Network Connections Screen Displaying LAN Wireless Interface



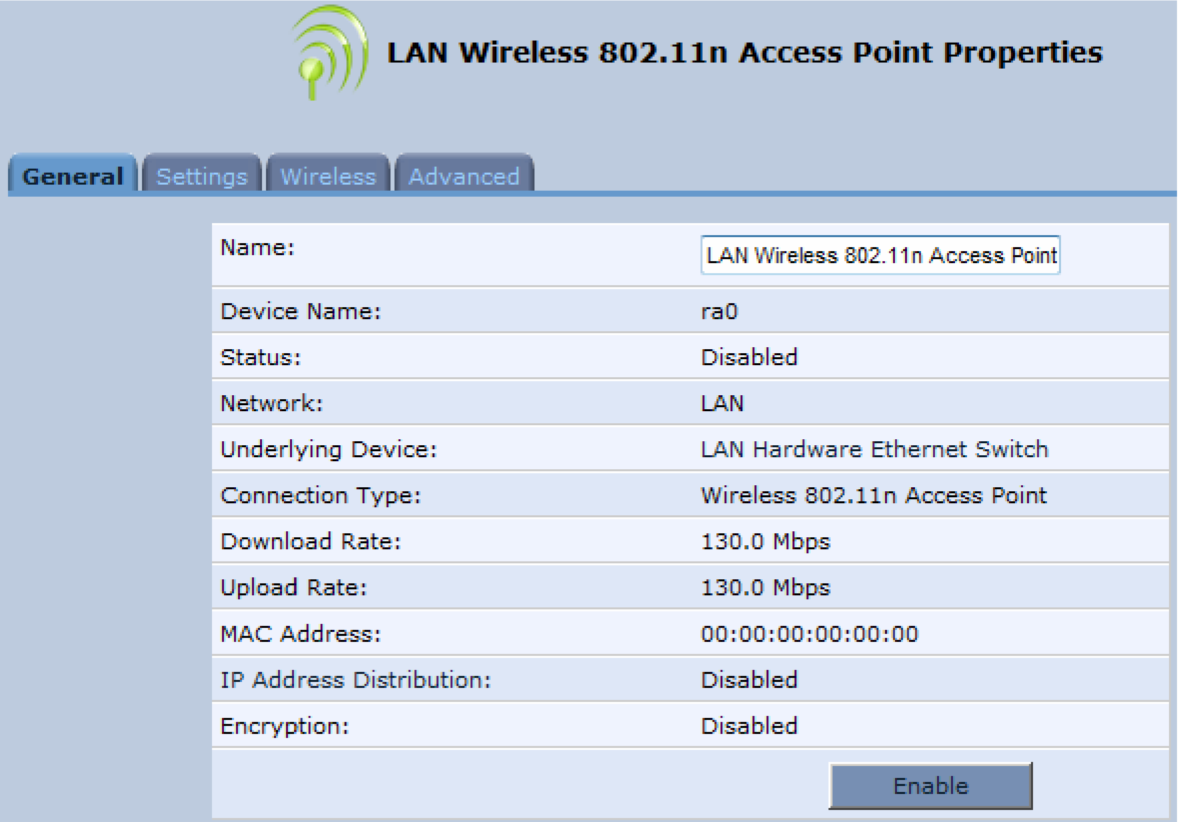
Network Connections

Name	Status	Action
WAN Ethernet	Connected	✎
LAN Bridge	Connected	✎ ✖
LAN Hardware Ethernet Switch	1 Ports Connected	✎
LAN Wireless 802.11n Access Point	Disabled	✎
WAN DSL	Disabled	✎
GSM Modem	Up	✎
LAN Ethernet	Connected	✎
Serial PPP	Waiting for Underlying Connection (GSM Modem - Up)	✎ ✖
New Connection		✚

The 'Status' column corresponding to the wireless LAN network ('LAN Wireless 802.11n Access Point') displays whether the wireless connection is enabled or disabled.

2. Click the **Edit** ✎ icon corresponding to the 'LAN Wireless 802.11n Access Point' network name; the 'LAN Wireless 802.11n Access Point Properties' screen appears, displaying the contents of the **General** tab.

Figure 12-35: LAN Wireless 802.11n Access Point Properties (General Tab) Screen



LAN Wireless 802.11n Access Point Properties

Name:	LAN Wireless 802.11n Access Point
Device Name:	ra0
Status:	Disabled
Network:	LAN
Underlying Device:	LAN Hardware Ethernet Switch
Connection Type:	Wireless 802.11n Access Point
Download Rate:	130.0 Mbps
Upload Rate:	130.0 Mbps
MAC Address:	00:00:00:00:00:00
IP Address Distribution:	Disabled
Encryption:	Disabled

3. In the 'Name' field, enter an arbitrary name for your wireless network.

The **General** tab also allows you to enable or disable the wireless connection (for more information, see Section 12.2.1.1 on page 153). In addition, it displays various statistics such as download and upload rate, and whether encryption is enabled or disabled. These parameters can be configured using the other tabs, as described in the subsequent sections.

12.2.1.1 Enabling and Disabling the Wireless Network

Once you have configured your MP252 wireless network connection, you can enable and disable it, as required.

➢ **To enable or disable the wireless network, do one of the following:**

- Press the **WiFi** button located on the front panel of the MP252 (see Section 3.1.1 on page 27)
- In the 'LAN Wireless 802.11n Access Point Properties (General Tab)' screen (see Section Figure 12-35 on page 152), click the **Enable** or **Disable** button.

12.2.1.2 Configuring Wireless Properties under the Settings Tab

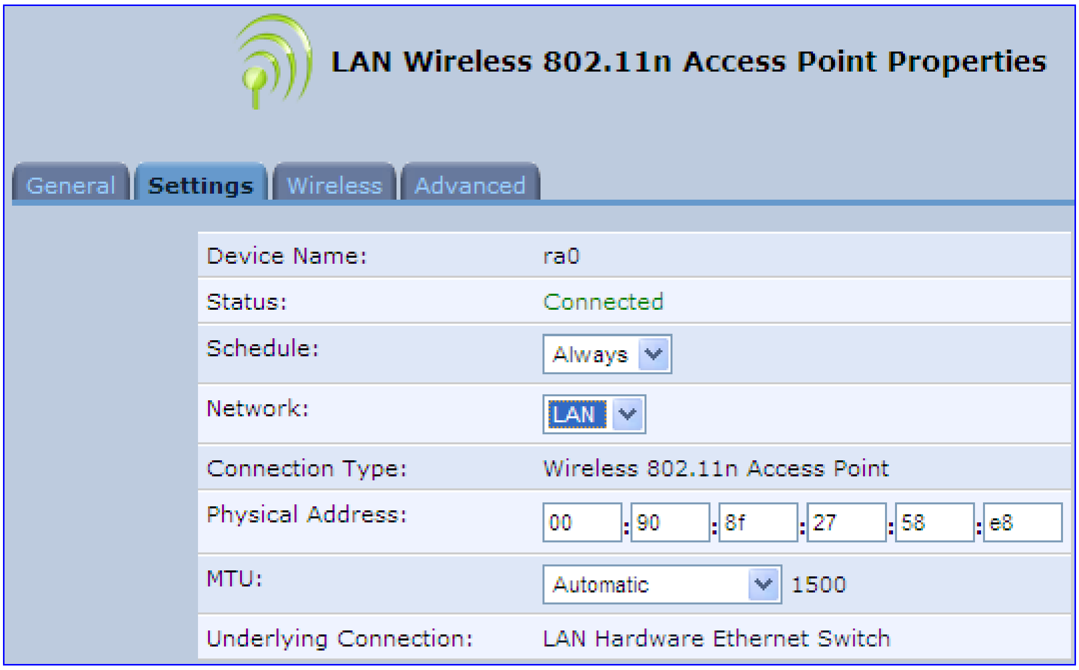
The procedure below describes the configurations under the **Settings** tab of the 'LAN Wireless 802.11 Access Point Properties' screen.

> **Note:** Since your MP252 wireless network is configured to operate with default settings, it is recommended to leave the settings in this screen at their default values.

➢ To configure the wireless parameters under the Settings tab:

1. Click the **Settings** tab.

Figure 12-36: LAN Wireless 802.11 Access Point Properties (Settings Tab) Screen



LAN Wireless 802.11n Access Point Properties

Device Name:	ra0
Status:	Connected
Schedule:	Always
Network:	LAN
Connection Type:	Wireless 802.11n Access Point
Physical Address:	00 : 90 : 8f : 27 : 58 : e8
MTU:	Automatic 1500
Underlying Connection:	LAN Hardware Ethernet Switch

The ‘Underlying Connection’ read-only field displays the underlying connection upon which the wireless LAN is defined.

2. From the ‘Scheduler’ drop-down list, select the Scheduler rule during which this network connection is active. To ensure that the network is always active, select ‘Always’. To define Scheduler rules, see Section 4.5.1 on page 47.
3. From the ‘Network’ drop-down list, select the network (LAN, WAN, or DMZ) to which this new network is related.
4. In the ‘Physical Address’ field, define the physical address of the network card used for your network.
5. From the ‘MTU’ drop-down list, select the largest packet size permitted for Internet transmission (i.e., MTU / Maximum Transmission Unit). By default, it is set to 'Automatic', whereby MP252 selects the best MTU for your Internet connection. If you modify this field, ensure that the range is 1200 to 1500.
6. Click **OK** to save your settings.

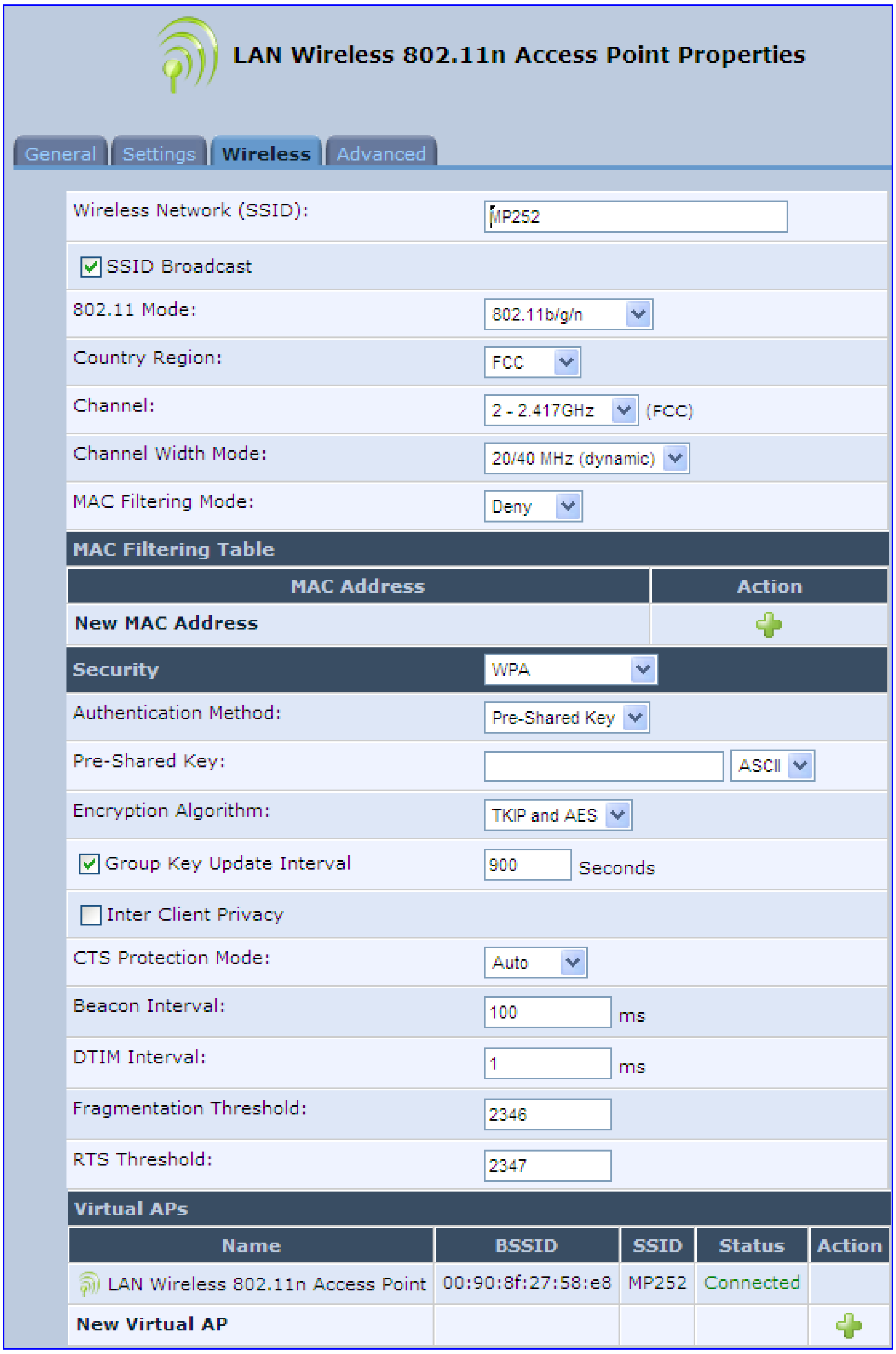
12.2.1.3 Configuring Wireless Properties under the Wireless Tab

The procedure below describes the configurations under the **Wireless** tab of the 'LAN Wireless 802.11 Access Point Properties' screen.

➢ **To configure the wireless parameters under the Wireless tab:**

1. Click the **Wireless** tab.

Figure 12-37: LAN Wireless 802.11 Access Point Properties (Wireless Tab) Screen



LAN Wireless 802.11n Access Point Properties

Wireless Network (SSID):	MP252
☑ SSID Broadcast	
802.11 Mode:	802.11b/g/n
Country Region:	FCC
Channel:	2 - 2.417GHz (FCC)
Channel Width Mode:	20/40 MHz (dynamic)
MAC Filtering Mode:	Deny

MAC Filtering Table

MAC Address	Action
New MAC Address	✚

Security	WPA
Authentication Method:	Pre-Shared Key
Pre-Shared Key:	ASCII
Encryption Algorithm:	TKIP and AES
☑ Group Key Update Interval	900 Seconds
☐ Inter Client Privacy	
CTS Protection Mode:	Auto
Beacon Interval:	100 ms
DTIM Interval:	1 ms
Fragmentation Threshold:	2346
RTS Threshold:	2347

Virtual APs

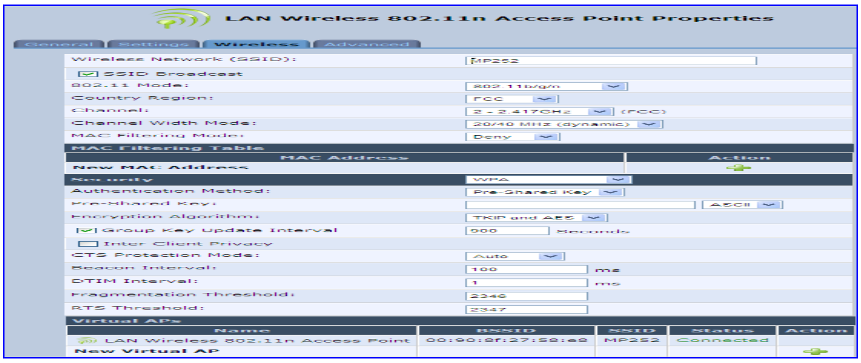
Name	BSSID	SSID	Status	Action
LAN Wireless 802.11n Access Point	00:90:8f:27:58:e8	MP252	Connected	
New Virtual AP				✚

2. Refer to the subsequent sections for a description of the parameters in this screen.

12.2.1.3.1 Wireless Network Group

This group in the **Wireless** tab screen configures the basic wireless access point settings.

Figure 12-38: Wireless Network Group in Wireless Tab Screen



Wireless Network (SSID): MP252

☑ SSID Broadcast

802.11 Mode: 802.11b/g/n

Country Region: FCC

Channel: 2 - 2.417GHz (FCC)

Channel Width Mode: 20/40 MHz (dynamic)

MAC Filtering Mode: Deny

MAC Filtering Table

MAC Address	Action
New MAC Address	✚

Security: WPA

Authentication Method: Pre-Shared Key

Pre-Shared Key: ASCII

Encryption Algorithm: TKIP and AES

☑ Group Key Update Interval 900 Seconds

□ Inter Client Privacy

CTS Protection Mode: Auto

Beacon Interval: 100 ms

DTIM Interval: 1 ms

Fragmentation Threshold: 2346

RTS Threshold: 2347

Virtual APs

Name	BSSID	SSID	Status	Action
LAN Wireless 802.11n Access Point	00:90:8f:27:58:e8	MP252	Connected	
New Virtual AP				✚

The table below describes the parameters in this group:

Table 12-1: Wireless Tab – Basic Wireless Access Point Parameters Description

Parameter	Description
Wireless Network (SSID)	Enter the name of the wireless network. This name is needed for a wireless device to attach to your wireless network (see Section 6.2 on page 61). **Note:** The default wireless (Wi-Fi) network name (SSID) is "MP252" (and is unsecured).
SSID Broadcast	Select this check box to enable the SSID's broadcast. SSID broadcast is used to hide the name of the AP (SSID) from clients.
802.11 Mode	Select the wireless communication standard that is compatible with your client's wireless card: 802.11b/g Mixed, 802.11g Only, 802.11b Only, 802.11b/g/n, 802.11g/n, 802.11n Only.
Country Region	Select the Wi-Fi country region for allowing only permitted channels (frequencies) for the region. **Note:** This parameter determines the available channel options listed in the 'Channel' parameter.
Channel	Select the appropriate channel to correspond with your network settings. All devices in your wireless network must broadcast on different channels to function correctly. **Note:** The available channels depend on the country region (configured by the 'Country Region' parameter) in which you are operating MP252. For example, if you selected 'FCC' as the country region, the available channels from which you can select conform to the U.S.A. Regulatory Authority FCC (Federal Communications Commission).
Channel Width Mode	Select the available transmit data rate of the wireless network: 20 MHz only or 20/40 MHz dynamic.
Virtual APS	
Virtual APS	You can set up multiple virtual wireless LAN's on MP252. Such virtual wireless LANs are referred to as "Virtual APs" (virtual access points). For a detailed description on configuring Virtual APS, see 'Virtual Access Points' on page 162.

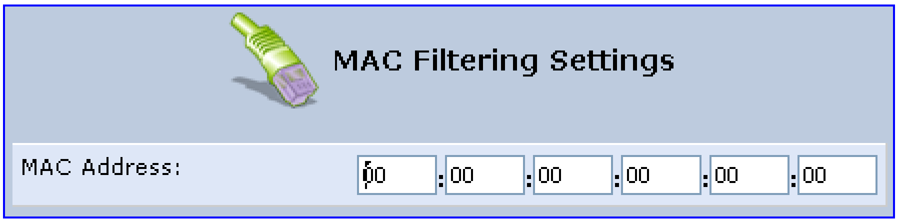
12.2.1.3.2Configuring MAC Filtering

The procedure below describes how to filter wireless users according to their MAC addresses. You can define as list of MAC addresses and for the entire list, either allow or deny access.

➢ **To define MAC filtering:**

1. From the 'MAC Filtering Mode' drop-down list, select either 'Allow' or 'Deny' (or 'Disable' if you do not want use MAC filtering).
2. In the **MAC Filtering Table**, click the **New MAC Address** ✚ icon; the 'MAC Filtering Settings' screen appears.

Figure 12-39: MAC Filtering Settings Screen

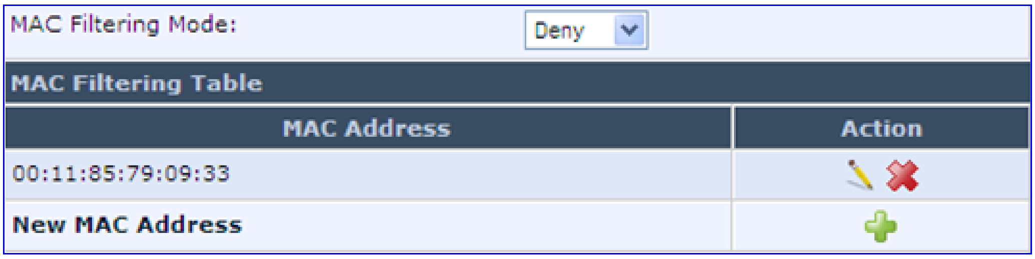


MAC Filtering Settings

MAC Address: 00 : 00 : 00 : 00 : 00 : 00

3. In the 'MAC Address' field, enter the MAC address to be filtered.
4. Click **OK**; the MAC address is listed in the MAC Filtering table.

