PAMSPAN501x

G.SHDSL.bis EFM Gateway User Manual

Version 1.5

RECYCLABLE

Contents:

INSTRUCTION MANUAL

IMPORTANT SAFETY INSTRUCTIONS

BEFORE USING YOUR TELEPHONE EQUIPMENT, BASIC SAFETY PRECAUTIONS SHOULD ALWAYS BE FOLLOWED TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK AND INJURY TO PERSONS, INCLUDING THE FOLLOWING:

1. Read and understand all instructions.
2. Follow all warnings and instructions marked on the product.
3. Unplug this product from the wall telephone jack and power outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this product near water, for example, near a bathtub, washbowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.
5. Do not place this product on an unstable cart, stand or table. The product may fall, causing serious damage to the product.
6. Slots or openings in the cabinet and the bottom are provided for ventilation, to protect it from overheating. These openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, or other similar surface. This product should never be placed near or over a radiator or heat register.
7. This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your dealer or local power company.
8. Do not allow anything to rest on the power cord. Do not place this product where the cord will be abused by persons stepping on it.
9. Do not overload wall outlets and extension cords as this can result in fire or electric shock. Never spill liquid of any kind on the product.
10. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in fire or electric shock.
11. To reduce the risk of electric shock, do not disassemble this product but take it to a qualified serviceman when some service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the appliance is subsequently used.
12. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
    a. When the power supply cord or plug is damaged or frayed.
    b. If liquid has been spilled into the product.
    c. If the product has been exposed to rain or water.
    d. If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
    e. If the product has been dropped or the cabinet has been damaged.
    f. If the product exhibits a distinct change in performance.
13. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
14. Do not use the telephone to report a gas leak in the vicinity of the leak.

1 Introduction

Thank you for choosing the PAMSPAN501x as your broadband access solution. This manual will help you with the setup and configuration of your product.

1.1 PAMSPAN501x Overview

The PAMSPAN501x takes advantage of the latest technology - Extended Rate Bonded SHDSL – opening up unprecedented possibilities for symmetric transmission.
The PAMSPAN501x comes with EFM bonding or ATM m-pair bonding; higher packet transport allows symmetric data rates of up to 5.69 Mbps, 11.38Mbps, 17.07 Mbps, or 22.76Mbps over standard 2-wire, 4-wire, 6-wire, or 8-wire telephone lines, respectively.
EFM different rates between pair 4:1 means that speed ratio of 4 between the fastest and slowest link of a group (according to IEEE 802.-2004)

The PAMSPAN501x is a solution that enables enterprise users to enjoy long distance, high bandwidth and symmetric data transmission.

Distance & Rate relationship Table

26 AWG_ Without Noise _ EFM mode				
Line rate (kbps)	1-Pair Longest reach (feet)	2-Pairs Longest reach (feet)	3-Pairs Longest reach (feet)	4-Pairs Longest reach (feet)
192	18000	18000	18000	18000
256	18000	18000	18000	18000
384	18000	18000	18000	18000
768	16400	16400	16400	16400
2560	11500	11500	11500	11500
3072	10500	10500	10500	10500
3392	10000	10000	10000	10000
3584	9500	9500	9500	9500
3848	9400	9400	9400	9400
4096	9000	9000	9000	9000
5696	7000	7000	7000	7000

1.2 Features

- **Rate and Reach Improvements**

  The symmetric transmission rate can be up to 5.69 Mbps, 11.38Mbps, 17.07 Mbps, or 22.76Mbps over standard 2-wire, 4-wire, 6-wire, or 8-wire telephone lines, respectively.

  Note: When one pair fails while operating in multiple pairs mode, the connection will still be maintained. The other pairs can still operate at the maximum rates.

- **CO and CPE Mode selectable**

  Provides point-to-point connectivity

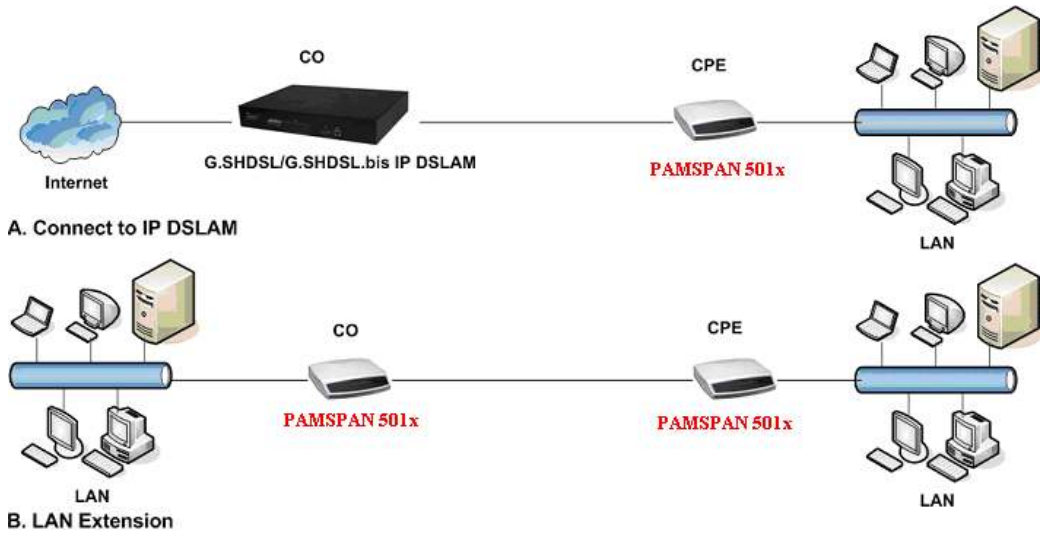
- **2-wire/4-wire/6-wire/8-wire EFM bonding or ITU-T G.bonding Mode selectable**
  Offers flexible rate options

- **Easy Management**

  Support both web-based GUI and CLI-based management.

- **Backward Compatible to G.SHDSL (G.991.2)**

1.3 Application



1.4 Specification

Standard Compliance	Protocol
● **ITU-T G.991.2** ➢ Transmission rate up to 5.69 Mbps on 2-wire ➢ Transmission rate up to 11.38 Mbps on 4-wire ➢ Transmission rate up to 17.07 Mbps on 6-wire ➢ Transmission rate up to 22.76 Mbps on 8-wire ➢ Support of Annex A, Annex B, Annex F, and Annex G ➢ Auto load balancing with bonded pairs ➢ Support point-to-point configuration ➢ Manual or auto rate selectivity ● **Comply IEEE 802.3ah-2004** ● **ITU-T G.994.1**	● Support EFM over G.SHDSL.bis and G.SHDSL ● Support ATM over G.SHDSL.bis and G.SHDSL ● MAC bridging (IEEE 802.3ah-2004 and 802.1D) ● PPPoE (RFC 2416) ● RFC 1483/2684 Bridged encapsulation (routing mode optional) ● IP support TCP, RIPv1, RIPv2, UDP, ICMP, ARP ● IEEE802.1P Priority Output Queuing ● IEEE 802.1Q VLAN ● IEEE802.3u Fast Ethernet 100BaseT ● MAC Filtering ● QoS support VBR-rt, VBR-nrt, CBR and UBR

Maintenance

- Firmware upgradeable via FTP or TFTP (optional)
- Support Telnet
- Support ATM OAM F5 End to End and Segment loop backs
- Statistics on DSL link and data ports
- Sys-log
- HTTP web downloadable

Management

- Password protection
- PAP and CHAP support
- Remote access management via telnet
- SNMPv1/SNMPV2
- Firewall Security
  - Packet Filter
  - Denial of Service
  - Stateful Packet Inspection (SPI)
  - Attack Alert and log
  - Access Control
  - Real time log
- MIB-II (RFC 1213, RFC 1573)
- Web based GUI
- Command Line Interface (CLI)

- Support 8 PVCs
- NAT/PAT support
- DHCP client/server and DHCP relay functionality
- Support IGMP Snooping
- DMZ support
- Support Port-based VLAN

LED

- LED indicator; power, DSL links, Alarm, Ethernet ports and CO/CPE mode

Hardware Interface

- DSL interface: 2/4 wires one RJ-11 jack. 8 wires two RJ-11 jacks
- Ethernet interface: four RJ-45 jack; 10/100BaseT auto sensing and crossover
- AC power adapter (100VAC ~ 240VAC, 50-60Hz)
- One craft Interface for local console access (CID)

Dimensions & Weight

- Dimensions: 35mm(H)×210mm(W)×193mm(D)
- Weight: 914g

Operating Requirements

- Operating temperature: 0C to +50C
- Operating humidity: 5% to 90% RH non-condensing
- Power Consumption for 2-pair is 5.6W and 4-pair is 5.8W

2 Hardware Setup and Startup

2.1 Front Panel LED and Rear Panel description

Following pictures are the front panel of 4-wire and 8-wire PAMSPAN501x respectively.

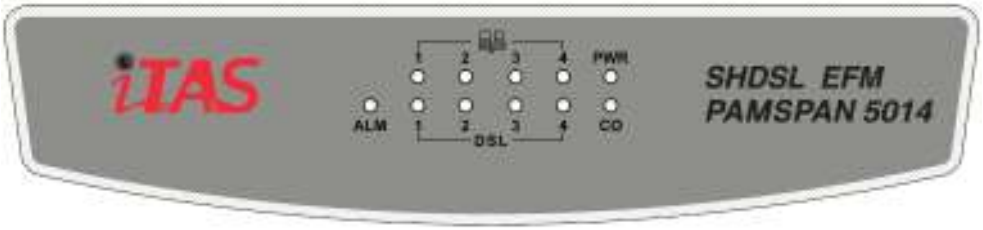


Figure 2-1 8-wire PAMSPAN501x Front Panel LED

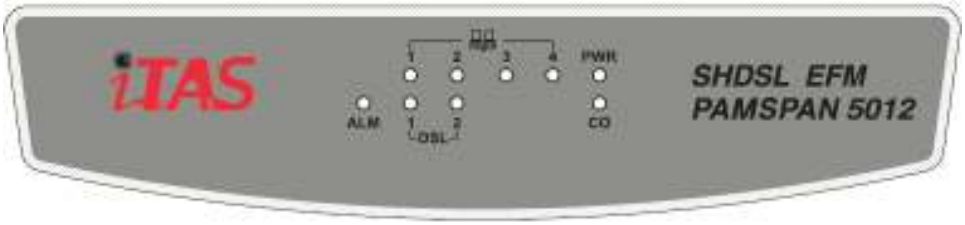


Figure 2-2 4-wire PAMSPAN501x Front Panel LED

1. PWR	Power Indicator
2. DSL	DSL loop
3. CO	On--- CO
	Off--- CPE
4. ALM	Alarm for error
5. LAN	On---Ethernet Link connected

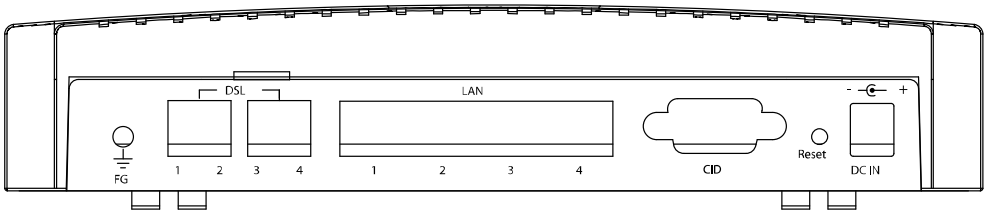


Figure 2-3 8-wire PAMSPAN501x rear view

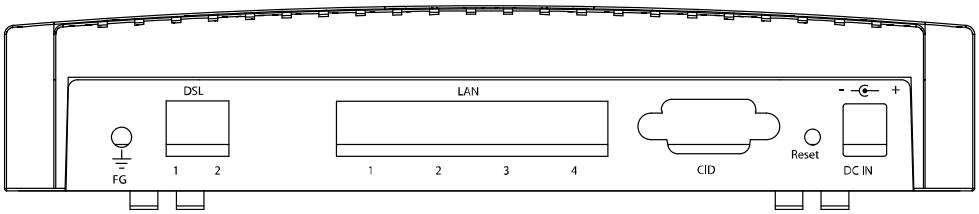
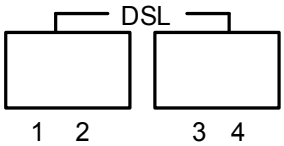


Figure 2-4 4-wire PAMSPAN501x rear view

1. DC IN:	Power Adapter Input
2. Reset Button:	Reset device to factory default setting
3. CID:	Connected to PC serial port for console
4. LAN:	Connected to Ethernet Port
5. DSL 1 to 4	Connected to loop 1 to 4
6. FG	Connected to ground wire

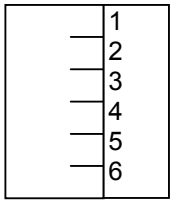
2.2 DSL Connectors Description

DSL Connectors on back of the unit, 2 RJ-11 sockets.



RJ-11 uses a 6P4C connector and cable. The cable has 4 wires and we are using them for 2 pairs of DSL connection.

Pin 1	Not used.
Pin 2	Tip for DSL pair 2 or 4.
Pin 3	Tip for DSL pair 1 or 3
Pin 4	Ring for DSL pair 1 or 3
Pin 5	Ring for DSL pair 2 or 4
Pin 6	Not used.



2.3 Restore Factory Defaults/Reboot Button

Press the reset button to reset the PAMSPAN501X to its factory-default settings (the default configuration file will be uploaded). If you forget your password or cannot access the device, you will need to reset the device to the default settings. The procedure is as follows:

1. Power off the modem.
2. Press the reset default button.
3. Power on the Modem, and check the front panel of the modem.
4. When the “CPE LED” blinks rapidly, release the reset button.
   (If you press the button for too long, the configuration file recall won't work. This is to prevent the user from holding the button continuously)
5. The factory defaults should now be recalled. (This is called a "one-time recall")

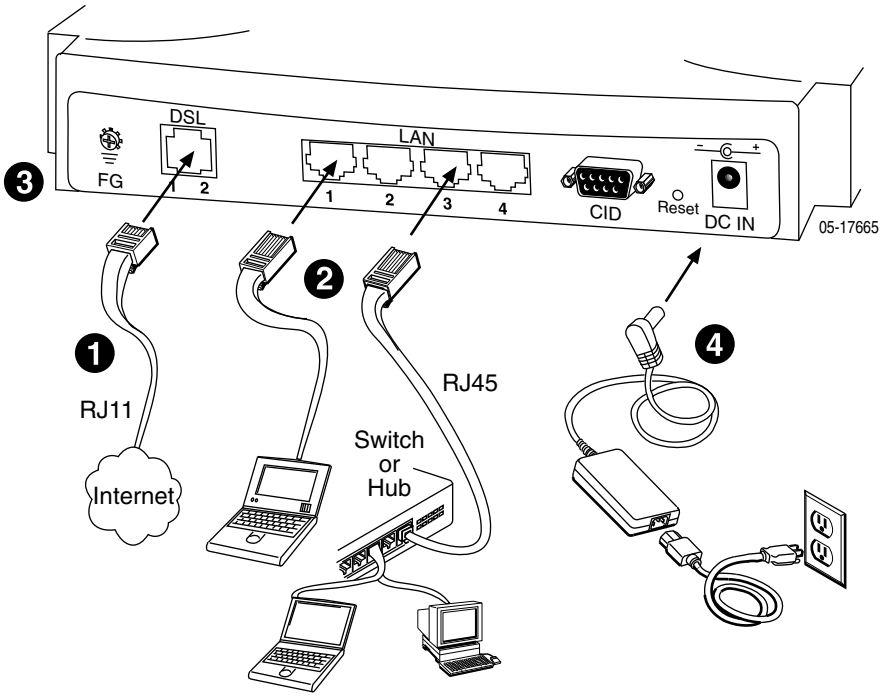
2.4 Parts check

Check the following items in your package. Contact our sales representatives if any item is missing or damaged.

	PAMSPAN501x		**RJ-11 Cable**
	Power Adapter		**Support CD**
	RJ-45 Cable	Q.I.G	**Quick Installation Guide**

2.5 Hardware Connection

1. Connect the RJ11 cable supplied to the port marked DSL at the back of the PAMSPAN501X. Connect the other end of the cable to your SHDSL signal source.
2. Insert one end of the RJ45 Ethernet cable into one of the LAN ports on the back of the PAMSPAN501X. Connect the other end of the cable to the Ethernet Network Interface Card (NIC) in your PC. Up to four Ethernet devices can be connected to the PAMSPAN501X.
3. Connect an earth ground to the grounding terminal (marked FG).
4. Connect the external AC adapter supplied to the DC power outlet on the back of the PAMSPAN501X. Connect the power supply to your wall outlet or surge protector.



2.6 Configuration

This section provides instructions for configuring your Internet settings to work with the router.

2.6.1 Before you begin

By default, the LAN port is assigned this IP address: **192.168.1.1**. (You can change this IP address as you need. For example: IP 192.168.1.2 NetMask 255.255.255.0).

Note: *In some cases, you may want to assign Internet information manually to some or all of your computers rather than allow the PAMSPAN501X to do so. See "Assigning static Internet information" for instructions.*

2.6.2 Assigning static Internet information

If you are like most users, you will not need to assign static Internet information to your LAN PCs. Your ISP automatically assigns this information.

In some cases however, you may want to assign Internet information to some or all of your PCs directly (often called "statically"), rather than allowing the PAMSPAN501X to assign it. This option may be desirable (but not required) if:

- You have obtained one or more public IP addresses that you want to always associate with specific computers (for example, if you are using a computer as a public web server). (suggest to delete)
- You maintain different subnets on your LAN.

Before you begin, be sure to have the following information on hand, or contact your ISP if you do not know it:

- The IP address and subnet mask to be assigned to each PC to which you will be assigning static IP information.
- The IP address of the default gateway for your LAN. In most cases, this is the address assigned to the LAN port on the PAMSPAN501X.
- The IP address of your ISP's Domain Name System (DNS) server.

On each PC to which you wish to assign static information, follow the instructions on checking for and/or installing the IP protocol. Once it is installed, continue to follow the instructions for displaying each of the Internet Protocol (TCP/IP) properties. Instead of enabling dynamic assignment of the IP addresses for the computer, DNS server and default gateway, click the radio buttons that enable you to enter the information manually.
Note: *Your PCs must have IP addresses that place them in the same subnet as the*

PAMSPAN501X LAN port. If you manually assign IP information to all your LAN PCs, you can use the LAN Connections to update the LAN port IP address accordingly.

2.6.3 Windows ® XP PCs

1. In the Windows task bar, click the **Start** button, and then click **Control Panel.**
2. Double-click the **Network Connections** icon.
3. In the LAN or High-Speed Internet window, right-click on the icon corresponding to your network interface card (NIC) and select **Properties**. (Often, this icon is labeled Local Area Connection). The Local Area Connection dialog box displays with a list of currently installed network items.
4. Ensure that the check box to the left of the item labeled **Internet Protocol TCP/IP** is checked, and click. Properties
5. In the **Internet Protocol (TCP/IP) Properties** dialog box, click the radio button labeled **Obtain an IP address automatically**. Also click the radio button labeled **Obtain DNS server address automatically**.
6. Click OK twice to confirm your changes, and close the Control Panel.

2.6.4 Windows 2000 PCs

First, check for the IP protocol and, if necessary, install it:

1. In the Windows task bar, click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **Network and Dial-up Connections** icon.
3. In the Network and Dial-up Connections window, right-click the Local Area Connection icon, and then select **Properties**.
   The Local Area Connection Properties dialog box displays with a list of currently installed network components. If the list includes **Internet Protocol (TCP/IP)**, then the protocol has already been enabled. Skip to step 10.
4. If **Internet Protocol (TCP/IP)** is not displayed as an installed component, click Install...
5. In the Select Network Component Type dialog box, select **Protocol**, and then click Add...
6. Select **Internet Protocol (TCP/IP)** in the Network Protocols list, and then click OK

You may be prompted to install files from your Windows 2000 installation CD or other media. Follow the instructions to install the files.

7. If prompted, click [OK] to restart your computer with the new settings.

Next, configure the PCs to accept IP information assigned by the PAMSPAN501X:

8. In the Control Panel, double-click the Network and Dial-up Connections icon.
9. In Network and Dial-up Connections window, right-click the Local Area Connection icon, and then select **Properties**.
10. In the Local Area Connection Properties dialog box, select **Internet Protocol (TCP/IP)**, and then click [Properties].
11. In the Internet Protocol (TCP/IP) Properties dialog box, click the radio button labeled **Obtain an IP address automatically**. Also click the radio button labeled **Obtain DNS server address automatically**.
12. Click [OK] twice to confirm and save your changes, and then close the Control Panel.

2.6.5 Windows Me PCs

1. In the Windows task bar, click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **Network and Dial-up Connections** icon.
3. In the Network and Dial-up Connections window, right-click the Network icon, and then select **Properties**.

   The Network Properties dialog box displays with a list of currently installed network components. If the list includes **Internet Protocol (TCP/IP)**, then the protocol has already been enabled. Skip to step 11.
4. If **Internet Protocol (TCP/IP)** does not display as an installed component, click [Add...].
5. In the Select Network Component Type dialog box, select **Protocol**, and then click [Add...].
6. Select **Microsoft** in the Manufacturers box.
7. Select **Internet Protocol (TCP/IP)** in the Network Protocols list, and then click [OK].

   You may be prompted to install files from your Windows Me installation CD or other media. Follow the instructions to install the files.
8. If prompted, click [OK] to restart your computer with the new settings.

Next, configure the PCs to accept IP information assigned by the PAMSPAN501X.

9. In the Control Panel, double-click the Network and Dial-up Connections icon.
10. In Network and Dial-up Connections window, right-click the Network icon, and then select **Properties**.
11. In the Network Properties dialog box, select **TCP/IP**, and then click Properties.
12. In the TCP/IP Settings dialog box, click the radio button labeled **Server assigned IP address**. Also click the radio button labeled **Server assigned name server address**.
13. Click OK twice to confirm and save your changes, and then close the Control Panel.

2.6.6 Windows 95, 98 PCs

First, check for the IP protocol and, if necessary, install it:

1. In the Windows task bar, click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **Network** icon.
   The Network dialog box displays with a list of currently installed network components. If the list includes TCP/IP, and then the protocol has already been enabled. Skip to step 9.
3. If TCP/IP does not display as an installed component, click Add...
   The Select Network Component Type dialog box displays.
4. Select **Protocol**, and then click Add...
   The Select Network Protocol dialog box displays.
5. Click **Microsoft** in the Manufacturers list box, and then click **TCP/IP** in the Network Protocols list box.
6. Click OK to return to the Network dialog box, and then click OK again.
   You may be prompted to install files from your Windows 95/98 installation CD. Follow the instructions to install the files.
7. Click OK to restart the PC and complete the TCP/IP installation.

Next, configure the PCs to accept IP information assigned by the PAMSPAN501X:

8. Open the Control Panel window, and then click the Network icon.
9. Select the network component labeled TCP/IP, and then click Properties.

Note: If you have multiple TCP/IP listings, select the listing associated with your network card or adapter.

10. In the TCP/IP Properties dialog box, click the IP Address tab.
11. Click the radio button labeled **Obtain an IP address automatically**.
12. Click the DNS Configuration tab, and then click the radio button labeled **Obtain an IP address automatically**.
13. Click OK twice to confirm and save your changes.

    You will be prompted to restart Windows. Click Yes.

3 Configure the PAMSPAN501x via EmWeb

3.1 Accessing EmWeb

To access EmWeb on the PAMSPAN501x that has been booted with an image containing a factory default configuration:

1. Attach a PC to one of the LAN interfaces. At your web browser, enter the URL: http://192.168.1.1
2. If you first time login the EmWeb, you will see a login box is displayed. You must enter your username and password to access the pages. The default User name/Password as follows

   User Name: admin

   Password: admin
3. Click on [OK]. You are now ready to configure PAMSPAN501x using EmWeb.

3.2 About EmWeb pages

EmWeb provides a series of web pages that you can use to setup and configure the PAMSPAN501x. These pages are organized into three main topics. You can select each of the following topics from the menu on the left-hand side of the main window:

• Status: information about the current setup and status of the system.

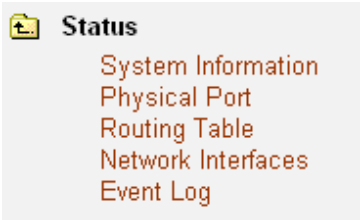
• System: The System section lets you carry out system commands like Event Log, Firmware Update, Backup/Restore, Save configuration and Authentication.

• Configuration: information about the current configuration of various system features with options to change the configuration.

The changes made via web pages will immediately reflect in all elements of the network. The exact information displayed on each web page depends on the specific configuration that you are using. The following sections give you a general overview of the setup and configuration details.

3.2.1 Status Pages

The Status homepage contains information about the current configuration of PAMSPAN501x. It provides an overview of the current image configuration. The page contains the following sections:



3.2.1.1 System Information

Click *System Information* on Status menu, and then System information page will be displayed as shown below:

System Information	
Prompt Name	host
Firmware Version	2.0.906.3
PCB Version	1.1
TXCVR Info	Infineon - 04
LAN IP Address	192.168.1.1
LAN Subnet Mask	255.255.255.0
MAC Address	00:01:EB:0C:6E:CB
Up-Time	00:08:04s

3.2.1.2 Physical Port

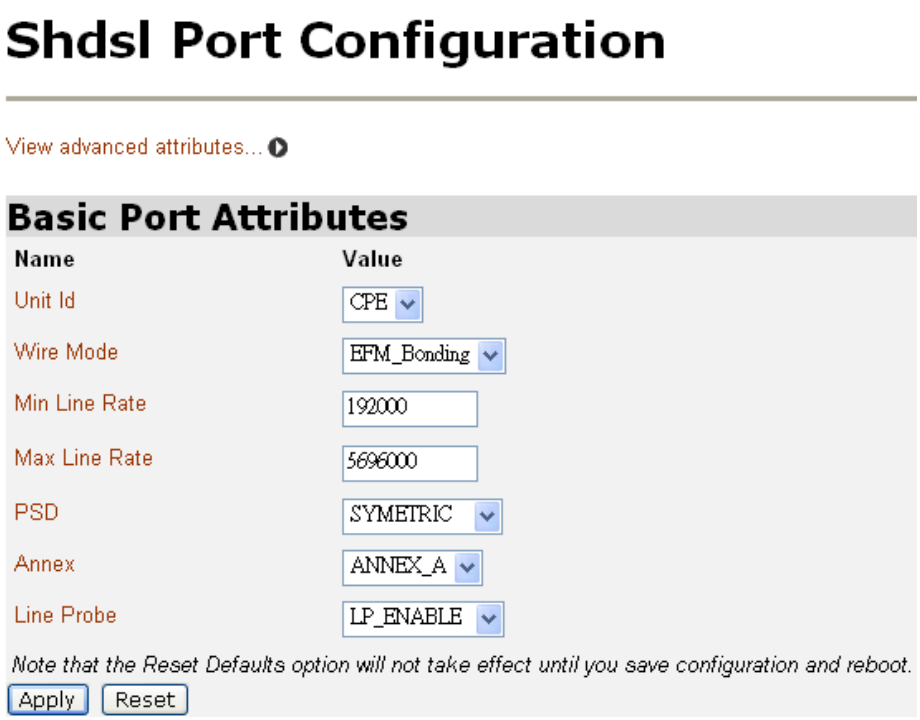
This option allows you to configure the ports available on your PAMSPAN501X, depending on the type of image that you intend to boot.

Configuring ports

1. *From the Status menu, click on Physical Port.* The physical ports available on your device will be displayed.

Physical Ports		
Port	Type	Connected
Shdsl	atm	✗
Eth1	ethernet	✓
Eth2	ethernet	✗
Eth3	ethernet	✗
Eth4	ethernet	✗

2. Click on *Shdsl*. The *Shdsl Port Configuration* page will be displayed:



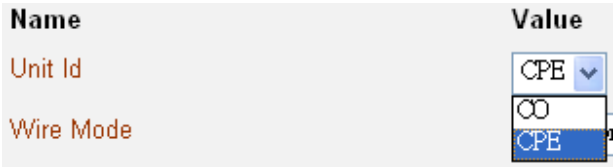
3. This page allows you to carry out advanced configuration of your SHDSL port attributes. From the *Shdsl Port Configuration* page, click *View advanced attributes.* The *Shdsl Port Configuration* page will be displayed. “Shdsl” is the default SHDSL port name created in the PAMSPAN501X. You can configure the SHDSL parameters on this page.

