SIEMENS Business Class

5890

DSL Router

User's Guide

SIEMENS

Part No. 107-5890-001

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C. Returned Products will be tested upon receipt by Siemens Subscriber Networks. Products that pass all functional tests will be returned to the end user.

D. Siemens Subscriber Networks will return the repaired or replacement Product to the end user at the address provided by the end user atSiemens Subscriber Networks's expense. For Products shipped within the United States of America, Siemens Subscriber Networks will use reasonable efforts to ensure delivery within five (5) business days from the date received by Siemens Subscriber Networks. Expedited service is available at additional cost to the end user.

E. Upon request from Siemens Subscriber Networks, the end user must prove the date of the original purchase of the product by a dated bill of sale or dated itemized receipt.

5. **Limitations.**

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   Siemens Subscriber Networks LLC
   4849 Alpha Road
   Dallas, TX 75244
   U.S.A.
   Attn: Customer Service

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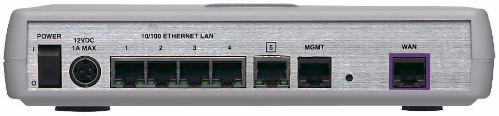
Chapter 1 Product Specifications

Front Panel

The following table explains the LEDs that appear on the front panel of the Siemens 5890 router.

Light	Color	Indications
Power	Green Off	Power is ON Power is OFF
Test	Yellow: Green: (2 sec blink) Off:	Running Power On Self Test Self Test successful (heartbeat) Router is shut down
Link	Yellow: Green: Off:	Establishing DSL modem link DSL modem link successful DSL modem link is shut down
WAN	Green flashing: Off:	WAN traffic detected No current WAN traffic
LANT	Green flashing: Off:	Transmit traffic detected No current transmit traffic
LANR	Green flashing: Off:	Receive traffic detected No current receive traffic

Back Panel



The following table describes the various connections on the back panel of the Siemens 5890 router.

Connection	Function
Power	Turns power on and off.
12VDC 1A MAX	12Vdc, 1Amax input.
Ethernet Ports	5-port Ethernet Switch: RJ-45 (5).
Port 5	Ethernet port configurable as either DMZ or LAN.
MGMT	Use only when instructed by Technical Support.
WAN Port	IDSL/SDSL/SHDSL RJ-45. Uses Pair 1 (pins 4 & 5).

Hardware Specifications

Physical Specifications

- Dimensions:8.25" W x 7.0" D x 1.7" H
- Weight:
  – TBD

Power Requirements

- US/NA = 120VAC 60Hz 20W, ROW = 100-240VAC 50-60Hz 1A

LAN Interface

- Built-in 5-port 10/100 Base-T Ethernet switch with link status LED for each port
- Auto detect full or half duplex operation
- Auto detect regular or crossover cable for easy connection to a switch or hub
- Ports configured individually
- Port mirroring

Serial Interface

- One asynchronous serial console port

Operational Environment

- Temperature:0°F to 104°F
- 10°C to 40°C
- Humidity: 8% to 95% non-condensing

Processor

- MPC859T

WAN Interface

- G.SHDSL, 2-wire
- SDSL, 2B1Q
- IDSL, 2B1Q

Software Specifications

Configuration Management

- Easy Setup Web Management Interface
- Configuration and management using HTTP, serial console, SNMP, SSH, or Telnet
- TFTP download/upload of new software and configuration files
- Dynamic event and history logging
- Network boot uses the BootP server (RFC 2131, RFC 2132)
- Syslog Server Support
- Performance monitoring data available via SNMP

Differentiated Services - Quality of Service provisioning

- Weighted Fair Queuing (WFQ)
- Differentiated Services (DiffServ)
- Traffic Shaping

Dial Backup

- Failover to external V.90 via console port
- Web Management Interface
- User selectable fail/restore criteria
- Optional modem connector (DB9 or DB25)
- Supports L2TP and IPSec tunnel failover

Routing

- TCP/IP with RIP1 (RFC 1058), RIP1 compatible and RIP2 (RFC 1389) or static routing on the LAN or WAN
- Novell® IPX with RIP/SAP (RFC 1552)
- DHCP client (RFC 2132)
- DHCP server - Automatic assignment of IP address, mask, default gateway and DNS server addresses to workstations (RFC 2131, 2132)
- DHCP relay agent (RFC 1542)
- DNS relay
- Multiple subnets on LAN support NAT, RIP1, RIP2, ARP, and IP filters
- Virtual routing