Figure 12-40: MAC Address Added to MAC Filtering Table



MAC Filtering Mode: Deny

MAC Filtering Table

MAC Address	Action
00:11:85:79:09:33	✎ ✖
New MAC Address	✚

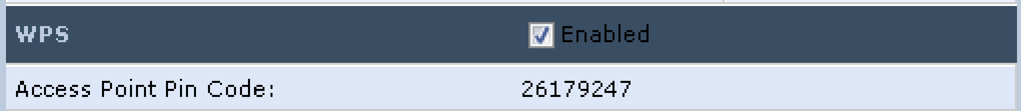
12.2.1.3.3Enabling Wi-Fi Protected Setup (WPS)

The procedure below describes how to enable WPS. WPS is a method for simplifying the security setup and management of wireless networks. This feature is disabled by default. By enabling it, you can control the setup of your wireless security, which is defined in the **Security** group.

➢ **To enable WPS:**

- Under the **WPS** group, select 'Enabled'; an access point pin code is automatically generated and displayed.

Figure 12-41: WPS Group in Wireless Tab Screen



WPS ☑ Enabled

Access Point Pin Code: 26179247

The access point pin code is an eight digit pin number, provided by the wireless client's software. When attempting to connect a wireless client to MP252, you must be aware of its setup method.

12.2.1.3.4Configuring Wireless Security

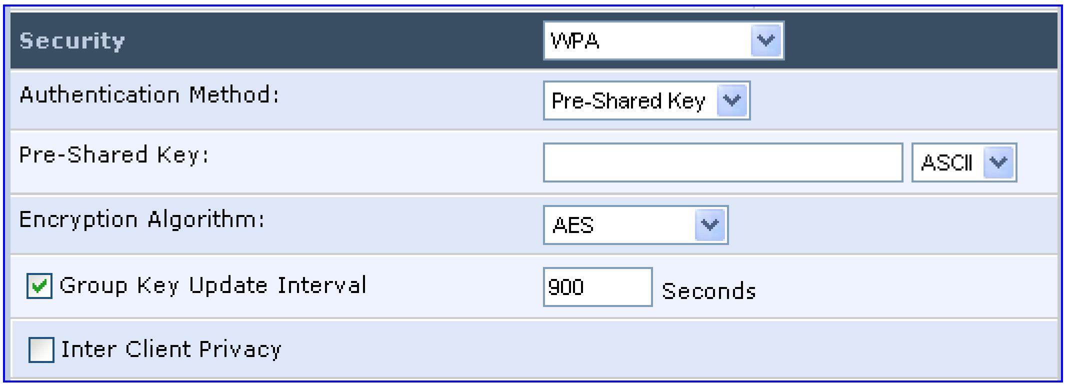
The procedure below describes how to configure wireless security.

Note: WPS supports only the WPA security protocol. Therefore, when enabled (see Section 12.2.1.3.3 on page 157), only the WPA protocols are available (in the 'Security' drop-down list described below).

➢ To define wireless security:

1. From the 'Security' drop-down list, select the type of security protocol; the screen refreshes, displaying parameters relevant to the selected protocol:
   - **None:** disables security on your wireless connection.
   - **WPA:** WPA is a data encryption method for 802.11 wireless LANs.

Figure 12-42: Configuring WPA Security



Security: WPA

Authentication Method: Pre-Shared Key

Pre-Shared Key: ASCII

Encryption Algorithm: AES

☑ Group Key Update Interval 900 Seconds

□ Inter Client Privacy

Configure the following fields:

b. **Authentication Method:** select the required authentication method ('Pre-Shared Key' and '802.1x').

c. **Pre-Shared Key:** this field appears only if you selected 'Pre-Shared Key' in the 'Authentication Method field. Enter your encryption key (using either an ASCII or a Hex value), by selecting the value type in the drop-down list provided.

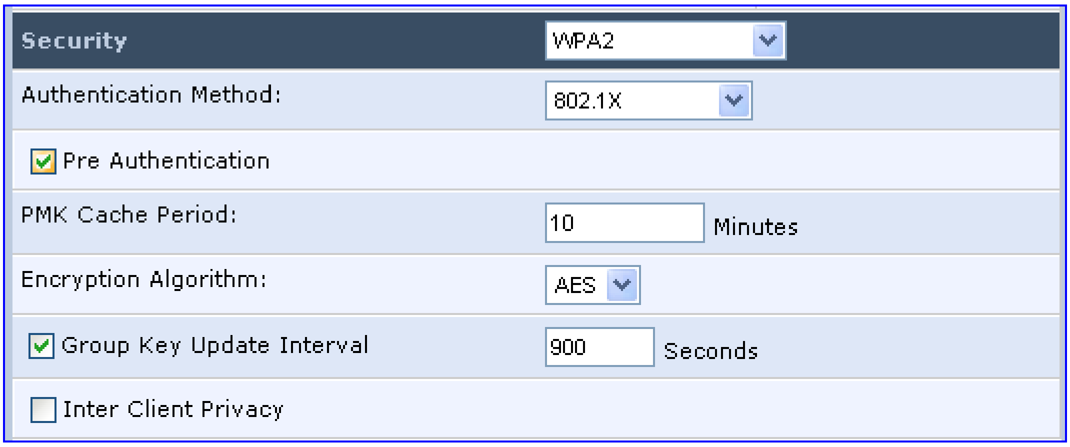
d. **Encryption Algorithm:** select 'TKIP' (Temporal Key Integrity Protocol), 'AES' (Advanced Encryption Standard) or both ('TKIP and AES') for the encryption algorithm.

e. **Group Key Update Interval:** select this check box, and then enter the time interval in seconds for updating a group key.

f. **Inter Client Privacy:** select this check box to prevent communication between the wireless network clients using the same access point. When enable, clients are unable to view and access each other's shared directories.

- **WPA2:** WPA2 is an enhanced version of WPA, and defines the 802.11i protocol.

Figure 12-43: Configuring WPA2 Security



Security: WPA2

Authentication Method: 802.1X

☑ Pre Authentication

PMK Cache Period: 10 Minutes

Encryption Algorithm: AES

☑ Group Key Update Interval: 900 Seconds

□ Inter Client Privacy

a. **Authentication Method:** select the authentication method ('Pre-Shared Key' and '802.1x').

b. **Pre-Shared Key:** this field appears only if you selected this authentication method. Enter your encryption key in either an ASCII or a Hex value (by selecting the value type in the drop-down list provided).

c. **Pre Authentication:** This field appears only when selecting the 802.1x authentication method. Select this option to enable MP252 to accept RADIUS authentication requests from computers connected to other access points. This enables roaming from one wireless network to another.

d. **PMK Cache Period:** This field appears only when selecting the 802.1x authentication method. This field defines the number of minutes before deletion (and renewal) of the Pairwise Master Key used for authentication.

e. **Encryption Algorithm:** encryption algorithm for WPA2 is the Advanced Encryption Standard (AES).

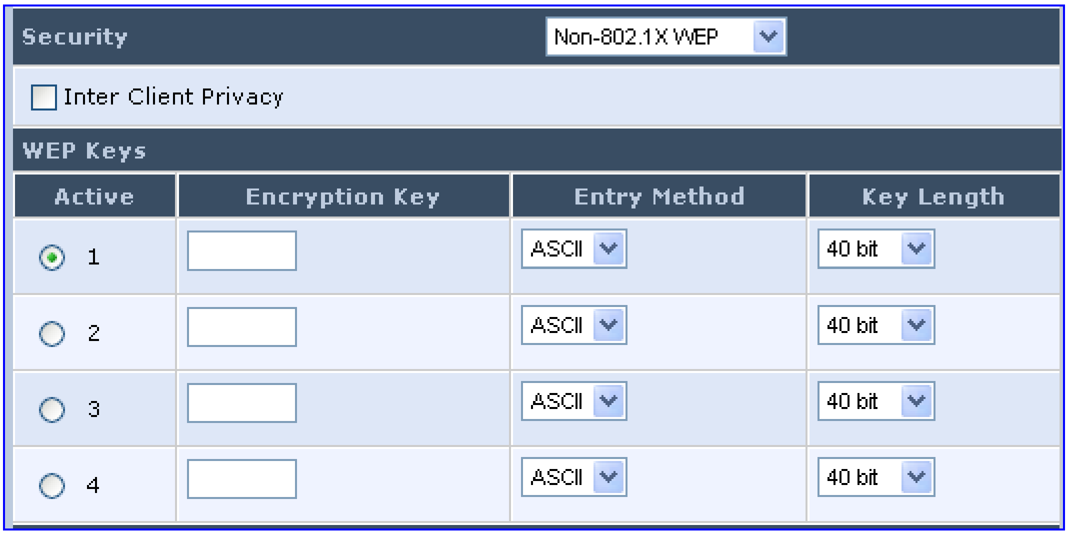
f. **Group Key Update Interval:** Defines the time interval in seconds for updating a group key.

g. **Inter Client Privacy:** select the check box to prevent communication between the wireless network clients using the same access point. Clients will not be able to view and access each other's shared directories.

- **WPA and WPA2:** WPA and WPA2 is a mixed data encryption method. For a description of these fields, see WPA and WPA2 above.

- **Non-802.1x WEP:** data encryption method utilizing a statically defined key for wireless clients that do not use 802.1x for authentication, but use WEP for encryption. You may define up to four keys, but use only one at a time.

Figure 12-44: Configuring Non-WEP Security



Security: Non-802.1X WEP

□ Inter Client Privacy

WEP Keys

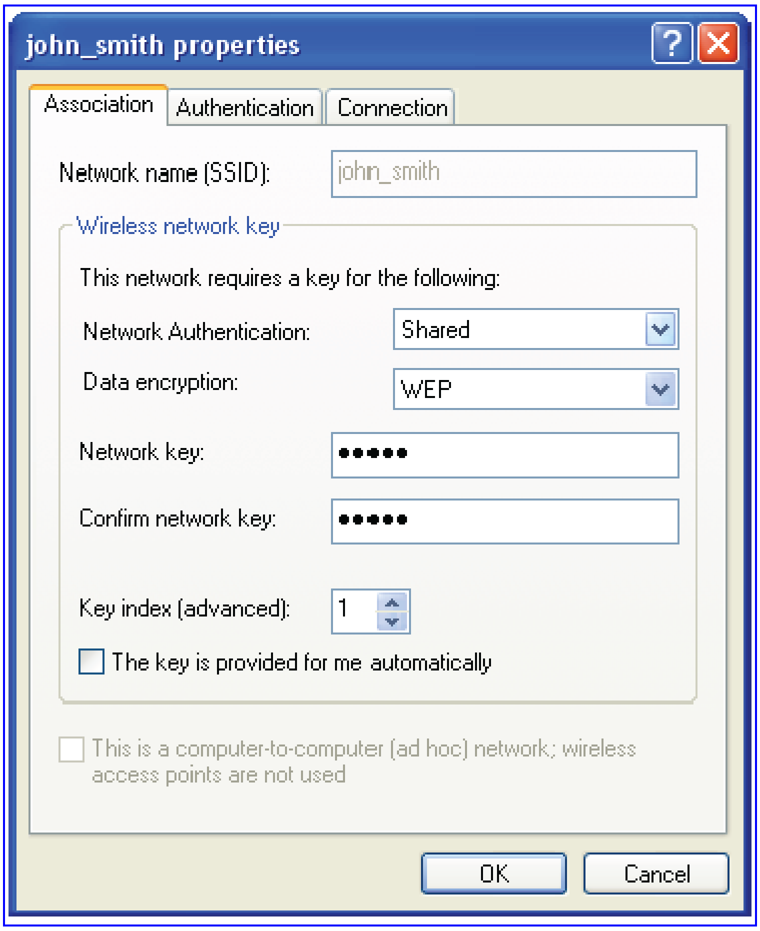
Active	Encryption Key	Entry Method	Key Length
● 1		ASCII	40 bit
○ 2		ASCII	40 bit
○ 3		ASCII	40 bit
○ 4		ASCII	40 bit

a. **Inter Client Privacy:** select this check box to prevent communication between the wireless network clients using the same access point. Clients will not be able to view and access each other's shared directories.

b. **WEP Keys table:**
   - ✓ **Active:** select the encryption key to be activated.
   - ✓ **Encryption Key:** enter the encryption key until the entire field is filled. The key cannot be shorter than the field's length.
   - ✓ **Entry Method:** select the character type for the key: ASCII or HEX.
   - ✓ **Key Length:** select the key length in bits: 40 or 104 bits.

Note: The encryption key must be defined in the wireless Windows client as well. This is done in the Connection Properties Configuration window (your encryption key is entered in both the 'Network key' and 'Confirm network key' fields, as shown in the figure below.

Figure 12-45: Configuring Encryption Key in Windows Wireless Client



john_smith properties

Association | Authentication | Connection

Network name (SSID): john_smith

Wireless network key

This network requires a key for the following:

Network Authentication: Shared

Data encryption: WEP

Network key: ●●●●●

Confirm network key: ●●●●●

Key index (advanced): 1

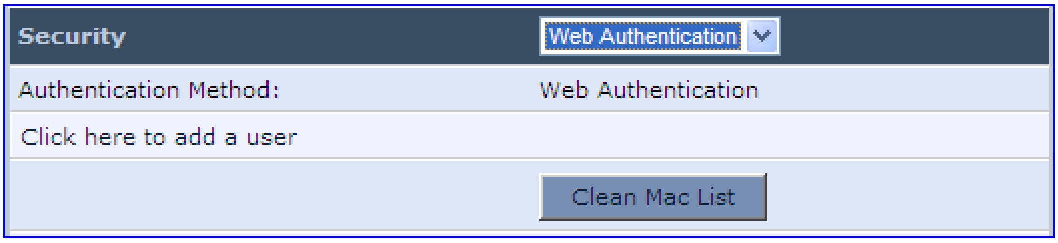
□ The key is provided for me automatically

□ This is a computer-to-computer (ad hoc) network; wireless access points are not used

OK Cancel

- **Web Authentication:** wireless clients attempting to connect to the wireless connection (Internet) receive a Web Authentication screen, requiring the clients to authenticate themselves before they are able to use the connection. To add a Web client user, click the **Click here to add a user** link. MP252 keeps record of authenticated clients. To clear this list, click the **Clean Mac List** button. Clients need to re-authenticate themselves to use the wireless connection.

Figure 12-46: Configuring Authentication Only Security



Security	Web Authentication
Authentication Method:	Web Authentication
Click here to add a user	
	Clean Mac List

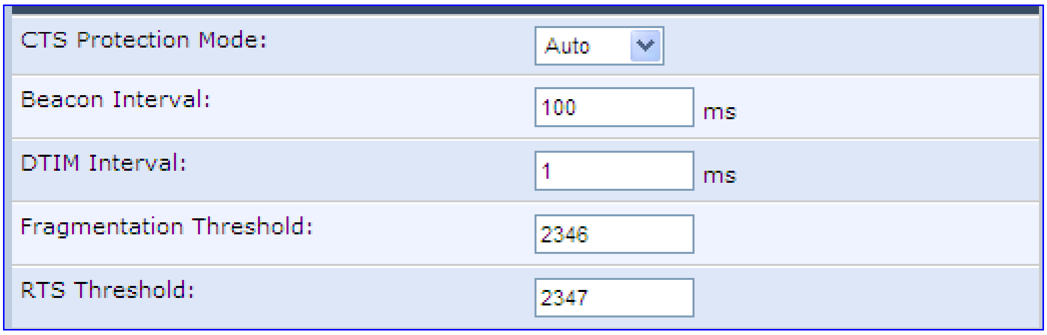
12.2.1.3.5 Configuring Transmission Properties

The procedure below describes how to configure wireless transmission properties.

➢ **To configure the transmission properties:**

1. Access the **Wireless** tab screen.

Figure 12-47: Transmission Parameters in Wireless Tab Screen



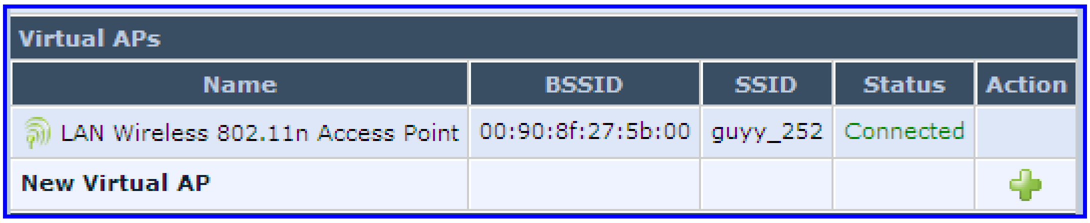
CTS Protection Mode:	Auto
Beacon Interval:	100 ms
DTIM Interval:	1 ms
Fragmentation Threshold:	2346
RTS Threshold:	2347

2. From the ‘CTS Protection Mode’ drop-down list, select whether you want to enable or disable this feature (‘Always' to enable CTS or 'Auto' to have MP252 automatically decide whether or not to use this feature). CTS Protection Mode boosts your MP252's ability to intercept 802.11g and 802.11b transmissions. Conversely, CTS Protection Mode decreases performance. Leave this feature disabled unless you encounter severe communication difficulties between MP252 and 802.11g products.
3. In the ‘Beacon Interval’ field, enter how often the beacon packet is sent. A beacon is a packet broadcast by MP252 to synchronize the wireless network.
4. In the ‘DTIM Interval’ field, enter the Delivery Traffic Indication Message (DTIM) countdown value that informs wireless clients of the next opportunity to receive multicast and broadcast messages. This value ranges between 1 and 16384.
5. In the ‘Fragmentation Threshold’ field, enter the packet size threshold above which packets are fragmented into multiple packets. Try to increase the fragmentation threshold if you encounter high packet error rates. Do not set the threshold too low, since this can result in reduced networking performance.
6. In the ‘RTS Threshold’ field, enter the packet threshold size below which the Request to Send (RTS) / Clear to Send (CTS) mechanism are not active. MP252 sends RTS packets to the wireless client to negotiate the dispatching of data. The wireless client responds with a CTS packet, signaling that transmission can commence. If you encounter inconsistent data flow, try a slight reduction in the RTS threshold size.

12.2.1.3.6 Adding Virtual Access Points

You can set up multiple virtual wireless LAN's on MP252, limited. Such virtual wireless LANs are referred to as "Virtual APs" (virtual access points). In the **Wireless** tab's screen, under the section 'Virtual APs' section, MP252's physical wireless access point is displayed first, and on top of which virtual connections may be created.

Figure 12-48: Virtual APs Table



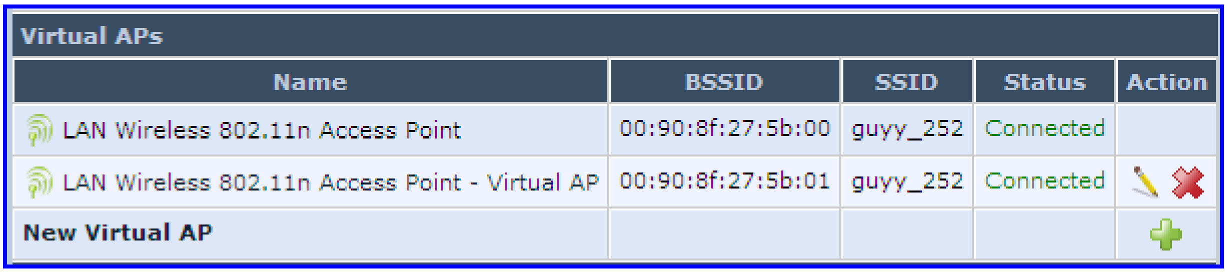
Virtual APs

Name	BSSID	SSID	Status	Action
LAN Wireless 802.11n Access Point	00:90:8f:27:5b:00	guyy_252	Connected	
New Virtual AP				✚

➢ To create a virtual connection:

1. In the **Wireless** tab's screen, under the section 'Virtual APs' section, click the **New Virtual AP** link; the screen refreshes, displaying the new virtual connection.