Advanced Port Attributes

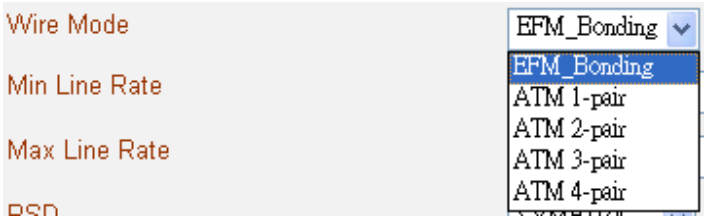
Name	Value
Unit Id	CPE
Wire Mode	EFM_Bonding
Min Line Rate	192000
Max Line Rate	5696000
PSD	SYMETRIC
Annex	ANNEX_A
Line Probe	LP_ENABLE
Data Rate Link No_0	0
RX_SNR_Margin Customer Side Link No_0	0
RX_SNR_Margin Network Side Link No_0	0
Data Rate Link No_1	0
RX_SNR_Margin Customer Side Link No_1	0
RX_SNR_Margin Network Side Link No_1	0
Data Rate Link No_2	0
RX_SNR_Margin Customer Side Link No_2	0
RX_SNR_Margin Network Side Link No_2	0
Data Rate Link No_3	0
RX_SNR_Margin Customer Side Link No_3	0
RX_SNR_Margin Network Side Link No_3	0
High Speed Rx Port	false
High Speed Tx Port	false
Hw VPBreakout	false
Hw VPIBits	6
Hw VCIBits	10
Discard Stats	0x2068e970

Apply Reset

4. In the Unit Id drop-down menu, you can set the device as either CO or CPE, and then click Apply to save the settings.

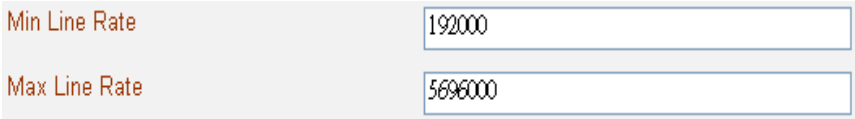


5. To set the PAMSPAN501X to Wire pair mode, click the Wire Mode drop-down list to select the desired Wire Pair number. After that, click Apply to save the settings.

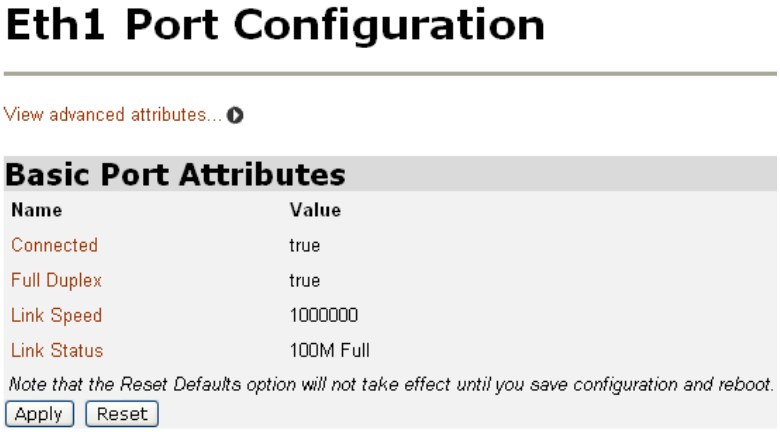


Wire Mode	DSL Pair to Use	Illustration
1-PAIR	1	DSL 1 2 3 4
2-PAIR	1,2	
3-PAIR	1,2,3	
4-PAIR	1,2,3,4	

6. To set the maximum and minimum line rate, enter the Max and Min Line Rate values (where the values range from 192000bps to 5696000bps) and then click Apply to save the settings. Once the handshaking process between the STU-R and STU-C devices is complete, the actual transmission rate will be displayed in the Current Tx Rate attribute.



7. To configure a specific Ethernet port, click the appropriate port number (*eth1~eth4)* in the Physical Port Table and then the *Ethernet Port Configuration* page will be displayed:



The page displays the basic port attributes for the Ethernet port on your PAMSPAN501X.

8. This page allows you to view or carry out advanced configuration of your Ethernet port attributes. For instance, Click *View advanced attributes on Eth1 Port Configuration*, and then the *Advanced Eth1t Port Configuration* page will be displayed.

Advanced Port Attributes

Name	Value
Connected	true
Full Duplex	true
Link Speed	1000000
Link Status	100M Full
In Octets	36375
In Unicast Pkts	145
In Errors	0
In NUcast Pkts	48
In Discards	0
Out Octets	76636
Out Unicast Pkts	128
Out Errors	0
Out NUcast Pkts	0
Out Discards	0
Phy Mode	Auto
Clear Statistic	false
Admin Status	up

Apply Reset

Set the Ethernet port as either enabled or disabled via the Admin Status drop-down list, and then click Apply to update the advanced configuration, or Reset to revert to the default advanced configuration settings. Click *Return to basic attributes* to return to the *Eth1 Port Configuration* page.

3.2.1.3 Routing Table

Routing Table is a matrix with a network control protocol, which gives the hierarchy of link routing at each node.

The Routing Table screen allows you to view the routing table built in the device.

Routing Table			
Destination	Netmask	Gateway	Interface
192.168.1.0	255.255.255.0	0.0.0.0	iplan
127.0.0.0	255.0.0.0	0.0.0.0	loopback

If to create an IP route, refer to the IP Routes section on *Advanced* menu.

3.2.1.4 Network Interface

If to view the statistics on Bridge/Router Interfaces, select a specified interface to invoke the Bridge/Router Interface page.

Bridge/Router Interface			
Description	Statistics	Extra Info	Interface Name
rfc1483-0	Show Statistics...	Port: shdsl VPI/VCI: 0/35	pvc0
eth1	Show Statistics...		eth1
eth2	Show Statistics...		eth2
eth3	Show Statistics...		eth3
eth4	Show Statistics...		eth4

Following figure shows the statistics on the interface, rfc1483-0.

Status: rfc1483-0 - *rfc1483-0*

Bridged interface

ATM connection:

Port name	shdsl	Active	TRUE
Rx VPI	0	Tx VPI	0
Rx VCI	35	Tx VCI	35
Rx packets	0	Tx packets	45
Rx bad packets	0	Tx bad packets	0

RFC 1483 parameters:

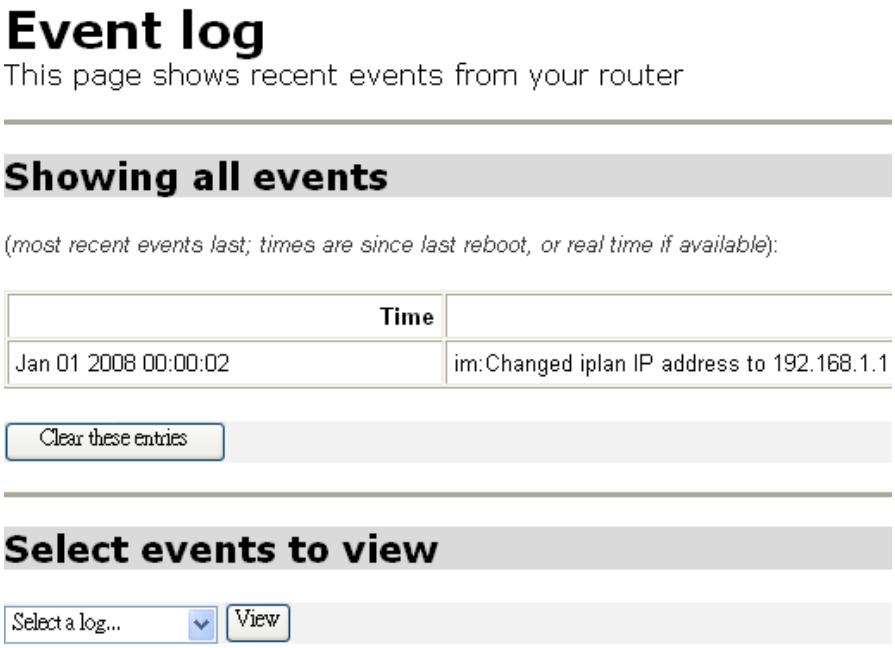
Encapsulation	LlcBridged

Refresh

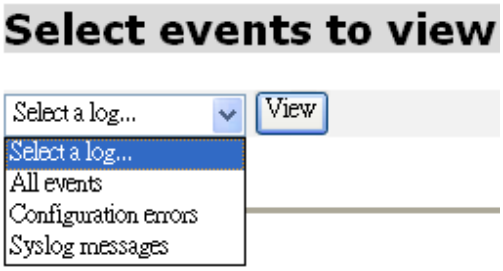
Click Refresh to get the latest status information for this bridge interface.

3.2.1.5 Event Log

Click on Event Log, the following page is displayed as follows:



This page displays a table containing all configuration errors experienced by your Router during a current session. 3 types of logs can be selected via select a log drop-down list.



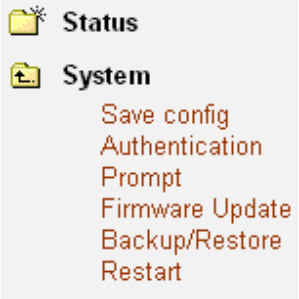
All Events: Shows all events occurred.

Configuration errors: Shows error messages regarding configuration(s) which the system DOES NOT allow to change

Syslog messages: Shows all messages regarding system actions other then Configuration errors.

3.2.2 System Pages

Click on System menu, the following options appear:

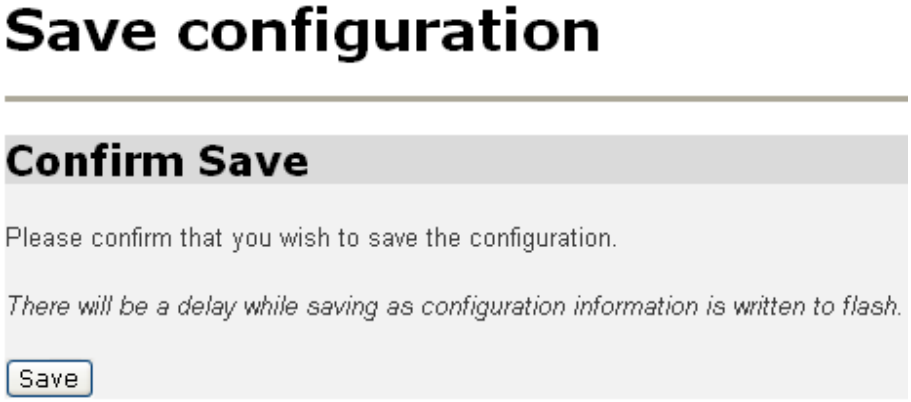


The System menu contains options including, *Firmware Update, Backup/Restore and Restart Router, Prompt, Save configuration and Authentication*. They will be introduced in the following sections.

3.2.2.1 Save config

To save your current configuration to Flash ROM:

1. From the System menu, click on *Save configuration*. The following page is displayed:

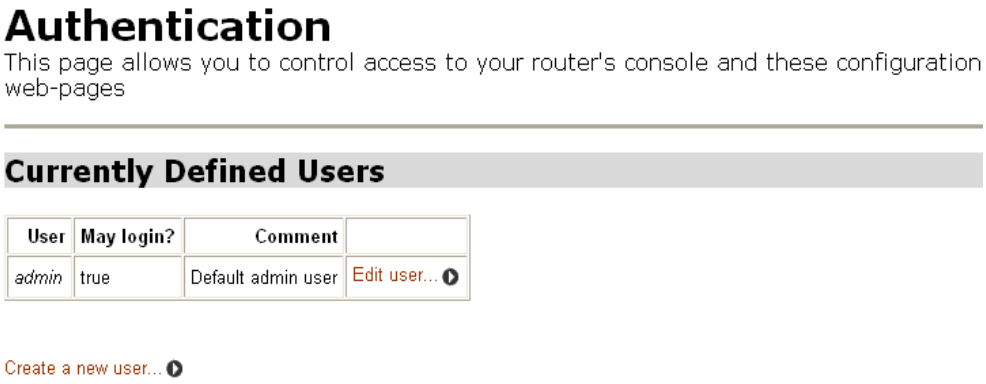


2. Click on Save to save your current configuration in the device.

After a short time the configuration is saved and the following confirmation message is displayed: Saved information model to file //flashfs/im.conf

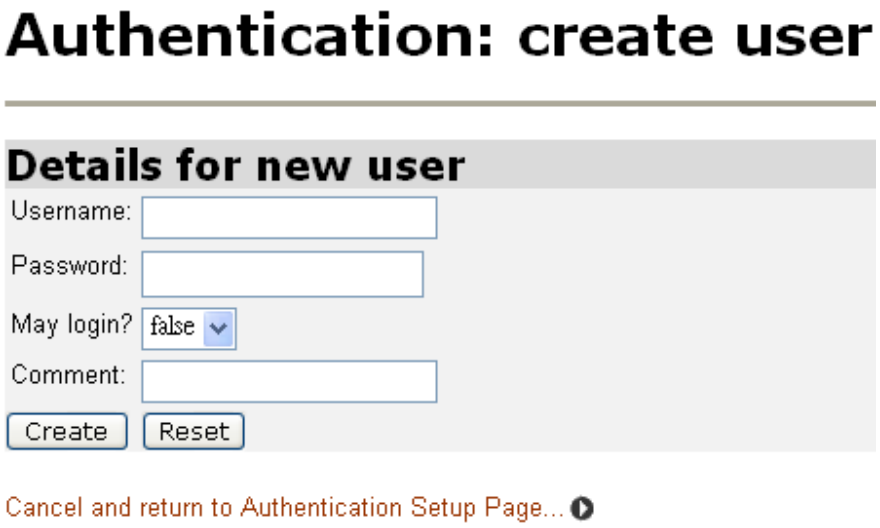
3.2.2.2 Authentication

This option allows accounts for users who access the PAMSPAN501X to be administered. Click *Authentication* via the System menu. The following page will be displayed:



To creating a new login account

1. Click *Create a new user*. The following page will be displayed:

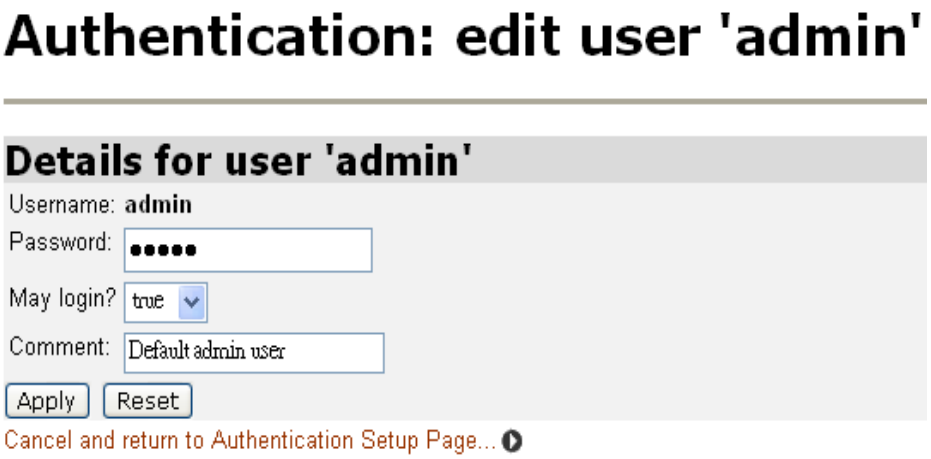


2. Enter the desire information details for the new user into the username, password and comment text fields.

3. Click Create. The Authentication page will be displayed. The table now contains details for the user that has just been created.

To editing/deleting a login account

1. The Authentication page table contains an Edit user hyperlink for each user account entry. Click a link and the following page will be displayed:



This page allows:

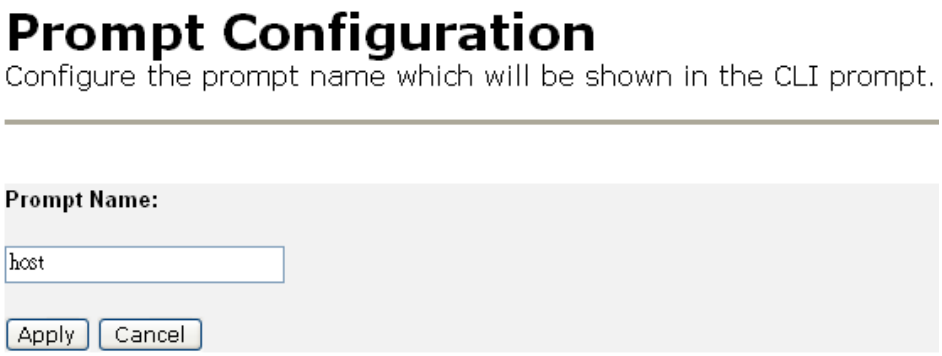
• Details for a specific user account to be updated. Modify the necessary text boxes then click Apply.

• A user account to be deleted. Click the *Delete this user* button.

2. Once a user account has been edited or deleted, the Authentication page will be displayed and the table will reflect any changes that have been made on the *Edit user* page.

3.2.2.3 Prompt

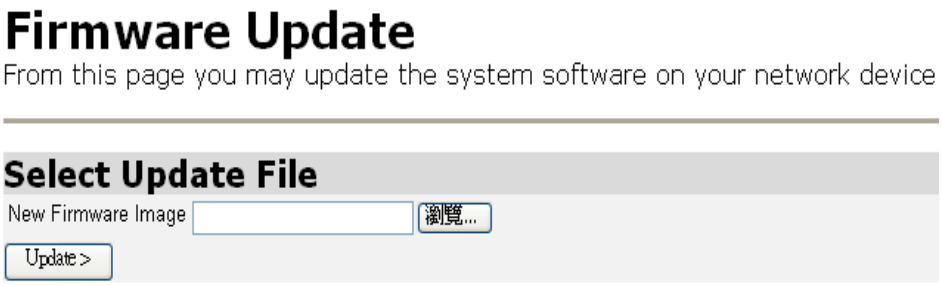
This configuration allows user to configure the prompt name which will be shown in the CLI prompt. Enter the name you wish to show in CLI prompt and click Apply.



3.2.2.4 Firmware Update

This option allows firmware images to be uploaded to the PAMSPAN501X using HTTP.

1. From the System menu, click *Firmware update*. The following page will be displayed:



2. Enter the location of the new firmware image that is to be uploaded, or use the Browse... button to browse and select the file. Click Update >.

3. Once the file has been uploaded to the RAM of your device, it is written to the Flash ROM. A status page will be displayed confirming whether the upload is complete or indicating how much of the file (in bytes and as a percentage) has been written to the Flash ROM.

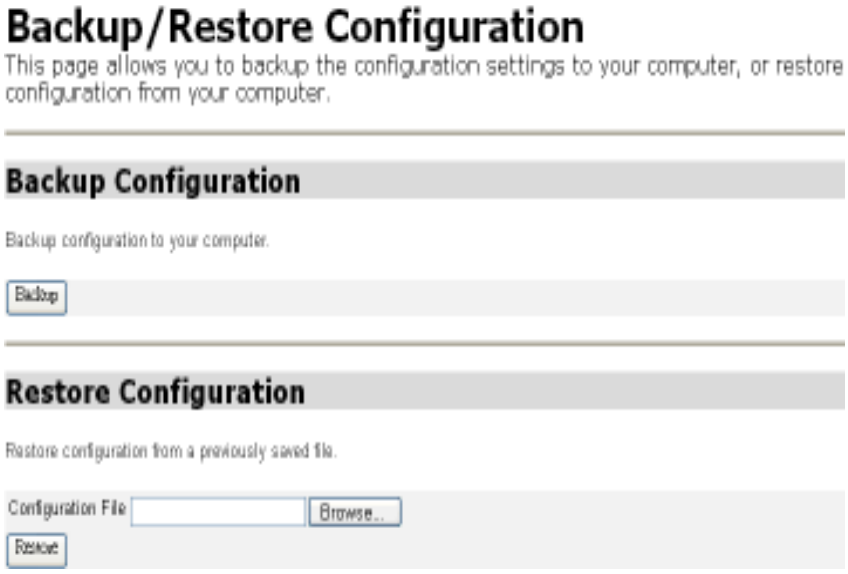
4. Once the file has been written to flash, the Firmware Update page is refreshed. The page confirms completion of the update and requests that the PAMSPAN501X be restarted in order to use the new firmware. Click Restart in the system menu.

***Note**: Please do not power-off the device while updating firmware or saving the configuration as this might cause the device to malfunction.*

5. After updating the firmware, it is strongly suggested that the device is restarted and the default configuration is recalled as this will prevent any incompatible configuration between the former and the current firmware versions. To do this, check the *Reset to factory default settings* box on the *Restart* page in the system menu.

3.2.2.5 Backup/Restore

From the System menu, click *Backup/restore*. The following page will be displayed. This page allows the configuration to be backed up to, or restored from, another computer.

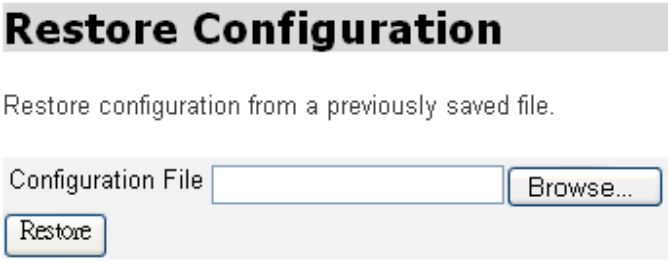


Backing up your configuration

1. From the *Backup Configuration* section, click Backup. The *File Download* window will be displayed. Click Save. The *Save As* window will then be displayed. Select a directory in which to save the backup configuration and click Save.

Restoring a configuration

1. In the *Restore Configuration* section as shown below, click in the *Configuration File* text box and enter the network path of the file that is to be restored. If the path details are unknown, click Browse... and locate the file using the *Choose file* window.

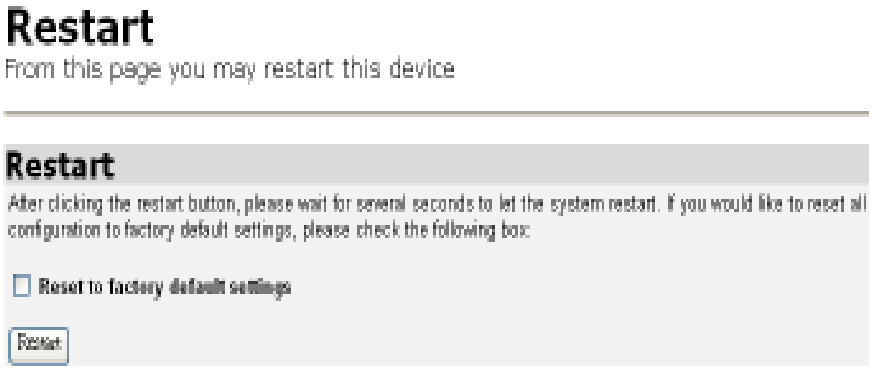


2. Click Restore. The page will be refreshed and a *Configuration Restored* message will be displayed giving details of the number of bytes uploaded.

3.2.2.6 Restart

This page allows the PAMSPAN501X to be restarted and has the same effect as resetting the PAMSPAN501X by pressing the reset button on the hardware.

1. From the System menu, click *Restart*. The following page will be displayed:



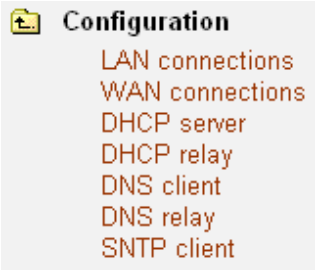
2. Click Restart to reset the PAMSPAN501X. The *Restart* page also provides an option to restart and restor the factory default settings. Check the *Reset to factory default settings* checkbox, and then click Restart. Monitor the console status output to check the reset progress.

3. After the login and password prompt is displayed, login as usual (with login = *admin*, password = *admin*), and then refresh the browser that is running EmWeb. The *Status* page will be displayed and the PAMSPAN501X has been reset.

3.2.3 Configuration pages

The Configuration menu contains options for configuring features on PAMSPAN501x including basic LAN and WAN connections and DHCP and DNS settings.

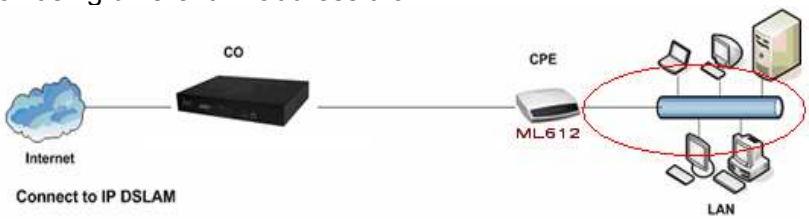
Note: Most of the features contain sensible default settings. You are unlikely to have to reconfigure every feature included in the Configuration menu. From the left-hand menu and click on *Configuration*. The following sub-headings are displayed:



- **LAN connections:** allows you to edit your LAN port IP address, create and edit a secondary IP address and create new LAN services.
- **WAN connections:** allow you to create, edit and delete WAN services.
- **DHCP server:** allow you to enable, disable and configure your DHCP server.
- **DHCP relay:** allow you to enable, disable and configure your DHCP relay.
- **DNS client:** allow you to enable, disable and configure DNS client.
- **DNS relay:** allow you to enable, disable and configure DNS relay.
- **SNTP client:** allow you to configure Simple Network Time Protocol at Client side. (Please point to the SNTP server, contact with your ISP provider.)

3.2.3.1 LAN connections

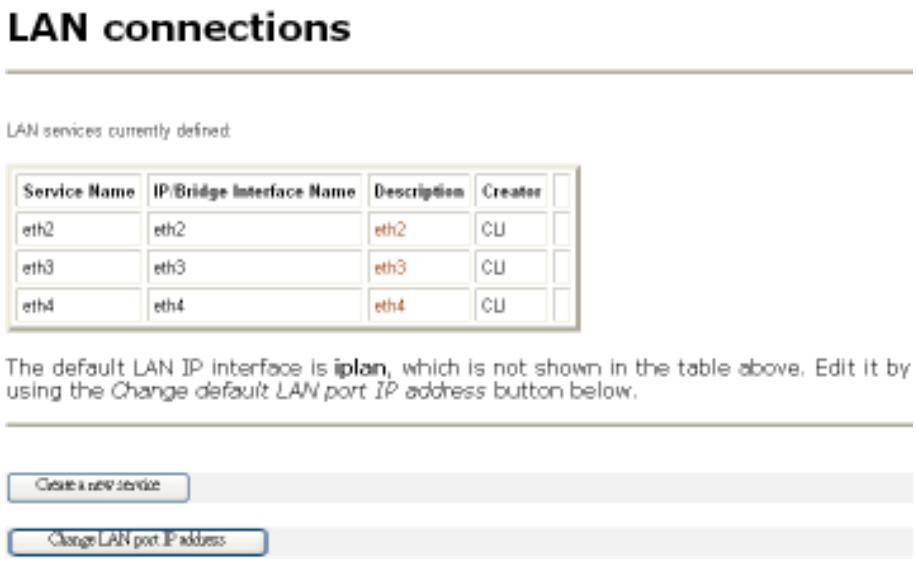
LAN connections, as shown below, refer to the connection of the customer end, which using different IP address than WAN.



This option allows you to:

- Configure the LAN IP address and subnet of the default LAN connection to the PAMSPAN501X.
- Create WAN interfaces: multiple virtual interfaces can be associated with the existing primary LAN interface.

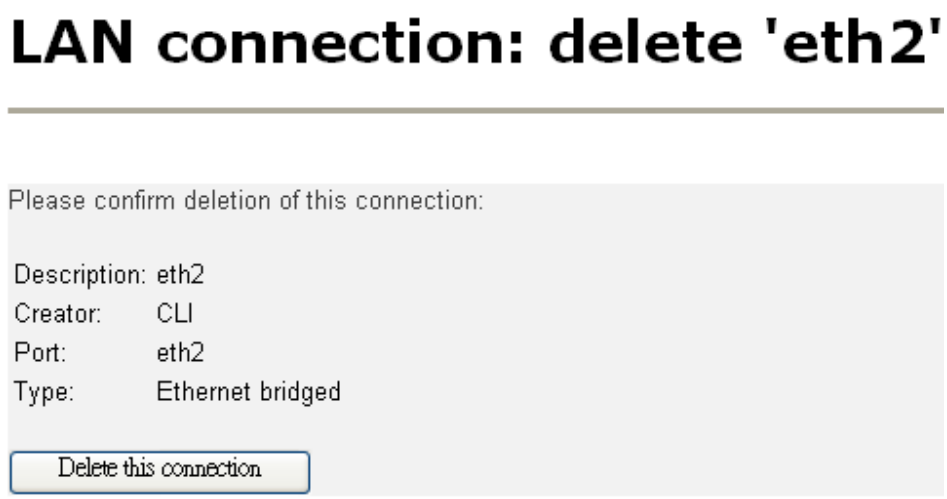
From the Configuration menu, click LAN connections. The following page will be displayed:



The service, eth1, is not shown because it has already been created by default, which user will not be able to delete it. The Creator column shows the method that the services are being created. By default command, all four ports will be created from CLI; therefore, it would show CLI under the Creator column.

To delete a service

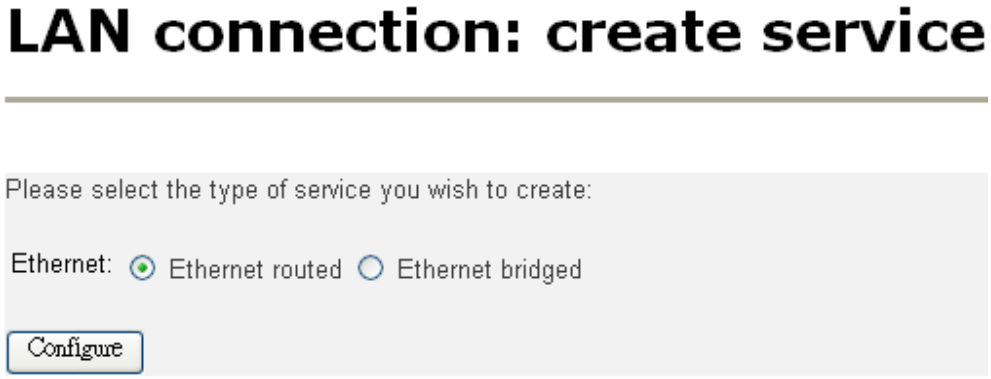
If users would like to delete a service, simply click the specific port link, such as “eth3” under Descriptions column, the port deletion page will be displayed as shown below:



Click 

to delete the connection. Once there is a connection

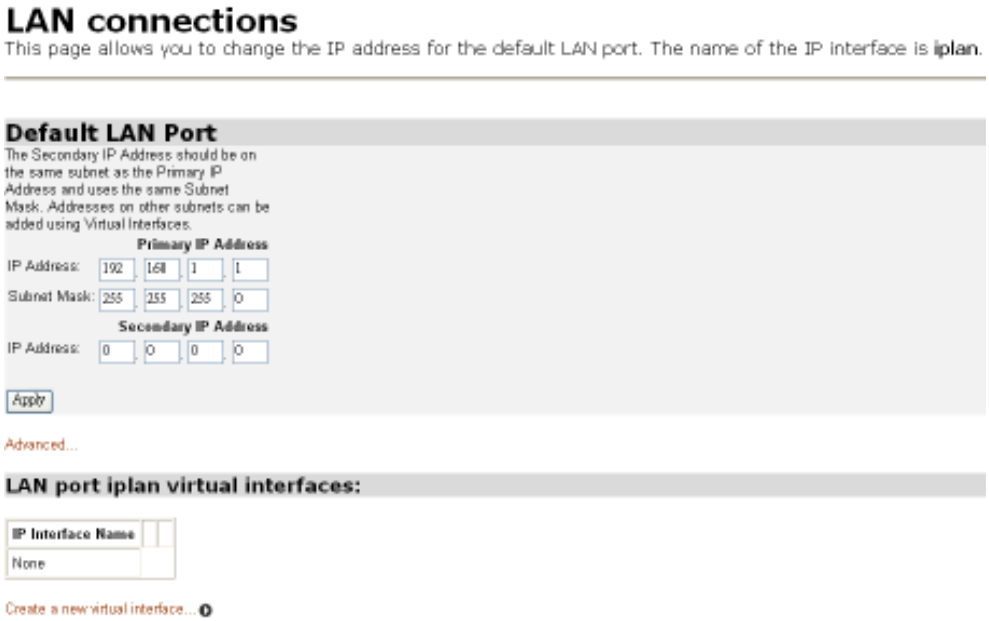
that has been deleted, user will then be able to use [Create a new service] to create a service. By clicking [Create a new service], users will be able to select the type of service that they wish to create as shown below:



By using the web to create a service, it would then show WebAdmin under the Creator column.

Configuring primary and secondary LAN connections

1. The Default LAN Port section contains two subsections:



a. IP address and subnet mask details for your primary LAN connection. To edit these details, click [Change LAN port IP address] and enter the new primary address details

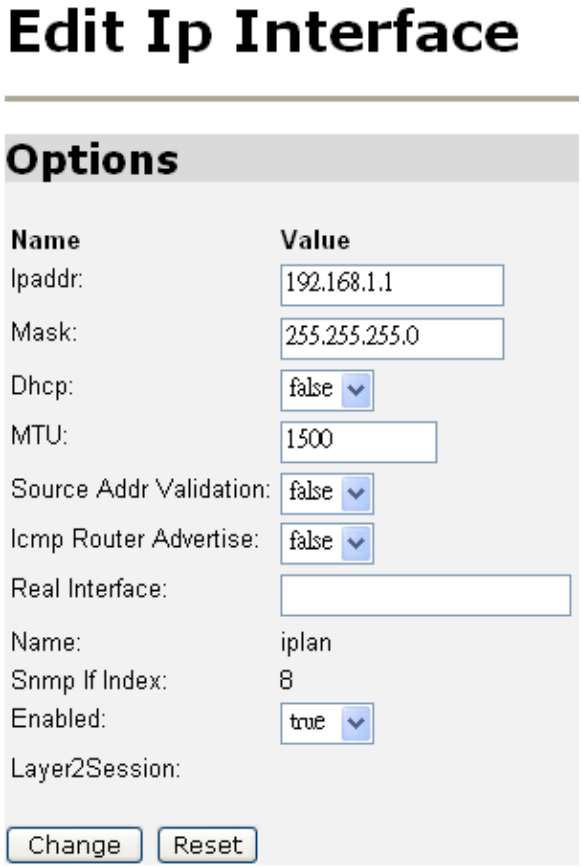
b. Secondary IP address details. To create/configure a secondary IP address, click in the Secondary IP Address text box and enter the new address details.

2. Once you have configured the IP address(es), click [Apply] button. A message will be displayed confirming that your address information is being updated. If you have

changed the primary IP address, you may need to enter the new address in your web browser address box.

To edit IP interface

1. Click Advanced. hyperlink at the bottom of the LAN connections page. The Edit IP Interfaces page will be displayed as shows below, the user will be able to change or modify the value of this IP Interface.



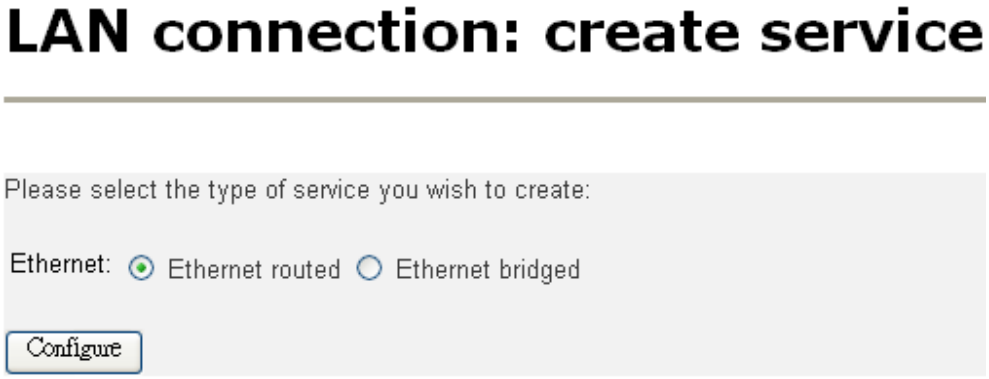
Field Definition of IP Interface

Field	Definition
Ipaddr	The IP address for this IP Interface
Mask	Mask fort this IP Interface
Dhcp	DHCP is a protocol used to obtain IP addresses and other parameters such as the default gateway, subnet mask, and IP addresses of DNS servers from a DHCP server. The DHCP server ensures that all IP addresses are unique, which means that no IP address is assigned to a second client while the assignment for the first client's is valid.
MTU	MTU refers to the size (in bytes) of the largest packet that a given layer of a communications protocol can pass onwards. A higher MTU

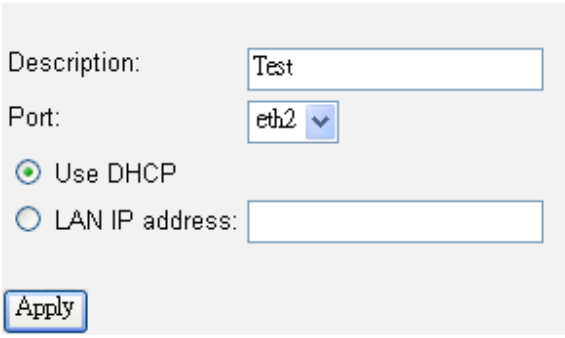
	provides higher bandwidth efficiency.
Source Addr Vaildation	This command enables/disables extra checking of the source address for packets received on this interface. If enabled, the system will only accept packets from valid addresses that have already been identified.
Icmp Router Advertise	The Internet Control Message Protocol for IPv4 is a network layer Internet Protocol that reports errors and provides other information relevant to IP packet processing.
Real Interface	The actual main interface
Name	The name of this Interface
Enabled	Enable or disable this interface

3.2.3.1.1 Supporting multi port router

The device permit multi port router. To configure this, user must first delete the default services since all ports have already been created under bridged mode by default. Then click [Create a new service] on the LAN connection page and choose the routed mode as shown below:



Click “Configure” to display the service creating page. Enter the data for the required fields and then click “Apply” to create the service as shown below:



After completing the above steps, user will be able to see the permission of multi port router on the LAN connection main page as shown below:

Service Name	IP/Bridge Interface Name	Description	Creator	
eth4	eth4	eth4	CLI	
ethernet-0	ethernet-0	test	WebAdmin	Virtual I/f
ethernet-1	ethernet-1	test1	WebAdmin	Virtual I/f

3.2.3.1.2 Command Line Interface for LAN

User can also use a Command Line Interface to configure the LAN. Below are some examples:

#> ethernet add transport <ethx> <ethx>
This command adds an <ethx> Ethernet transport and allows you to specify the <ethx> Port it will use to transport Ethernet data. In order for this command to work, both <ethx> and <ethx> must be the same.

#> bridge add interface <ethx>
This command adds the interface name <ethx> to the bridge.

#> bridge attach <ethx> <ethx>
This command attaches an existing transport to an existing bridge interface to allow data to be bridged via the transport. Only one transport can be attached to an interface. If you use this command when there is already a transport attached to the interface, the previous transport will be replaced by the new one.

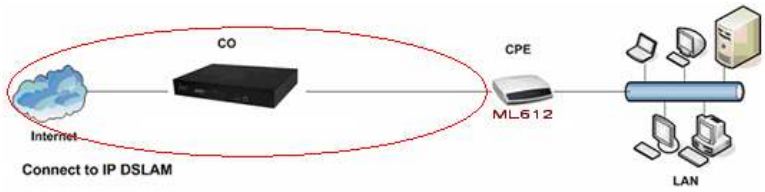
#> ip add interface <name> 192.168.1.1 255.255.255.0
This command adds a named interface and optionally sets its IP address. The IP address is not mandatory at this stage, but if it is not specified in this command, the interface will not be configured.

#> ip attachbridge <name>
This command attaches the named bridge to the PAMSPAN501X via an existing IP interface.

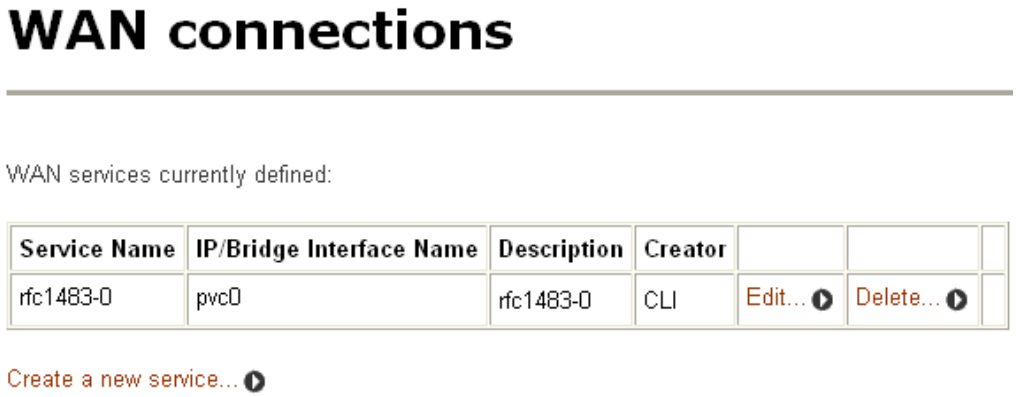
#> ip attachvirtual <virtual interface> <real ip interface>
This command creates a virtual interface. The virtual interface is associated with a 'real' IP interface that has already been attached to a transport using the *ip attach* command. Multiple virtual interfaces can be attached to a single 'real' IP interface.

3.2.3.2 WAN Connection

WAN connections, as shown below, refer to the connection of the Internet end, which has a different IP address than the LAN side.



This option allows the user to create and configure WAN connections for your PAMSPAN501X. You can also create virtual interfaces on routed services. Click on WAN connections via the Configuration menu. The WAN connections page will be displayed:



Editing a WAN service

2. Click on the *Edit* link for a specific service. The Edit page for that specific connection will be displayed. From there the user will be able to modify two interfaces: Bridge Interfaces and Spanning Bridge Interfaces.

3. Bridge Interface is the configuration settings and traffic statistics of a named bridge interface.

Edit Bridge Interface

Options

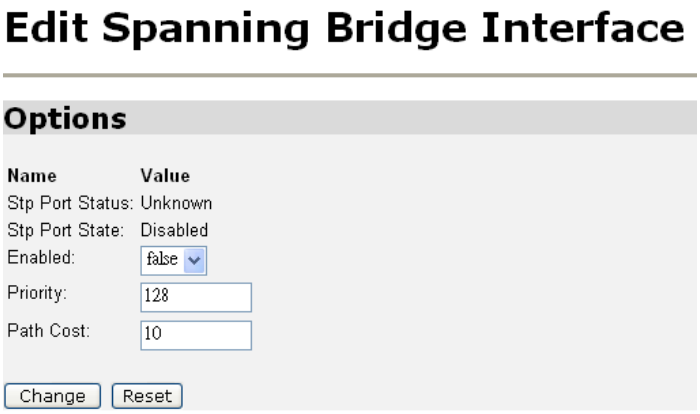
Name	Value
Leave Mode:	Normal
Name:	
Ether Filter Type:	All
Port Filter:	All
Eport Flag:	false
Port Id:	5
In Frames Count:	0
Out Frames Count:	5
Transit Delay Discards Count:	0
Buf Overflow Discards Count:	0
Port Pvid:	1
Ingress Filtering Status:	false
Frame Access Type:	ALL
Port Default User Priority:	0
Num Traffic Classes:	8
Regen Priority0:	0
Regen Priority1:	1
Regen Priority2:	2
Regen Priority3:	3
Regen Priority4:	4
Regen Priority5:	5
Regen Priority6:	6
Regen Priority7:	7
Traffic Class Map0:	0
Traffic Class Map1:	1
Traffic Class Map2:	2
Traffic Class Map3:	3
Traffic Class Map4:	4
Traffic Class Map5:	5
Traffic Class Map6:	6
Traffic Class Map7:	7
Unknown Vlan Discards Count:	0
Ingress Filtering Discards Count:	0
Unaccept Frame Type Discards:	0
Enabled:	true
Layer2Session:	

Change Reset

Field Definition of Bridge Interface

Field	Definition
Name	Name of this Interface
Enter Filter Type	The Enter Filter Type field allows the user to choose IP or PPPOE, which allows control over the filtering of Internet transmission packets, such as 080x or 886x.
In Frame Count	The number of incoming packets.
Out Frame Count	The number of outgoing packets.
Transit Delay Discards Count	The number of frames discarded due to transit delays
Buf Overflow Discards Count	The number of frames discarded due to buffer overflow
Port Pvid	The Port Pvid is the Port VLAN ID setting, is non-configurable and is always enabled, i.e. the bridge supports the ability to override the default Pvid setting and its egress status (VLAN tagged or untagged) on each bridge interface.
Ingress Filtering Status	This specifies whether the bridge interface discards incoming VLAN tagged frames for a VLAN that does not have this interface in its Egress interface list, or it accepts all incoming frames.
Frame Access Type	This command enables control over the types (Tagged or Untagged) packets. When choosing ALL, the system will accept either Tagged or Untagged packets. When choosing Tagged, the system will only accept Tagged packets.
Port Default User Priority	This command enables control over the priority of ports. “0” means the highest priority. “7” is the lowest.
Num Traffic Classes	A Traffic Class specifies a mechanism that can be used to match incoming and/or outgoing packets on a router's interface.
Regen Priority	This command specifies the mapping of user priorities in the incoming frames to the regenerated user priority that will be used for traffic class mapping as well as set in the VLAN tag of the outgoing frame.
Traffic Class Map	This command specifies the mapping of regenerated priority to their traffic class values.
Unknown Vlan Discards Count	The number of unknown VLANs that have been discarded by the system.
Ingress Filtering Discards Count	The number of incoming frames that have been filtered and discarded by the system.
Unaccept Frame Type Discards	The number of unaccepted frames that have been discarded by the system.
Enabled	Enable or Disable this interface.

4. Spanning Bridge Interface consist of the status, path cost, and priority used for spanning tree protocol of the bridge interface. Spanning tree allows a network design to include spare (redundant) links to provide automatic backup paths if an active link fails, without the danger of bridge loops, or the need for manual enabling/disabling the backup links. Bridge loops must be avoided to prevent flooding the network.

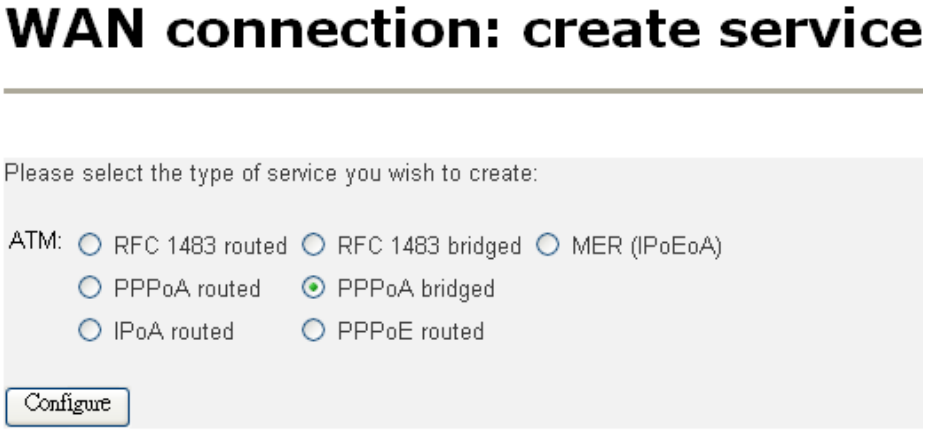


Field Definition of Spanning Bridge Interface

Field	Definition
Stp Port Status	This field shows the status of the Stp Port.
Enabled	Enabled or disabled this interface
Priority	Priority of this Interface
Path Cost	The value indicates the distance of the packets traveled.

Create a new service

The device supports several types of services, such as RFC 1483, MER (IPoEoA), PPPoA, PPPoE, and IPoA. Click Create a new service and the WAN connection service creating page will be displayed as shown below.



For example: To create a PPP over AAL5 service, choose PPPoA bridged and click on “Configure” to go to the MER service creating page as shown below. Fill in the desire data into the appropriate fields and click “Apply” to create this service.

WAN connection: PPPoA bridged

Description:
VPI: 0
VCI: 35
LLC header mode: off
HDLC header mode: off
No authentication
PAP
CHAP
User name:
Password:
Apply

Field Definition of PPPoA

Field	Definition
Description:	Text explanation of the service.
VPI:	ID number for the service. Must match on CPE side
VCI:	Secondary ID number for the service. Must match on CPE side
LLC header mode	Enable or disable the LLC header
HDLC header mode	Enable or disable the HDLC header
Authentication	Enter the username and passwords for access

Another example: To create a MER (IPoEoA) service:

Please select the type of service you wish to create:

ATM: RFC 1483 routed RFC 1483 bridged MER (IPoEoA)
PPPoA routed PPPoA bridged
IPoA routed PPPoE routed

Configure

Choose MER (IPoEoA) and click on “Configure” to go to the MER service creating page as shown below. Fill in the desire data into the appropriate fields and click “Apply” to create this service.

Field Definition of MER (IPoEoA)

Field	Definition
Description:	Text explanation of the service.
VPI:	ID number for the service. Must match on the CPE side
VCI:	Secondary ID number for the service. Must match on the CPE side
Encapsulation method:	Packet format. Choose between LLC/SNAP or VcMux
Use DHCP/ WAN IP address	Use DHCP to assign the IP automatically or choose WAN to assign the IP manually.
Enable NAT on this interface	Check the box to enable NAT on this interface.

3.2.3.2.1 Command Line Interface for WAN

Users can also use a Command Line Interface to configure a WAN. Below are some examples:

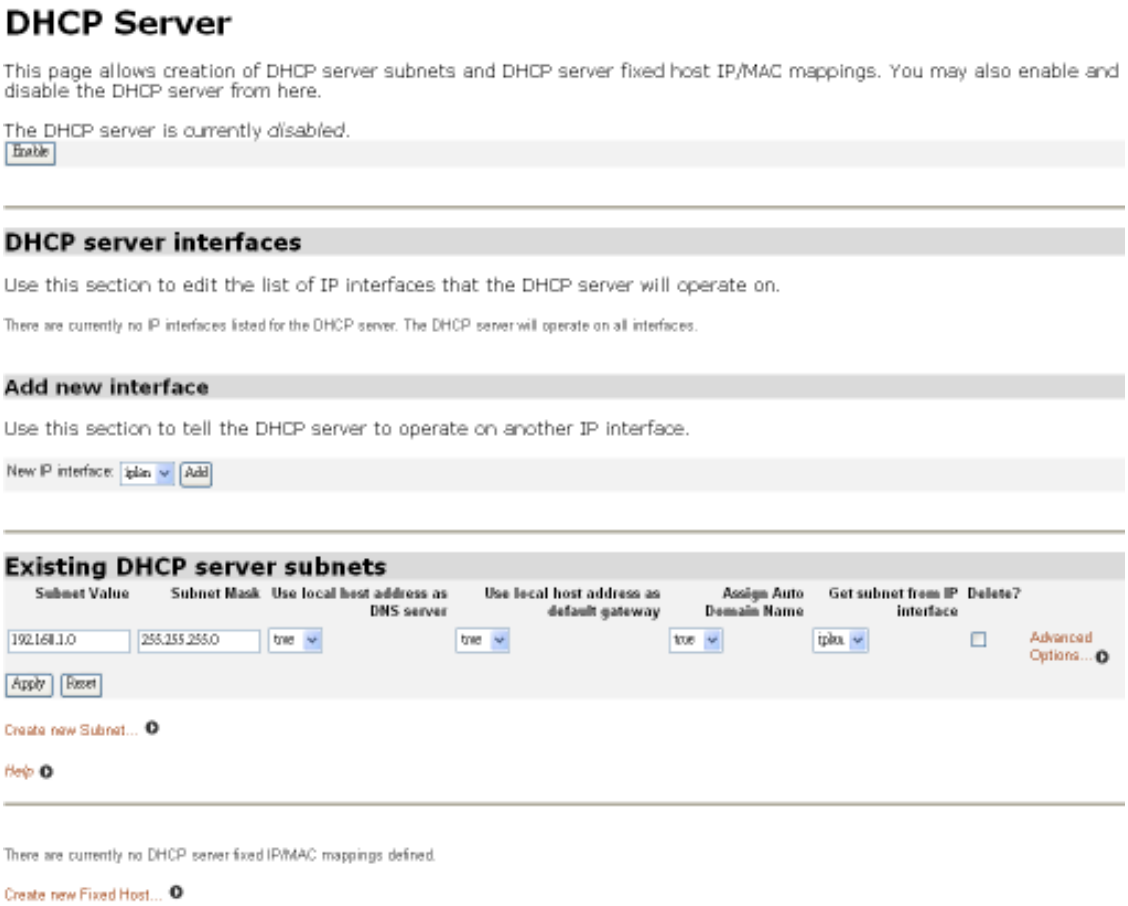
#> rfc1483 add transport <name> <port> <vpi> <vci> {llc|vcmux} {bridged|routed}
This command creates a named RFC1483 transport and allows the following parameters to be specified:
• The ATM port that will transport RFC1483 data.
• VPI (Virtual Path Identifier)
• VCI (Virtual Circuit Identifier)
• LLC or VcMux encapsulation (optional)
• Bridged or Routed (optional)
The port/VPI/VCI combination must be unique for each transport.

#> bridge add interface <eth1>
This command adds a interface name <eth1> to the bridge.

#> bridge attach <eth1> <eth1>
This command attaches an existing eth1 transport to an existing eth1 bridge interface to allow data to be bridged via the transport. Only one transport can be attached to an interface. If you use this command when there is already a transport attached to the interface, the previous transport is replaced by the new one.