Figure 12-49: New Virtual AP



Virtual APs

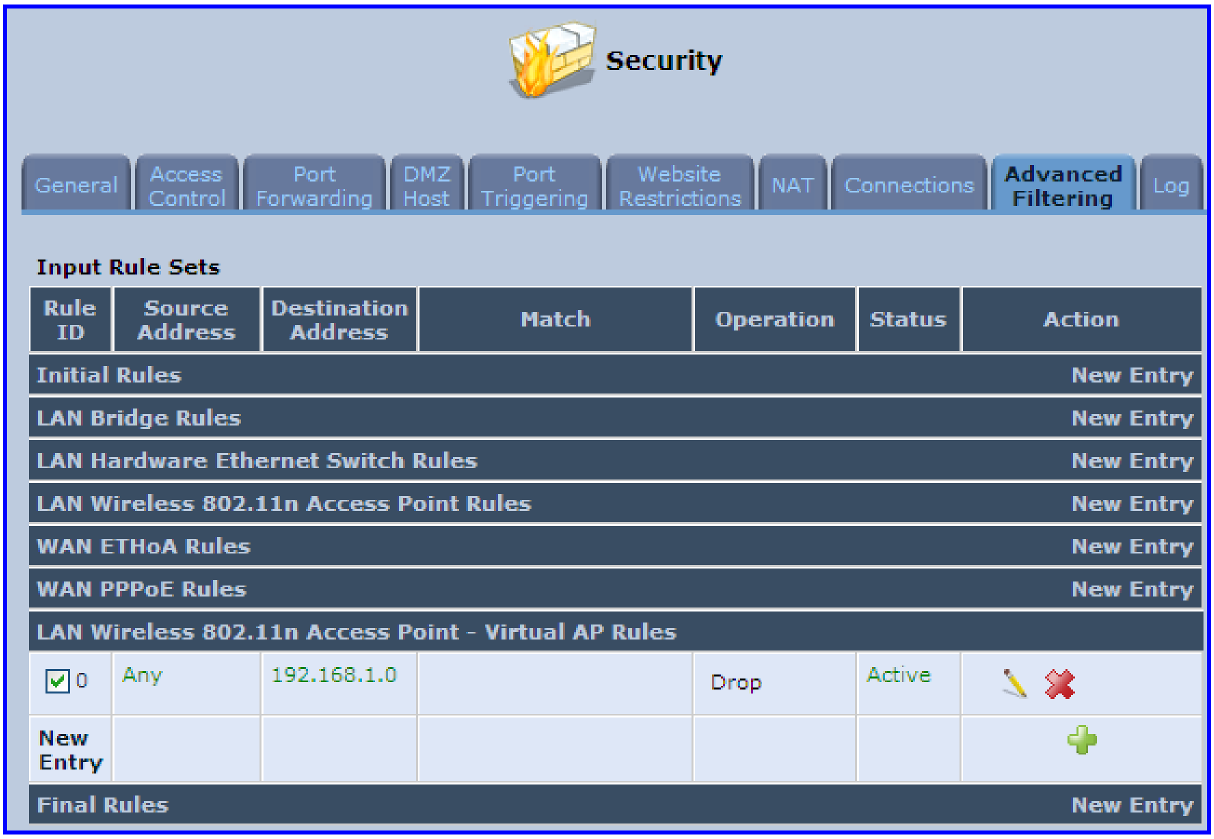
Name	BSSID	SSID	Status	Action
LAN Wireless 802.11n Access Point	00:90:8f:27:5b:00	guyy_252	Connected	
LAN Wireless 802.11n Access Point - Virtual AP	00:90:8f:27:5b:01	guyy_252	Connected	✎ ✖
New Virtual AP				✚

The new virtual connection is also added to the list of connections in the 'Network Connections' screen (**Network Connections** menu), and is configurable like any other connection (by clicking its corresponding **Edit** ✎ icon).

A useful implementation of Virtual AP's is to define a virtual connection with a different SSID value to dedicate it for guest access. Through this connection, guests are able to access the WAN, but they are denied access to other wireless LANs provided by MP252. To do so, perform the following:

2. Set a firewall rule that blocks access to all other MP252 LANs (**Security** menu > **Advanced Filtering** tab).

Figure 12-50: Firewall Blocking Access to All Other LANs



Input Rule Sets

Rule ID	Source Address	Destination Address	Match	Operation	Status	Action
Initial Rules						New Entry
LAN Bridge Rules						New Entry
LAN Hardware Ethernet Switch Rules						New Entry
LAN Wireless 802.11n Access Point Rules						New Entry
WAN ETHoA Rules						New Entry
WAN PPPoE Rules						New Entry
LAN Wireless 802.11n Access Point - Virtual AP Rules						
☑ 0	Any	192.168.1.0		Drop	Active	✎ ✖
New Entry						✚
Final Rules						New Entry

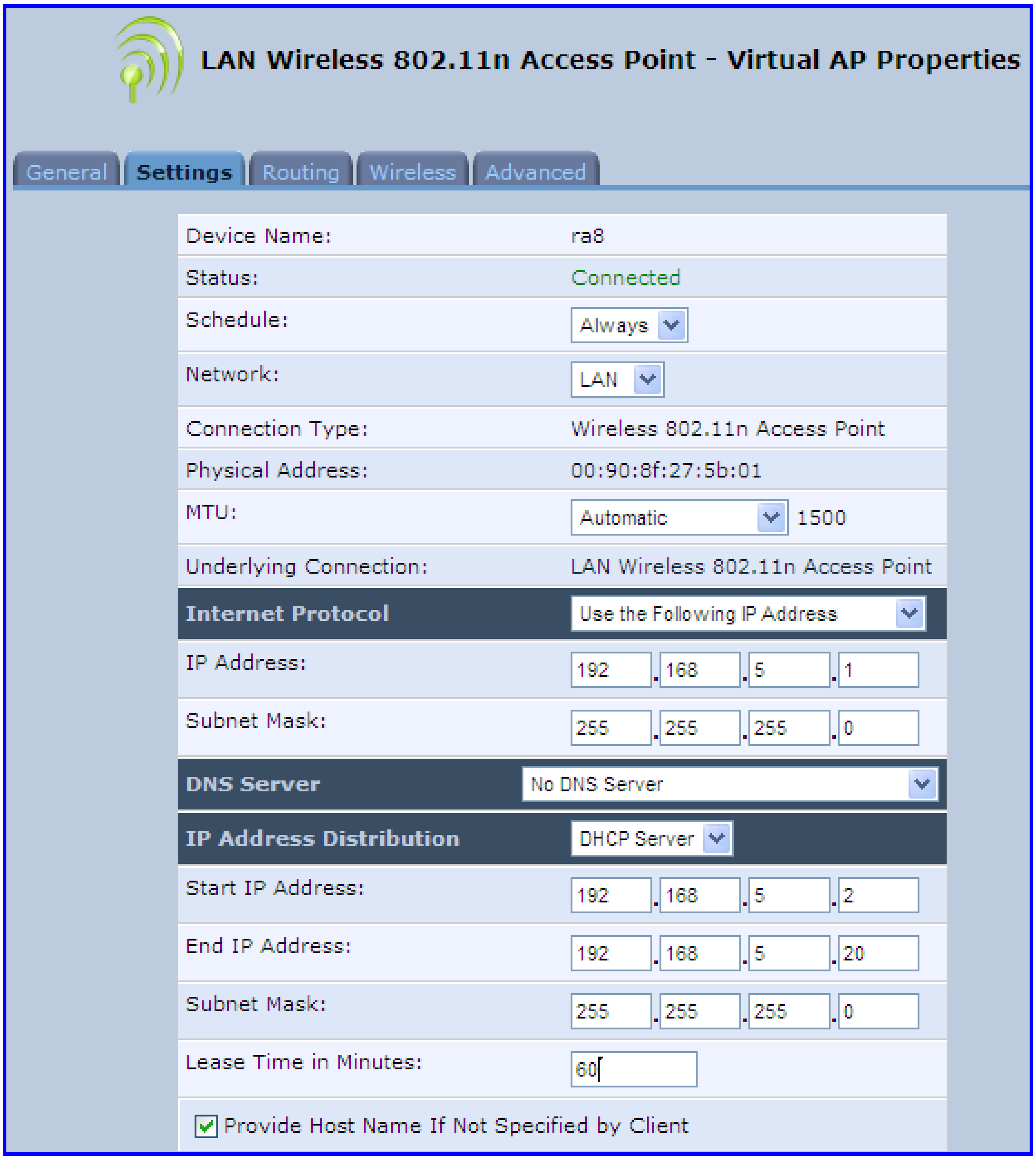
3. In the **Wireless** tab's screen, click the **Edit** ✎ icon corresponding to the Virtual AP to open the virtual connection's 'LAN Wireless 802.11n Access Point - Virtual AP Properties' screen:

   a. In the 'Internet Protocol' section under the 'Settings' sub-tab, enter an IP address for the connection by selecting 'Use the Following IP Address'.

b. In the 'IP Address Distribution' section, select 'DHCP Server' and enter the IP range from which IP addresses will be granted to wireless guests.

c. Click **OK**.

Figure 12-51: Example Virtual AP



LAN Wireless 802.11n Access Point - Virtual AP Properties

Device Name:	ra8
Status:	Connected
Schedule:	Always
Network:	LAN
Connection Type:	Wireless 802.11n Access Point
Physical Address:	00:90:8f:27:5b:01
MTU:	Automatic 1500
Underlying Connection:	LAN Wireless 802.11n Access Point
Internet Protocol	Use the Following IP Address
IP Address:	192 . 168 . 5 . 1
Subnet Mask:	255 . 255 . 255 . 0
DNS Server	No DNS Server
IP Address Distribution	DHCP Server
Start IP Address:	192 . 168 . 5 . 2
End IP Address:	192 . 168 . 5 . 20
Subnet Mask:	255 . 255 . 255 . 0
Lease Time in Minutes:	60

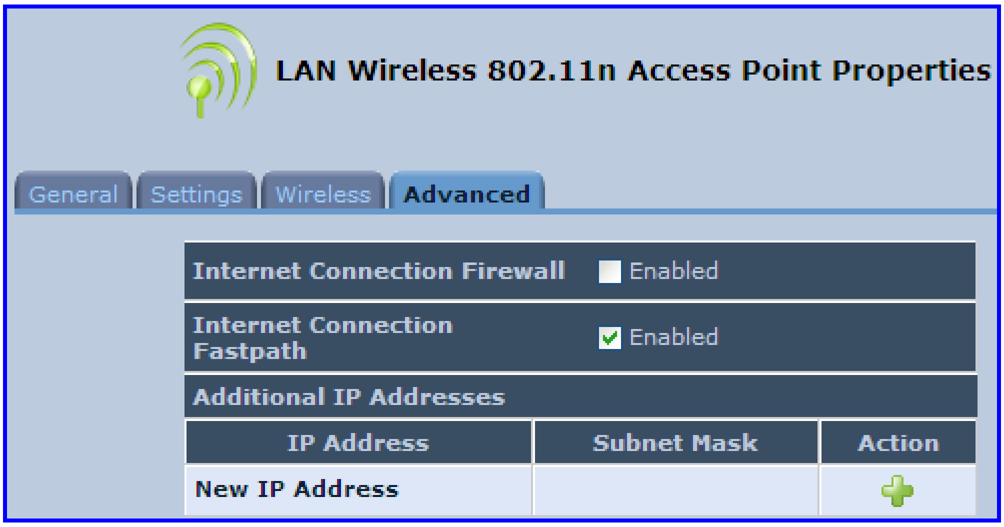
☑ Provide Host Name If Not Specified by Client

After performing this procedure, you have secured all of your wireless connections. A guest is only able to connect to the "Guests" wireless LAN, from which only the WAN access is granted.

12.2.1.4 Advanced Tab

The **Advanced** tab allows you to enable your firewall on your wireless network connection as well as define alias names.

Figure 12-52: Wireless Advanced Tab



Internet Connection Firewall	□ Enabled
Internet Connection Fastpath	☑ Enabled

Additional IP Addresses

IP Address	Subnet Mask	Action
New IP Address		✚

- **Internet Connection Firewall:** Your MP252's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box.
- **Internet Connection Fastpath:** Select this check box to utilize the Fastpath algorithm for enhancing packet flow, resulting in faster communication between the LAN and the WAN
- **Additional IP Addresses:** You can add alias names (additional IP addresses) to MP252 by clicking the **New IP Address** link. This enables you to access MP252 using these aliases in addition to the IP address (e.g., 192.168.2.1) and http://mp252.home.

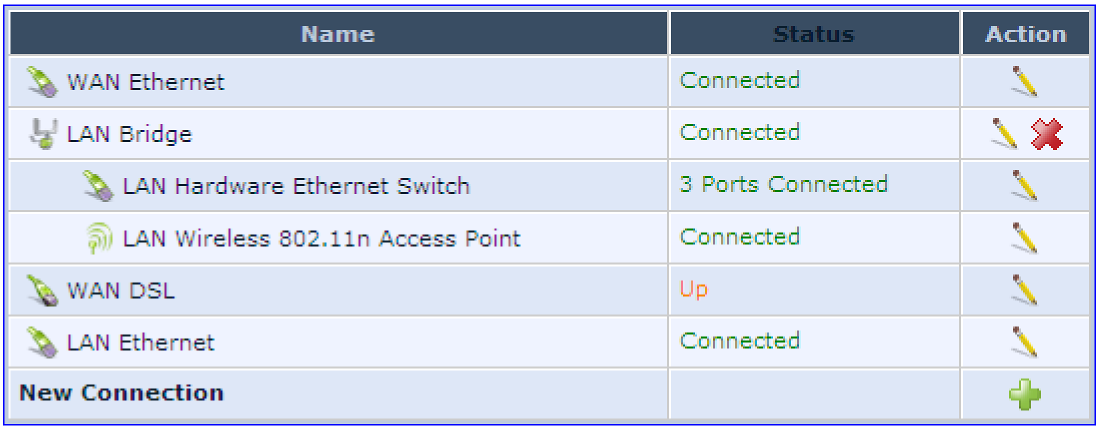
12.2.2 LAN Hardware Ethernet Switch

The LAN Hardware Ethernet Switch interface represents the physical ports on MP252.

➢ **To configure the LAN hardware Ethernet switch:**

4. From the menu bar, click the **Network Connections** menu; the 'Network Connections' screen appears.

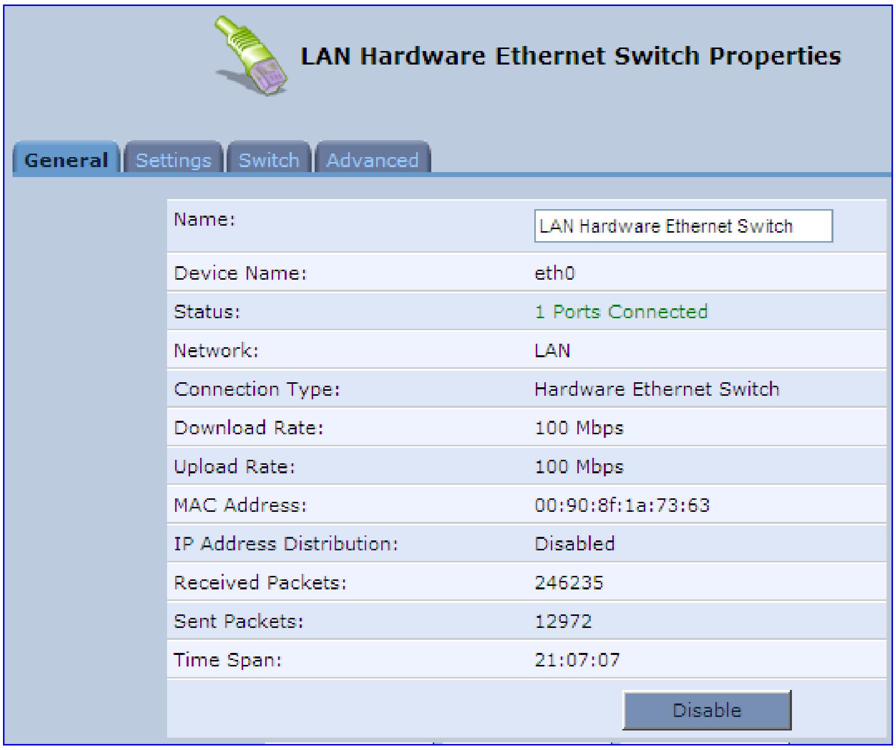
Figure 12-53: Network Connections Screen



Name	Status	Action
WAN Ethernet	Connected	✎
LAN Bridge	Connected	✎ ✖
LAN Hardware Ethernet Switch	3 Ports Connected	✎
LAN Wireless 802.11n Access Point	Connected	✎
WAN DSL	Up	✎
LAN Ethernet	Connected	✎
New Connection		✚

5. Click the **LAN Hardware Ethernet Switch** link; the **LAN Hardware Ethernet Switch Properties** screen appears:

Figure 12-54: LAN Hardware Ethernet Switch Screen



LAN Hardware Ethernet Switch Properties

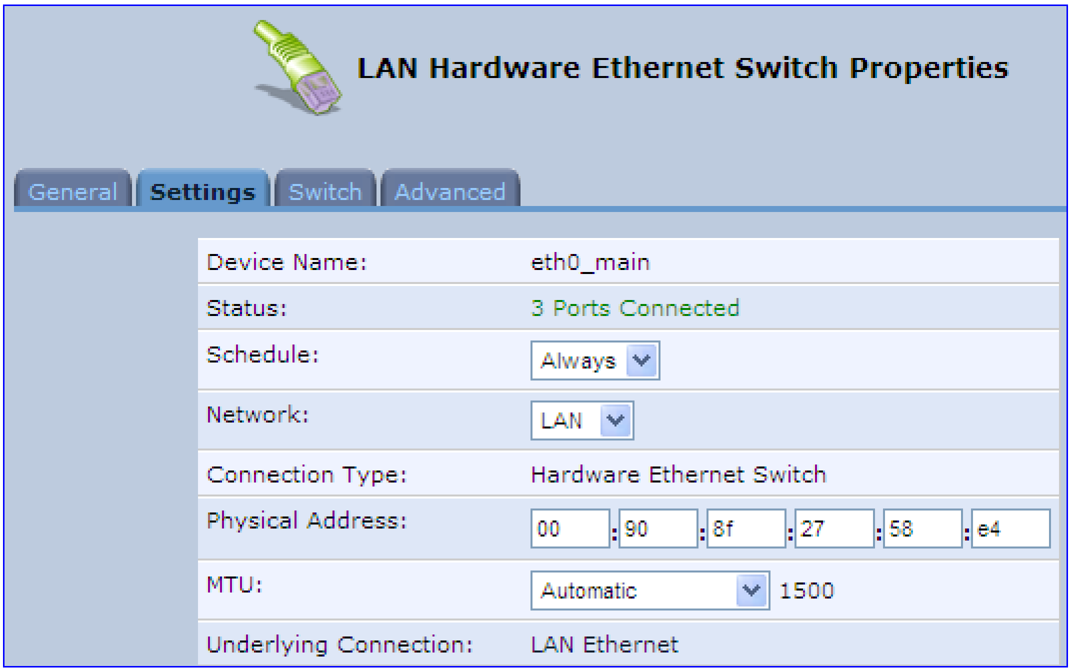
Name:	LAN Hardware Ethernet Switch
Device Name:	eth0
Status:	1 Ports Connected
Network:	LAN
Connection Type:	Hardware Ethernet Switch
Download Rate:	100 Mbps
Upload Rate:	100 Mbps
MAC Address:	00:90:8f:1a:73:63
IP Address Distribution:	Disabled
Received Packets:	246235
Sent Packets:	12972
Time Span:	21:07:07

6. The **General** tab allows you to assign a name to this connection as well as disable or enable the connection, by clicking the **Enable** or **Disable** buttons respectively.