3.2.3.3 DHCP Server

This option allows you to enable/disable the DHCP server and create, configure and delete DHCP server subnets and DHCP fixed IP /MAC mappings. Click on *DHCP server* from the *Configuration* menu. The following page will be displayed:



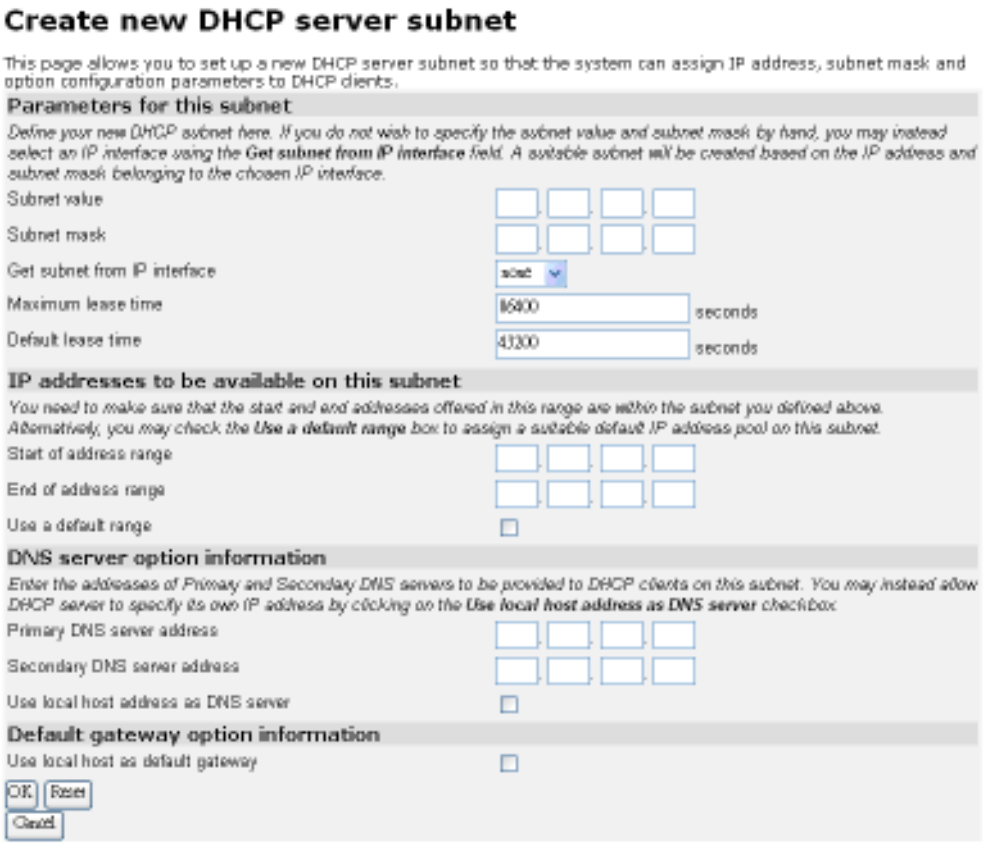
Enabling/disabling the DHCP server

The DHCP server is enabled by default. To disable the DHCP server, click Disable

Note: User may not enable both the DHCP relay and DHCP server at the same time because some interface is configured for DHCP server as well as for DHCP relay. If DHCP relay is currently enabled, User will not be able to set the DHCP server to enable. The DHCP server can't be enabled unless the DHCP relay is disabled.

Creating a DHCP server subnet

1. Click on the *Create new Subnet* link. The following page will be displayed:



2. This page allows you to:

a. Set the value and subnet mask of the subnet (either manually or by selecting an IP interface whose value and mask is used instead), and set the maximum and default lease times.

b. Set the DHCP address range (or use a default range of 20 addresses).

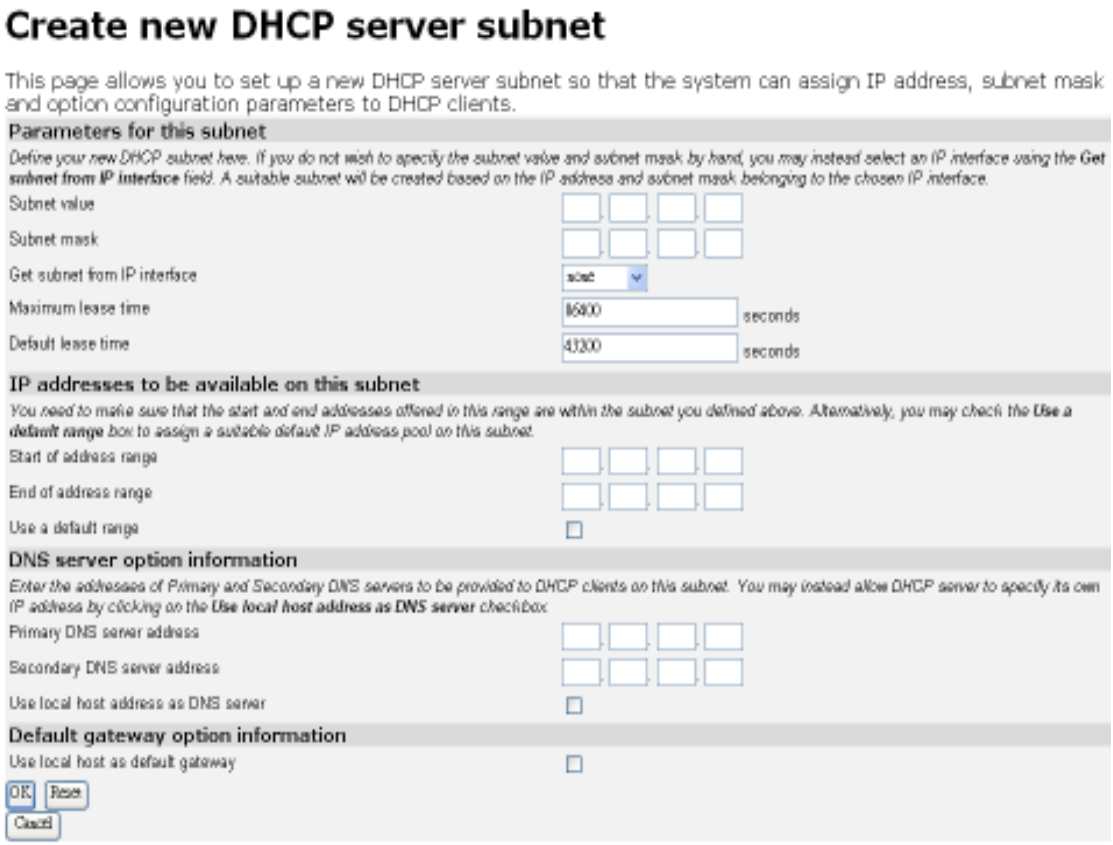
c. Set the Primary and Secondary DNS Server addresses or set your System to give out its own IP address as the DNS Server address.

d. Set your PAMSPAN501X to give out its own IP address as the default Gateway address.

3. Once you have entered the new configuration details for your DHCP server, click OK. The *DHCP Server* page will be displayed containing details of your new subnet.

Editing a DHCP subnet

1. Click on the *Advanced Options* link for a specific subnet. The *Edit DHCP server subnet* page will be displayed. This page allows you to edit the values that were set when the subnet was created.



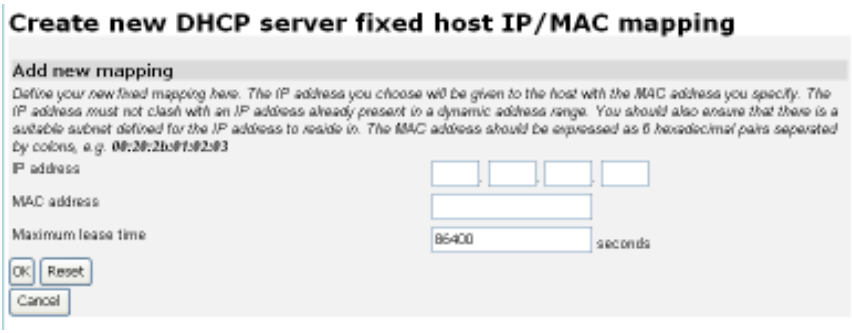
2. This page also allows you to add additional option information. At the bottom of the page, click on the *Create new DHCP option* link.

3. Click on the *Option name* drop-down list and select a name as shown below. Type a value that matches the selected option name in the *Option value* text box. Click OK.

4. The *Edit DHCP server subnet* page will be displayed as shown below, and details of your new option will be displayed under the *Additional option information* sub-heading. To delete an existing option, check the *Delete* box for a specific option and click OK.

Creating a fixed host

1. Click on the *Create new Fixed Host* link. The following page will be displayed:



2. Complete the following:

a. Type in the IP address that will be given to the host with the specified MAC address.

b. Type in the MAC address and the maximum lease time (default is 86400 seconds).

3. Click OK. The *DHCP Server* page will be displayed, and details of your new fixed host will be displayed under the *Existing DHCP fixed IP/MAC mappings* sub-heading. To edit a fixed mapping, click on the IP address, MAC address or max lease time, make a new entry and click Apply. To delete a fixed mapping, check the *Delete* box for a specific mapping and click Apply.

3.2.3.3.1 Command Line Interface for DHCP Server

You can also use a **command line interface (CLI)** to configure the DHCP server. Below are some examples:

(Please add numbering for the CLI commands)

Enable DHCP server:

#> dhcpserver enable

Create a DHCP server subnet configuration that already exists and the default and maximum lease times are set as follows:

#> dhcpserver add subnet LAN 192.168.1.0 255.255.255.0 192.168.1.2 192.168.1.21

The following options set the IP address of the DNS server and the default Gateway respectively**:**

#> dhcpserver subnet LAN add option domain-name-servers 192.168.2.30

#> dhcpserver subnet LAN add option routers 192.168.3.40

The following option sets the IP address of an IRC (Internet Relay Chat) server**:**
#> dhcpserver subnet LAN add option irc-server 10.5.7.20

The following option allows the use of address auto-configuration by clients on the network.
This is applicable when the DHCP server is unable to supply a lease to clients. If this option is set to 1, an IP address is automatically configured for the client:
#> dhcpserver subnet LAN add option auto-configure 1

You can prompt the DHCP server to issue a DHCPFORCERENEW message to the DHCP client at a given IP address. Note that the server will only do this if the DHCP client is on one of the subnets that the DHCP server has been configured to serve. The client must also be configured to respond to DHCPFORCERENEW requests as described in *Configuring DHCP Client*. Enter the following:
#> dhcpserver forcerenew 192.168.1.10

You can also add a fixed host mapping to the DHCP server configuration. This allows you to configure the DHCP server to assign a specific IP address to a specific DHCP client based on the client's MAC address. Enter:
#> dhcpserver add fixedhost myhost 192.168.1.20 00:20:2b:01:02:03

This adds a fixed mapping of the IP address 192.168.1.20 to a host whose Ethernet MAC address is 00:20:2b:01:02:03. If your fixed IP mapping overlaps with an IP address in a dynamic address range, then the fixed mapping will always supersede the dynamic address, and so that IP address will only ever be assigned to the given host. You will still need to have a suitable subnet declaration – for example, a subnet 192.168.1.20 with netmask 255.255.255.0, as shown earlier. Any configuration options you define in this subnet will also be offered to any fixed host you have added which is also on the given subnet. You can also assign a maximum lease duration to fixed DHCP clients as follows:
#> dhcpserver set fixedhost myhost maxleasetime 7200

In this context, a fixed lease duration would usually be used to allow DHCP clients to quickly see changes in the offered options. The IP address itself is always guaranteed to be available for assignment to the specific host (unless there are other DHCP servers on the same network that are deliberately configured to

conflict).

Addition/deletion of the interface “iplan” to the list of allowed interfaces may be carried out by using the following commands:

#> dhcpserver add interface iplan

#> dhcpserver delete interface iplan

You must disable the DHCP server before adjusting the list of interfaces it will bind to. After issuing the commands above, you might see the following message if you have previously turned off the DHCP server:

Note: the DHCP server is not currently enabled.

If you see this, issue the following command:

#> dhcpserver enable

The final step is to update the DHCP server with the new IP interface and configuration that has been defined. To do this, enter:

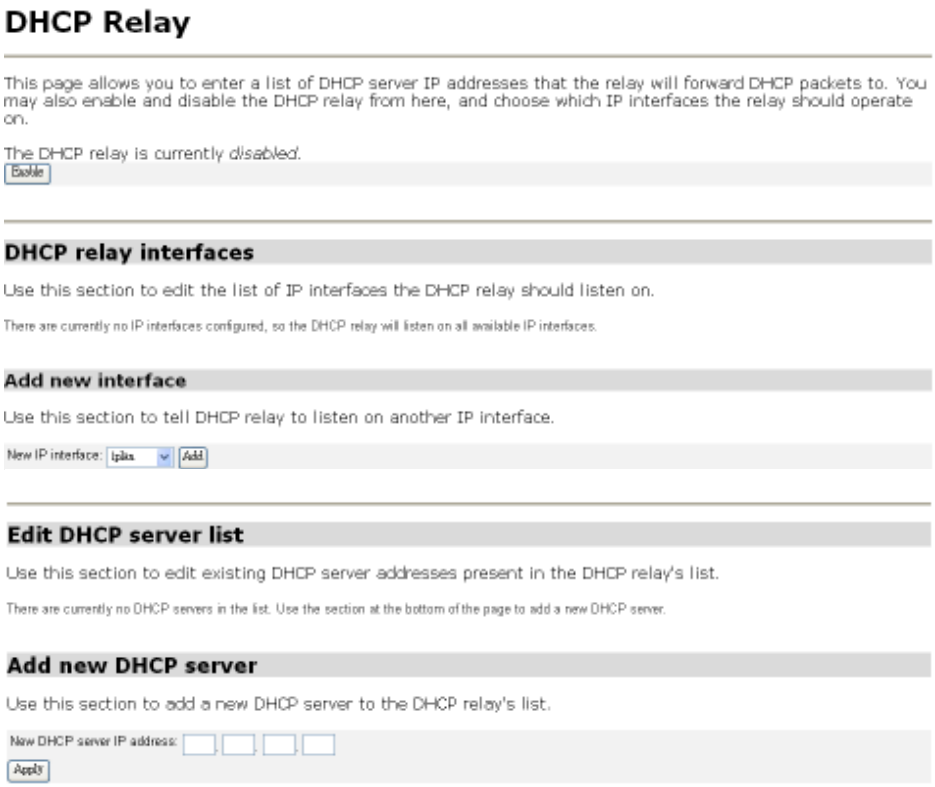
#> dhcpserver update

3.2.3.4 DHCP Relay

This option allows you to:

- Enable/Disable a DHCP relay.
- Add DHCP servers to the DHCP relay list.
- Configure/delete server entries on the DHCP relay list.

Click on DHCP relay from the Configuration menu. The following page will be displayed:



Enabling/disabling DHCP relay

1. The image shows that the DHCP relay is currently disabled. You may click the *Enable* button to enable the DHCP relay. If the DHCP relay is currently enabled, the button will display *Disable,* which upon clicking it will disable the relay.

Note: If the DHCP server is enabled, the DHCP relay will be disabled by default. You can't enable the DHCP relay unless you disable the DHCP server.

Adding a DHCP server to the DHCP relay list

1. In the *Add new DHCP server* section, type an address in the *New DHCP server IP address* text box.

2. Click Apply. The address will be displayed in the *Edit DHCP server list* section.

Editing/deleting entries in the DHCP relay list

1. To edit an entry, click on an IP address and enter the new details, and then click Apply.
2. To delete an entry, check the *Delete* box for a specific IP address, and then click Apply.

3.2.3.4.1 Command Line Interface for DHCP Relay

You can also use the command line interface (CLI) to configure the DHCP relay by using the following examples:

To add a DHCP server subnet to the DHCP relay's list of server IP addresses, use the following command:

#> dhcprelay add server 192.168.1.0

You need to update the DHCP relay in order for this addition to take effect by entering:

#> dhcprelay update

Simultaneous use of DHCP Relay and DHCP Server

To configure this, you must first disable both the DHCP server and the DHCP relay:

#> dhcprelay disable

#> dhcpserver disable

Bind the DHCP server to the LAN interface:

#> dhcpserver add interface iplan

Bind the DHCP relay to the wireless LAN interface and the WAN interface:

#> dhcprelay add interface wlan_filtered

#> dhcprelay add interface ipwan

Now enable the DHCP:

#> dhcprelay enable

#> dhcpserver enable

Now you will be able to use DHCP Relay and DHCP Server simultaneously.

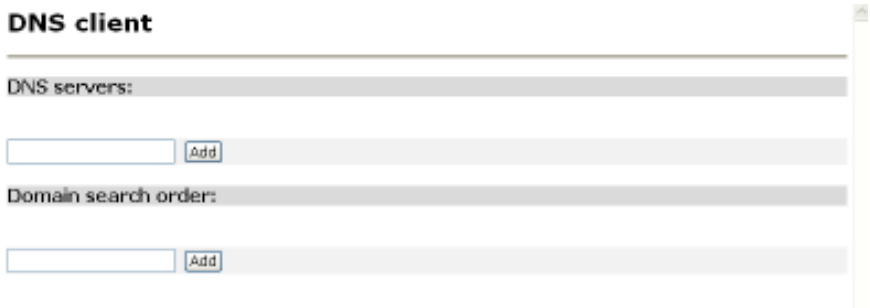
3.2.3.5 DNS Client

This option allows you to:

• Create a list of *server addresses*. This enables you to retrieve a domain name for a given IP address.

• Create a *domain search list*. DNS client uses this list when a user asks for the IP address list for an incomplete domain name.

Click on *DNS client* from the *Configuration* menu. The following page will be displayed:



Configuring DNS servers

1. Type the IP address of the unknown domain name in the *DNS servers* text box.

2. Click Add. The IP address appears in the DNS servers table. You can add a maximum of three server IP addresses. Each IP address entry has a *Delete* button associated with it. Click Delete to remove an IP address from this list.

Configuring DNS search domains

1. Type a search string in the *Domain search order* text box.

2. Click Add. The search string is displayed in the *Domain search order* table. You can add a maximum of six search strings. Each search string entry has a *Delete* button associated with it. Click Delete to remove a string from this list.

3.2.3.5.1 Command Line Interface for DNS Client

You can also use the command line interface (CLI) to configure the DNS client. Below are some examples:

To add a server address in order to retrieve a domain name for a given IP address, enter:

#> dnsclient add server <ipaddress>

You can add up to three server addresses. To display them, enter:

#> dnsclient list servers

To delete one or all of them, enter:

#> dnsclient delete server <number>

#> dnsclient clear servers

To create a domain search list, the DNS client refers to its domain search list when a user asks for the IP address list for an incomplete domain name. To add to this list, enter:

#> dnsclient add searchdomain <searchstring>

You can add up to six domain searches. To display them, enter:

#> dnsclient list searchdomains

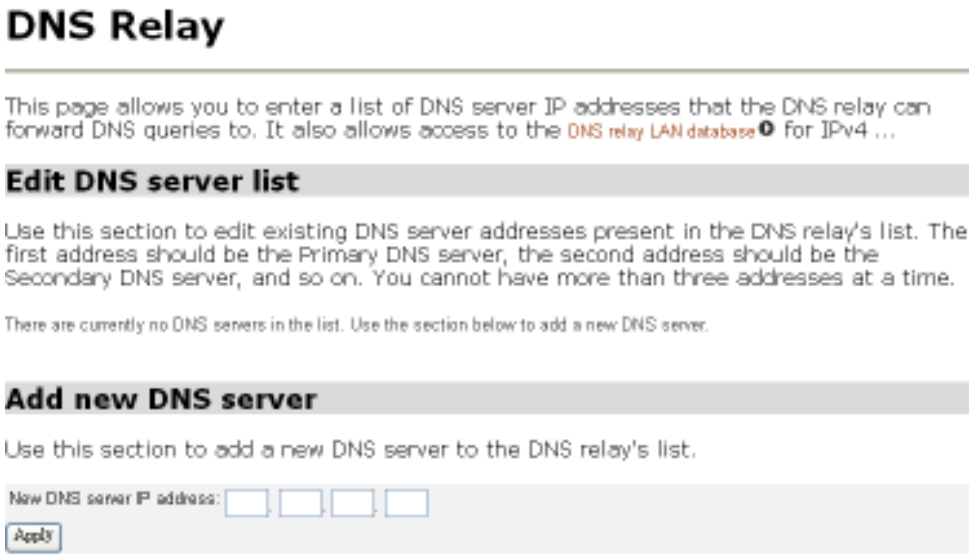
To delete one or all of them, enter:

#> dnsclient delete searchdomain <number>

#> dnsclient clear searchdomains

3.2.3.6 DNS Relay

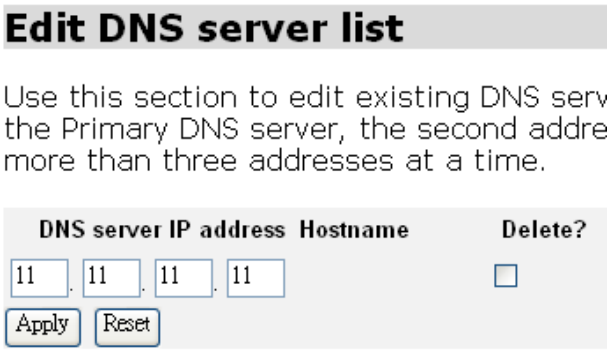
This option allows you to create, configure and delete a DNS relay's primary and secondary DNS servers. The DNS relay can forward DNS queries to the DNS servers on this list. Click *DNS Relay* from the *Configuration* menu. The following page will be displayed:



Configuring the DNS relay list

1. In the *Add new DNS server* section, type an address in the *New DNS server IP address* text box.

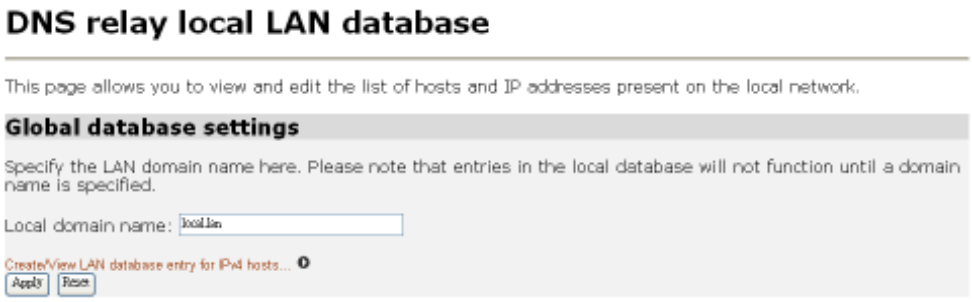
2. Click Apply. The address is displayed in the *Edit DHCP server list* section as shown.



To edit an entry, click on an IP address and enter the new details, and then click Apply. To delete an entry, check the *Delete b*ox for an IP address, and then click Apply.

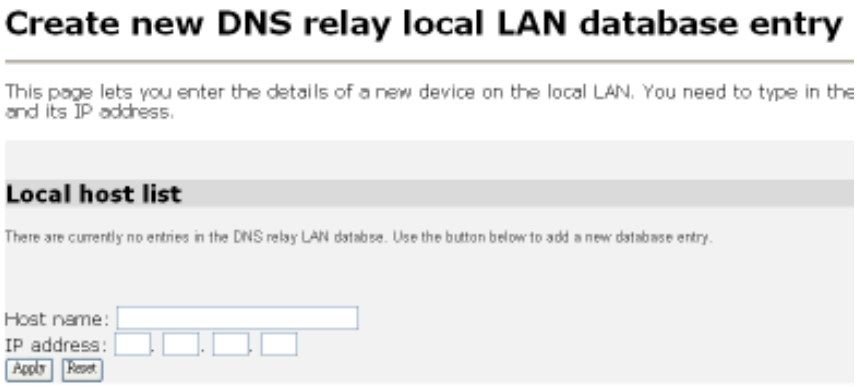
DNS Relay LAN Database

Click the *DNS Relay LAN Database* link on the top of the DNS Relay page, The *DNS Relay LAN Database* page will be displayed as shown below:

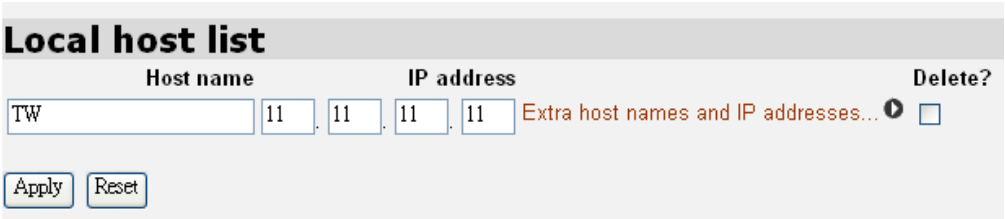


This page allows you to view and edit the list of hosts and IP addresses present on the local network. User has to specify the LAN domain name here since the entries in the local database will not function until a domain name is specified.

Clicking the *Create/View LAN database entry for IPv4* link at the bottom of the DNS relay local LAN database page to display the *Create new DNS relay local LAN database entry* page as shown below:



This page lets you enter the details of a new device on the local LAN. You need to type in the name of the device and its IP address. Once you type in the name and IP address in the appropriate fields, click Apply to save your settings. Then the new host name and IP address will be added in the Local host list as shown below:



Click the *Edit host names and IP addresses* link to rename or modify the IP address.

3.2.3.6.1 Command Line Interface for DNS Relay

You can also use the command line interface (CLI) to configure the DNS relay. Below are some examples:

To allow the DHCP to pass DNS server information to the DNS relay, enter:
#> dhcpclient set interfaceconfig WAN givetodnsrelay enabled

To set a DNS server that the DNS relay can use to obtain domain/address information, enter:
#> dnsrelay add server <ip-address>

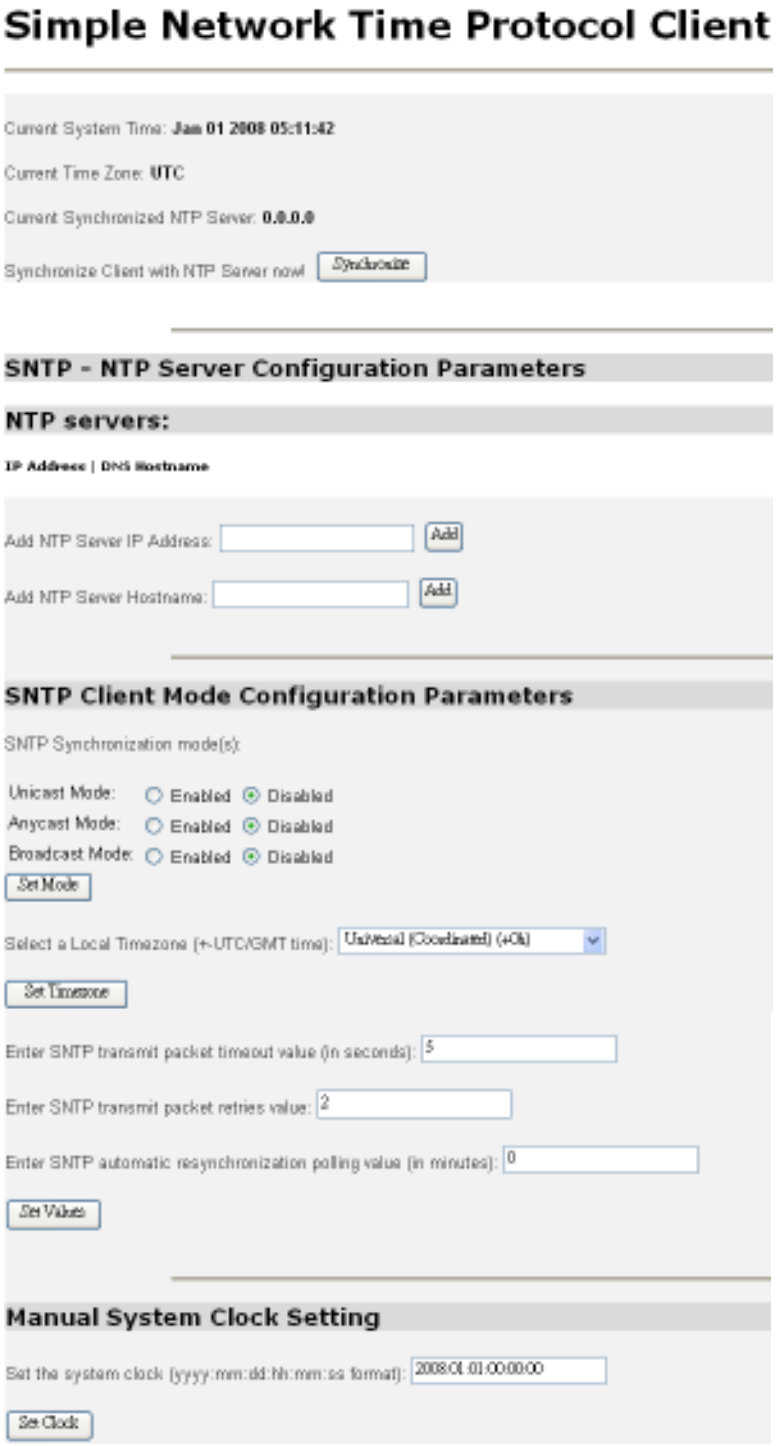
The DNS server address should be supplied by your ISP. To display servers, enter:
#> dnsrelay list servers

3.2.3.7 SNTP Client

This option allows you to:

- Synchronize a Client with an NTP Server
- Configure the SNTP-NTP Server
- Manually set the system clock

Click on *SNTP client* from the *Configuration* menu. The following page will be displayed:



Synchronize a Client with an NTP Server

1. Click Synchronize will force the SNTP client to immediately synchronize the local time with the server located in the association list (if unicast) or, if anycast is enabled, initiate an anycast sequence on the network.