12.2.2.1 Settings Tab

The **Settings** tab screen is displayed below:

Figure 12-55: LAN Hardware Ethernet Switch Screen – Settings Tab



LAN Hardware Ethernet Switch Properties

Device Name:	eth0_main
Status:	3 Ports Connected
Schedule:	Always
Network:	LAN
Connection Type:	Hardware Ethernet Switch
Physical Address:	00 : 90 : 8f : 27 : 58 : e4
MTU:	Automatic 1500
Underlying Connection:	LAN Ethernet

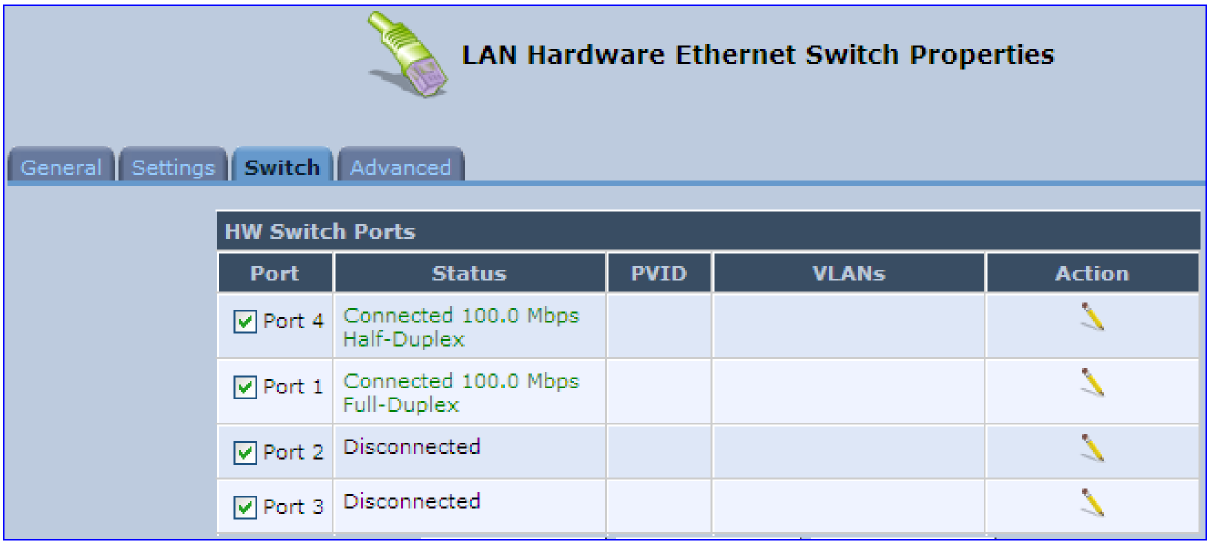
The **Settings** tab provides you with the following parameters

- **Schedule:** By default, the connection is always active. However, you can configure scheduler rules to define time segments during which the connection is active. Once a scheduler rule(s) is defined, the drop-down list allows you to choose between the available rules.
- **Network:** Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection.
- **Physical Address:** The physical address of the network card used for your network. Some cards allow you to change this address.
- **MTU:** Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

12.2.2.2 Switch Tab

The **Switch** tab screen is displayed below:

Figure 12-56: LAN Hardware Ethernet Switch Screen – Switch Tab



LAN Hardware Ethernet Switch Properties

HW Switch Ports

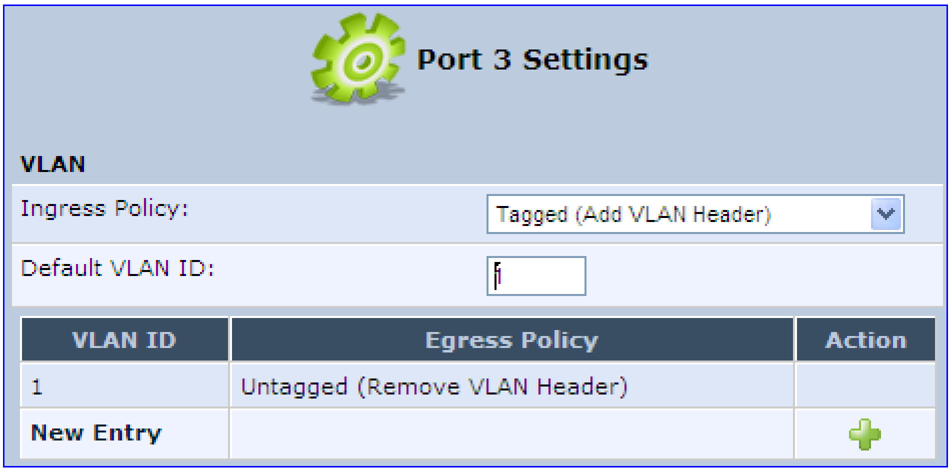
Port	Status	PVID	VLANs	Action
☑ Port 4	Connected 100.0 Mbps Half-Duplex			✎
☑ Port 1	Connected 100.0 Mbps Full-Duplex			✎
☑ Port 2	Disconnected			✎
☑ Port 3	Disconnected			✎

The **Switch** tab screen displays the hardware switch ports properties. The switch ports are physical sockets on the MP252 to which different cables connect. The table in this screen consists of a list of all available ports, their status, and the VLANs of which they are members. Untagged packets (packets without a VLAN tag) that arrive at a port are tagged with the VLAN number that appears under the Port VLAN Identifier (‘PVID’) column.

➢ To edit the configuration of a port:

1. Click a connected port's **Edit** ✎ icon.

Figure 12-57: Port Settings Screen



Port 3 Settings

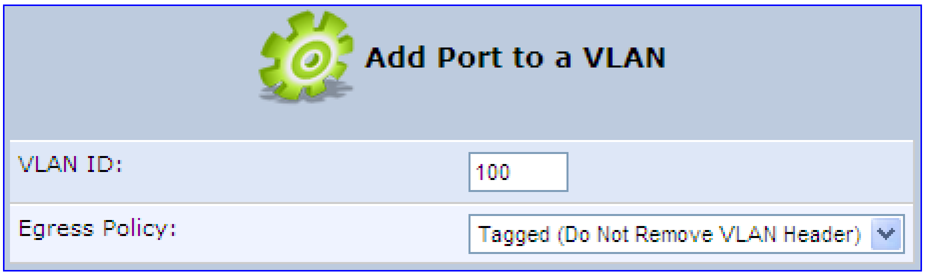
VLAN

Ingress Policy: Tagged (Add VLAN Header)

Default VLAN ID: 1

VLAN ID	Egress Policy	Action
1	Untagged (Remove VLAN Header)	
New Entry		✚

2. Ingress (incoming packets):
   a. From the ‘Ingress Policy’ drop-down list, select whether or not to tag incoming packets with the port's VLAN header.
   b. If the 'Tagged (Add VLAN Header)' option is selected, in the ‘Default VLAN ID’ field, enter the port's VLAN identifier.
3. Egress (outgoing packets):
   a. Click the **New** ✚ icon; the Add Port to a VLAN screen appears.



Add Port to a VLAN

VLAN ID:	100
Egress Policy:	Tagged (Do Not Remove VLAN Header)

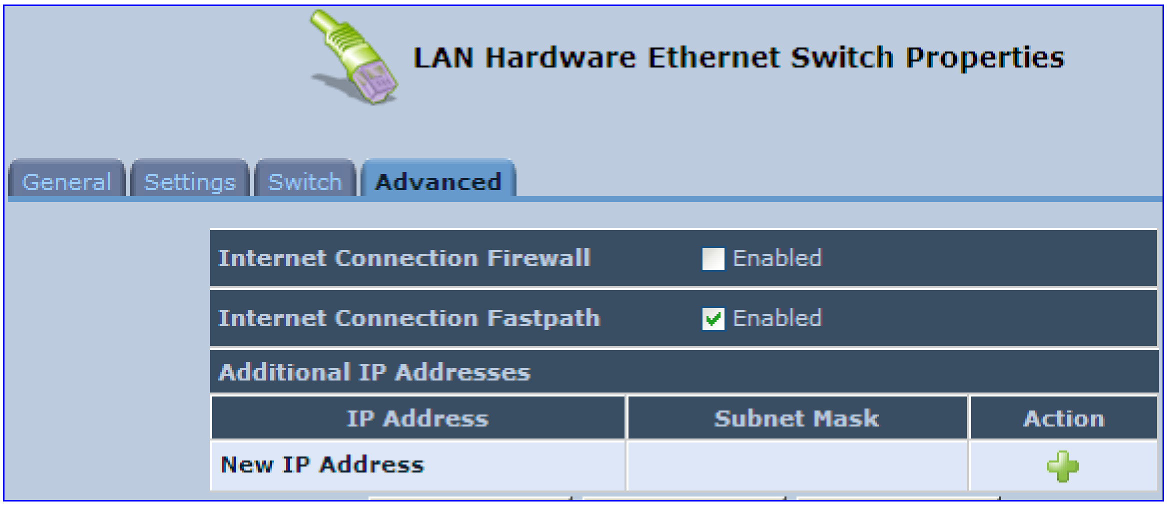
b. In the ‘VLAN ID’ field, enter the VLAN ID for this port.

c. From the ‘Egress Policy’ drop-down list, select whether or not to remove the VLAN tag from outgoing packets.

12.2.2.3 Advanced Tab

The **Advanced** tab screen is displayed below:

Figure 12-58: LAN Hardware Ethernet Switch Screen – Advanced Tab



LAN Hardware Ethernet Switch Properties

Internet Connection Firewall	□ Enabled
Internet Connection Fastpath	☑ Enabled

Additional IP Addresses

IP Address	Subnet Mask	Action
New IP Address		+

- **Internet Connection Firewall:** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box.
- **Internet Connection Fastpath:** Select this check box to utilize the Fastpath algorithm for enhancing packet flow, resulting in faster communication between the LAN and the WAN. By default, this feature is enabled.
- **Additional IP Addresses:** You can add alias names (additional IP addresses) to the gateway by clicking the 'New IP Address' link. This enables you to access the gateway using these aliases in addition to the IP address (e.g., 192.168.2.1) and the http://mp252.home.

12.3 Editing Network Connections and Advanced Configuration

You can edit created network connections listed in the 'Network Connections' screen. Editing network connections also allows you to perform additional configuration which is unavailable when first creating the network connection.

As many of the editing screens are similar between the different network connections, this section only provides a general description of the screens provided when the connection’s **Edit** ✎ icon is clicked.

12.3.1 General Tab

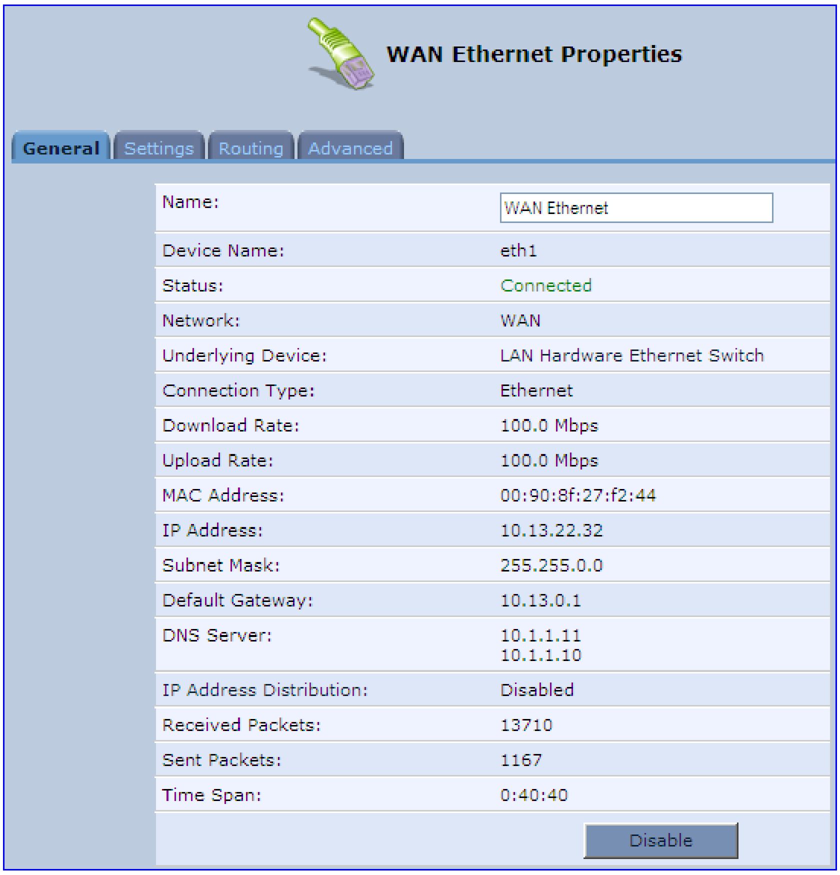
The **General** tab displays mainly read-only properties of the connection.

The main actions that can be done in this tab screen includes the following:

- Modifying the connection name – in the 'Name' field
- Enabling and disabling the connection, by clicking the **Enable** or **Disable** button respectively

Below shows an example of a General tab screen, displaying the 'Name' field and the **Disable** button.

Figure 12-59: Editing Connection - General Tab (For Example, WAN Ethernet)

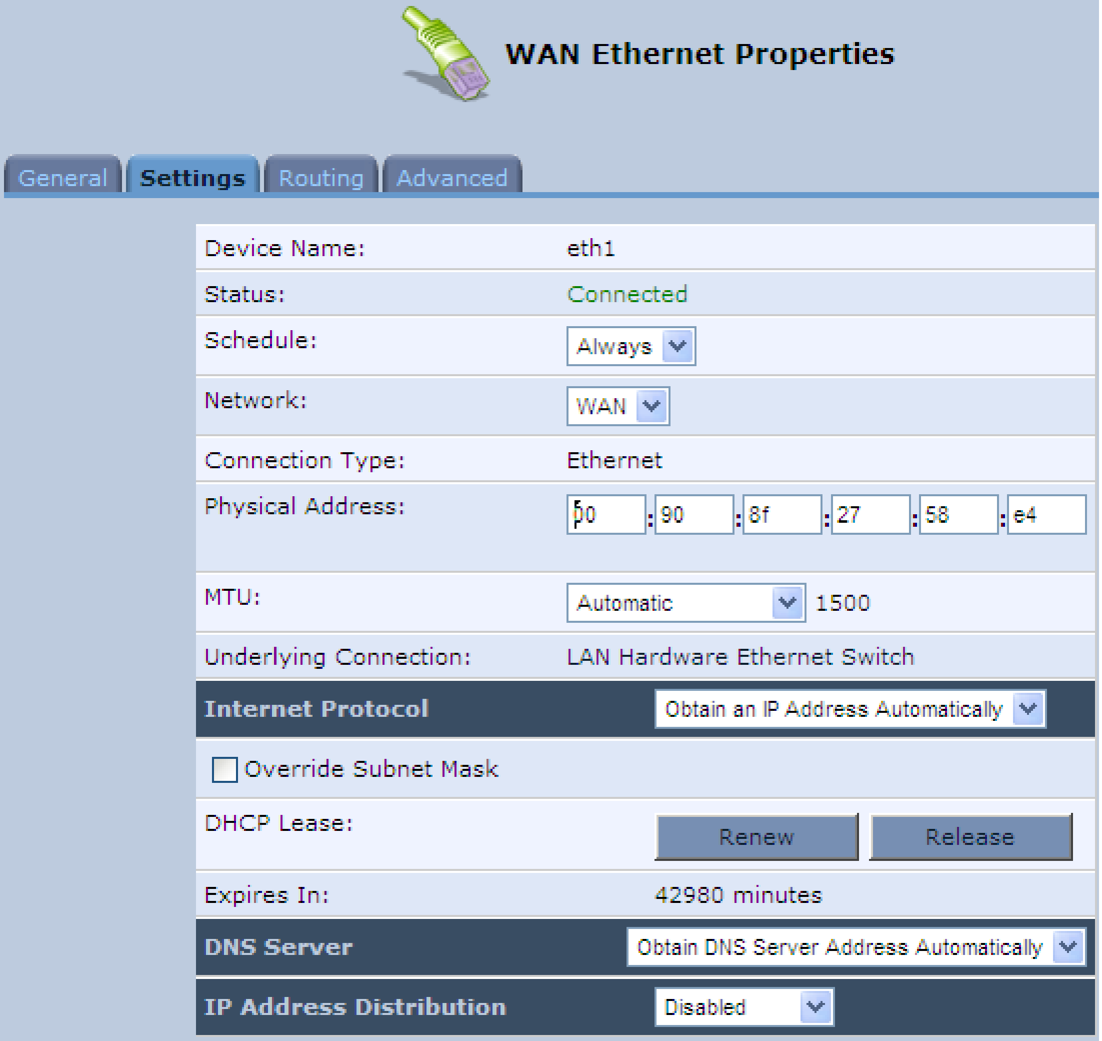


Name:	WAN Ethernet
Device Name:	eth1
Status:	Connected
Network:	WAN
Underlying Device:	LAN Hardware Ethernet Switch
Connection Type:	Ethernet
Download Rate:	100.0 Mbps
Upload Rate:	100.0 Mbps
MAC Address:	00:90:8f:27:f2:44
IP Address:	10.13.22.32
Subnet Mask:	255.255.0.0
Default Gateway:	10.13.0.1
DNS Server:	10.1.1.11 10.1.1.10
IP Address Distribution:	Disabled
Received Packets:	13710
Sent Packets:	1167
Time Span:	0:40:40

12.3.2 Settings Tab

The top part of the Settings tab screen displays general communication parameters. It is recommended not to change the default values in this screen unless you are familiar with the networking concepts they represent. Since your MP252 is configured to operate with the default values, no parameter modification is necessary.

Figure 12-60: Editing Connection - Settings Tab (For Example, WAN Ethernet)



Device Name: eth1

Status: Connected

Schedule: Always

Network: WAN

Connection Type: Ethernet

Physical Address: 00 : 90 : 8f : 27 : 58 : e4

MTU: Automatic 1500

Underlying Connection: LAN Hardware Ethernet Switch

Internet Protocol: Obtain an IP Address Automatically

□ Override Subnet Mask

DHCP Lease:

Expires In: 42980 minutes

DNS Server: Obtain DNS Server Address Automatically

IP Address Distribution: Disabled

The Settings tab screen allows you to configure the following:

Table 12-2: Settings Tab - Parameter Descriptions

Parameter	Description
Schedule	You can select a Scheduler rule that defines time segments during which the connection is active. To configure scheduler rules, see Section 4.5.1 on page 47.
Network	Select whether the connection relates to a LAN, WAN, or DMZ connection. Every network connection can be configured as one of these types. This provides flexibility and increased functionality. For example, you may define that a LAN Ethernet connection on MP252 operates as a WAN network. This means that all hosts in this LAN will be referred to as WAN computers, both by computers outside MP252 and by MP252 itself. WAN and firewall rules may be applied, such as on any other WAN network. Another example, is that a network connection can be defined as a DMZ (Demilitarized) network. Although the network is physically inside MP252, it will function as an unsecured, independent network, for which MP252 merely acts as a router.
Physical Address	The physical address of the network card used for your network.

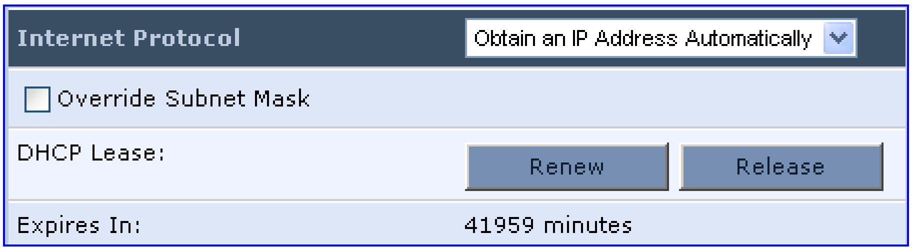
Parameter	Description
MTU	Maximum Transmission Unit (MTU) species the largest packet size permitted for Internet transmission. In the default setting, ‘Automatic’, the MP252 selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you change to ‘Manual’, you can enter the largest packet size, you should leave this value in the 1200 to 1500 range.
Internet Protocol	For a description, see Section 12.3.2.1.

12.3.2.1 Internet Protocol Settings

The 'Internet Protocol' group defines the Internet Protocol options. Select one of the following Internet Protocol options from the 'Internet Protocol' drop-down list:

- **No IP Address**
- **Obtain an IP Address Automatically:** Your WAN connection is configured by default to act as a DHCP client. You should keep this configuration in case your service provider supports DHCP, or if you are connecting using a dynamic IP address.

Figure 12-61: Automatically Obtaining an IP Address



Internet Protocol: Obtain an IP Address Automatically

□ Override Subnet Mask

DHCP Lease:

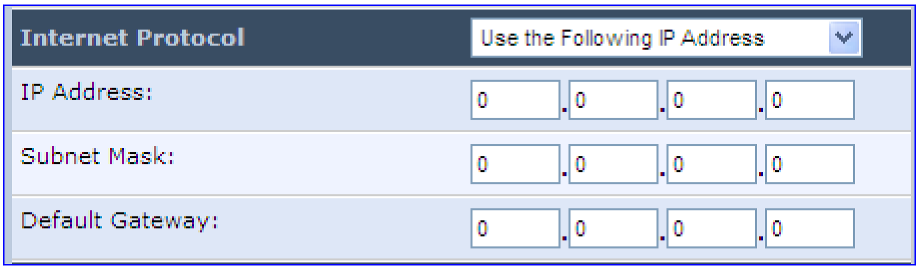
Expires In: 41959 minutes

The server that assigns the MP252 with an IP address also assigns a subnet mask. You can override the dynamically assigned subnet mask by selecting the 'Override Subnet Mask' check box and specifying your own mask instead.

You can click the **Release** button to release the current leased IP address. Once the address has been released, the button text changes to 'Renew'. Use the **Renew** button to renew the leased IP address.

For defining DNS and DHCP servers, see sections 12.3.2.1.1 and 12.3.2.1.2 respectively.

- **Use the Following IP Address:** Your WAN connection can be configured using a permanent (static) IP address. Your service provider should provide you with this IP address, subnet mask and the default MP252 IP address.



Internet Protocol	Use the Following IP Address
IP Address:	0 . 0 . 0 . 0
Subnet Mask:	0 . 0 . 0 . 0
Default Gateway:	0 . 0 . 0 . 0

For defining DNS and DHCP servers, see sections 12.3.2.1.1 and 12.3.2.1.2 respectively.

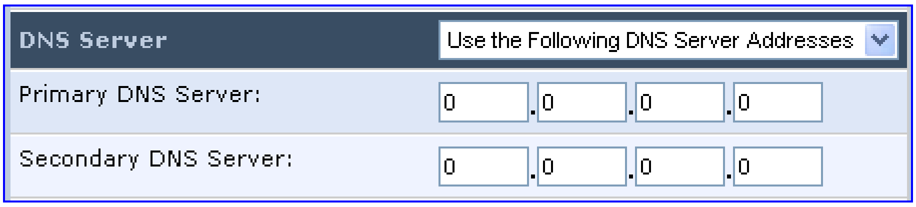
12.3.2.1.1 DNS Server

Domain Name System (DNS) is the method by which websites or domain names are translated into IP addresses. You can configure the connection to automatically obtain a DNS server address, or specify such an address manually, according to the information provided by your ISP.