Note: to synchronize a Client with an NTP Server, the NTP server, SNTP client mode, and local time zone information should be pre-configured.

Configure an SNTP-NTP Server

1. Enter the NTP Sever IP address in the Add NTP Server IP Address text box, and then click Add to validate the settings.
2. Enter the NTP Sever Hostname in the Add NTP Sever Hostname text box, and then click Add to validate the settings.

Configure SNTP client mode

1. Select an SNTP Synchronization mode(s): This action enables/disables the STNP client in a particular time synchronous access mode. There are three modes to choose from, and each mode has enable and disable options:

a. Unicast mode:

- *Enable* - this mode uses a unicast server and the IP address or hostname in the SNTP server association list is used to synchronize the client time with the server. The SNTP client attempts to contact the specific server in the association in order to receive a timestamp when the *sntpclient sync* command is issued.
- *Disable* - the unicast server is removed from the association list.

b. Broadcast mode:

- *Enable* - allows the SNTP client to accept time synchronization broadcast packets from an SNTP server located on the network, and updates the local system time accordingly.
- *Disable* - stops synchronization via broadcast mode

c. Anycast Mode:

- *Enable* - the SNTP client sends time synchronized broadcast packets to the network and subsequently expects a reply from a valid timeserver. The client then uses the first reply it receives to establish a link for future sync operations in unicast mode.

This server will then be added to the server association list. The client ignores any later replies from servers after the first one is received.

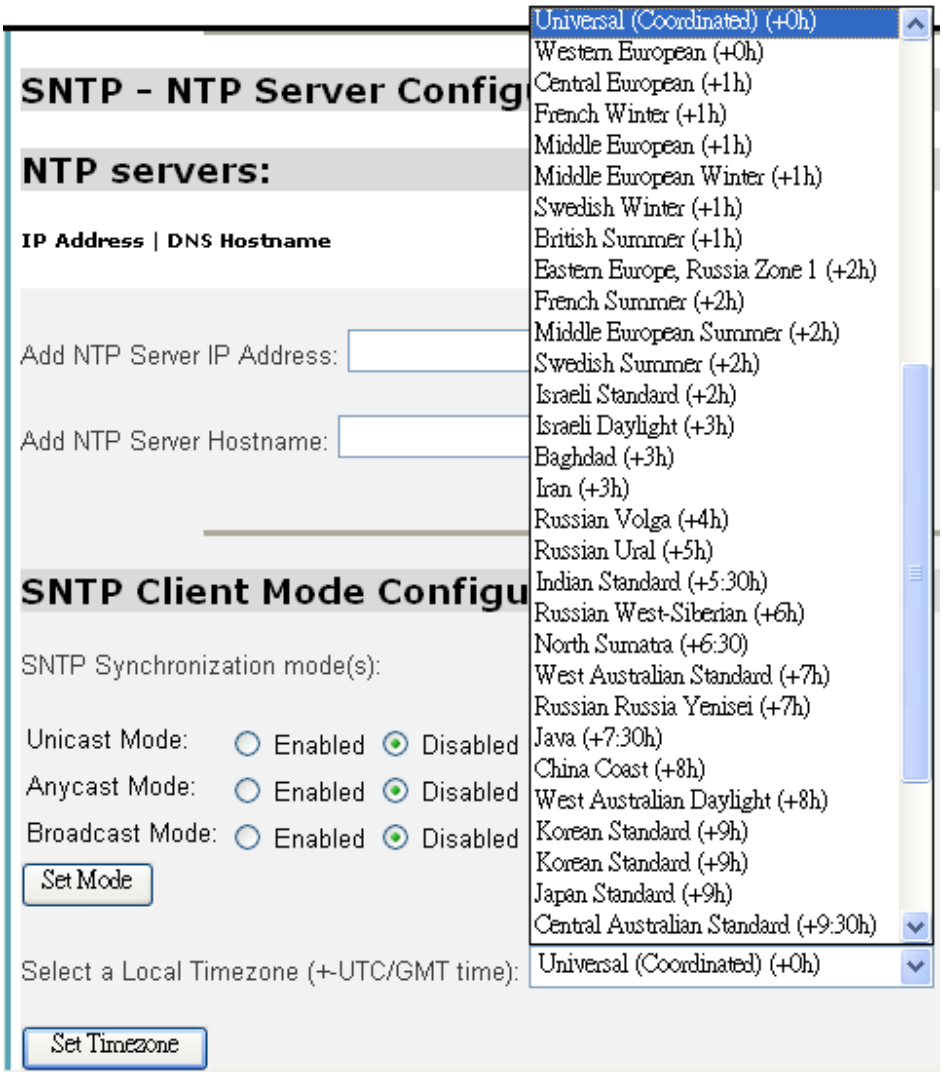
The enabled anycast mode takes precedence over any entries currently in the associations list when the *sntpclient* sync command is issued. The entry will then be substituted for any existing entry in the unicast association list.

- *Disable* - stops synchronization via anycast mode

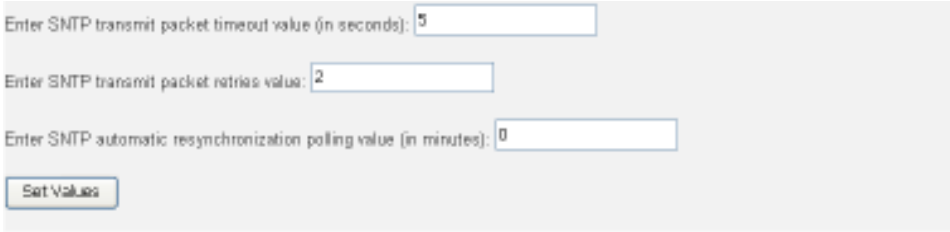
Click Set Mode to validate your settings, after choosing the SNTP Synchronization mode.

2. Select a time zone:

Click on the local time zone drop down list and select a time zone, and then click Set Timezone to validate your settings.

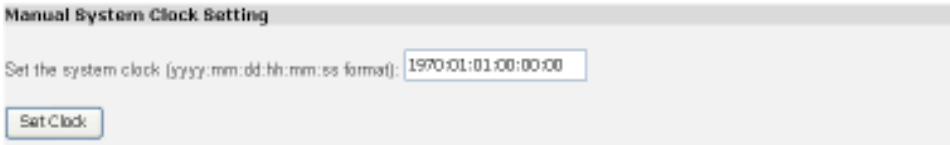


3. Enter the SNTP transmit packet timeout value, the SNTP transmit packet retries value and the SNTP automatic resynchronization polling value in their respective text boxes, then click Set Values to validate your settings.



Manually setting the System clock

Enter the date and time in the text box in yyyy:mm:dd:hh:mm:ss format to set the system clock, then click Set Clock to validate your settings.



Note: if manually setting the system clock, the local time will follow the internal clock set by the user.

3.2.3.7.1 Command Line Interface for SNTP Client

You can use the command line interface to configure the SNTP client. Below are some examples:

To enable/disable the SNTP client in a particular access mode, use the command:

#> sntpclient set mode {unicast|broadcast|anycast} {enable|disable}

For example, to enable broadcast mode, enter:

#> sntpclient set mode broadcast enable

To disable broadcast mode, enter:

#> sntpclient set mode broadcast disable

To add a server, use the command:

#> sntpclient add server {ipaddress <sntpipaddress> | hostname <sntphostname>}

To add a server to the list using either the server's IP address or hostname, enter:

#> sntpclient add server ipaddress 129.6.15.28

To delete a single NTP server association from the client's list, enter:

#> sntpclient delete server <serverid>

The number is the ID that corresponds to a particular server as displayed by the *sntpclient list servers* command.

To delete all NTP servers from the client's list, enter:
#> sntpclient clear servers

To display the current status of SNTP client, enter:

#> sntpclient show status

Clock Synchronized	TRUE
SNTP Standard Version Number:	4
SNTP Mode(s) Configured:	Unicast Broadcast
Local Time:	Tuesday, 28 Aug, 2001 - 14:39:25
Local Time Zone:	EDT, Eastern Daylight Time
Time Difference +-VTC:	-4:00
Precision:	1/16384 of a second
Root Dispersion:	+0.2342 second(s)
Server Reference ID:	GPS.
Round Trip Delay:	2 second(s)
Local Clock Offset:	-1 second(s)
Resync Poll Interval:	15 minute(s)
Packet Retry Timeout:	5 seconds
Packet Retry Attempts:	3

3.2.4 Advanced Pages

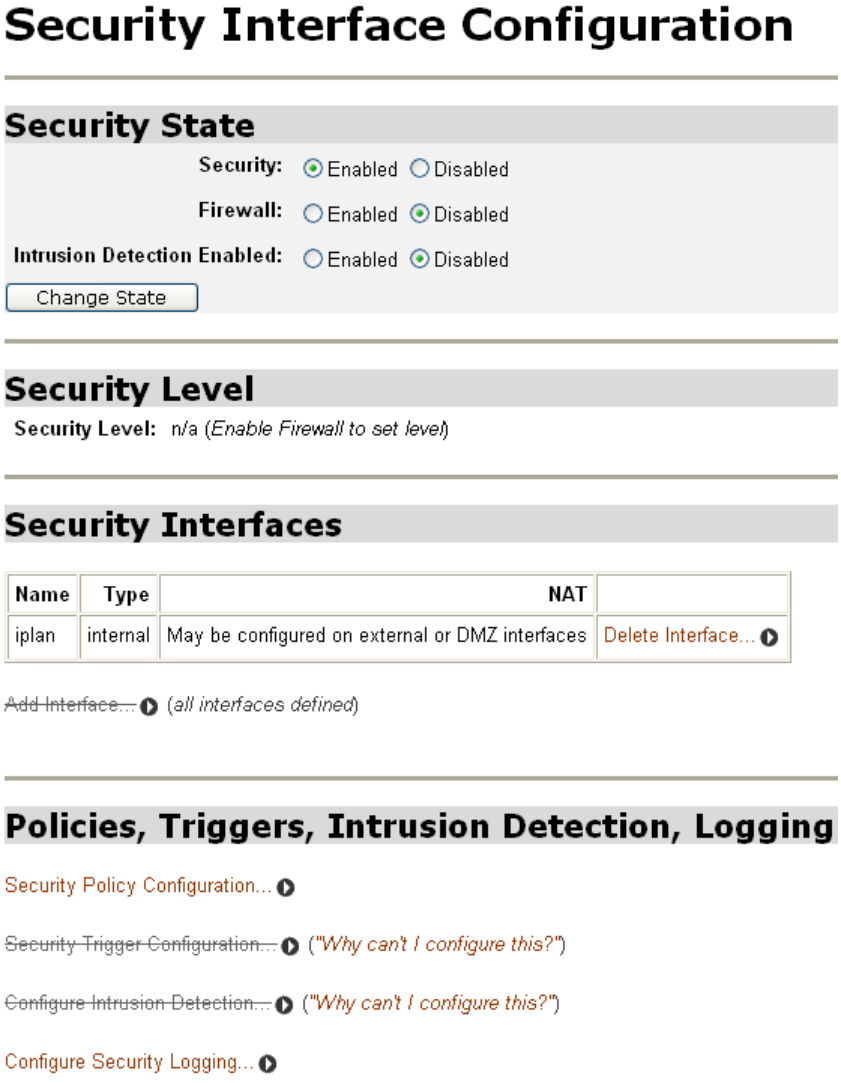
The Advanced pages allow you to configure:

3.2.4.1 Security

Using EmWeb, the following security settings can be enabled:

- Enable Security
- Configure Security interfaces
- Configure triggers
- NAT - EmWeb allows you to:
  - Enable NAT between interfaces
  - Configure global addresses
  - Configure reserved mappings
- Firewall - EmWeb allows you to:
  - Enable Firewall and Firewall Intrusion Detection settings
  - Set the Firewall security level
  - Configure Firewall policies, portfilters and validators
- Configure Intrusion Detection settings

Click on *Security* in the Advanced menu and the following page will be displayed:



3.2.4.1.1 Enabling Security

Security must be enabled before *Firewall* and/or *Intrusion Detection* can be enabled.

In the *Security State* section:

1. Select the *Security Enabled* radio button.
2. Click [Change State] to update the *Security State*.

3.2.4.1.2 Enabling Firewall and/or Intrusion Detection

A security interface must be created before Firewall and/or Intrusion Detection can be enabled.

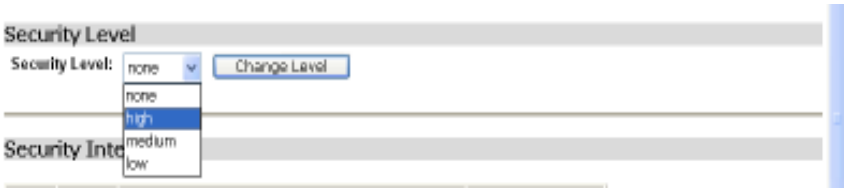
Once a security interface has been created:

1. Select the *Firewall Enabled* and/or *Intrusion Detection Enabled* radio buttons.
2. Click [Change State] to update the *Security State*.

3.2.4.1.3 Setting a default Security Level

Both *Security* and *Firewall* must be enabled in order to set a default Security Level.

1. In the *Security Level* section, click on the *Security Level* drop-down list.
2. Select the level that you want to set; which can be either *none*, *high*, *medium* or *low*.



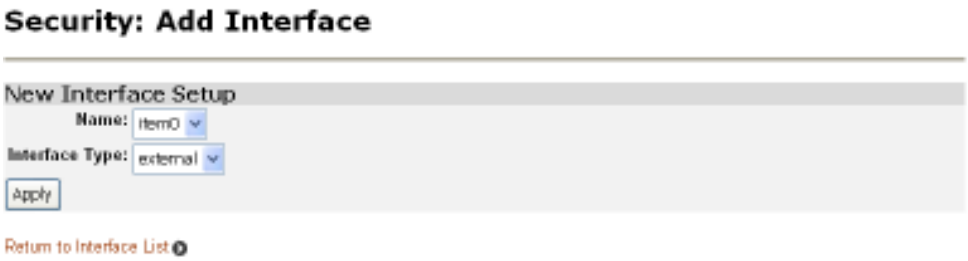
3. Click the [Change Level] button to save the changes.

3.2.4.1.4 Configuring Security Interfaces

Security Interfaces are based on existing LAN services. A LAN service must be created for each Security Interface that you want to configure.

For details of how to create LAN services,

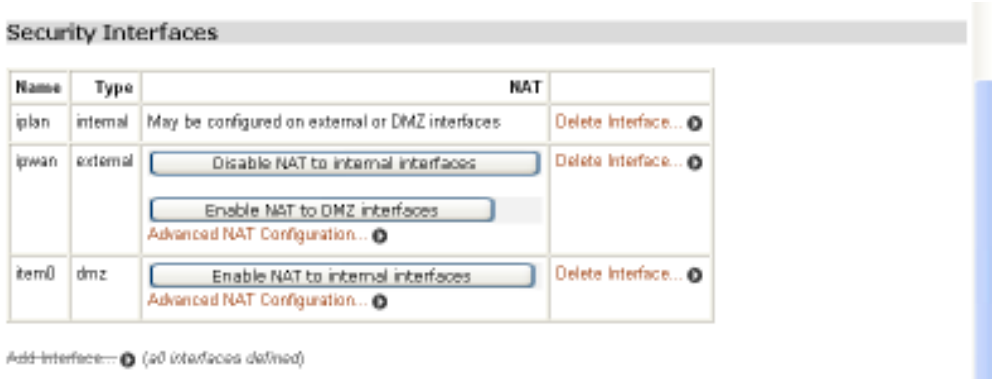
1. From the *Security Interfaces* section, click *Add Interface* and the *Add Interface* page will be displayed:



2. Click on the *Name* drop-down list and select the LAN service that you want to base your security interface on.

3. Click on the *Interface Type* drop-down list and specify what kind of interface it is depending on how it connects to the network; *external*, *internal* or *DMZ*.

4. Click Apply. The Security page will be displayed. The *Security Interfaces* section contains a table that displays information about each security interface that has been created:



• *Name* – the name of the LAN service that the security interface is based on

• *Type* – the type of network connection specified

• *NAT* settings - contains hyperlinks that allow NAT to be configured.

• *Delete Interface...* hyperlink - Click this to display the *Security: Delete Interface* page. Check the interface details, and then click the *Delete* button.

3.2.4.1.5 Configuring NAT

To configure NAT:

1. Enable Security

2. Create at least two different security interface types based on existing LAN services

3. Once more than one security interface has been created, the *NAT* column in the *Security Interfaces* table will indicate that NAT can be enabled between the existing security interface and a network interface type. For example, if an external interface

and an internal interface are created, the table will be as below:

Security Interfaces

Name	Type	NAT	
iplan	internal	May be configured on external or DMZ interfaces	Delete Interface...
ipwan	external	Disable NAT to internal interfaces Advanced NAT Configuration...	Delete Interface...

Add Interface...

The NAT column for the external interface indicates that NAT to internal interfaces can be enabled. If a DMZ interface has also been configured, this column will also include an *Enable NAT to DMZ interfaces* button.

4. To enable NAT between the external interface and the internal interface type, click Enable NAT to internal interfaces. The *Security* page is refreshed and NAT is enabled. To disable NAT between these interfaces, click Disable NAT to internal interfaces.

Once NAT between interfaces has been enabled, you can:

• Configure global addresses

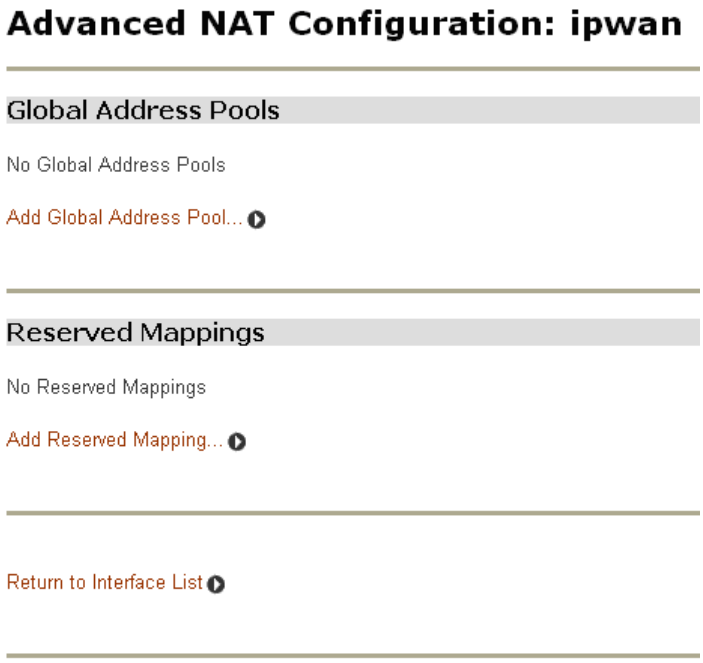
• Configure reserved mappings

3.2.4.1.6 Configuring NAT global addresses

Global address pools allow a pool of outside network addresses to be created that is visible outside your network. Before global addresses can be configured, NAT needs to be configured.

To set up a global address pool on existing NAT enabled interfaces:

1. From the *NAT Security Interfaces* table, click the *Advanced NAT Configuration* hyperlink for the interface to which a global pool is to be added. The following page will be displayed:



2. Click *Add Global Address Pool.* The following page will be displayed:

3. This page allows a pool of network IP addresses that are visible outside your network to be created. Add values for the following table entries:

• *Interface Type* - select the type of interface that is to be mapped to an external interface. Click the drop-down list and select an interface type.

• *Use Subnet Configuration* - there are two ways to specify a range of IP addresses: either *Use Subnet Mask* (specify the subnet mask address of the IP address) or *Use IP Address Range* (specify the first and last IP address in the range). Click the drop-down list and select a method.

• Enter an *IP Address* that is visible outside the network

• *Subnet Mask/IP Address 2*; the value specified here depends on the subnet configuration that is being used. If *Use Subnet Mas*k is chosen, enter the subnet mask of the IP address. If *Use IP Address Range* is chosen, enter the last IP address in the range of addresses that make up the global address pool.

4. Once the table has been configured, click Add Global Address Pool. The table is refreshed and the global address pool is added to the NAT configuration.

To delete a global address pool, click the *Delete* hyperlink, and then click the *Delete Global Address Pool* button.

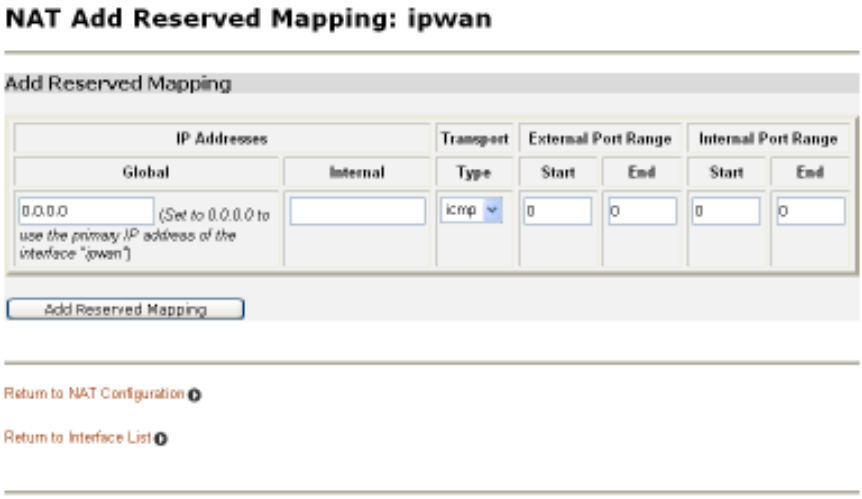
Click *Return to Interface List* to display the *Security Interface Configuration* page. To create a reserved mapping, click the *Add Reserved Mapping* hyperlink.

3.2.4.1.7 Configuring NAT reserved mapping

Reserved mapping allows an outside security interface or an IP address to be mapped from a global pool to an individual IP address inside the network. Mapping is based on transport type and port number. Before reserved mapping can be configured, NAT needs to be configured. For more details, see the Configuring NAT Section.

To set up a reserved mapping on existing NAT enabled interfaces:

1. From the NAT Security Interfaces table, click the Advanced NAT Configuration hyperlink for the interface to which reserved mapping is to be added. The Advanced NAT Configuration page will be displayed.
2. Click the Add Reserved Mapping hyperlink. The following page will be displayed:



3. This page allows reserved mapping to be configured. Add specific values for the following table entries:

• Global IP Address - if mapping from a global IP address, enter the address here. If mapping from a security interface, enter 0.0.0.0.

• Internal IP Address - the IP address of an individual host inside the network.

• Transport Type - specify the transport type that is to be mapped from the outside interface to the inside.

• Port Number - the port number that the transport uses.

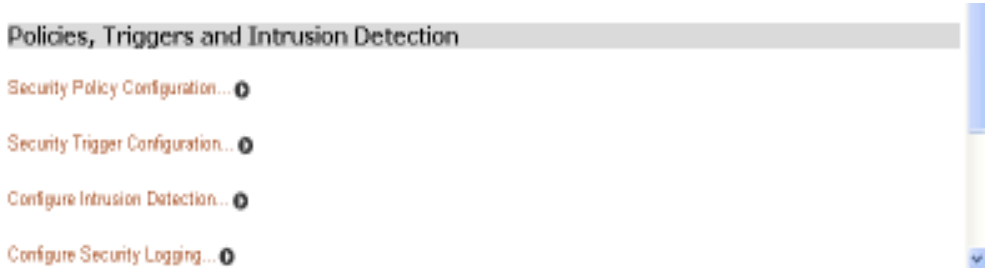
4. Once the table is configured, click [Add Reserved Mapping]. The table is refreshed and the reserved mapping is added to the NAT configuration.

To delete a reserved mapping setup, click the Delete hyperlink, and then click [Delete Reserved Mapping].

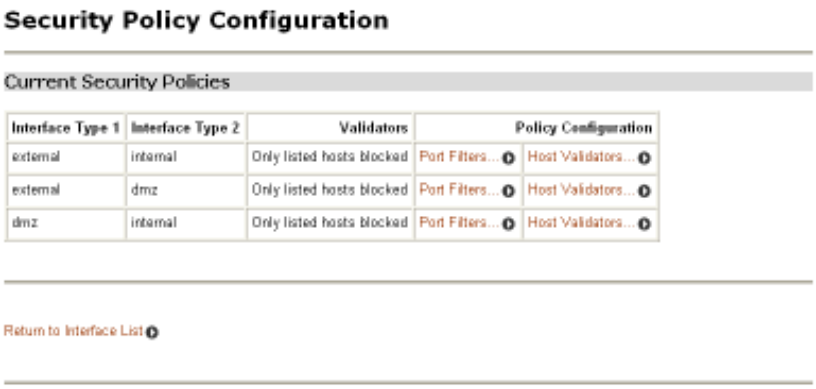
Click *Return to Interface List* to display the Security Interface Configuration page.

3.2.4.1.8 Configuring Firewall policies

To configure firewall policies, click *Security Policy Configuration* from the *Policies, Triggers and Intrusion Detection* page, as shown in the following figure.



The *Security Policy Configuration* table will then be displayed which contains details of each Firewall policy.



The policies can now be configured to include portfilters and validators.

A portfilter is an individual rule that determines what kind of traffic can pass between two interfaces specified in an existing policy.

To configure a portfilter:

1. From the *Current Security Policies* table, click the *Port Filters* link for the policy that is to be configured. The page displayed contains three *Add Filter* hyperlinks that allow three different kinds of portfilter to be created:

• For a TCP/UDP port filter, click *Add TCP or UDP Filter*. The following page will be displayed:

Firewall Add TCP/UDP Port Filter: external-internal

Source address	Destination address	Protocol	Source port	Destination port	Direction	
					Inbound	Outbound
IP Address: 0.0.0.0 Mask: 0.0.0.0	IP Address: 0.0.0.0 Mask: 0.0.0.0	TCP	Range Start - End 0 - 65535	Range Start - End 0 - 65535	Allow	Allow

Apply

Specify the start and end of the port range for the TCP/UDP protocol that is to be filtered. Then select either the TCP or UDP protocol from the Protocol drop-down list. After that, use the Direction drop-down lists to specify whether inbound traffic and outbound traffic is to be allowed or blocked. Click Apply. The *Firewall Port Filters* page will be displayed, containing details of the TCP portfilter that has just been added.

• For a non-TCP/UDP portfilter, click *Add Raw IP Filter*. The following page will be displayed:

Firewall Add Raw IP Filter: external-internal

Source address	Destination address	IP Protocol	Direction	
			Inbound	Outbound
IP Address: 0.0.0.0 Mask: 0.0.0.0	IP Address: 0.0.0.0 Mask: 0.0.0.0	Number or name: 0	Allow	Allow

Apply

Specify the protocol number in the Transport Type text box, for example, for IGMP, enter protocol number 2. Then use the Direction drop-down lists to specify whether inbound traffic and outbound traffic is to be allowed or blocked.. Click Apply. The *Firewall Port Filters* page will be displayed, containing details of the IP portfilter that has just been added.

2. Each portfilter displayed in the *Firewall Port Filters* page has a *Delete* hyperlink assigned to it. To delete a portfilter, click this link, and then, click Delete on the confirmation page. The port filter will be removed from the Firewall configuration.

3.2.4.1.9 Configuring validators

A validator allows/blocks traffic based on the source/destination IP address and the subnet mask. Traffic will be allowed or blocked depending on the validator configuration specified when the policy was created. See the Configuring Firewall policies Section. This section assumes that the instructions given in the Configuring Firewall policies Section have previously been followed.

To configure a validator:

1. From the Current Security Policies table, click on the *Host Validators* link for the policy that is to be configured. The *Configure Validators* page will be displayed. Click the *Add Host Validator* link. The following page will be displayed:

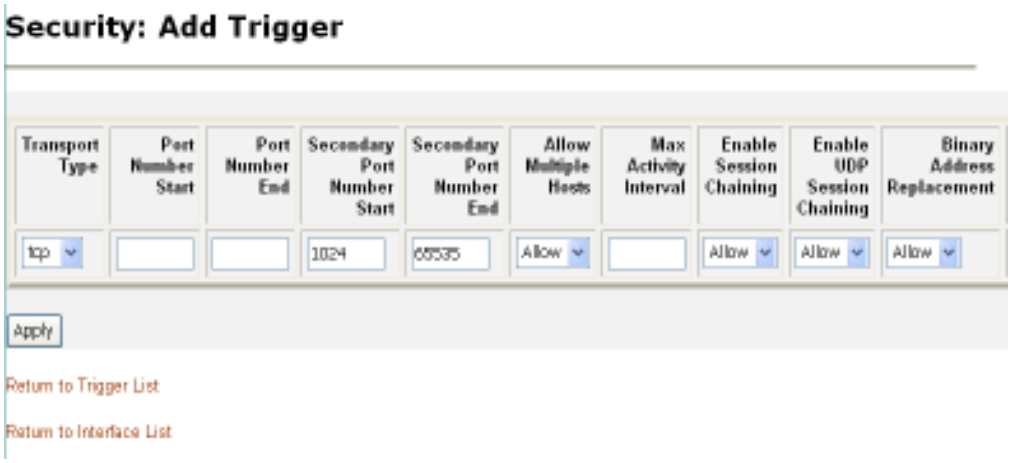
2. In the Host IP Address text box, enter the IP address that is to be allowed/blocked.
3. In the Host Subnet Mask text box, enter the IP mask address. If a range of addresses is to be filtered, the mask can be specified, for example, 255.255.255.0. If a single IP address is to be filtered, use the specific IP mask address, for example, 255.255.255.255.
4. Click on the Direction drop-down list and select the direction of the traffic that the validator is to filter.
5. Click Apply. The *Configure Validators* page will be displayed, containing details of the host validator that has just been added.
6. Each portfilter displayed on the *Configure Validators* page has a *Delete Host Validator* hyperlink assigned to it. To delete a validator, click this link, and then click on the Delete Host Validator button on the confirmation page. The validator will be removed from the Firewall configuration.

3.2.4.1.10 Configuring triggers

A trigger allows an application to open a secondary port in order to transport packets. The most common applications that require secondary ports are FTP and NetMeeting. This section assumes that the instructions given in the Enabling Security Section have been followed.

To configure a trigger:

1. Go to the *Policies, Triggers, Intrusion Detection, and Logging* section of the *Security Interface Configuration* page. Click Security Trigger Configuration, and then the Current Security Triggers page will be displayed. Click the *New Trigger* link. The following page will be displayed:



2. Configure the trigger as follows:

a. Transport Type - select a transport type from the drop-down list, depending on whether a trigger for a TCP or a UDP application is to be added.

b. Port Number Start - enter the start of the trigger port range that the primary session uses.

c. Port Number End - enter the end of the trigger port range that the primary session uses.

d. Allow Multiple Hosts - select allow if a secondary session is to be initiated to/from different remote hosts. Select block if a secondary session is to be initiated only to/from the same remote host.

e. Max Activity Interval – enter the maximum interval time (in milliseconds) between the uses of the secondary port sessions.

f. Enable Session Chaining - select Allow or Block depending on whether multi-level TCP session chaining is to be allowed.

g. Enable UDP Session Chaining - select Allow or Block depending on whether multi-level UDP and TCP session chaining is to be allowed. Enable Session Chaining must be set to allow if this is to work.

h. Binary Address Replacement - select Allow or Block depending on whether binary address replacement is to be used on an existing trigger.

i. Address Translation Type - specify what type of address replacement is set on a trigger. Binary Address Replacement must be set to allow if this is to work.

3. Once the trigger has been configured, click Apply. The Current Security Trigger page will be displayed, containing details of the trigger that has just been configured.

4. Each trigger displayed in the Current Security Trigger page has a Delete hyperlink assigned to it. To delete a trigger, click this link, and then click the Delete button on the confirmation page.The Current Security Trigger page will be displayed and details of the deleted trigger(s) have been removed. There are two hyperlinks on the page:

a. To add a new trigger, click *New Trigger*.

b. To display the Security Interface Configuration page, click *Return to Interface List*.

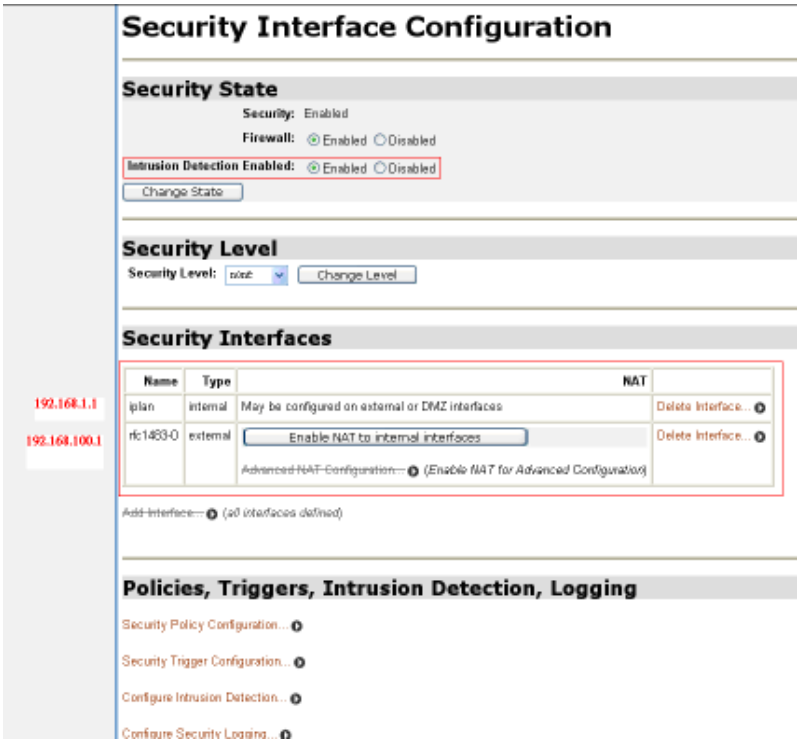
3.2.4.1.11 Configuring Intrusion Detection Settings

Intrusion Detection Settings (IDS) are network protection features that can be configured to guard against certain **Denial of Service** and **port scanning**. Any attempts to attack or scan the network will cause the traffic originating from the attacking machine to be blacklisted for a set time.

➢ Basic IDS Configuration

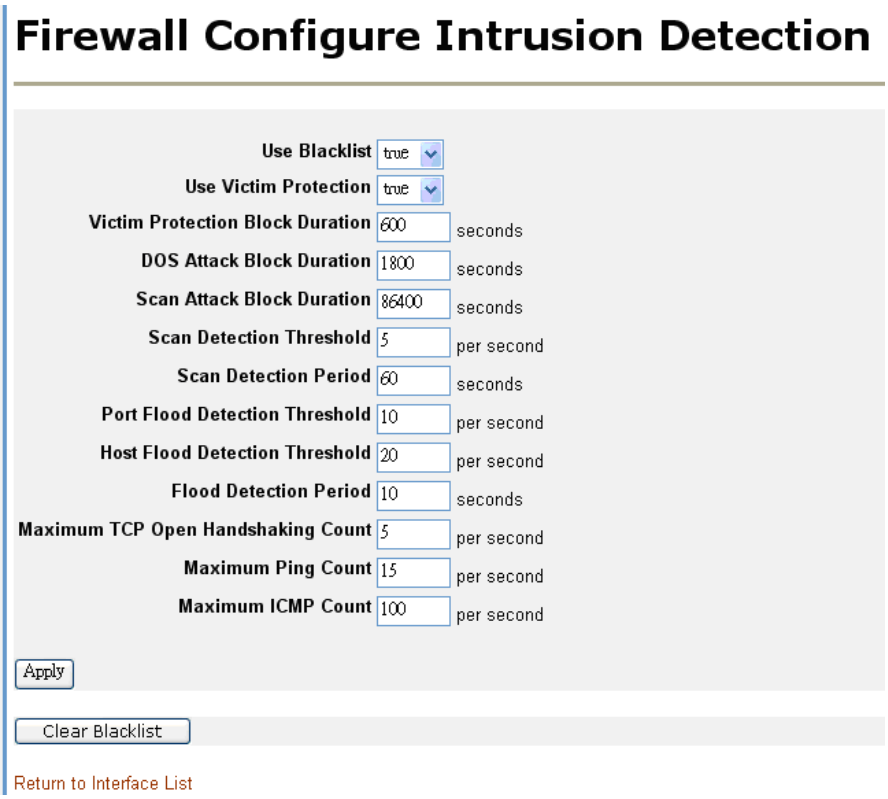
• To enable/disable IDS and display status are shown as follows.

firewall {enable|disable} IDS
firewall show IDS
Equal to
security enable IDS
security disable IDS
security show IDS



• Displaying information about IDS

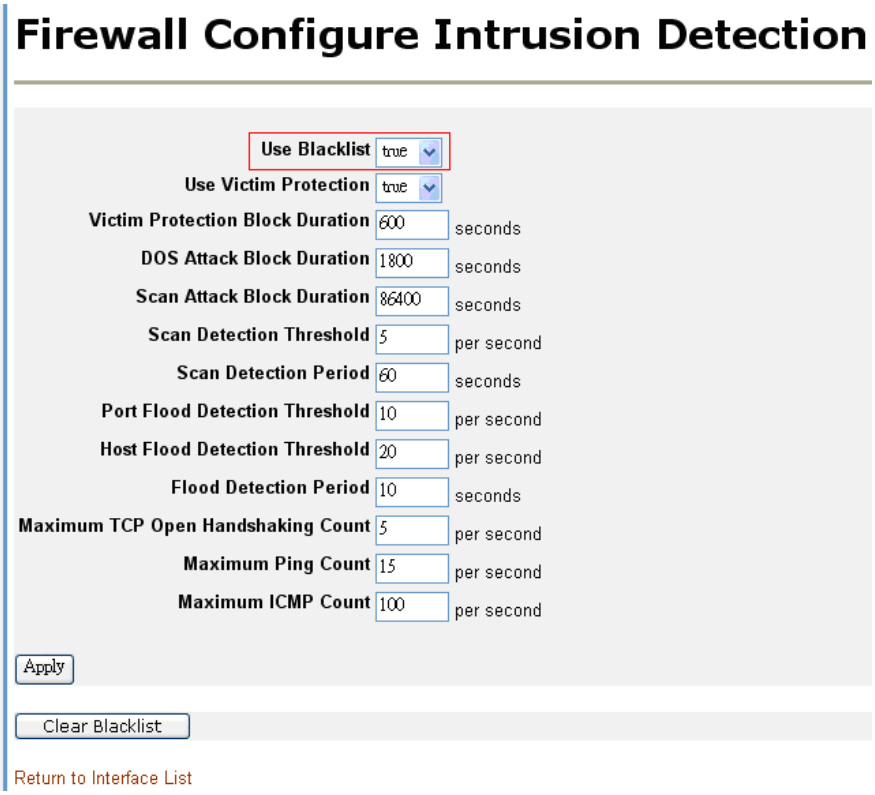
console enable
security list intrusion



➢ Configuring blacklisting

- Enable/disable/clear IDS blacklist

firewall set IDS blacklist {enable|disable|clear}
Equal to
security enable IDS blacklist
security disable IDS blacklist
security clear IDS blacklist



Enabling the Blacklist will block traffics from an external host when it has detected one of the following types of attack:

Protocol	Attack Name
UDP	Ascend Kill
UDP	Echo Scan (Port scan attack)
TCP	WinNuke (Port scan attack)
TCP	Xmas Tree Scan (Port scan attack)
TCP	IMAP SYN/FIN Scan ((Port scan attack)
ICMP	SMURF (if victim protection is set; SMURF Attack)
TCP	SYN Flood (if scanning threshold is exceeded; SYN/FIN/RST Flood)
TCP	Net Bus Scan (Port scan attack)
UDP	Back Orifice Scan (Port scan attack)

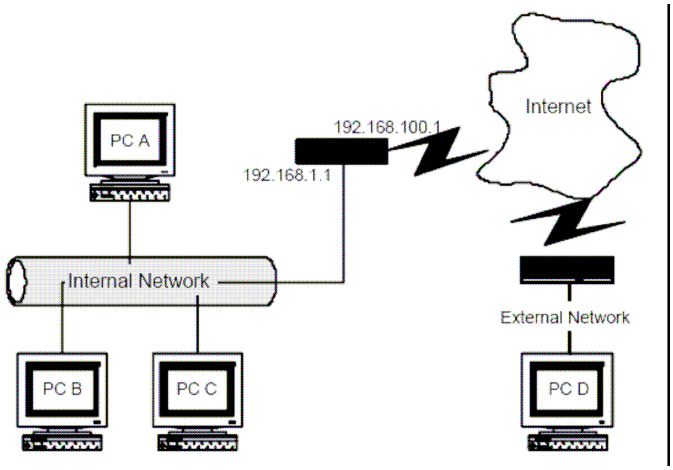
- If a DoS attack is detected, the host is blacklisted for 30 minutes by default
- If a port scan is detected, the host is blacklisted for 24 hours by default

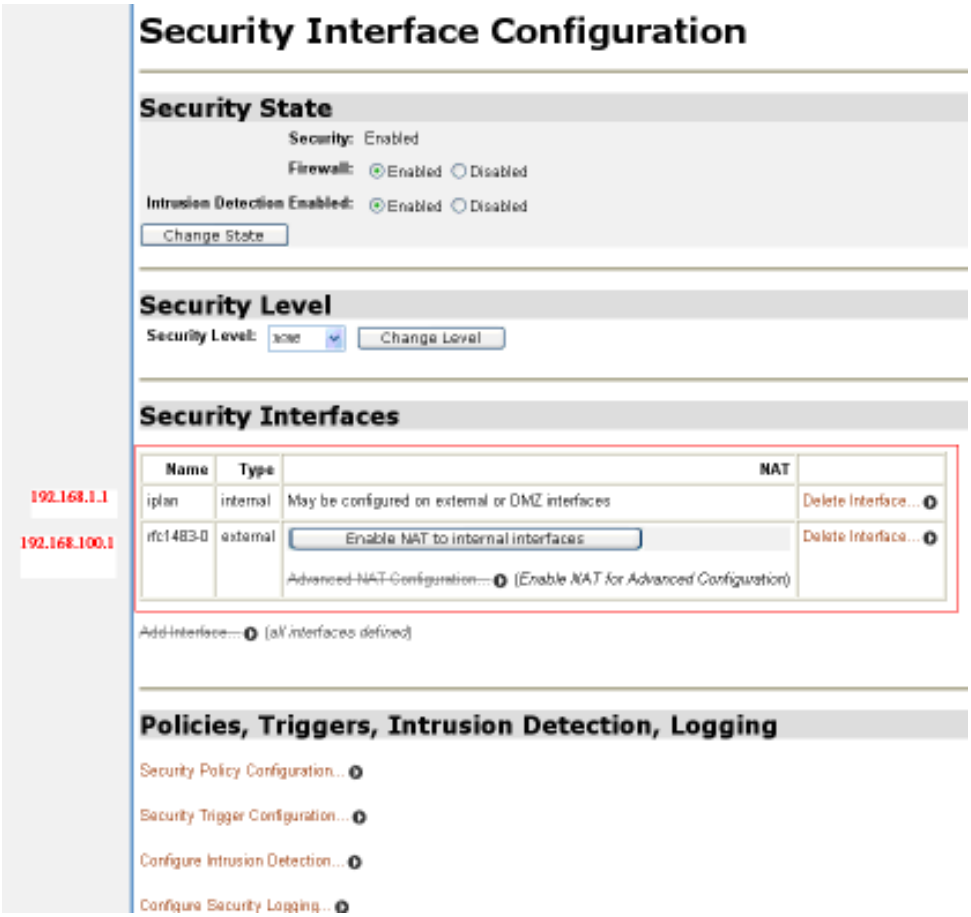
- If a web spoofing (SMURF) attack is detected, the host is blacklisted for 10 minutes by default

• Displaying blacklisting details

console enable
security list blacklist

➢ Basic Network Configuration





■ Port Scan attacks

• The following are port scan attacks that will be detected in system.

Scan Attack	Description
Echo scan	The attacker sends scanning traffic to the standard Echo port (TCP port 7).
Xmas Tree scan	The attacker sends TCP packets with FIN, URG and PSH flags set. If a port is closed, the device responds with an RST. If a port is open, the device does not respond.
IMAP scan	The attacker exploits vulnerability of the IMAP port (TCP port 143) once a TCP packet is received from the victim with the SYN and FIN flag set.
TCP SYN ACK scan	The attacker sends a SYN packet and the device responds with a SYN and ACK to indicate that the port is listening or an RST if it is not listening.
TCP FIN RST scan	The attacker sends a FIN packet to close an open connection. If a port is closed, the device responds with an RST. If a port is open, the device does not respond.
NetBus scan	NetBus is a Trojan Horse attack for Windows 95/98/NT. Once installed on the victim's PC, the attacker uses TCP port 12345, 12346 or 20034 to remotely perform illicit activities.
Back Orifice scan	Back Orifice and Back Orifice 2k are Trojan Horse attacks for Windows 95/98/NT. Once installed on the victim's PC, the attacker commonly listens on UDP ports 31337, 31338 (Back Orifice) and 54320, 54321 (Back Orifice 2k). The attacker can then remotely perform illicit activities.
SubSeven attack	SubSeven and SubSeven 2.1 are Trojan Horse attacks for Windows platforms. Once installed on the victim's PC, the attacker uses TCP ports 1243, 6711, 6712, 6713 (SubSeven) and 27374 (SubSeven 2.1) to remotely perform illicit activities.

• Configuring protection against Port Scan attacks

- The device detects an attempted port scan if it receives more than 5 scanning packets (e.g., SYN/ACK, FIN or RST packets) per second from a single host. To modify this default threshold, enter:

security set IDS scanthreshold <max>

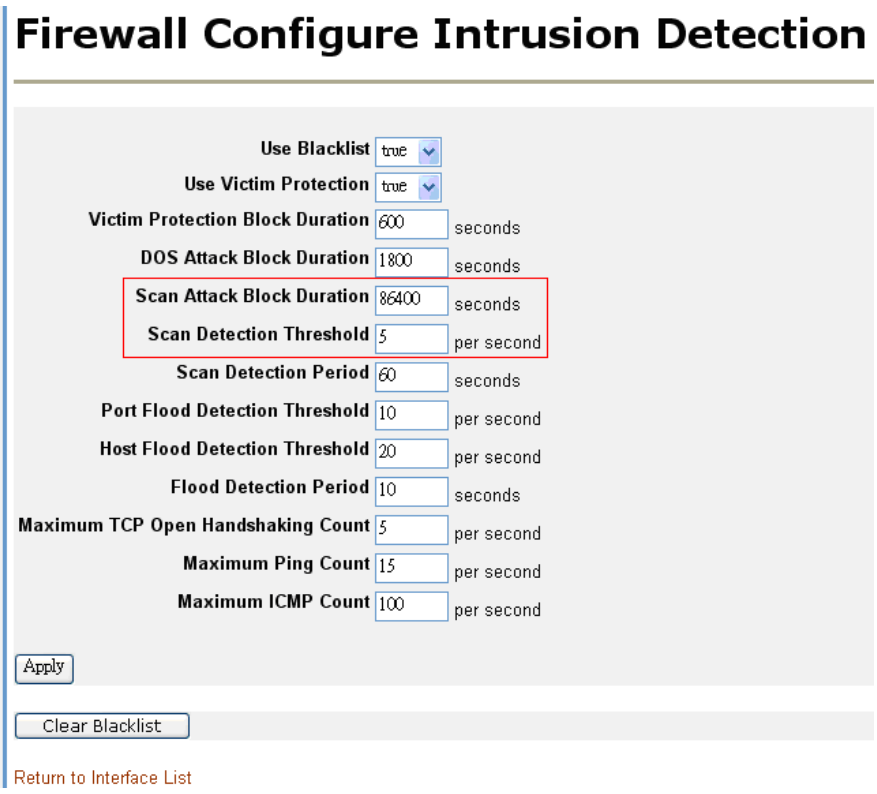
- The device counts the maximum number of scan packets allowed per second over a 60 second period. To modify this default threshold, enter:

security set IDS scanperiod <duration>

- If the number of scanning packets counted within the specified duration is greater

than the scan threshold that is set, the suspected attacker is blocked for 86400 seconds. To modify this default duration, enter:

security set IDS SCANattackblock <duration>



■ Denial of Service (DoS) attacks

• A Denial of Service (DoS) attack is an attempt by an attacker to prevent legitimate hosts from using a service. There are two main types of DoS attack:

- *Flood attack* is when an attacker tries to overload your device by flooding it with packets. Whilst your device tries to cope with this sudden influx of packets, it causes delays to the transport of legitimate packets or prevents the network from transporting legitimate traffic altogether.

- *Logic* or *software attack* is a small number of corrupt packets that are designed to exploit known software bugs on the target system.

The Security module can detect the early stages of the following DoS attacks:

✓ *SMURF Attack*
✓ *SYN/FIN/RST Flood*
✓ *ICMP Flood*
✓ *Ping Flood*

- ✓ *Ascend Kill*
- ✓ *WinNuke Attack*
- ✓ *Echo Chargen*
- ✓ *Echo Storm*
- ✓ *Boink*
- ✓ *Land Attack*
- ✓ *Ping of Death*
- ✓ *Overdrop*

• SMURF Attack

In a SMURF attack, an attacker sends pings (Echo Requests) to a host with a destination IP address of broadcast (protocol 1, type 8). The broadcast address has a spoofed return address which is the address of the intended victim, and the replies cause the system to crash.
Protection from SMURF attacks is provided once victim protection is enabled. Enter:

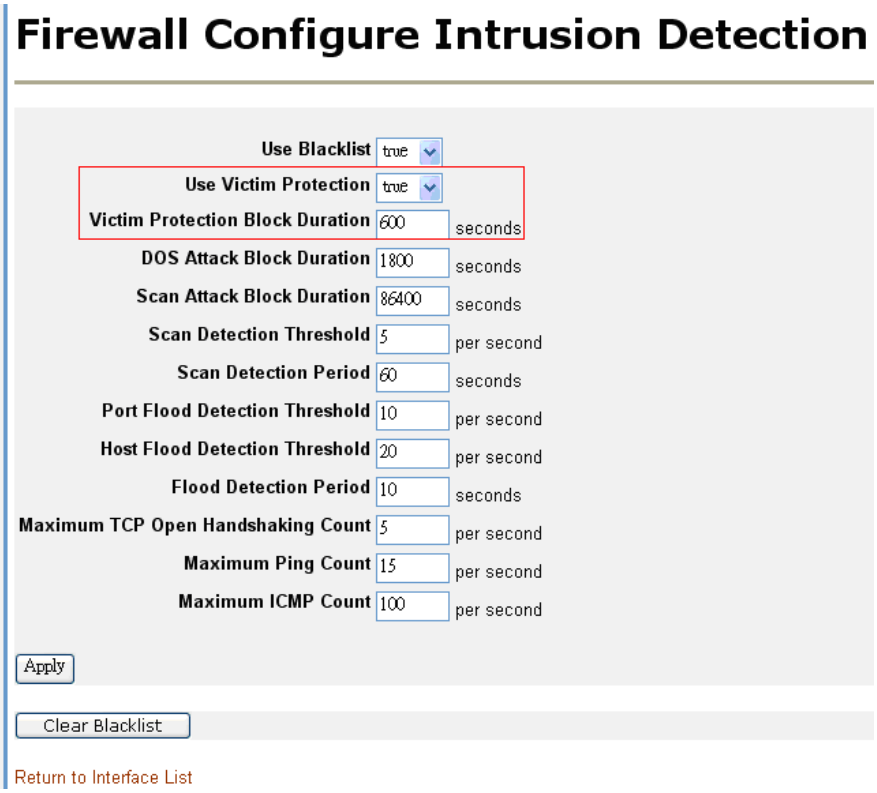
security enable IDS victimprotection

To disable victim protection, enter:

security disable IDS victimprotection

If victim protection is enabled, the device detects the broadcast packet and blocks the attacker from sending ICMP traffic for 10 minutes. To modify this default duration, enter:

security set IDS victimprotection <duration>



• SYN/FIN/RST Flood

The attack exploits the way TCP-connections are established between two computers. Attackers send unreachable source addresses in SYN packets, so your device sends SYN/ACK packets to the unreachable address, but does not receive any ACK packets in return. This causes a backlog of half-opened sessions. Once the queue is full, your device ignores all incoming SYN requests which may include legitimate traffic.

TCP packets with FIN and RST flags set also cause problems and constitute a preliminary survey to gain information about the victim's network.