From the 'DNS Server' drop-down list, you can select one of the following methods:

- **Obtain DNS Server Address Automatically:** the connection automatically obtains a DNS server address.
- **Use the Following DNS Server Addresses:** manually configure DNS server - specify up to two different DNS server addresses - one primary, the other secondary:

Figure 12-62: Manually Defining DNS Server



DNS Server	Use the Following DNS Server Addresses
Primary DNS Server:	0 . 0 . 0 . 0
Secondary DNS Server:	0 . 0 . 0 . 0

- **No DNS Server:** select this if there is no DNS server.

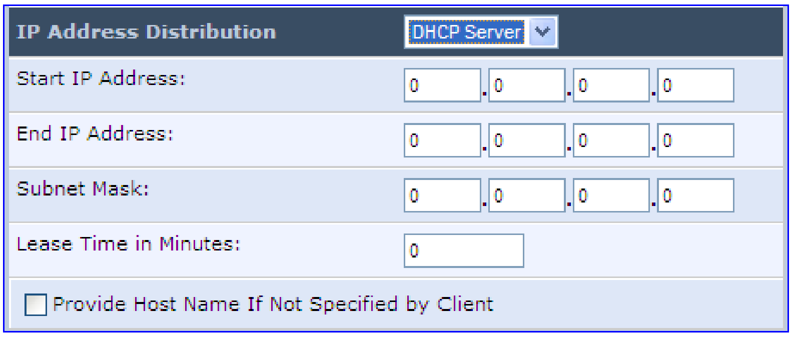
12.3.2.1.2 IP Address Distribution

The 'IP Address Distribution' section allows you to configure the device's Dynamic Host Configuration Protocol (DHCP) server parameters. The DHCP automatically assigns IP addresses to network PCs. If you enable this feature, make sure that you also configure your network PCs as DHCP clients.

Select one of the following options from the 'IP Address Distribution' drop-down list:

- **Disabled:** Select this option to statically assign IP addresses to your network computers.
- **DHCP Server:** Enables DHCP server:

Figure 12-63: IP Address Distribution - DHCP Server



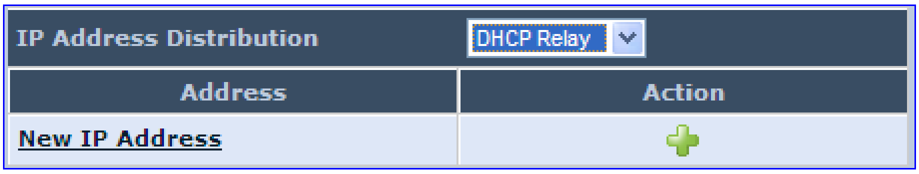
IP Address Distribution	DHCP Server
Start IP Address:	0 . 0 . 0 . 0
End IP Address:	0 . 0 . 0 . 0
Subnet Mask:	0 . 0 . 0 . 0
Lease Time in Minutes:	0

□ Provide Host Name If Not Specified by Client

- **Start IP Address:** The first IP address that may be assigned to a LAN host. Since the device's default IP address is 192.168.2.1, this address must be 192.168.2.2 or greater.
- **End IP Address:** The last IP address in the range that can be used to automatically assign IP addresses to LAN hosts.
- **Subnet Mask:** A mask used to determine to what subnet an IP address belongs.
- **Lease Time In Minutes:** Each device is assigned an IP address by the DHCP server for this amount of time when it connects to the network. When the lease expires, the server determines if the computer has disconnected from the network. If it has, the server may reassign this IP address to a newly-connected computer. This feature ensures that IP addresses that are not in use become available for other computers on the network.
- **Provide Host Name If Not Specified by Client:** If the DHCP client does not have a host name, the device automatically assigns one for him

- **DHCP Relay:** The MP252 can act as a DHCP relay in case you would like to dynamically assign IP addresses from a DHCP server other than MP252's DHCP server. Note that when selecting this option, you must also change the device's WAN to work in routing mode.

Figure 12-64: IP Address Distribution - DHCP Relay

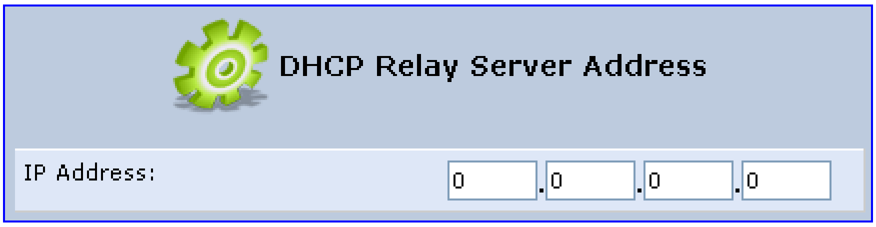


IP Address Distribution: DHCP Relay

Address	Action
New IP Address	✚

1. Click the **New** ✚ icon; the 'DHCP Relay Server Address' screen appears:

Figure 12-65: DHCP Relay Server Address



DHCP Relay Server Address

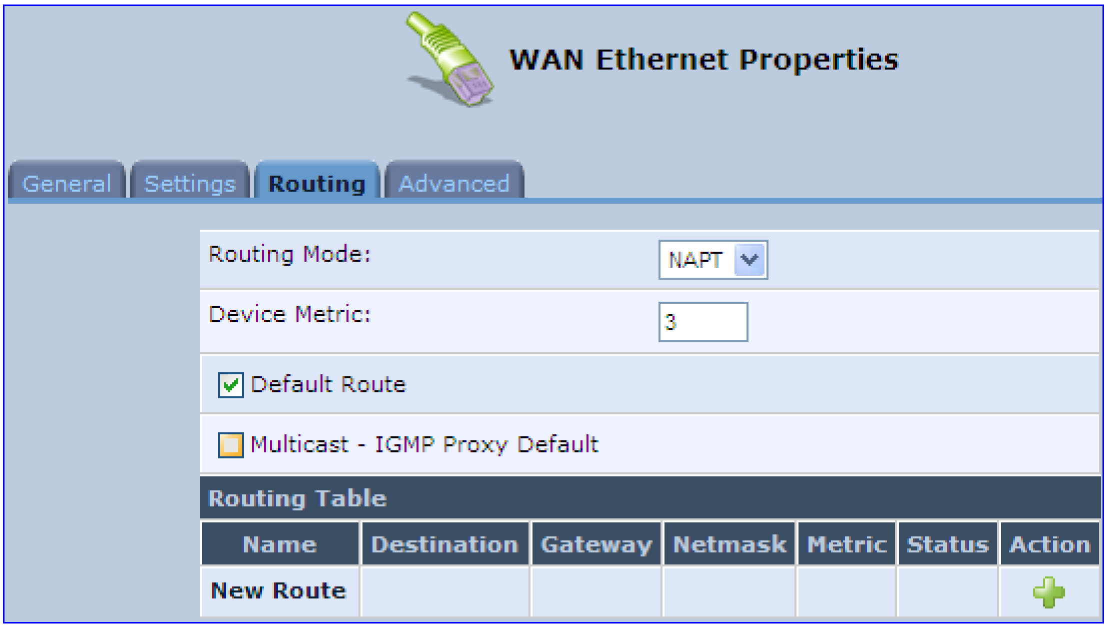
IP Address: 0 . 0 . 0 . 0

2. Specify the IP address of the DHCP server, and then click **OK** to save the settings.

12.3.3 Routing Tab

You can choose to setup your MP252 to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Figure 12-66: Editing Connection - Routing Tab (For Example, WAN Ethernet)



WAN Ethernet Properties

Routing Mode: NAPT

Device Metric: 3

☑ Default Route

□ Multicast - IGMP Proxy Default

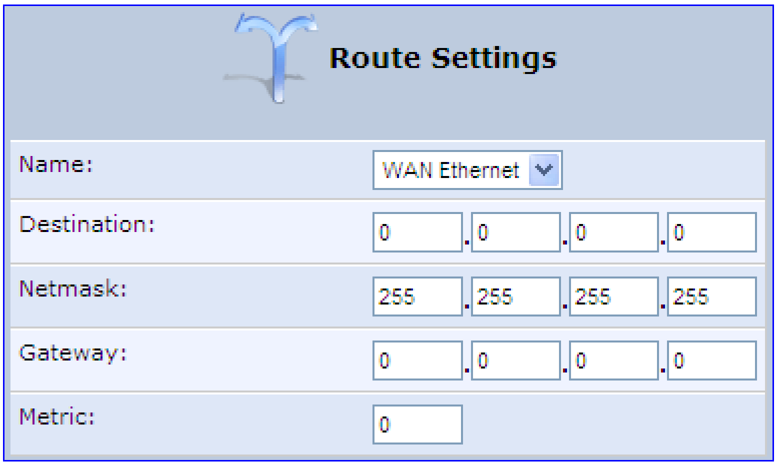
Routing Table

Name	Destination	Gateway	Netmask	Metric	Status	Action
New Route						✚

Table 12-3: Routing Parameters

Parameter	Description	
Routing Mode	Select one of the following Routing modes:	
	Route	Use route mode if you want your MP252 to function as a router between two networks.
	NAPT	Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.
Device Metric	The device metric is a value used by the MP252 to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.	
Default Route	Select this check box to define this device as a the default route.	
Multicast - IGMP Proxy Default	IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups.	
Routing Table	Allows you to add or modify routes when this device is active. Click the **New** ✚ icon to add a route (as shown in the figure below) or edit existing routes.	

Figure 12-67: Route Settings Screen



Route Settings

Name:	WAN Ethernet
Destination:	0 . 0 . 0 . 0
Netmask:	255 . 255 . 255 . 255
Gateway:	0 . 0 . 0 . 0
Metric:	0

- **Name:** Select the network device.
- **Destination:** destination host, subnet address, network address, or default route. The destination for a default route is 0.0.0.0.
- **Netmask:** Netmask used in conjunction with the destination to determine when a route is used.
- **Gateway:** Enter the MP252's IP address.
- **Metric:** A measurement of the preference of a route. Typically, the lowest metric is the most preferred route. If multiple routes exist to a given destination network, the route with the lowest metric is used.:

12.3.4 Wireless Tab

For a description of the **Wireless** tab, see Section **Error! Reference source not found.** on page **Error! Bookmark not defined.**.

Note: This tab is applicable only to LAN Wireless connections.

12.3.5 Switch Tab

For a description of the **Switch** tab, see Section 12.2.2.2 on page 168.

Note: This tab is applicable only to LAN Hardware Ethernet Switch connections.

12.3.6 Bridging Tab

For a description of the **Bridging** tab, see Section 12.5.1 on page 190.

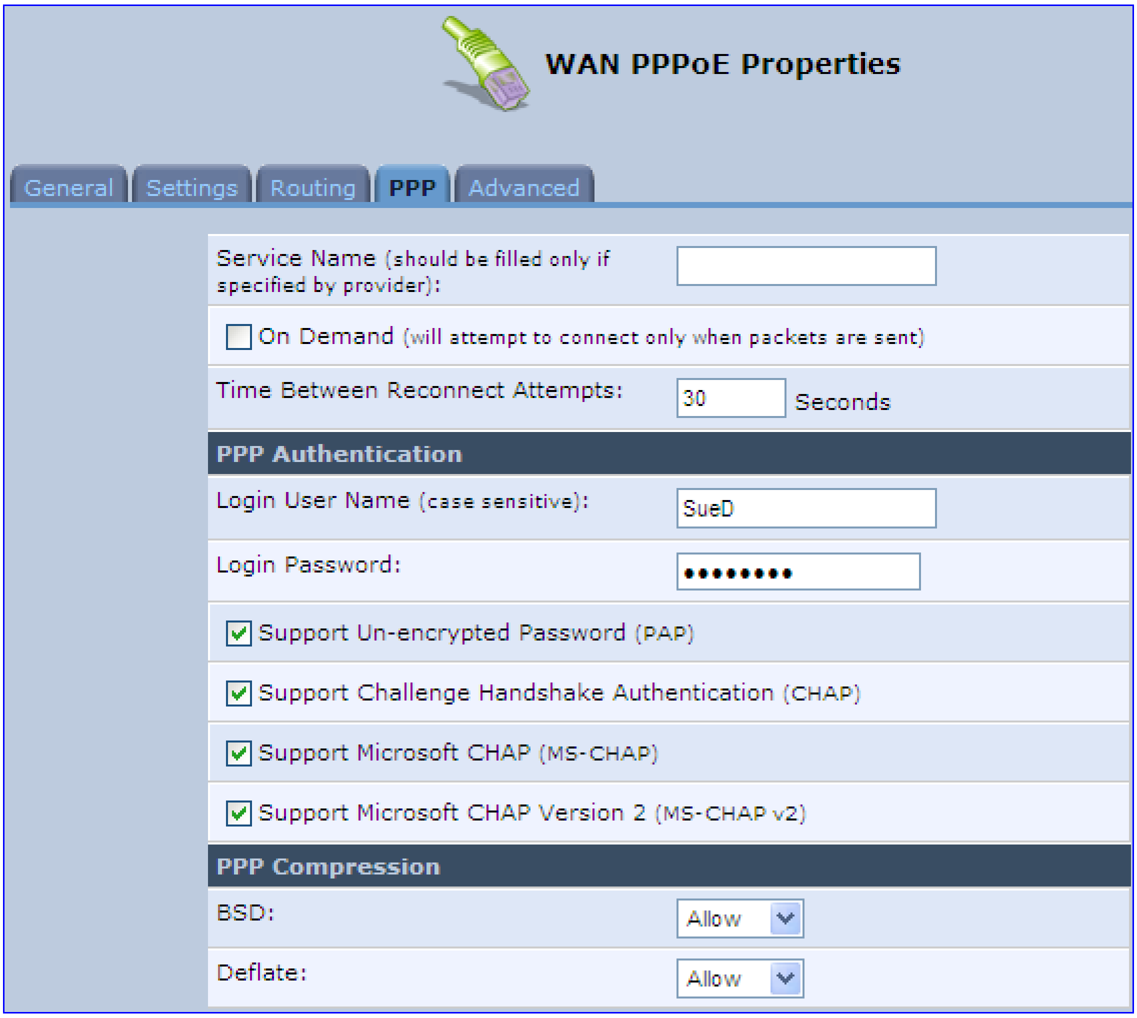
Note: This tab is applicable only to LAN-WAN Bridging connections.

12.3.7 PPP Tab

The **PPT** tab displays the PPPoE settings.

Note: This tab is applicable only to PPP connections.

Figure 12-68: Editing Connection - PPP Tab



Service Name (should be filled only if specified by provider):

□ On Demand (will attempt to connect only when packets are sent)

Time Between Reconnect Attempts: 30 Seconds

PPP Authentication

Login User Name (case sensitive): SueD

Login Password: ●●●●●●●●

☑ Support Un-encrypted Password (PAP)

☑ Support Challenge Handshake Authentication (CHAP)

☑ Support Microsoft CHAP (MS-CHAP)

☑ Support Microsoft CHAP Version 2 (MS-CHAP v2)

PPP Compression

BSD: Allow

Deflate: Allow

Table 12-4: PPP Tab Parameter Descriptions

Parameter	Description
On Demand	Use PPP on demand to initiate the PPP session only when packets are actually sent over the Internet.

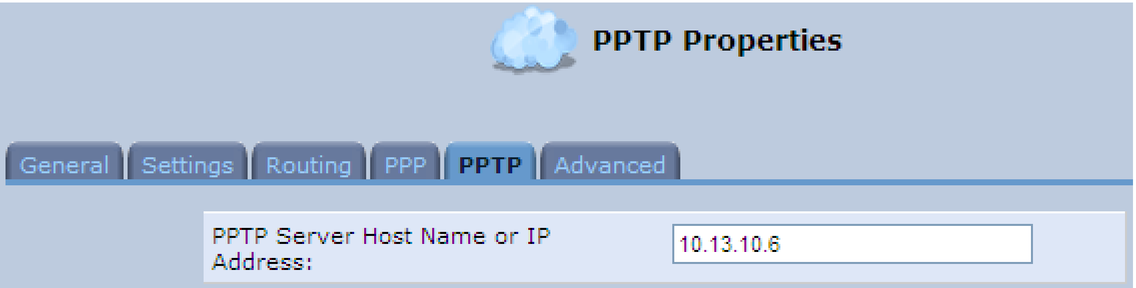
Parameter	Description
Idle Time Before Hanging Up	Specify the amount of idle time (during which no data is sent or received) that should elapse before the gateway disconnects the PPP connection. **Note:** This parameter appears only if On Demand is selected.
Time Between Reconnect Attempts	Specify the duration between PPP reconnected attempts, as provided by your ISP.
PPP Authentication	PPP supports four authentication protocols: Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP), Microsoft CHAP version 1, and Microsoft CHAP version 2. This section allows you to select the authentication protocols your MP252 may use when negotiating with a PPTP server. Select all the protocols if no information is available about the server's authentication protocols. Note that encryption is performed only if 'Microsoft CHAP', 'Microsoft CHAP version 2', or both are selected. ▪ **Login User Name:** login username according to ISP ▪ **Login Password:** login password according to ISP ▪ **Support Un-encrypted Password (PAP):** PAP is a simple, plaintext authentication scheme. The username and password are requested by your networking peer in plain text. PAP, however, is not a secure authentication protocol. Man-in-the-middle attacks can easily determine the remote access client's password. PAP offers no protection against replay attacks, remote client impersonation, or remote server impersonation. ▪ **Support Challenge Handshake Authentication (CHAP):** CHAP is a challenge-response authentication protocol that uses MD5 to hash the response to a challenge. CHAP protects against replay attacks by using an arbitrary challenge string per authentication attempt. ▪ **Support Microsoft CHAP:** Select this check box if you are communicating with a peer that uses Microsoft CHAP authentication protocol. ▪ **Support Microsoft CHAP Version 2**: Select this check box if you are communicating with a peer that uses Microsoft CHAP Version 2 authentication protocol.
PPP Compression	The PPP Compression Control Protocol (CCP) is responsible for configuring, enabling, and disabling data compression algorithms on both ends of the point-to-point link. It is also used to signal a failure of the compression/ decompression mechanism in a reliable manner. For each compression algorithm, select one of the following from the drop down menu. ▪ **Reject:** Reject PPP connections with peers that use the compression algorithm. ▪ **Allow:** Allow PPP connections with peers that use the compression algorithm. ▪ **Require:** Ensure a connection with a peer is using the compression algorithm.

12.3.8 PPTP tab

The **PPTP** tab displays the PPTP settings.

Note: This tab is applicable only to PPTP connections.

Figure 12-69: Editing Connection - PPTP Tab



PPTP Server Host Name or IP Address: 10.13.10.6

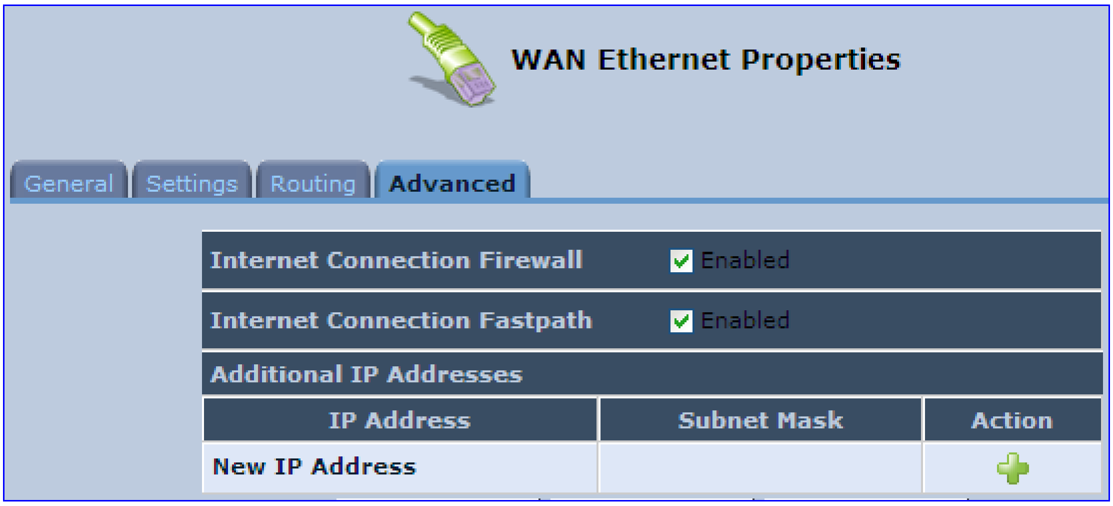
Table 12-5: PPTP Tab Parameter Descriptions

Parameter	Description
PPTP Server Host Name or IP Address	PPTP server host name or IP address provided by your ISP.

12.3.9 Advanced Tab

The **Advanced** tab provides various advanced configurations.