The device detects an attempted SYN flood if it received more than 20 SYN packets per second from a single host. To modify this default threshold, enter:

security set IDS floodthreshold <max>

The device also detects an attempted SYN flood if it receives more than 10 SYN packets per second from a single host destined for a single port. To modify this default threshold, enter:

security set IDS portfloodthreshold <max>

The device counts the maximum number of SYN packets (for both the flood threshold and the port flood threshold) allowed per second over a 10 second period. To modify this default duration, enter:

security set IDS floodperiod <duration>

If the number of SYN packets counted within the specified duration is greater than the flood threshold or port flood threshold, traffic originating from the attacker is blocked for 1800 seconds by default. To modify this default duration, enter:

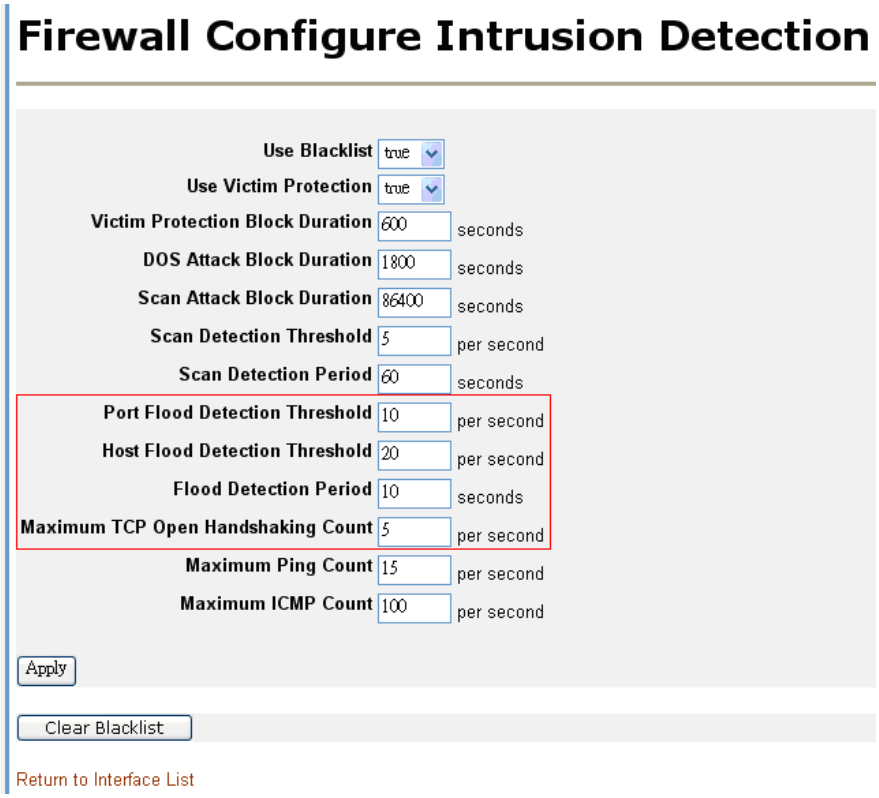
security set IDS DOSattackblock <duration>

The device detects an SYN/ACK attack if it receives more than 100 unfinished TCP handshakes per second from a single host. To modify this default threshold, enter:

security set IDS MaxTCPopenhandshake <max>

Once this threshold is exceeded, traffic originating from the attacker is blocked for 1800 seconds by default. To modify this default duration, enter:

security set IDS DOSattackblock <duration>



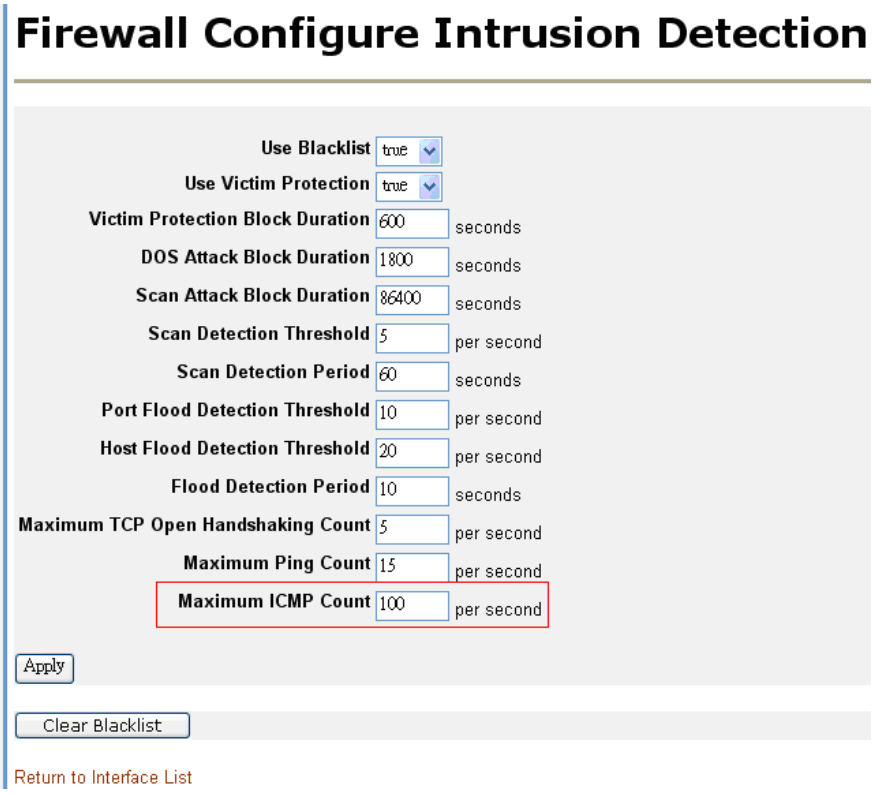
• ICMP Flood

The attacker floods the network with ICMP packets that are not Echo requests, stealing bandwidth needed for legitimate services. The device detects an attempted ICMP flood if it receives more than 100 ICMP packets per second from a single host. To modify this default threshold, enter:

security set IDS MaxICMP <max>

Once this threshold is exceeded, traffic originating from the attacker is blocked for 1800 seconds by default. To modify this default duration, enter:

security set IDS DOSattackblock <duration>



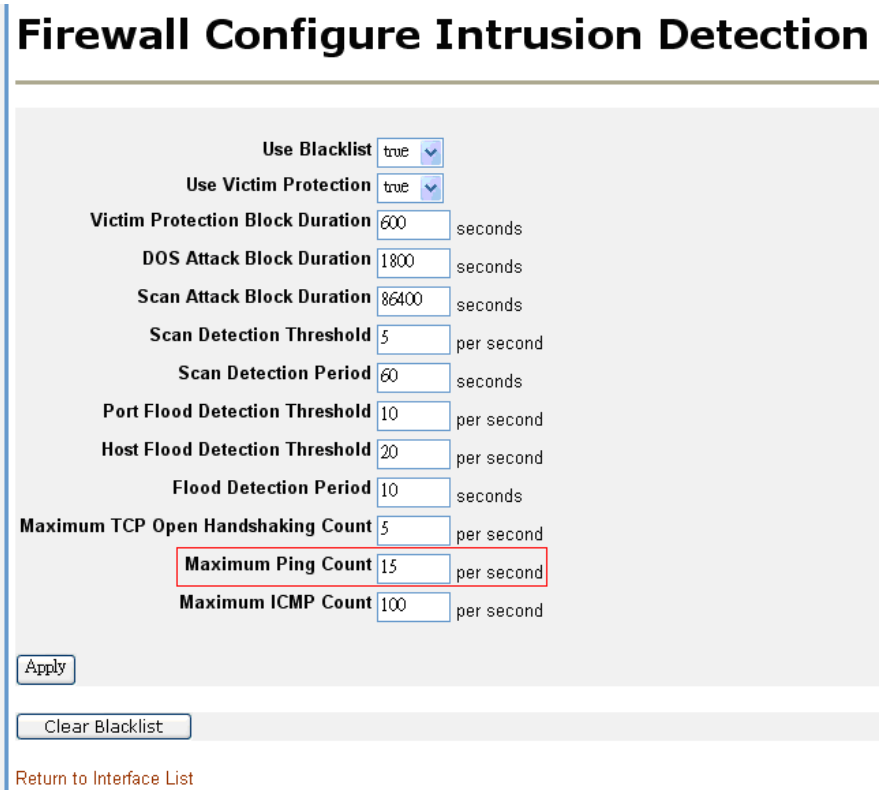
• Ping Flood

The attacker floods the network with pings, using bandwidth needed for legitimate services. The device detects an attempted ping flood if it receives more than 15 pings per second from a single host. To modify this default threshold, enter:

security set IDS MaxPING <max>

Once this threshold is exceeded, traffic originating from the attacker is blocked for 1800 seconds by default. To modify this default duration, enter:

security set IDS DOSattackblock <duration>

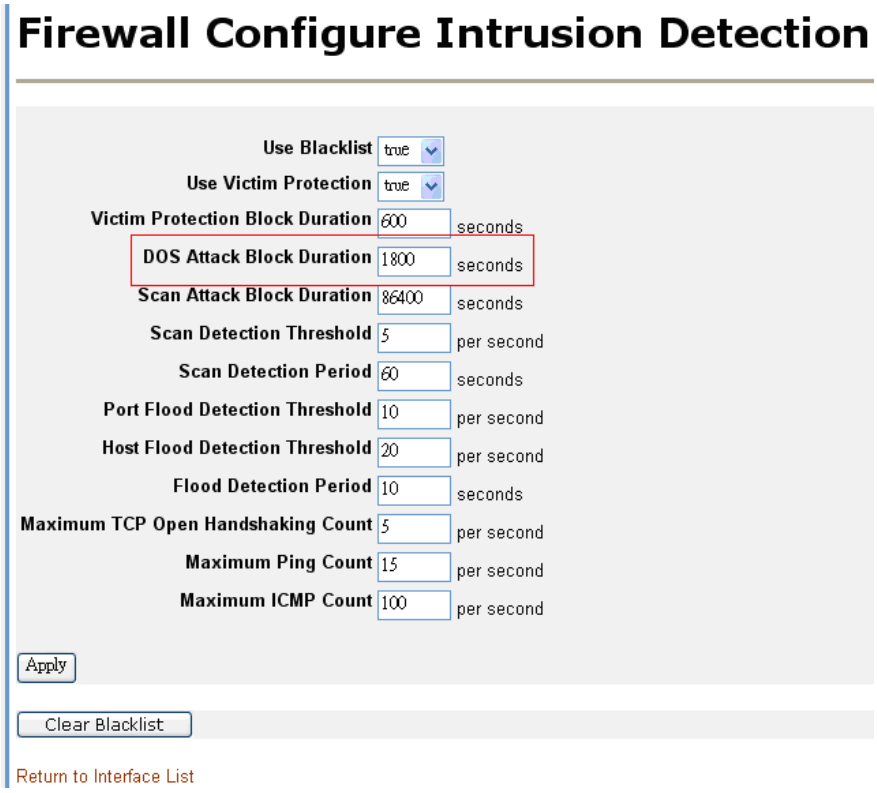


• Ascend Kill

This attack is aimed at Ascend routers. The attacker sends a UDP packet containing special data to port 9 (the discard port), causing your Ascend router to reboot and possibly crash continuously.

Traffic originating from the attacker is blocked for 1800 seconds by default. To modify this default duration, enter:

security set IDS DOSattackblock <duration>



• WinNuke Attack

The attacker sends invalid TCP packets which disable networking on many Microsoft Windows 95 and Windows NT machines. The exploit sent a string of OOB (out of band) data to the target computer on TCP port 139 (NETBIOS), causing it to lock up and display a Blue Screen of Death. This did not cause any damage to, or change data on, the computer's hard disk, but any unsaved data would be lost. NetBIOS is often used. Traffic originating from the attacker is blocked for 1800 seconds by default. To modify this default duration, enter:

security set IDS DOSattackblock <duration>

• Echo Chargen

A chargen attack exploits character generator (chargen) service (UDP port 19). Sessions that appear to come from the local system's Echo service are spoofed and pointed at the chargen service to create an endless loop of high volume traffic that will slow your network down. Traffic originating from the attacker is blocked for 1800 seconds by default. To modify this default duration, enter:

security set IDS DOSattackblock <duration>

• Echo Storm

Attackers send oversized ICMP datagram to your device using ping in an attempt to crash, freeze or cause a reboot. The device detects an attempted Echo Storm attack if it receives more than 15 ICMP datagram per second from a single host. To modify this default threshold, enter:

security set IDS MaxPING <max>

Once this threshold is exceeded, traffic originating from the attacker is blocked for 1800 seconds by default. To modify this default duration, enter:

security set IDS DOSattackblock <duration>

• Boink

An attacker sends fragmented TCP packets that are too big to be reassembled on arrival, causing Microsoft Windows 95 and Windows NT machines to crash. Traffic originating from the attacker is blocked by the router for 1800 seconds by default. To modify this default duration, enter:

security set IDS DOSattackblock <duration>

• Land Attack

This attack targets Microsoft Windows machines. An attacker sends a forged packet with the same source and destination IP address which confuses the victim's machine, causing it to crash or reboot.
Traffic originating from the attacker is blocked for 1800 seconds by default. To modify this default duration, enter:

security set IDS DOSattackblock <duration>

• Ping of Death

It is possible to crash, reboot or otherwise kill a large number of systems by sending a ping of a certain size from a remote machine. This ping is defined as a ping of death when the ping payload exceeds 65535 bytes.
Traffic originating from the attacker is blocked for 1800 seconds by default. To

modify this default duration, enter:

security set IDS DOSattackblock <duration>

• Overdrop

This attack uses incorrect IP packet fragmentation to exploit vulnerabilities in networked devices. Fragmented IP packets are sent and the fragment information indicates that the packet length is over 65535 bytes (including IP header), but the actual data in the payload is much less than this amount.
Traffic originating from the attacker is blocked for 1800 seconds by default. To modify this default duration, enter:

security set IDS DOSattackblock <duration>

3.2.4.2 IP Routes

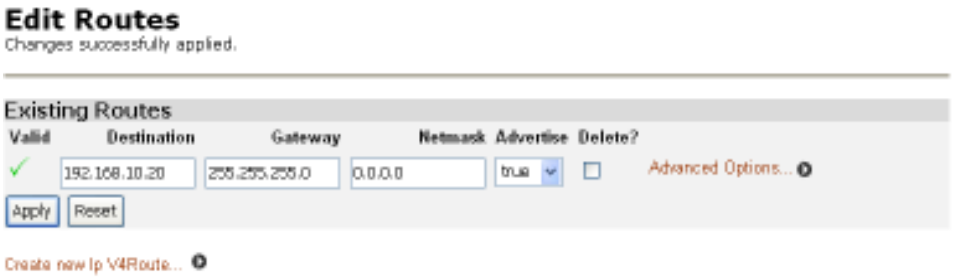
This option allows you to create static IP routes to destination addresses via an IP interface name or a Gateway address. Click on *IP routes* from the *Configuration* menu. The *Edit Routes* page is displayed:

This page lists the following information about existing routes:

• Whether the route is valid or invalid
• Destination IP address
• Gateway address
• Subnet mask
• Whether the route is advertised via RIP (true or false)

Editing a route

1. To edit the destination, gateway and netmask address of a route, Click in the relevant text box, update the information then click on Apply.



2. To edit the cost, interface setting or advertise status for the route, click on the *Advanced Options* hyperlink for a specific route and update the relevant information. Click on OK.

Deleting a route

1. To delete an existing route, check the *Delete box* for a specific route.

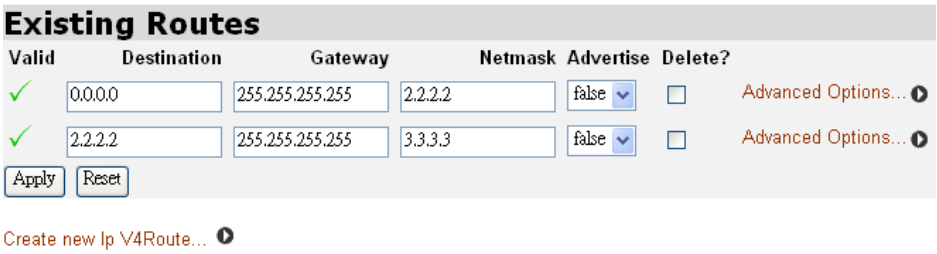
2. Click on Apply.

Creating an IP V4 Route

1. Click on the *Create new Ip V4 Route* hyperlink. The following page is displayed

2. Complete the Create IP v4 Route form in order to configure the route.

3. When you have typed the details, click on OK. The *Edit Routes* page is displayed. The table now contains details of the route that you have just created.



3.2.4.3 Bridge

From the *Advanced menu*, click on *Bridge* and then the *Bridge page* is displayed. This page lists the following information about bridge:

1. Global bridge configuration
2. VLAN configuration
3. Spanning tree configuration

The following shows the Global Bridge configuration settings.

Global Bridge Configuration:

PARAMETER	VALUE
Bridge Mac Address	0:1:eb:c:6e:cb
Number of Ports	5
Bridge Type	TRANSPARENT
Unicast Learning	HYBRID
Multicast Learning	HVM
Config Pvid Status	true
Tagging	ENABLED
AcceptableFrameTypeCfg	ENABLED
IngressFilteringCfg	ENABLED
Filter Age(in seconds)	300 Set Value
Traffic Class Mapping	DISABLED Set Status
Filter Unknown VLAN	Enabled Set Status

The following Global Bridge information is displayed:

1. Bridge MAC Address

2. Number of Ethernet Bridge interfaces configured

3. The type of Ethernet Bridge

4. Unicast learning is non-configurable and always set to Hybrid, i.e. VLAN learning, and is both “Independent” as well as “Shared” depending on the association of the VLANs with the filtering databases.

5. The Multicast Learning setting is non-configurable and always set to HVM (Hybrid VLAN Multicast Learning), i.e. if two VLANs are associated with the same FDB. The filtering information for a multicast MAC address in one VLAN will also be used in the forwarding decision for the same MAC address in the other VLAN.

6. Config Pvid Status is non-configurable and is always true, i.e. the Ethernet Bridge supports the ability to override the default PVID setting and its egress status (VLAN tagged or untagged) on each Ethernet Bridge interface.

7. Tagging is non-configurable and is always enabled, i.e. each Ethernet Bridge interface supports 802.1Q VLAN tagging of frames.

8. AcceptableFrameTypeCfg is non-configurable and is always enabled, i.e. each Ethernet Bridge interface can be configured to accept all frames or only tagged frames.

9. IngressFilteringCfg is non-configurable and is always enabled, i.e. each Ethernet Bridge interface supports discarding of frames whose VLAN classification does not include that interface in its member set.

10. Filter Age (in seconds) sets the duration after which MAC addresses are removed from the filter table when there has been no activity. The time may be an integer value between 10 and 100,000 seconds. The default value is 300 seconds. To change the filter age value, enter the required number of seconds in the filter age field, and then click [Set Value] to save the settings.

11. Traffic Class Mapping. To set the traffic class, select an option from the drop-down list and click [Set Status] to save the settings. The following table gives the range of values for each option that can be specified with this command, and a default value.

Option	Description	Default value
enable	Enables the mapping of each regenerated priority to its traffic class.	Disabled
disable	Disables the mapping of each regenerated priority to its traffic class.	Disabled
prioritybased	Traffic class mapping will only occur if the traffic class has not already been set.	Disabled

12. Filter Unknown VLAN. Filters out unknown VLAN frames. The default value is set to enabled. To disable the filter, select an option from the drop-down list and choose *Disabled.* Then click [Set Status] to save the settings. You can also use CLI to configure the unknown VLAN filter settings.

#> unknownVlanFilter (How to handle unknown VLAN frames)
Enabled: Drop Unknown VLAN frames (Default action)
Disabled: Pass Unknown VLAN frames based on Default VLAN ports.

3.2.4.3.1 Spanning Bridge Configuration

The following shows the Spanning Bridge configurations settings.

Spanning bridge Configuration:

PARAMETER	VALUE
Spanning	false
Priority	32768
Forward Delay	15
Hello Time	2
Maximum Age	20

OK Reset

The following Spanning Bridge information will be displayed and allows users to configure:

1. Spanning: spanning tree setting (true or false)
2. Priority: spanning tree priority value
3. Forward Delay: spanning tree forward delay time (seconds)
4. Hello time: spanning tree hello time (seconds)
5. Maximum Age: spanning tree maximum age (seconds)

3.2.4.3.2 Interface Configuration

Click *Interface configuration* and then the Bridge Interfaces page will be displayed, as shown in the following figure.

Bridge Interfaces:

Name	PVID	Frame Access Type	Ingress Filtering	User Priority	Transport	Priority Map	Delete?	Action
eth1	1	ALL	false	0	eth1	Priority Map..	☐	OK Reset
eth2	1	ALL	false	0	eth2	Priority Map..	☐	OK Reset
eth3	1	ALL	false	0	eth3	Priority Map..	☐	OK Reset
eth4	1	ALL	false	0	eth4	Priority Map..	☐	OK Reset
HSL	1	ALL	false	0	HSL	Priority Map..	☐	OK Reset

Return to Bridge.

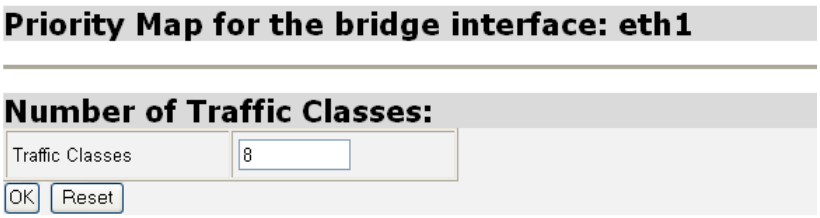
The following table gives the range of values for each option that can be specified using this command, and a default value.

Option	Description	Default value
Name	Interface name	
PVID	Port VLAN ID (PVID) associated with the interface.	1
Frame Access type	Acceptable Frame Type settings. Each bridge interface can be configured to accept all frames or only tagged frames.	all
Ingress filtering	Ingress Filtering Settings. Accepts VLAN tagged frames only if the VLAN ID in the frame has this interface in its egress interface list.	false
User priority	The user priority to regenerated user-priority mapping for a bridge interface.	0
Transport	Name of attached transport.	
Priority Map	The mapping of user priority in the incoming frames to the regenerated user priority that will be used for traffic class mapping, as well as being set in the VLAN tag of the outgoing frame. Configuration methods are introduced in section 5.1.4.	

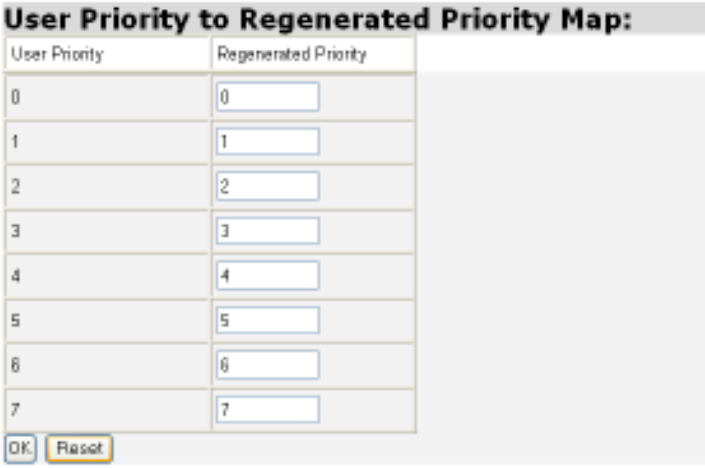
3.2.4.3.3 Priority map configuration

Click *Priority Map* for a specific Bridge Interface, and then the Priority Map for the Bridge Interface page will be displayed. On this page, number of Traffic Classes, user priority to regenerate the Priority Map and the Regenerated Priority to Traffic Class Map can be configured. The procedure is as follows:

1. The Number of Traffic Classes, as shown in the following figure, specifies the number of Traffic Classes supported by the Bridge Interface and can be any value between 1 and 8.



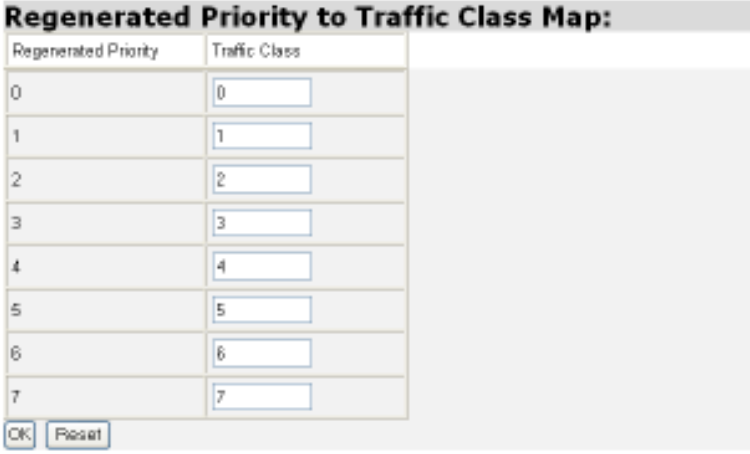
2. User Priority to Regenerated Priority Map, as shown is the following figure, specifies the mapping of user priority in the incoming frames to the regenerated user priority that will be used for Traffic Class mapping, as well as being set in the VLAN tag of the outgoing frame.



The following table gives the range of values for each option that can be specified using this command, and a default value.

Option	Description	Default value
Priority 0	The Regenerated User Priority to which the user priority with a value of 0 in the incoming frame should be mapped.	0
Priority 1	The Regenerated User Priority to which the user priority with a value of 1 in the incoming frame should be mapped.	1
Priority 2	The Regenerated User Priority to which the user priority with a value of 2 in the incoming frame should be mapped.	2
Priority 3	The Regenerated User Priority to which the user priority with a value of 3 in the incoming frame should be mapped.	3
Priority 4	The Regenerated User Priority to which the user priority with a value of 4 in the incoming frame should be mapped.	4
Priority 5	The Regenerated User Priority to which the user priority with a value of 5 in the incoming frame should be mapped.	5
Priority 6	The Regenerated User Priority to which the user priority with a value of 6 in the incoming frame should be mapped.	6
Priority 7	The Regenerated User Priority to which the user priority with a value of 7 in the incoming frame should be mapped.	7

3. Regenerated Priority to Traffic Class map, as shown in the following figure, specifies the mapping of Regenerated Priority to their Traffic Class values.

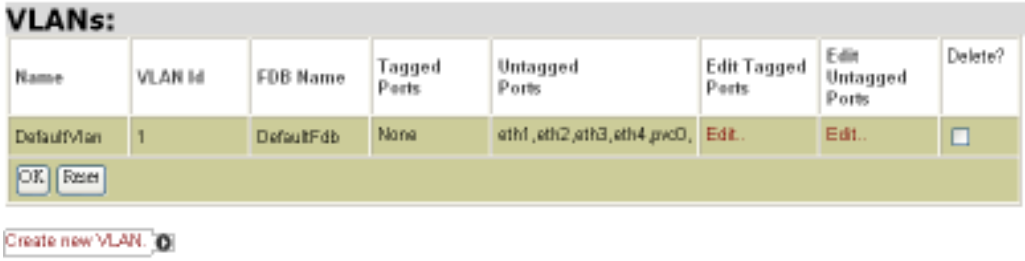


The following table gives the range of values for each option that can be specified with this command and a default value.

Option	Description	Default value
Priority 0	The traffic class to which the Regenerated Priority with a value of 0 is mapped.	0
Priority 1	The traffic class to which the Regenerated Priority with a value of 1 is mapped.	1
Priority 2	The traffic class to which the Regenerated Priority with a value of 2 is mapped.	2
Priority 3	The traffic class to which the Regenerated Priority with a value of 3 is mapped.	3
Priority 4	The traffic class to which the Regenerated Priority with a value of 4 is mapped.	4
Priority 5	The traffic class to which the Regenerated Priority with a value of 5 is mapped.	5
Priority 6	The traffic class to which the Regenerated Priority with a value of 6 is mapped.	6
Priority 7	The traffic class to which the Regenerated Priority with a value of 7 is mapped.	7

3.2.4.4 VLAN

The current maximum number of VLAN groups allowed is 15. To configure the VLAN, click *VLAN configuration* and then the VLAN Interfaces page will be displayed, as shown in the following figure. Currently existing VLAN Interfaces can be configured or a new VLAN Interface can be created via this page.

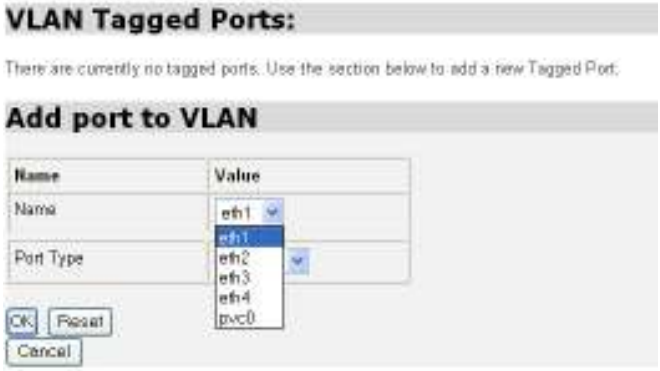


The following table gives the range of values for each option, which can be specified with this command and a default value.

Option	Description	Default value
Name	An arbitrary name that identifies the VLAN Interface and can consist of one or more letters or a combination of letters and digits, but cannot start with a digit.	DefaultVlan
VLAN ID	The VLAN ID that the user wants to assign to the VLAN name. The valid values for the VLAN ID range between 1 and 4094.	1
FDB Name	The name of an existing Filtering Database with which the user wants the VLAN Interface to be associated. If the FDB already exists, the VLAN Interface becomes associated with that FDB. If the FDB does not exist, it is created and the VLAN Interface becomes associated with it.	DefaultFdb
Tagged Ports	The tagged port list for the VLAN Interface	None
User priority	The untagged port list for the VLAN Interface	eth1, eth2, eth3, eth4, pvc0
Edit Tagged Ports	Clicking on *Edit* allows users to edit tagged ports	
Edit untagged Ports	Clicking on *Edit* allows users to edit untagged ports	

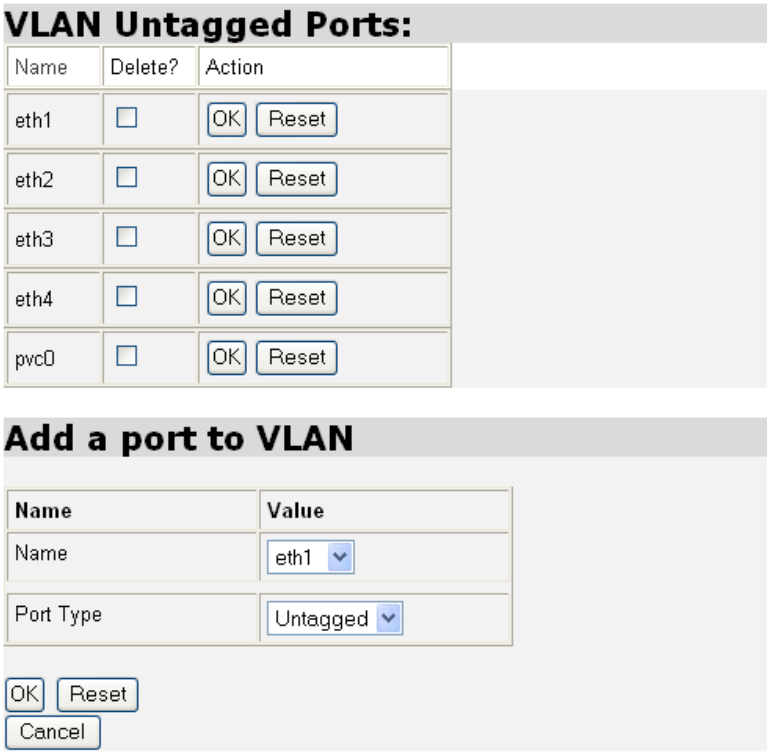
3.2.4.4.1 Edit Tagged Ports

As shown in the following figure, a specific tagged port can be added to the VLAN Interface using name drop-down list. Click OK to save the settings, Reset to clear the settings, or Cancel to return to the previous page.