Figure 12-70: Editing Connection - Advanced Tab (For Example, WAN Ethernet)



Internet Connection Firewall ☑ Enabled

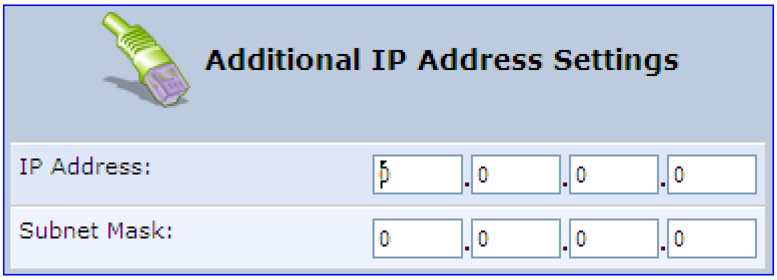
Internet Connection Fastpath ☑ Enabled

Additional IP Addresses

IP Address	Subnet Mask	Action
New IP Address		✚

- **Internet Connection Firewall:** Your MP252's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. You can click the **Internet Connection Firewall** link to access the 'Security' screen (see Section 14.1 on page 226).
- **Internet Connection Fastpath:** Select this check box to utilize the Fastpath algorithm for enhancing packet flow, resulting in faster communication between the LAN and the WAN.
- **Additional IP Addresses:** You can also add alias names (additional IP addresses) to the MP252, by clicking the **New** ✚ icon. This enables you to access the MP252 using these aliases in addition to the default IP addresses.

Figure 12-71: Additional IP Address Settings Screen



Additional IP Address Settings

IP Address: 5 . 0 . 0 . 0

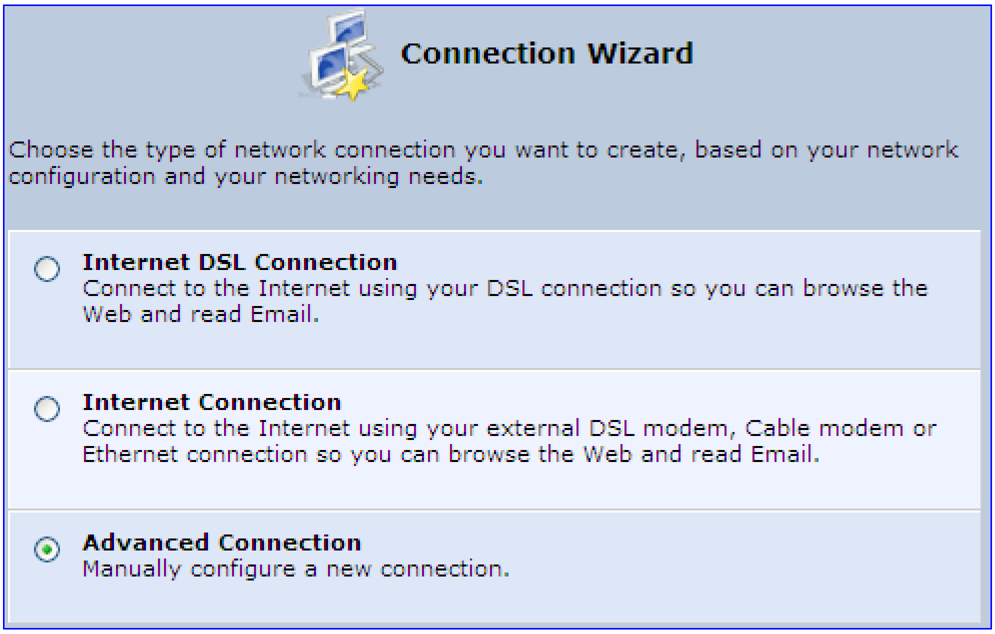
Subnet Mask: 0 . 0 . 0 . 0

12.4 VLAN Settings

➢ To create a new VLAN interface:

1. From the menu bar, click the **Network Connections** menu, and then in the screen 'Network Connections' click the **New** ✚ icon; the 'Connection Wizard' screen appears.

Figure 12-72: Connection Wizard Screen



Connection Wizard

Choose the type of network connection you want to create, based on your network configuration and your networking needs.

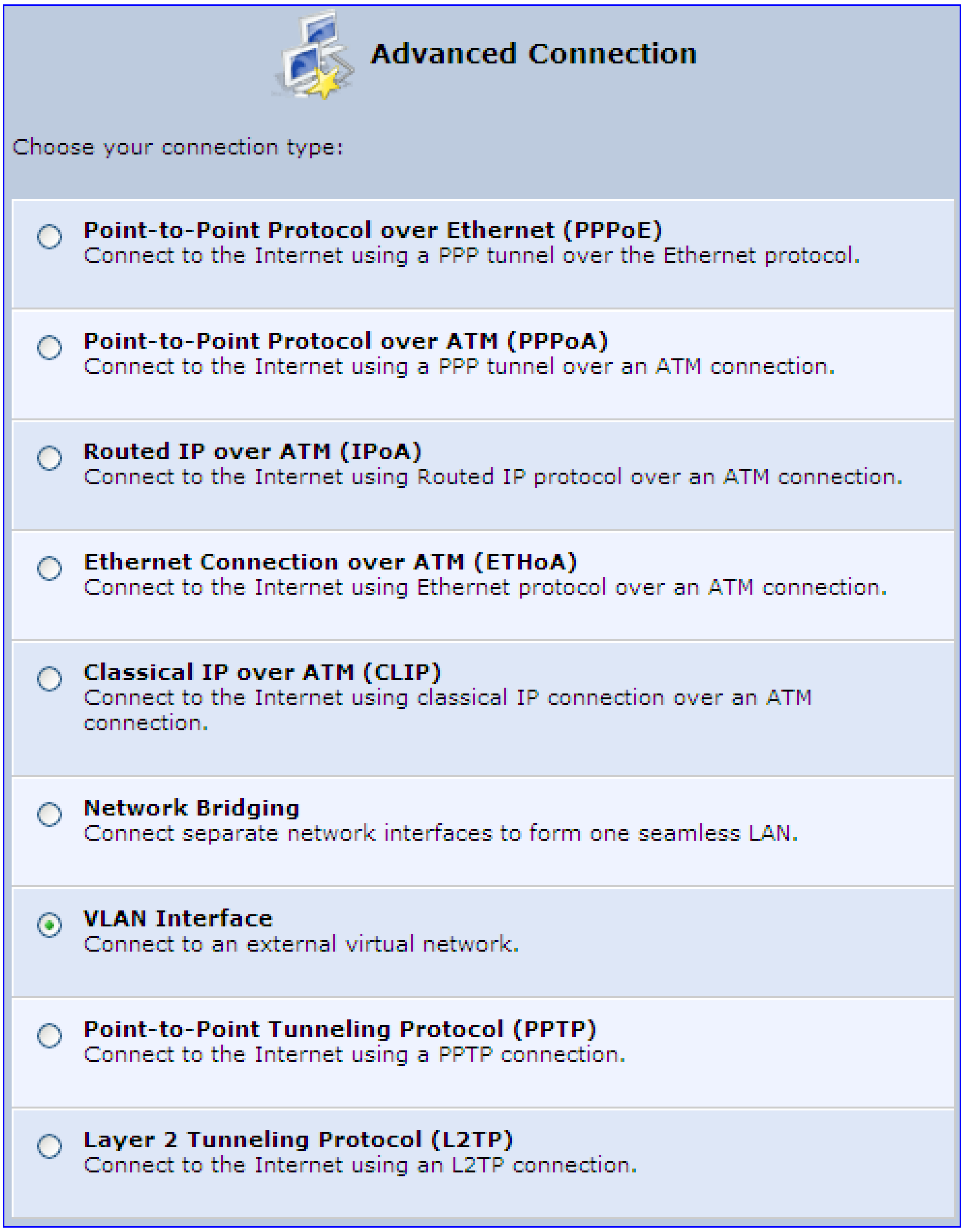
○ **Internet DSL Connection**
Connect to the Internet using your DSL connection so you can browse the Web and read Email.

○ **Internet Connection**
Connect to the Internet using your external DSL modem, Cable modem or Ethernet connection so you can browse the Web and read Email.

● **Advanced Connection**
Manually configure a new connection.

2. Select the 'Advanced Connection' option, and then click **Next**; the 'Advanced Connection' screen appears.

Figure 12-73: Advanced Connection



Advanced Connection

Choose your connection type:

○ **Point-to-Point Protocol over Ethernet (PPPoE)**
Connect to the Internet using a PPP tunnel over the Ethernet protocol.

○ **Point-to-Point Protocol over ATM (PPPoA)**
Connect to the Internet using a PPP tunnel over an ATM connection.

○ **Routed IP over ATM (IPoA)**
Connect to the Internet using Routed IP protocol over an ATM connection.

○ **Ethernet Connection over ATM (ETHoA)**
Connect to the Internet using Ethernet protocol over an ATM connection.

○ **Classical IP over ATM (CLIP)**
Connect to the Internet using classical IP connection over an ATM connection.

○ **Network Bridging**
Connect separate network interfaces to form one seamless LAN.

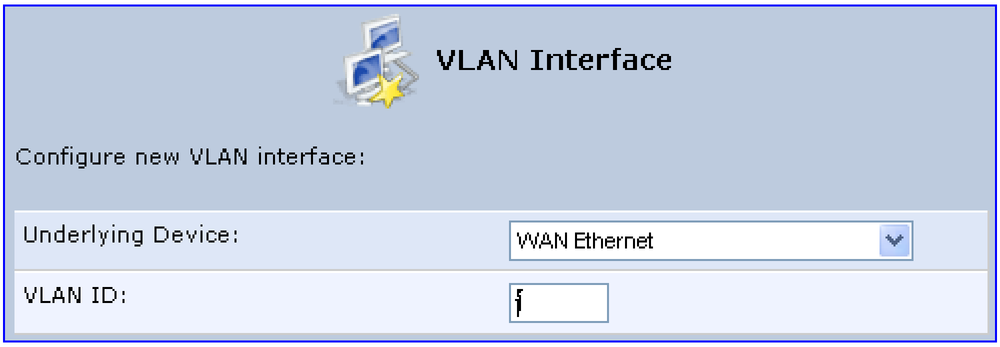
● **VLAN Interface**
Connect to an external virtual network.

○ **Point-to-Point Tunneling Protocol (PPTP)**
Connect to the Internet using a PPTP connection.

○ **Layer 2 Tunneling Protocol (L2TP)**
Connect to the Internet using an L2TP connection.

3. Select the 'VLAN Interface' option, and then click **Next**; the 'VLAN Interface' screen appears.

Figure 12-74: VLAN Interface



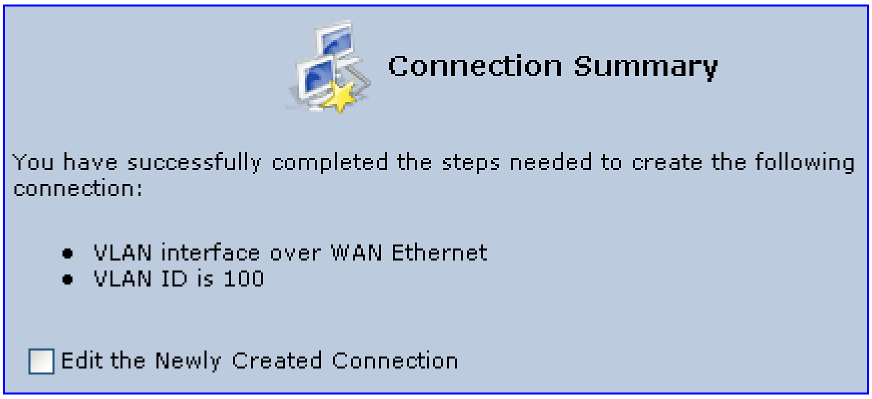
VLAN Interface

Configure new VLAN interface:

Underlying Device:	WAN Ethernet
VLAN ID:	

4. From the 'Underlying Device' drop-down list, select the underlying device (device's Ethernet connections) for this interface.
5. In the 'VLAN ID' field, enter a value to serve as the VLAN ID, and then click **Next**; the 'Connection Summary' screen appears.

Figure 12-75: Connection Summary



Connection Summary

You have successfully completed the steps needed to create the following connection:

- VLAN interface over WAN Ethernet
- VLAN ID is 100

□ Edit the Newly Created Connection

6. Check the 'Edit the Newly Created Connection' check box to be routed to the new connection's configuration screen after clicking **Finish**.
7. Click **Finish** to save the settings; the new VLAN interface is added to the network connections list; it's configurable like any other connection.

12.4.1 Settings Tab

The **Settings** tab of the 'VLAN Properties' displays general communication parameters. It's recommended to leave the values in this screen at their defaults unless you're familiar with the networking concepts they represent. Since your Telephone Adapter is configured to operate with the default values, no parameter modification is necessary. You can configure the following general connection settings:

Table 12-6: VLAN Interface - General Communication Parameters

Parameter	Description
Schedule	By default, the connection is always active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined (via Advanced>Scheduler Rules), this field changes to a drop-down list, allowing you to choose between the available rules. To configure scheduler rules, see Section 10.11.
Network	Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the drop-down list. For detailed information, see Section 4.2.
Physical Address	The physical address of the network card used for your network.
MTU	MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the Telephone Adapter selects the best MTU for your Internet connection. In case you change to manual, you can enter the largest packet size, you should leave this value in the 1200 to 1500 range.
Underlying Connection	The Ethernet device that the connection is implemented over.

Select one of the following Internet Protocol options from the 'Internet Protocol' drop down menu:

- No IP Address
- Obtain an IP Address Automatically
- Use the Following IP Address

Note that according to the selection you make in the 'Internet Protocol' drop down menu, the screen refreshes and displays relevant configuration settings.

- **No IP Address:** Select 'No IP Address' if you require that your Telephone Adapter has no IP address. This can be useful if you are working in an environment where you are not connected to other networks, such as the Internet.
- **Obtain an IP Address Automatically:** Your WAN connection is configured by default to act as a DHCP client. You should keep this configuration in case your service provider supports DHCP, or if you are connecting using a dynamic IP address. The server that assigns the Telephone Adapter with an IP address also assigns a subnet mask. You can override the dynamically assigned subnet mask by selecting the 'Override Subnet Mask' and specifying your own mask instead. You can click the **Release** button to release the current leased IP address. Once the address has been released, the button text changes to 'Renew'. Use the **Renew** button to renew the leased IP address.
- **Use the Following IP Address:** Your WAN connection can be configured using a permanent (static) IP address. Your service provider should provide you with this IP address, subnet mask and the default Telephone Adapter IP address.

12.4.1.1 IP Address Distribution

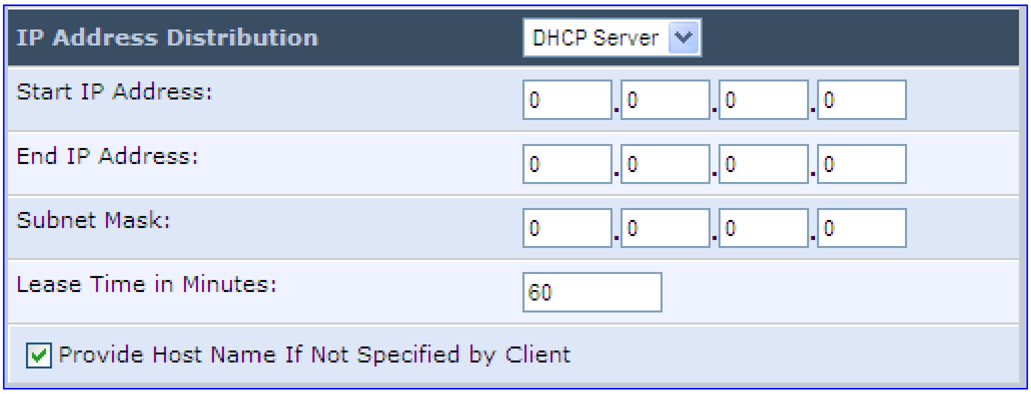
The 'IP Address Distribution' section allows you to configure the device's Dynamic Host Configuration Protocol (DHCP) server parameters. The DHCP automatically assigns IP addresses to network PCs. If you enable this feature, make sure that you also configure your network PCs as DHCP clients. For a comprehensive description of this feature, see Section 10.28.

Select one of the following options from the 'IP Address Distribution' drop-down list:

Table 12-7: IP Address Distribution Parameters

Parameter	Description
DHCP Server	Start IP Address The first IP address that may be assigned to a LAN host. Since the device's default IP address is 192.168.2.1, this address must be 192.168.2.2 or greater.
End IP Address	The last IP address in the range that can be used to automatically assign IP addresses to LAN hosts.
Subnet Mask	A mask used to determine to what subnet an IP address belongs. An example of a subnet mask value is 255.255.0.0.
Lease Time In Minutes	Each device is assigned an IP address by the DHCP server for a this amount of time, when it connects to the network. When the lease expires the server determines if the computer has disconnected from the network. If it has, the server may reassign this IP address to a newly-connected computer. This feature ensures that IP addresses that are not in use become available for other computers on the network.
Provide Host Name If Not Specified by Client	If the DHCP client does not have a host name, the device automatically assigns one for him.

Figure 12-76: IP Address Distribution - DHCP Server



IP Address Distribution	DHCP Server
Start IP Address:	0.0.0.0
End IP Address:	0.0.0.0
Subnet Mask:	0.0.0.0
Lease Time in Minutes:	60

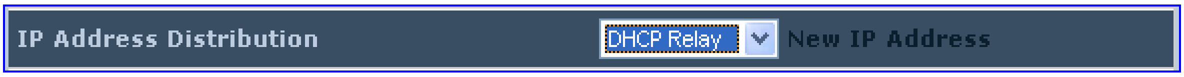
☑ Provide Host Name If Not Specified by Client

Table 12-8: DHCP Relay

Parameter	Description
DHCP Relay	Your device can act as a DHCP relay in case you would like to dynamically assign IP addresses from a DHCP server other than your Telephone Adapter's DHCP server. Note that when selecting this option you must also change the device's WAN to work in routing mode. For detailed information, see Section 10.28.2.

1. After selecting 'DHCP Relay' from the drop down list, a **New IP Address** link appears:

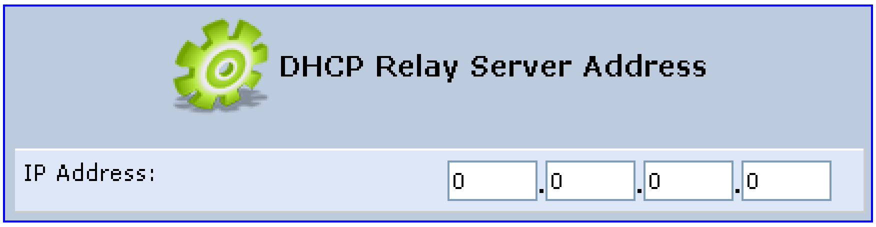
Figure 12-77: IP Address Distribution - DHCP Relay



IP Address Distribution: DHCP Relay

2. Click the **New IP Address** link; the 'DHCP Relay Server Address' screen appears:

Figure 12-78: DHCP Relay Server Address



DHCP Relay Server Address

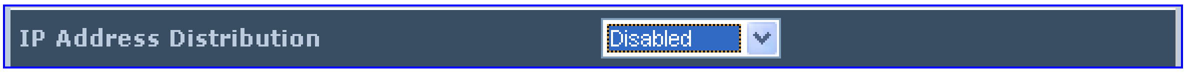
IP Address: 0.0.0.0

3. Specify the IP address of the DHCP server.
4. Click **OK** to save the settings.

Table 12-9: Assigning Static IP Addresses to Network Computers

Parameter	Description
Disabled	Select 'Disabled' from the drop-down list to statically assign IP addresses to your network computers.

Figure 12-79: IP Address Distribution - Disable DHCP

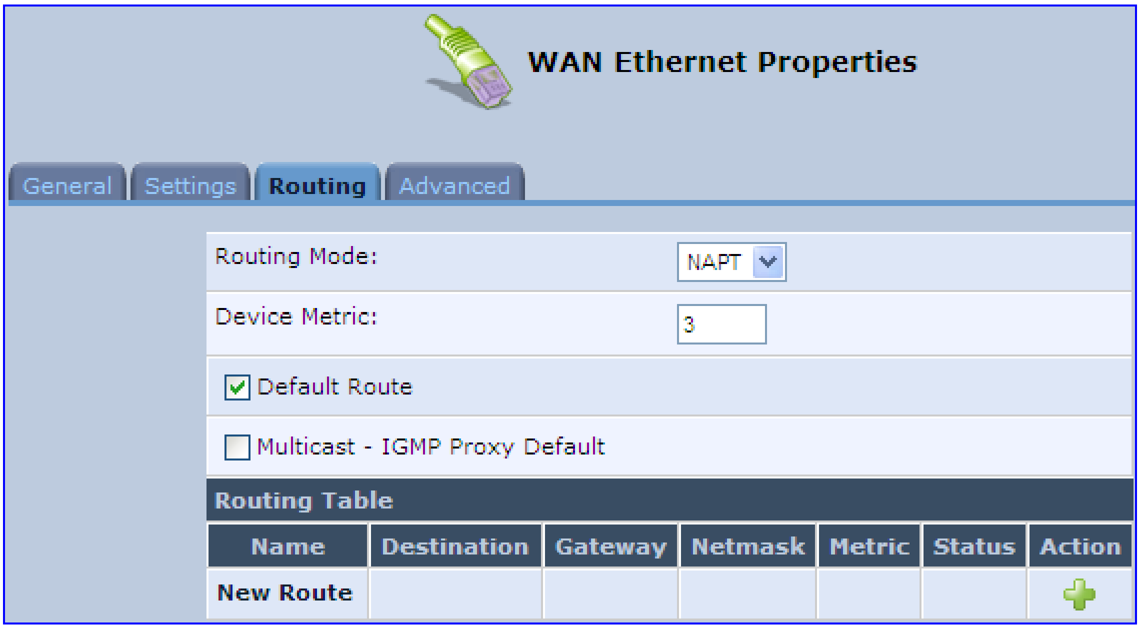


IP Address Distribution: Disabled

12.4.2 Routing Tab

You can choose to setup your Telephone Adapter to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Figure 12-80: Advanced Routing Properties



WAN Ethernet Properties

Routing Mode:	NAPT
Device Metric:	3

☑ Default Route

□ Multicast - IGMP Proxy Default

Routing Table

Name	Destination	Gateway	Netmask	Metric	Status	Action
New Route						➕

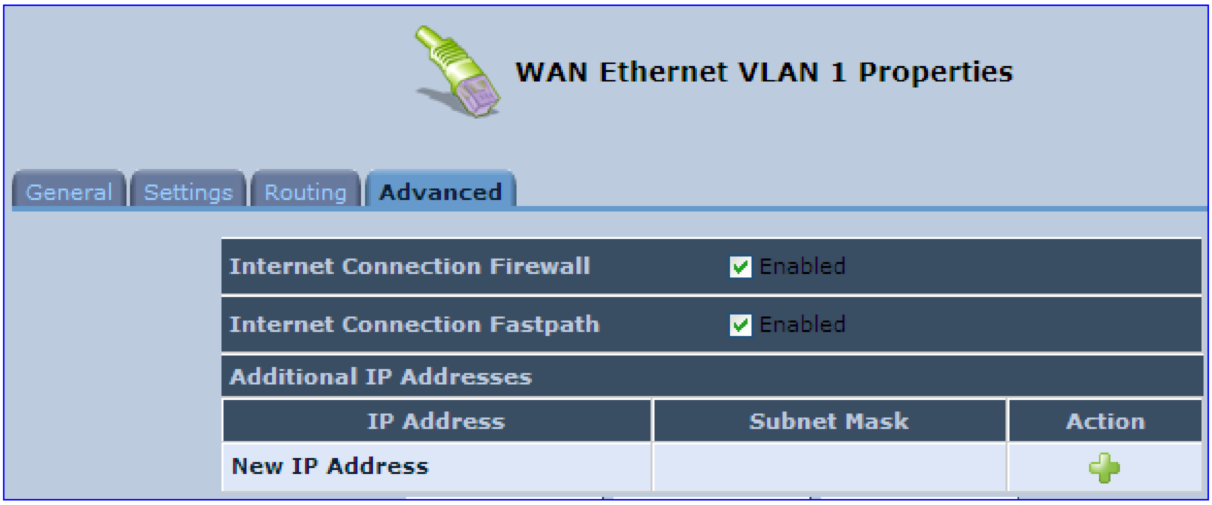
Table 12-10: Routing Parameters

Parameter	Description
Routing	Select 'Advanced' or 'Basic' routing.
Routing Mode	Select one of the following Routing modes: ▪ **Route:** Use route mode if you want your device to function as a router between two networks. ▪ **NAT:** Network Address Translation (NAT) translates IP addresses to a valid, public address on the Internet. This adds security since internal LAN addresses are not transmitted over the Internet. In addition, NAT allows many addresses to exist behind a single valid address. Use the NAT routing mode if your LAN consists of a single device, otherwise collisions may occur if more than one device attempts to communicate using the same port. ▪ **NAPT:** Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.
Device Metric	The device metric is a value used by the device to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.
Default Route	Select this check box to define this device as a the default route.
Multicast	IGMP Proxy Internal IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups. Select the 'Multicast IGMP Proxy Internal' check-box to enable this feature.
Routing Table	Allows you to add or modify routes when this device is active. Use the **New Route** button to add a route or edit existing routes.

12.4.3 Advanced Tab

Your Telephone Adapter’s firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. For detailed information on your device's security features, see Section 5.

Figure 12-81: Internet Connection Firewall



WAN Ethernet VLAN 1 Properties

Internet Connection Firewall ☑ Enabled

Internet Connection Fastpath ☑ Enabled

Additional IP Addresses

IP Address	Subnet Mask	Action
New IP Address		✚

You can add alias names (additional IP addresses) to the MP252 by clicking the 'New IP Address' link. This enables you to access the device using these aliases in addition to the IP address (e.g., 192.168.2.1) and *http://mp252.home*.

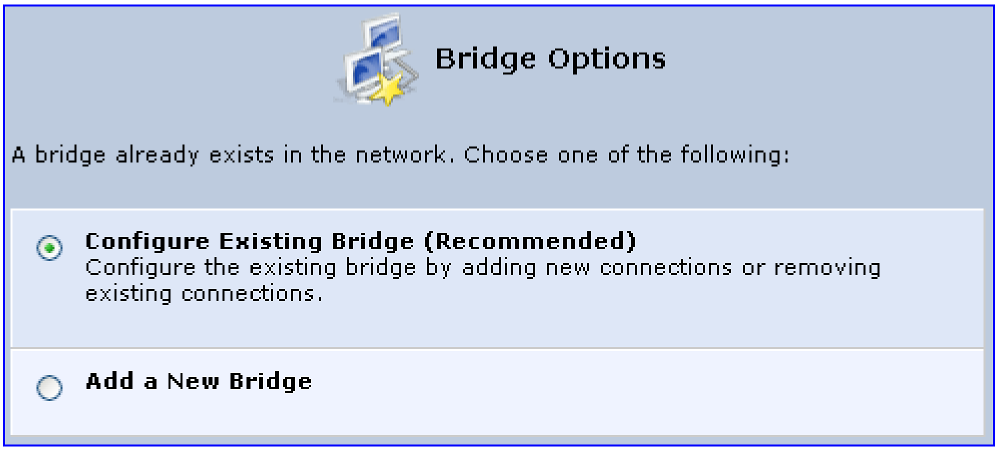
12.5 LAN-WAN Bridge Settings

A WAN-LAN bridge is a bridge over WAN and LAN devices. In such a setup, computers on the MP252 LAN side can get IP addresses that are known on the WAN side.

➢ To configure an existing bridge or create a new one:

1. From the menu bar, click the **Network Connections** menu, and in the screen 'Network Connections' click the **New** ✚ icon; the 'Connection Wizard' screen appears.
2. Select the 'Advanced Connection' option, and then click **Next**; the 'Advanced Connection' screen appears.
3. Select the 'Network Bridging' option, and then click **Next**; the screen 'Bridge Options' opens.

Figure 12-82: Bridge Options



Bridge Options

A bridge already exists in the network. Choose one of the following:

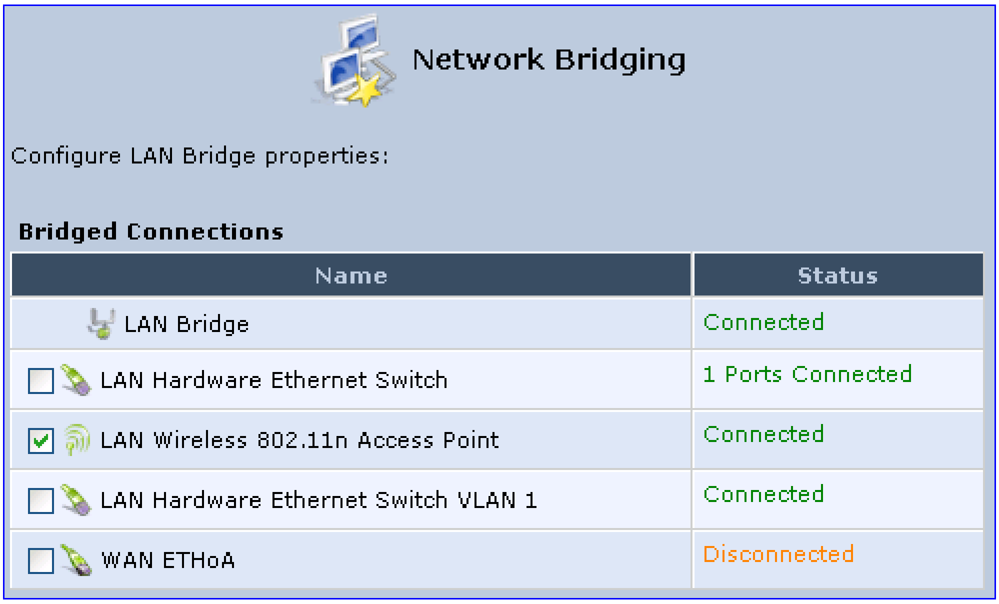
● **Configure Existing Bridge (Recommended)**
Configure the existing bridge by adding new connections or removing existing connections.

○ **Add a New Bridge**

4. Select whether to configure an existing bridge (this option only appears if a bridge exists) or to add a new one:

   - **Configure Existing Bridge:** Select this option and then click **Next**; the screen 'Network Bridging' opens, allowing you to add new connections or remove existing ones, by selecting or clearing their respective check boxes.

Figure 12-83: Network Bridging Screen



Network Bridging

Configure LAN Bridge properties:

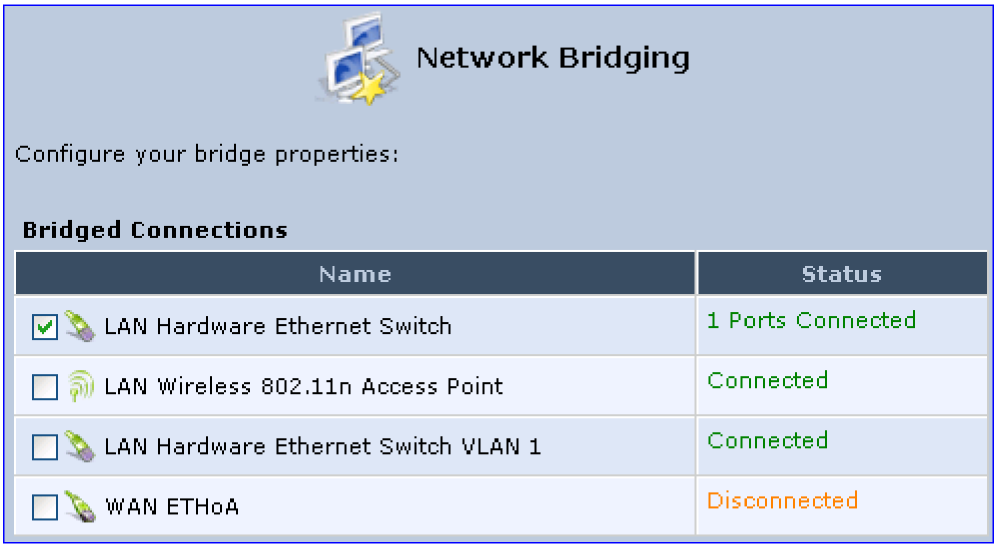
Bridged Connections

Name	Status
LAN Bridge	Connected
□ LAN Hardware Ethernet Switch	1 Ports Connected
☑ LAN Wireless 802.11n Access Point	Connected
□ LAN Hardware Ethernet Switch VLAN 1	Connected
□ WAN ETHoA	Disconnected

For example, checking the WAN check box creates a LAN-WAN bridge.

   - **Add a New Bridge:** Select this option and then click **Next**; a different 'Network Bridging' screen appears, allowing you to add a bridge over the unbridged connections, by selecting their respective check boxes.

Figure 12-84: Adding New Network Bridging



Network Bridging

Configure your bridge properties:

Bridged Connections

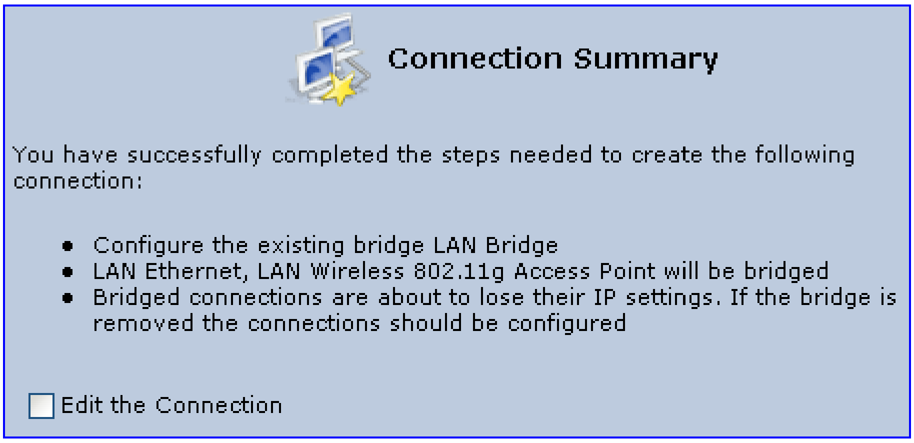
Name	Status
☑ LAN Hardware Ethernet Switch	1 Ports Connected
□ LAN Wireless 802.11n Access Point	Connected
□ LAN Hardware Ethernet Switch VLAN 1	Connected
□ WAN ETHoA	Disconnected

Important notes:

- The same connections cannot be shared by two bridges.
- A bridge cannot be bridged.
- Bridged connections lose their IP settings.

5. Click **Next**; the screen 'Connection Summary' opens, corresponding to your changes.

Figure 12-85: Connection Summary - Configure Existing Bridge



Connection Summary

You have successfully completed the steps needed to create the following connection:

- Configure the existing bridge LAN Bridge
- LAN Ethernet, LAN Wireless 802.11g Access Point will be bridged
- Bridged connections are about to lose their IP settings. If the bridge is removed the connections should be configured

☐ Edit the Connection

6. Select the check box 'Edit the Connection' to be routed to the new connection's configuration screen after clicking **Finish**.
7. Click **Finish** to save the settings; the new bridge is added to the network connections list; it's configurable like any other bridge.

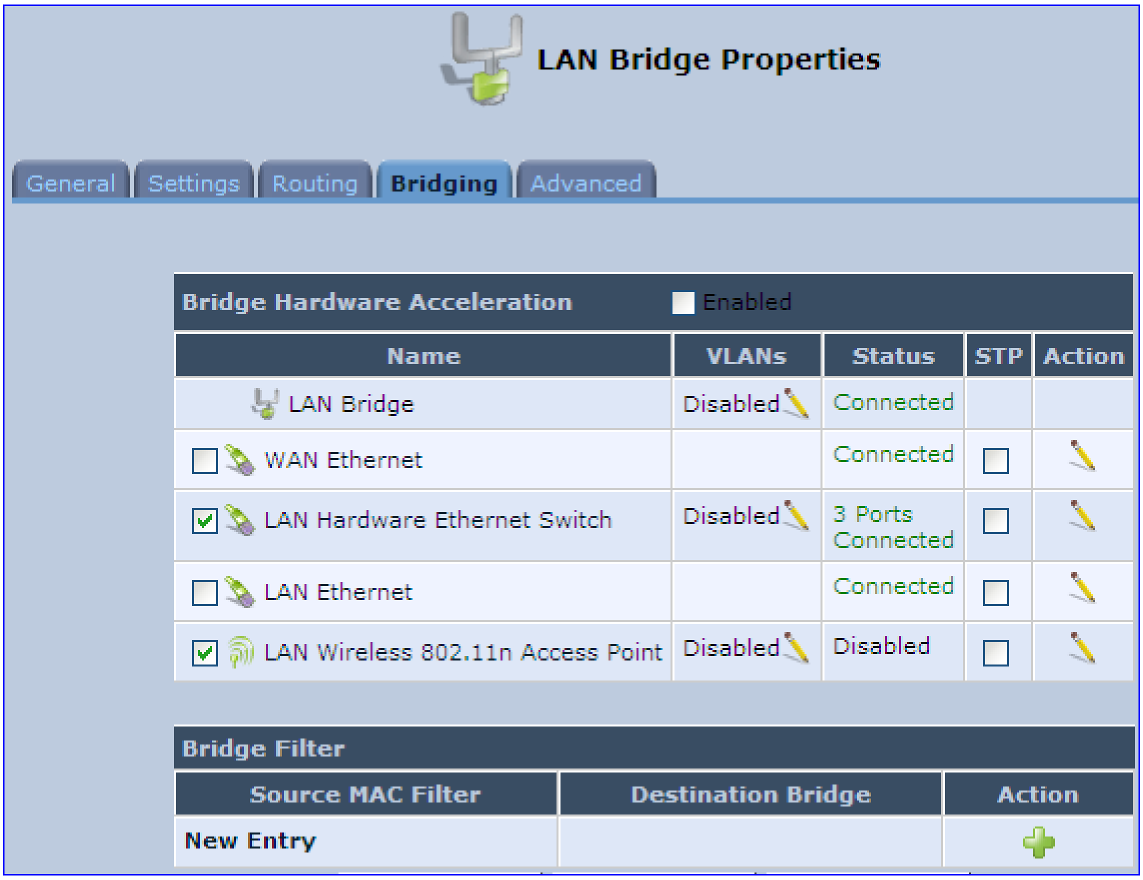
12.5.1 Editing LAN-WAN Bridging

You can edit existing LAN-WAN bridges that are listed in the Connections list. This is done in the **Bridging** tab, which allows you to specify the LAN and WAN devices that you would like to join under the network bridge.

➢ To edit LAN-WAN bridging:

1. From the menu bar, click the **Network Connections** menu, and then in the screen 'Network Connections' click the **Edit** ✎ icon corresponding the bridged network; the 'Connection Wizard' screen appears.
2. Click the **Bridge** tab; the LAN Bridge Properties screen appears.

Figure 12-86: Bridging Tab



LAN Bridge Properties

Bridge Hardware Acceleration □ Enabled

Name	VLANs	Status	STP	Action
LAN Bridge	Disabled ✎	Connected		
□ WAN Ethernet		Connected	□	✎
☑ LAN Hardware Ethernet Switch	Disabled ✎	3 Ports Connected	□	✎
□ LAN Ethernet		Connected	□	✎
☑ LAN Wireless 802.11n Access Point	Disabled ✎	Disabled	□	✎

Bridge Filter

Source MAC Filter	Destination Bridge	Action
New Entry		✚

3. Select the check boxes corresponding to the connection names that you want to bridge, or clear the check boxes of connections that you do not want to bridge.

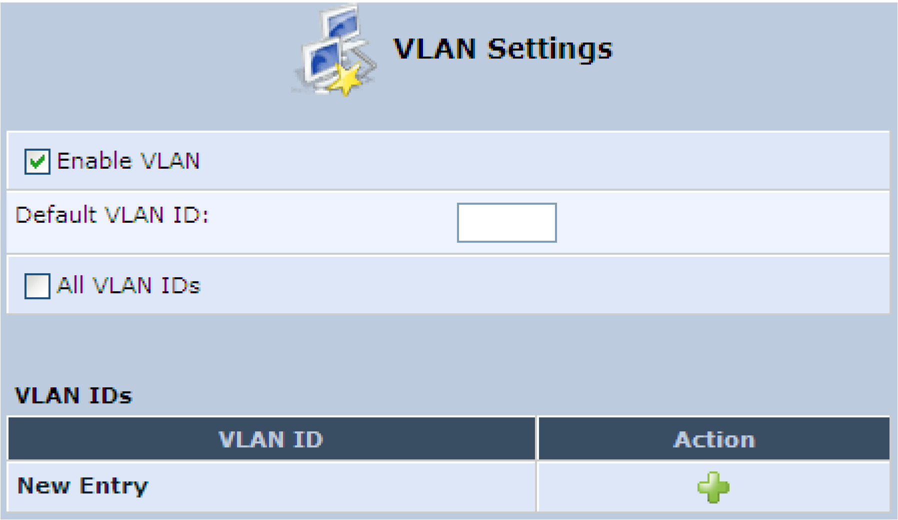
4. Select the ‘Bridge Hardware Acceleration’ check box to utilizes the Fastpath algorithm, which enhances packet flow, resulting in faster communication between the LAN and the WAN (excluding the wireless connection).

5. Select the 'STP' check box to enable the Spanning Tree Protocol (STP) on the device. You should use this to ensure that there are no loops in your network configuration, and apply these settings if your network consists of multiple switches, or other bridges apart from those created by the MP252

6. To configure VLANs for each network connection in the bridge:

   a. Click the **Edit** ✎ icon in the 'VLANs' column corresponding to a network that you want to assign specific Virtual LANs; the ‘VLAN Settings’ screen appears.