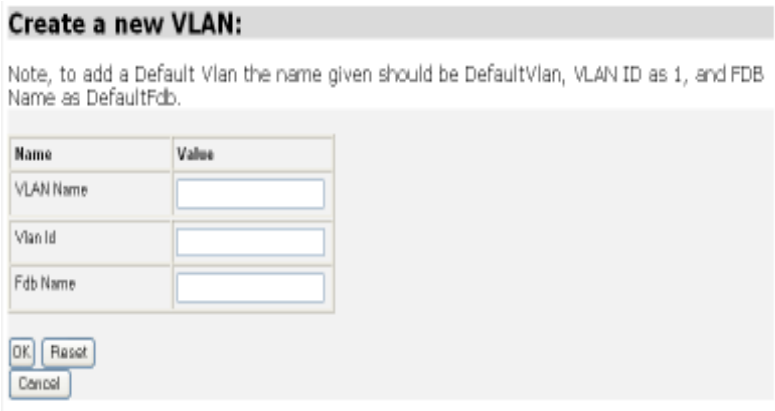


3.2.4.4.2 Edit untagged Ports

As shown in the following figure, a specific untagged port can be added to or deleted from the VLAN Interface. Click OK to save the settings, Reset to clear the settings, or Cancel to return to the previous page.



Click *Create a new VLAN* and the Create a new VLAN page will be displayed, as shown in the following figure. On this page, a new VLAN Interface can be created by configuring the VLAN name, the VLAN ID and FDB Name respectively. Click OK to save the settings, Reset to clear the settings, or Cancel to return to the previous page.

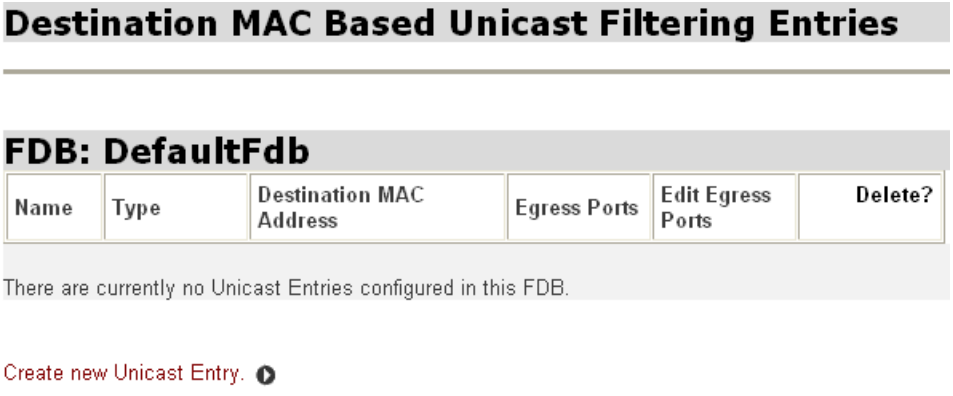


3.2.4.4.3 MGMT VLAN Configuration

First, create a VLAN group where the VLANid corresponds to the Management VLAN Vlanid. Enter the Management Vlanid in the text box and click Set Status to confirm.

3.2.4.4.4 Destination Based Unicast Filtering Entry Configuration

Unicast transmit the same, but separate data to each computer that requesting the same data. It might result in flooding the network. To configure Static Unicast Entries, click *Destination Based Unicast Filtering Entry Configuration* under *Bridge Config*. Then Destination MAC Based Unicast Filtering Entries window will be displayed as below:



To add a new entry, click Create new Unicast Entry and the following window will be displayed.

Create Destination MAC based unicast entry

Name	Value
Name	
Destination MAC Address	
Entry Type	Dest Static

OK Reset
Cancel

Enter the appropriate data into the field and click OK to create a new entry. Naming the entry to correspond with the Destination MAC Address will be helpful for the convenience of future search. User will only be able to choose “Dest Static” from the drop-down list because the entry is being created manually. On the contrary, Entry Type will be “Dynamic” if it is being detected from the input port.

3.2.4.4.5 Multicast Filtering Entry Configuration

In contrast with Unicast, Multicast acts like broadcast. It transmits the data to all end-stations on a LAN or VLAN. Multicast filtering is the system by which end-stations only receive multicast traffic if they register to join specific multicast groups. With multicast filtering, network devices only forward multicast traffic to the ports that are connected to registered end-stations. To configure Static Multicast Entries, click *Multicast Filtering Entry Configuration* under *Bridge Config*. Then Multicast Filtering Entries window will be displayed as below:

Multicast Filtering Entries

FDB: DefaultFdb

Name	MAC Address	Egress Ports	Edit Egress Ports	Delete?

Create new Multicast Entry..

To add a new entry, click Create new Multicast Entry and the following window will be displayed.

Create Multicast Filtering Entry

Name	Value
Name	
Mcast Learning Type	HVM
Mac Address	

OK Reset
Cancel

Enter the appropriate data into the field and click OK to create a new entry. Naming the entry to correspond with the MAC Address will be helpful for the convenience of future search. HVM in the Mcast Learning Type section means that the created entry can be shared within the VLAN.

3.2.4.4.6 Forward All/Unregistered Configuration

To configure Forward ALL/Unregistered Entries, click *Forward ALL/Unregistered Entries* under *Bridge Config* and the following window will be displayed as shown below. This option allows users to assign the Egress Ports that the system forward to. FWDALLMCAST means forwarding all Multicast entries. FWDUNREGMCAST means forwarding all unregistered Multicast entries. As the below image shown, FWDALLMCAST under FDB: DefaultFdb has been assigned to eth1and eth2. All the Multicast entries will then be passed to eth1 and eth2. FWDUNREGMCAST has been assigned to eth3, and then all the unregistered entries will be passed to eth3.

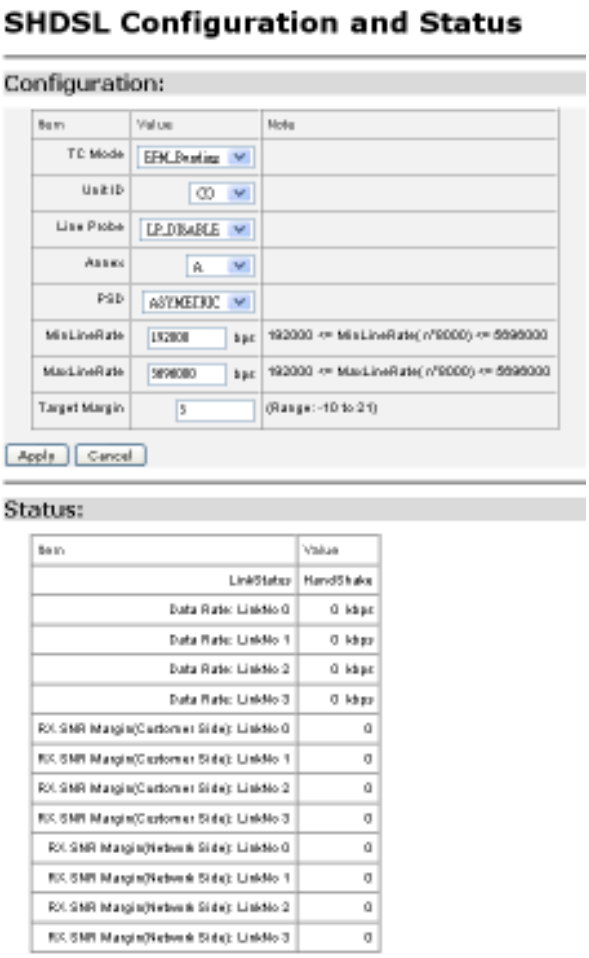
Forward All/Unregistered Entries

FDB: DefaultFdb

Name	MAC Address	Egress Ports	Edit Egress Ports
FWDALLMCAST	00:00:00:00:00:FE	eth1,eth2,	Edit..
FWDUNREGMCAST	00:00:00:00:00:FC	eth3,	Edit..

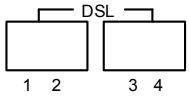
3.2.4.5 SHDSL

This option allows you to configure the SHDSL port on your router, Click on *SHDSL Configuration* via the Advanced menu. The SHDSL Port Configuration page appears promptly:



"Shdsl" is the default port name of SHDSL created in PAMSPAN501x where stands for ATM/EFM port. You can configure simple SHDSL parameters in this page. The procedure is shown as follows:

1. In the Role drop-down list, you can set the device as CPE or CO.
2. If to set PAMSPAN501x's Wire mode, click on Wire Pair drop-down list to select the Wire Pair number needed.

Wire Mode	DSL Pair to Use	Illustration
2-WireMode	1	
4-WireMode	1,2	
6-WireMode	1,2,3	
8-WireMode	1,2,3,4	

3. If to set the maximum and minimum line rate, input the Max Line Rate and Min Line Rate respectively (where values range from 192 kbps to 5696 kbps) and then click on [Apply] to submit your setting. After the handshaking between STU-R and STU-C devices, the actual transmission rate will be presented in the Current TX Rate attribute.

4. Click the line probe drop-down list to set line probe as enable or disable.

5. Click the annex drop-down list to select the desired annex mode, including A and B

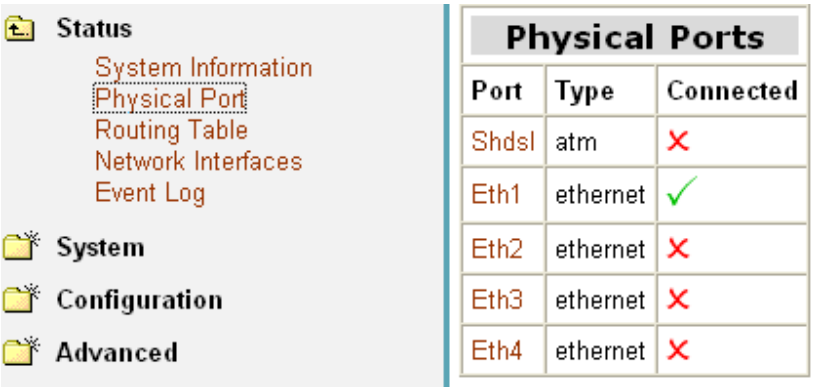
6. Click the PSD drop-down list to set PSD as symmetric or asymmetric.

7. If to set the maximum and minimum line rate, click on the Max Line Rate and Min Line Rate drop-down list respectively (range: 192 kbps to 5696 kbps).

8. If to set the target margin, input the desired number in the target margin field (range: -1 to 21 dB).

9. Click on [Apply] to submit your setting or [Cancel] to clear your setting.

10. To view the advanced status of SHDSL and Ethernet ports, refer to the system status section as follows:

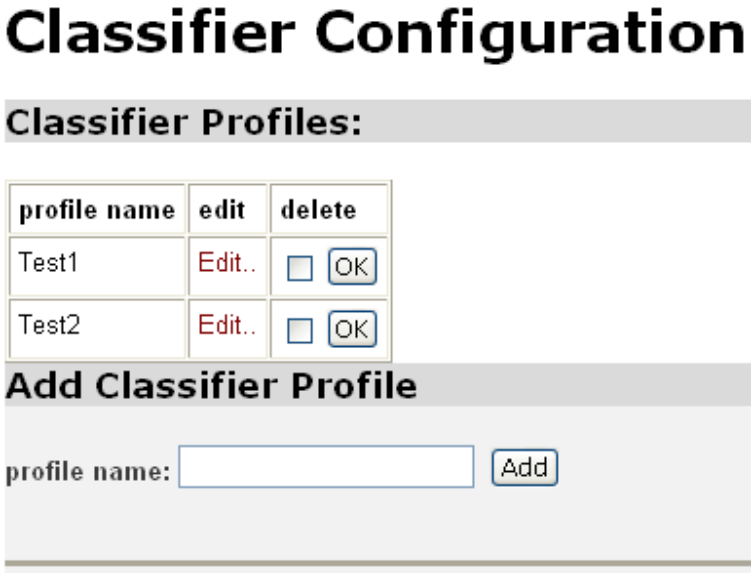


3.2.4.6 QoS

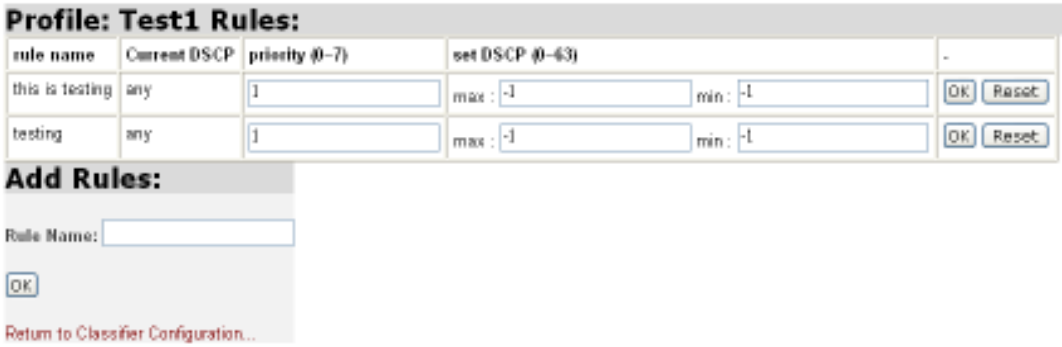
To configure the QoS, click QoS under “Configuration”. Below are some CLI commands and the corresponding web images for setting up and configuring the EFM for QoS function including some examples on how to add a classifier profile, scheduler profile and attach them on target transports.

3.2.4.6.1 To add a classifier profile

Enter the desired name for the profile and click *Add* to create a classifier profile.



Click the link *Edit* of the desired profile to modify the rule of that specific profile.



Enter name for the rule to add a new rule to the profile and then set the rule by enter the desired criteria into those fields and click “OK” to save the settings.

Below are some CLI regarding to the classifier. With “dscprange” and “priority” rule commands, you can abstract a packet and tag its priority by TOS/DSCP field. The order of the commands should follow the sequence of the examples below.

#> classifier add profile cdscp
This command adds a profile named cdscp.

#> classifier profile cdscp add rule r1
This command adds the rule r1 to the profile cdscp.

#> classifier profile cdscp set rule r1 dscprange 0 15
This command sets the dscprange with the criteria from 0 to 15 for rule r1.

#> classifier profile cdscp set rule r1 priority 0
This command tags the incoming packets that meet the r1 criteria to priority 0.

#> classifier profile cdscp add rule r2
This command adds the rule r2 to the profile cdscp.

#> classifier profile cdscp set rule r2 dscprange 16 31
This command sets the dscprange with the criteria from 16 to 31 for rule r2.

#> classifier profile cdscp set rule r2 priority 2
This command tags the incoming packets that meet the r2 criteria to priority 2.

#> classifier profile cdscp add rule r3
This command adds the rule r3 to the profile cdscp.

#> classifier profile cdscp set rule r3 dscprange 32 47
This command sets the dscprange with the criteria from 32 to 47 for rule r3.

#> classifier profile cdscp set rule r3 priority 4
This command tags the incoming packets that meet the r3 criteria to priority 4.

#> classifier profile cdscp add rule r4
This command adds the rule r4 to the profile cdscp.

#> classifier profile cdscp set rule r4 dscprange 48 63
This command sets the dscprange with the criteria from 48 to 63 for rule r4.

#> classifier profile cdscp set rule r4 priority 6
This command tags the incoming packets that meet the r4 criteria to priority 6.

#> classifier show profile cdscp
This command shows the cdscp profile information.

3.2.4.6.2 To add a scheduler for QoS

There are two methods of adding a scheduler for QoS. One is QoS with priority mode and another is QoS with the weighted queues.

Schelduler Configuration

Schelduler Profiles:

Profile Name	Max Rate	Max Burst	Profile Type	Edit Queue Weight	delete

Add Schelduler Profile

Profile Name: [ ] Add

Enter the name for the Scheduler Profile and click “Add” to create the new profile. Upon clicking “Add”, the following page will be displayed for user to choose the method for the QoS scheduler, Priority or Weighted Queues. Click priority for the priority type and wf2qplus for the weighted queue type.

Select Schelduler Profile Type

Profile Name: Sch1

Type : priority

Profile Name: Sch1

Type : wf2qplus

After clicking on the desired scheduler profile type, the profile will then be created and appear on the QoS main page.

Schelduler Configuration

Schelduler Profiles:

Profile Name	Max Rate	Max Burst	Profile Type	Edit Queue Weight	delete
Sch1	0	0	priority	-	☐
OK					
Sch2	0	0	wf2qplus	Edit..	☐
OK					

Add Schelduler Profile

Profile Name: [ ] Add

User will be able to edit and decide the weighted percentage of the weighted queues profile by clicking on the “Edit” link for the specific profile. The weighting page will then be displayed as shown below. Enter the percentage the specific queue and click OK to save the changes or Reset to clear the percentages.

Queue	Weight	-
default	70	-
q1	10	OK Reset
q2	10	OK Reset
q3	10	OK Reset
q4	0	OK Reset
q5	0	OK Reset
q6	0	OK Reset
q7	0	OK Reset

QoS with priority mode

When using this method, scheduler for transporting will totally based on the priority. Therefore, packets with the highest priority will get to send first and only when the highest priority packets have all been sent will the second priority packets being sent.

#> scheduler add profile spriority priority
This command adds a profile named spriority with priority queuing, which provides prioritized treatment to higher priority traffic.

#> scheduler show profile spriority
This command shows the profile spriority.

QoS with weighted queues

When using this method, scheduler for transporting will based on the weight of percentage. Each queue will contain the percentage weight and these weights will identify the total percentage that will get to send on every transmission. For example:

#> scheduler add profiles swf2q wf2qplus
This command adds a profile named swf2q. Wf2qplus (Worst Case Weighted Fair Queuing Plus) service discipline is a service discipline distributes the link bandwidth among participating queues in ratio of their respective configured weights.

#> scheduler profile swf2q set queue 1 weight 20
Queue 1 will contain 20% of the total transport bandwidth in every transmission.

#> scheduler profile swf2q set queue 2 weight 30
Queue 2 will contain 30% of the total transport bandwidth in every transmission.

#> scheduler profile swf2q set queue 3 weight 40
Queue 3 will contain 40% of the total transport bandwidth in every transmission.

(**Note:** The total weight is 100, and packets in other queues that are not being set will share rest bandwidth)

#> scheduler show profiles swf2q
This command shows the profile swf2q.

#> scheduler show profile swf2q queues
This command shows the profile swf2q queues information.

3.2.4.6.3 To add a meter for QoS

Meter Configuration

Meter Profiles:

Name	Type	cir	cbs	pir	pbs	ebs	delete
Meter1	srtcm	5	5	-	-	5	☐
OK							
Meter2	tokenbucket	3	3	-	-	-	☐
OK							
Meter3	trtcm	1	2	3	4	-	☐
OK							

Add Meter Profile:

Profile Name: [ ] Add

Enter the name for the meter profile and click “Add” to create the profile. Upon clicking “Add”, the create meter profile page will be displayed as shown below.

Enter the desired data into the fields and then click Add srtcm profile, Add tokenbunket profile, and Add to add and save the changes.

cerate meter profile

Name	Type	cir	cbs	pir	pbs	ebs	ok
Meter1	srtcm			-	-		Add srtcm profile
Meter1	tokenbunket			-	-	-	Add tokenbunket profile
Meter1	trtcm					-	Add

Below are some CLI related to Meter.

#> meter add profile <name> srtcm <cir> <cbs> <ebs>

This command creates a meter profile that uses strum algorithm for metering.

- If a packet stream's average rate is within CIR and the burst size is within CBS, then that packet is in-profile. (Green)
- If a packet stream's average rate is within CIR and the burst size is not within CBS but is within CBS+EBS, then that packet is partially in profile. (Yellow)
- All other packets are out of profile. (Red)

#> meter add profile <name> tokenbucket <cir> <cbs>

This command creates a meter profile that uses the token-bucket algorithm for metering.

- If a packet stream's average rate is within CIR and the burst size is within CBS, then the packet is in profile (Green).
- All other packets are out of profile (Red).

#> meter add profile <name> trtcm <cir> <cbs> <pir> <pbs>

This command creates a meter profile that uses the trtcm algorithm for metering.

- If a packet stream's average rate is within CIR and the burst size is within CBS, then the packet is in profile (Green).
- If a packet stream's average rate is within PIR and the burst size is within PBS, then the packet is partially in profile (Yellow).
- All other packets are out of profile (Red).

#> meter clear profiles

This command allows you to delete all meter profiles that were previously created using the *meter add profile* commands.

Note: This command does not delete the profiles that are associated with meter instances created using the *transports set meter instance profile* command.

#> meter delete profile <name>

This command allows you to delete a single meter profile that was previously created using the *meter add profile* commands.

Note: This command does not delete the profiles that are associated with meter instances created using the *transports set meter instance profile* command.

#> meter list profiles

This command lists all of the meter profiles that were created using the meter add profile commands. It displays the following information about meter profiles:

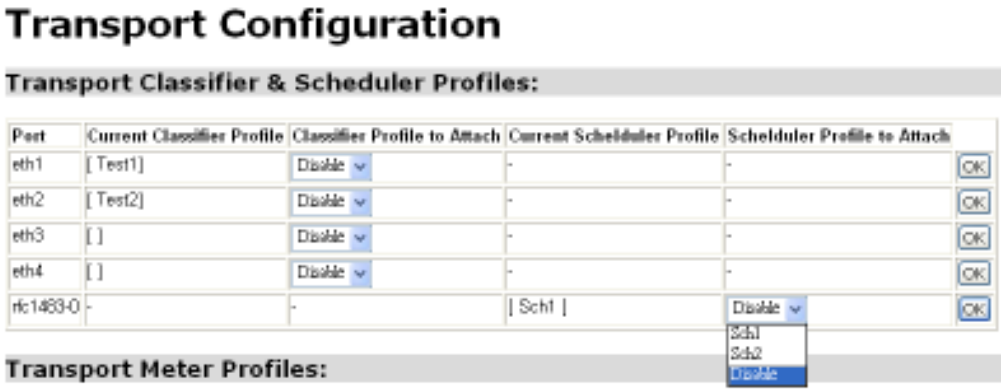
- Name
- Type of algorithm used
- CIR value (in kbps)
- CBS value (in bytes)
- EBS value (for algorithm type srtcm only)
- PIR value (for algorithm type trtcm only)
- PBS value (for algorithm type trtcm only)
- Green action
- Yellow action (for algorithm types trtcm and srtcm only)
- Red action

#> meter set profile <name> {green|red|yellow} action drop

This command configures an existing profile to drop packets depending on their metering result. Note that if this command is not applied, by default the green and yellow packets are passed and red packets are dropped.

3.2.4.6.4 Attach a profile to a transport

It is recommended that before attaching a profile to a transport, you should set "Bridge Config\Global Config\Traffic Class Mapping" to Enabled or Priority Based by Web control (or from a CLI command)



As the image shown above, to attach an existing classifier profile to an existing transport, click the drop-down list corresponded to the transport and choose which classifier desired for attaching and then click "OK" to save the configuration. To attach an existing scheduler profile to an existing transport, again use the drop-down list corresponded to the transport and chooses which scheduler to add.

Follow the same sequence as attaching scheduler and classifier when attaching an existing meter profile to an existing transport. Click the drop-down list corresponded to the transport and choose the meter to attach and then click “OK” to save the configuration as shown below.

Transport Meter Profiles:

ETH Port	Current meter Profile	Meter Profile to Attach	-
eth1	[Meter1]	Disable	OK
eth2	[Meter3]	Disable	OK
eth3	[Meter2]	Disable	OK
eth4	[ ]	Disable	OK

802.1P QoS

For this function, only a scheduler should be attached to the HSL transport. (If a classifier has attached on an ingress transport, you should remove it from this ingress transport.)

#> transports set HSL scheduler profile spriority
This command sets an existing scheduler profile on an existing transport. The outgoing traffic on the transport will be scheduled according to the configuration of the scheduler profile. It sets HSL scheduler to follow the rule in profile spriority.

#> transports show HSL
This command shows the information on the HSL transport.

TOS/DSCP QoS

For this function, you should set a scheduler to the HSL transport and a classifier to an ingress Ethernet transport. Below are the examples:

#> transports set HSL scheduler profile spriority
#> transports show HSL
#> transports set ETH1 classifier profile cdscp
#> transports show ETH1

The specific PPPoE QoS

For a PPPoE ingress packet, its QoS behavior in this system will be depended on what strict priority it carries or follow the classifier rule that attached on it. However, if a PPPoE packet carries both a strict priority and a classifier rule, then its QoS behavior will only follow the classifier rule and ignore the priority it carries.

Update a profile instance of a transport

After using the *transports set* command to attach a profile to a transport, the system will clone the profile content into that transport. If you would like to revise a profile and want a transport to work with this new profile, you should disable transport's profile first before attaching the new profile. Below are the sample commands:

For the transport set using scheduler

#> transports set HSL scheduler disabled
This command disables packet scheduling previously set on the HSL. The scheduler is removed from the data path.

#> transports set HSL scheduler profile spriority
This command sets an existing scheduler profile on an existing transport. The outgoing traffic on the transport will be scheduled according to the configuration of the scheduler profile. It sets HSL scheduler to follow the rule in profile spriority.

For the transport set using classifier

#> transports set ETH1 classifier disabled
This command disables packet classifying previously set on the ETH1. The classifier is removed from the data path.

#> transports set ETH1 classifier profile cdscp
This command sets the cdscp classifier profile on ETH1 transport. All rules that exist in this profile will test incoming packets on the specified transport.

4 Diagnostic and Troubleshooting

We could simply judge whether connection is correct or incorrect from the status of LED. Please refer to the list below for status of connection.

Description	Suggestion
Make sure Power LED, Ethernet LED, and DSL LED are lighted.	Check all connections whether ware correct, including DSL Line, Ethernet cable and power adapter.
Ethernet LED start to become blink yellow while RJ-45 line has just plugged, it will turn to yellow (No blink) while connection is established.	If your Ethernet LED no light, make sure the RJ-45 you using is connected properly (Please use the crossover Ethernet cable) If the port is disabled, then the Ethernet LED will not illuminate. User has to connect to the peer port and enable the port via Web or console. Note: if all the other peer ports are also disabled, then user will only be able to enable the ports using CLI via console.
DSL LED start to become blink yellow while DSL line has just plugged and start to train the DSL Link, it will turn to yellow (No blink) while connection is established.	If the DSL LED is still blinking, is means that Router is training the DSL Line and connection is not Established, in this case, Please make sure your ISP **User name** and **password** are correct or check DSL Link is connected properly.

Appendix A – Acronyms

This appendix gives the meanings of the acronyms used in this manual.

Table – A1 Acronym meanings

Acronym	Meanings
ATM	Asynchronous Transfer Mode
CPE	Customer Premise Equipment
CO	Central Office
DHCP	Dynamic Host Configuration Protocol
DMZ	Demilitarized Zone
DNS	Domain Name System
DSL	Digital Subscriber Line
EFM	Ethernet in the First Mile
FDB	Filtering Database
IGMP	Internet Group Management Protocol
NAT	Network Address Translation
NTP	Network Time Protocol
PAP	Password Authentication Protocol
RSTP	Rapid Spanning Tree Protocol
SHDSL	Symmetrical High Bitrate Digital Subscriber Line
SNTP	Simple Network Time Protocol
STP	Spanning Tree Protocol