Figure 12-87: VLAN Settings Screen



VLAN Settings

☑ Enable VLAN

Default VLAN ID:

□ All VLAN IDs

VLAN IDs

VLAN ID	Action
New Entry	✚

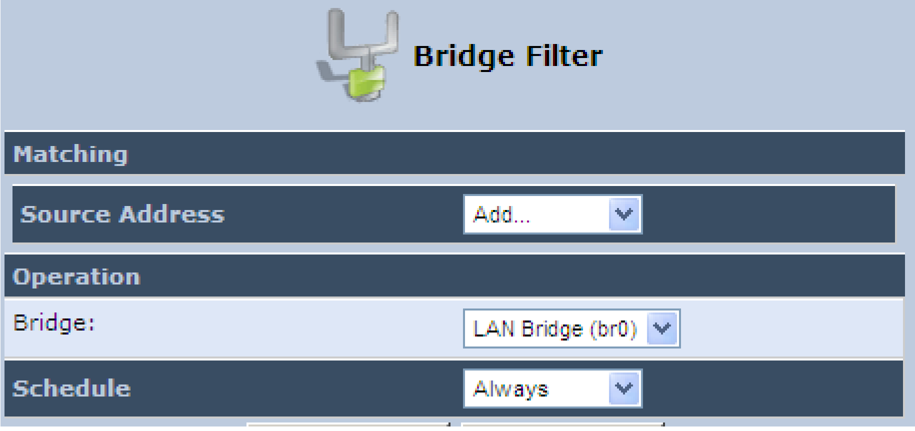
b. Select the ‘Enable VLAN’ check box to enable VLANs on this connection; the screen refreshes and additional parameters appear.

c. In the ‘Default VLAN ID’ field, enter a VLAN ID for this connection or add additional VLANs by clicking the **New** ✚ icon, and then enter another VLAN ID.

7. To create a traffic filtering rule on the bridge to enable direct packet flow between the WAN and the LAN (i.e., Bridge Filtering):

a. In the ‘Bridge Filter’ table, click the **New** ✚ icon; the ‘Bridge Filter’ screen appears.

Figure 12-88: Bridge Filter Screen



Bridge Filter

Matching

Source Address: Add...

Operation

Bridge: LAN Bridge (br0)

Schedule: Always

b. From the ‘Source Address’ drop-down list, select a Network Object (defined in Section 4.5.2 on page 50) or create a new one by clicking ‘User Defined’. You can define a traffic filtering rule that enables direct packet flow between the WAN and the LAN host that will be placed under the WAN-LAN bridge. This filtering rule can be based on either a LAN host's MAC address or one of its DHCP options.

c. From the 'Operation' drop-down list, select the bridge.

d. Click **OK**.

13 Remote MP252 Management

This chapter provides an overview of the MP252 remote configuration and management support. In addition, this chapter describes how to enable and secure remote management, as well configure MP252 through SNMP and TR069.

13.1 Overview

MP252 is designed to be mass-deployed. One of the keys to guarantee end-user satisfaction and true toll-quality service in mass field deployment is comprehensive remote configuration and management capabilities:

- Automatic and remote configuration updates
- Automatic and remote firmware updates
- Remote diagnosis of problems reported by the user
- Remote collection of statistical information regarding the quality of the service
- Remote notifications of problems in the service

13.1.1 Remote Configuration

By default, MP252 is provided with factory default settings, which are common to all MP252 devices (except for the MAC address). The factory settings allow the user to connect to MP252's Web interface through the LAN.

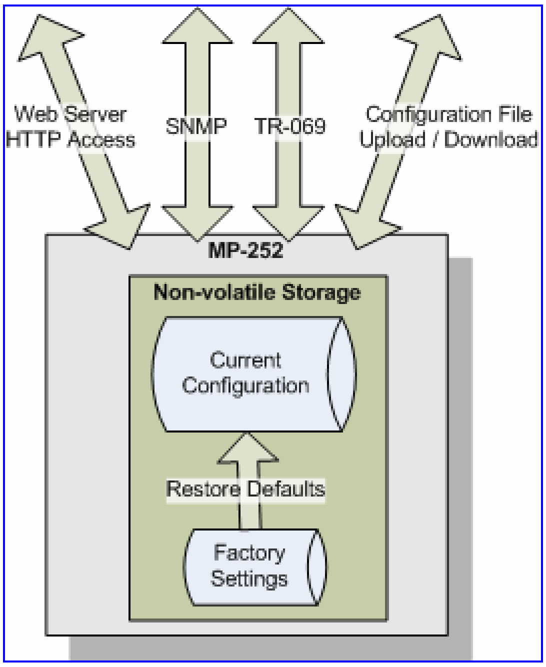
By default, the WAN interface is configured for DHCP (i.e., automatically obtains its IP address from a DHCP server). The default configuration should not include any VoIP service provider settings (such as a SIP proxy).

In some cases, AudioCodes can ship MP252 devices that are pre-configured with some customer-specific parameters. This set of parameters is usually defined as the new "factory settings" for the specific customer.

MP252's factory default settings and the current configuration running on MP252 are stored on MP252's non-volatile flash memory. The current configuration can be remotely updated using several configuration interfaces:

- HTTP-based Web server
- SNMP
- TR-069
- Configuration file upload/download

Figure 13-1: Remote Management Interfaces



All configuration interfaces access the same internal configuration repository. The configuration file represents the complete set of MP252 configuration parameters. Specific configuration interfaces (e.g. SNMP and TR-069) might support access only to a sub-set of these configuration parameters.

At any time, the factory settings can be restored using the Web interface or by pressing the **Reset** pin-hole button while MP252 is being powered up.

The table below lists the main MP252 configuration parameter groups:

Table 13-1: Main Configuration Parameter Groups

Group	Description
VoIP	Parameters relating to the VoIP functionality (e.g. analog interface, SIP signaling, voice and fax, media streaming)
WAN Interface	The main WAN Internet connection (this group is also referred to as the "Quick Setup").
Network Connections	Configuration of all network connections (LAN and WAN), including advanced connections such as VLANs.
Security	Parameters relating to the internal firewall.
QoS	Configuration of Quality of Service parameters such as priorities and traffic shaping.
System / Advanced	Configuration of system parameters such as Remote Update and Remote Access and advanced parameters such as Dynamic DNS, UPnP.

A typical set of parameters that a service provider may want to configure include the following:

- Remote access and/or automatic firmware and configuration update parameters
- VoIP configuration: SIP proxy, line settings (User IP, Password)
- QoS parameters (e.g. traffic shaping)

13.1.2 Remote Management

Remote management includes the following:

- Firmware upgrade
- Status and performance monitoring
- Alarms, notifications, and logs

13.1.2.1 Firmware Upgrade

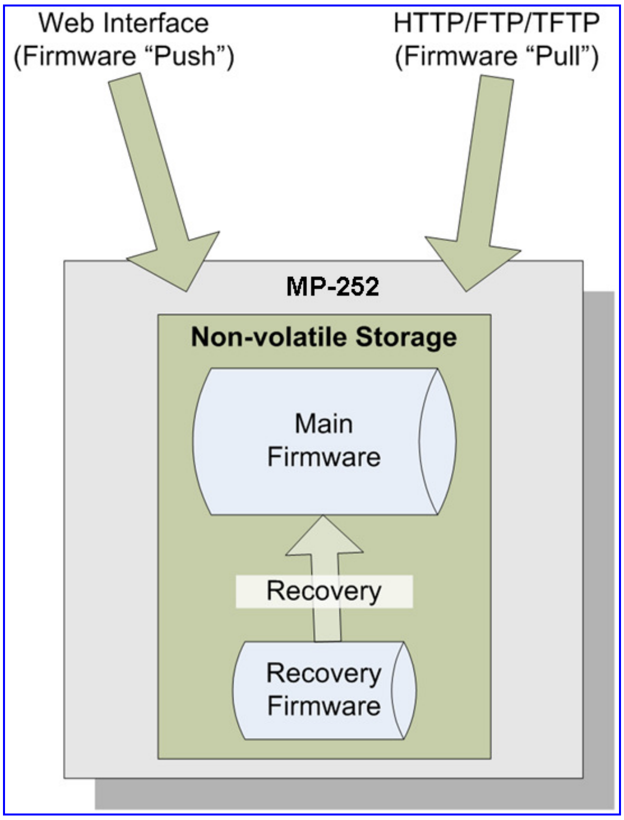
Service providers require the ability to update MP252's firmware in the field (e.g. in case of maintenance releases or releases that support new required features). The process is required to be automatic, allowing mass update, which is robust and fail-safe.

MP252's firmware is stored on the non-volatile flash memory. MP252's flash memory is capable of storing a recovery firmware that ensures a fail-safe operation (even if the user unplugs the power during the firmware burning process).

MP252's firmware can be upgraded using one of the following mechanisms:

- The new firmware can be "pushed" (uploaded) to MP252, using the MP252 Web interface
- The new firmware can be "pulled" (downloaded) by MP252 from a remote HTTP, FTP, or TFTP server

Figure 13-2: Firmware Upgrade Mechanism



The remote firmware download process can be triggered by one of the following:

- MP252 checks for a new firmware upon MP252 restart
- MP252 periodically checks for a new firmware
- Manual trigger using CLI, TR-069, SNMP or Web

Note: Unless forced, MP252 downloads and upgrades to the new firmware only if its version number is higher than the firmware version currently running on MP252. The version number is not taken from the image file name, but from the header of the image file.

13.1.2.2 Status and Performance Monitoring

The ability to remotely monitor the status of MP252 is critical to the service provider, who wants to support users without having to send a technician on site (avoiding the "truck roll"). The service provider may want to know the current status of MP252 (e.g. is it registered to the SIP proxy, is the phone off-hook) or some statistical information (e.g. average packet loss during a call).

MP252 maintains a set of status and performance information internally. This information (or parts of it) can be retrieved via the different management interfaces (e.g. Web, or TR-069).

The table below describes the status and performance monitoring (statistical) information available in MP252.

Table 13-2: Status and Performance Monitoring Parameters

Group	Description
VoIP	▪ Current status information per line: ✓ Phone state ✓ Registration status ✓ Source, codec and type of current call ✓ Packet loss, jitter and delay of current call
Network Connections	▪ Current status information per interface: ✓ Connection status ✓ Allocated IP address ✓ Received and transmitted packets
System	▪ Software version information ▪ Hardware version information ▪ System Up time

13.1.2.3 Alarms, Notifications and Logging

Instead of periodically polling MP252 to obtain its current status, the service provider may want MP252 to notify abnormal events or to send regular reports to a logging server. Both options are supported by MP252. The table below lists the relevant interfaces for alarms and notifications.

Table 13-3: Notifications and Logged Events

Group	Notifications and Logged Events
VoIP	▪ **Notifications:** Registration error or timeout ▪ **Logged Events:** ✓ End of call (Call Detail Record logging) ✓ SIP messages logging (optional - for debugging)
Network Connections	▪ **Notifications:** Connection up / down
Security	▪ **Logged Events:** Security log (configurable)
System	▪ **Notifications:** ✓ System restart ✓ Firmware / configuration update ▪ **Logged Events:** Debug-level logging (optional)

Note that the terms Alarm and Notification represent the same thing. The difference between alarm/notification and logging is that an alarm is normally used to represent an abnormal event (e.g. registration error), while logged events can represent either regular events (e.g. end of call) or abnormal events.

The table below lists the event severity levels defined in MP252. Typically, events with severity of Error or Emergency are notified in addition to being logged.

Table 13-4: Severity of Logged Events

Severity	Description
Debug	Debug-level messages.
Notice	Normal but significant condition. Notices requiring attention at a later time. Non-error conditions that might require special handling.
Error	Recoverable / temporary error condition.
Emergency	System is unusable. The most severe messages that prevent continuation of operation, such as immediate system shutdown.

13.2 Enabling Remote Management

You can access and manage MP252 not only from within the home network, but also from the Internet. This allows you to view or change settings while travelling. It also enables you to allow your ISP to change settings or help you troubleshoot functionality or communication issues from a remote location.

Remote access to MP252 is blocked by default to ensure the security of your home network. However, remote access is supported by the following services, and you may use the 'Remote Access Configuration' screen to selectively enable these services if they are needed.

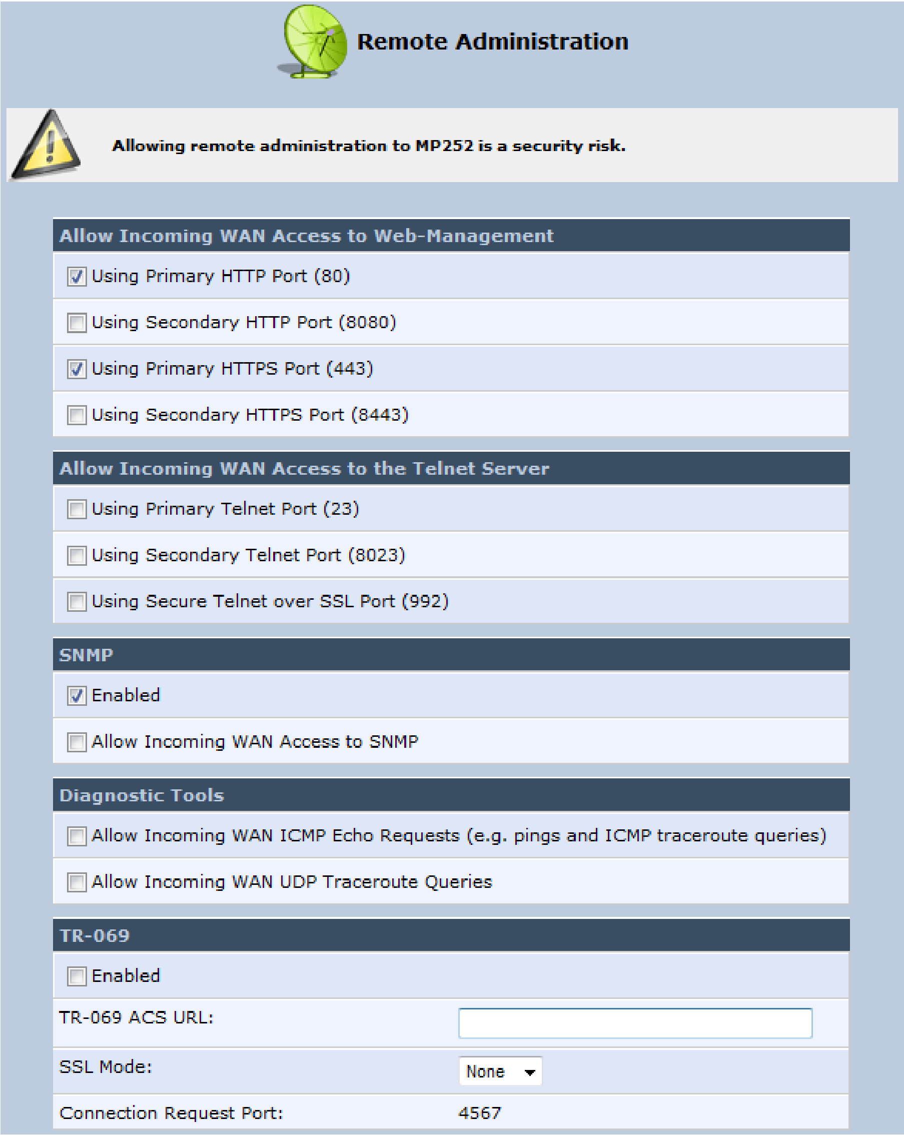
Notes:

- Telnet and Web-Management can be used to modify the settings of the firewall or to disable it. You can also change local IP addresses and other settings, making it difficult or impossible to access MP252 from the home network. Therefore, remote access to Telnet or HTTP services should be blocked and should only be permitted when absolutely necessary.
- Encrypted remote administration is done using a secure SSL connection that requires an SSL certificate. When accessing MP252 for the first time using encrypted remote administration, you are prompted by your browser with a warning regarding certificate authentication. This is because MP252's SSL certificate is self generated. When encountering this message under these circumstances, ignore it and continue. It should be noted that even though this message appears, the self-generated certificate is safe, and provides you with a secure SSL connection. You can also assign a user-defined certificate to MP252.

➢ To enable remote access to MP252 services:

1. In the 'Advanced' screen, click the **Remote Administration** icon; the 'Remote Administration' screen appears.

Figure 13-3: Remote Administration Screen



Remote Administration

Allowing remote administration to MP252 is a security risk.

Allow Incoming WAN Access to Web-Management

☑ Using Primary HTTP Port (80)

□ Using Secondary HTTP Port (8080)

☑ Using Primary HTTPS Port (443)

□ Using Secondary HTTPS Port (8443)

Allow Incoming WAN Access to the Telnet Server

□ Using Primary Telnet Port (23)

□ Using Secondary Telnet Port (8023)

□ Using Secure Telnet over SSL Port (992)

SNMP

☑ Enabled

□ Allow Incoming WAN Access to SNMP

Diagnostic Tools

□ Allow Incoming WAN ICMP Echo Requests (e.g. pings and ICMP traceroute queries)

□ Allow Incoming WAN UDP Traceroute Queries

TR-069

□ Enabled

TR-069 ACS URL:

SSL Mode: None

Connection Request Port: 4567

2. Select the services that you would like to make available to computers on the Internet.
   - **Allow Incoming WAN Access to Web-Management:** Allows access (from a Web browser) to the Web management interface and to all system settings and parameters. Both secure (HTTPS) and non-secure (HTTP) access is available.
   - **Allow Incoming WAN Access to the Telnet Server:** Allows access to the command-line session and to all system settings and parameters (using a text-based terminal).
   - **SNMP:** Allows Simple Network Management Protocol (SNMP) requests to remotely configure and monitor MP252.
   - **Diagnostic Tools:** Allows remote access for ping and traceroute (over UDP) troubleshooting.
   - **TR-069:** TR-069 is a WAN management protocol for communication between Customer Premise Equipment (CPE) and an Auto-Configuration Server (ACS). It defines a mechanism that encompasses secure auto-configuration of a CPE, and also incorporates other CPE management functions into a common framework.
3. Click **OK** to save your changes.

13.3 Securing Remote Management with Certificates

The **Certificates** icon allows you to configure certificates. When a service provider implements remote provisioning in which a unique configuration file (per MP252) is placed on a server located on the WAN, the service provider can ensure that only its deployed MP252 units are able to connect to the HTTP server via HTTPS. This is performed by using a certification validation process (client-server).

There are two types of certificates:

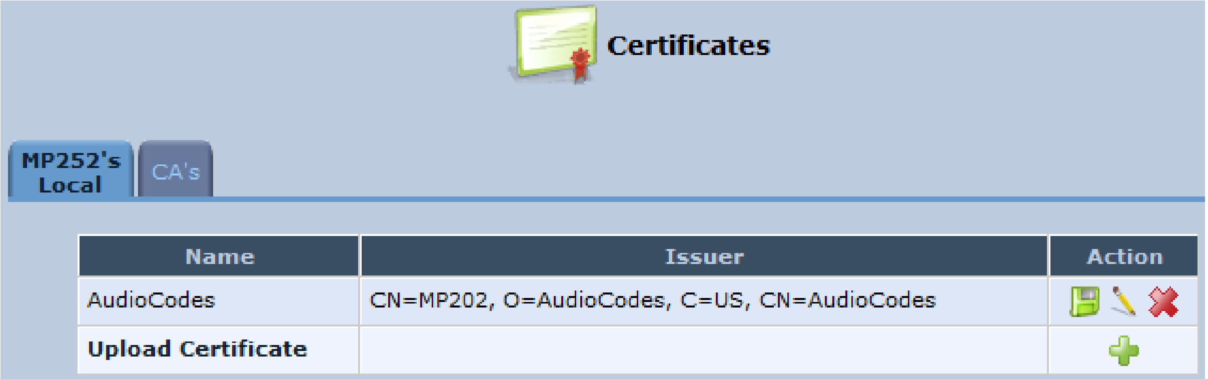
- Self-signed certificates
- Certificate Authority (CA) signed certificates

The procedure below describes how to operate with self-signed certificates.

➢ To operate with self-signed certificates:

1. In the 'Advanced' screen, click the icon; the 'Certificates' screen appears.

Figure 13-4: New Certificates Screen



Certificates

Name	Issuer	Action
AudioCodes	CN=MP202, O=AudioCodes, C=US, CN=AudioCodes	💾 ✎ ✖
Upload Certificate		➕

2. Create a self-signed certificate:

Note: You can also create a self-signed certificate using the OpenSSL utility, downloaded from http://sial.org/howto/openssl/self-signed.

   a. Select the **MP252's Local** tab.

   b. Click the **Create Self Signed Certificate** button; the 'Create Self Signed X509 Certificate' screen appears.