IP Address Translation

- Network renumbering (RFC 1631)
- Network Address Translation (NAT/PAT)
- NAT passthrough support for numerous applications including IPSec, PPTP, H.323, SIP and NetMeeting
- Supports public Web and e-mail servers with NAT

ATM

- Encapsulation (IP, Bridging, and Bridge Encapsulated Routing) (RFC 2684/1483)
- PPP over ATM (LLC and VC multiplexing) (RFC 2364)
- Classical IP over ATM (RFC 2225)
- Classical IP (RFC 1577)
- AAL5
- Virtual Circuit (VC) traffic shaping (CBR, PCR, UBR, VBR)
- No pre-defined limit on VCs
- I.610 OAM F5 end-to-end and segment LoopBack
- Initiates and responds to LoopBack signaling

PPP (RFC 1661, RFC 2364)

- Data compression of up to 4:1 (STAC™ LZS) (RFC 1974)
- Van Jacobsen header compression (RFC 1144)
- Spoofing and filtering (IP-RIP, IPX-RIP, SAP, Watchdog, serialization)
- Automatic IP and DNS assignment (RFC 1877)
- PPP over Ethernet (RFC 2516)
- PPP over ATM (RFC 2364)
- Bridging (RFC 1638)
- IP Routing (RFC 1331)
- IPX Routing (RFC 1552)
- Multiclass extensions to MLPPP (RFC 2686)
- MLPPP (RFC 1990)

Frame Relay

- Support of frame relay ANSI T1.618 and CCIT Q.922 formats
- DLCI support
- Inverse ARP support
- LMI support including LMI protocol discovery
- LLCP auto-update
- CIR & EIR rate enforcement
- Network Congestion Management

Security

- Role-based management
- User authentication (PAP/CHAP) with PPP (RFC 1334, RFC 1994)
- Password control for Configuration Manager
- SNMP community name reassignment
- HTTP/Syslog/SNMP/Telnet port reassignment, access control list
- Secure VPN support (L2TP, IPSec, IKE, DES, 3DES)
  - No pre-defined limit on VPN tunnels
  - IPSec tunnel and transport modes with AH and ESP
  - Implements RFCs 1321, 1828, 1829, 2085, 2104, 2401-2410, 2412, 2420, 2437, 2451, and 2631 (Groups 1 and 2)
- Firewall (IP filtering)
- Stateful Firewall (ICSA Compliant)
- Secure Management Communications
  - IPsec
  - SSH
- Radius Server support

Chapter 2 Installation

This chapter describes the steps you must take to install and configure the various components in your network to utilize the Siemens DSL broadband internet router. This includes setting up the hardware connections to the Internet router, configuring the PC to use the Internet router for Internet access, and setting up the Internet router configuration. Before beginning installation, make sure you meet all installation requirements.

Installation Requirements

Before beginning the installation and configuration of the various components on the network, make sure you received all the package contents, meet the basic PC requirements, and have the necessary information from your network Service Provider.

Package Contents

Your package should contain the items listed below. If you determine anything to be damaged or missing, please contact the dealer from whom the equipment was purchased.

- One Siemens 5890 router
- One Siemens Documentation CD-ROM
- One AC power cord
- One RJ-45 Ethernet cable, red label
- One RJ-45 Ethernet cable, yellow label
- One RJ-45 to DB-9 serial port adapter (console)

PC Requirements

At a minimum, your computer must be equipped with the following to successfully install the broadband Internet router.

- CD-ROM Drive
- Ethernet network interface card
- TCP/IP network protocol installed on your PC
- Web browser
- Terminal emulation software, if you want to configure your router via your computer’s serial port before placing it into service on a network.

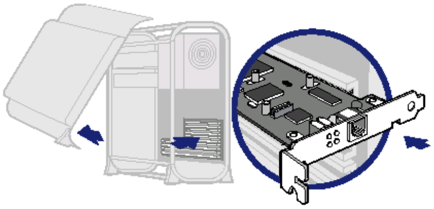
Network Service Provider Requirements

Your Network Service Provider will provide you with information to configure your router's WAN connection. Depending upon the type of service that you ordered, you will need some of the items from the following list. Contact your Network Service Provider for specific details on the items you should receive.

- DNS address
- One or more IP addresses and a subnet mask

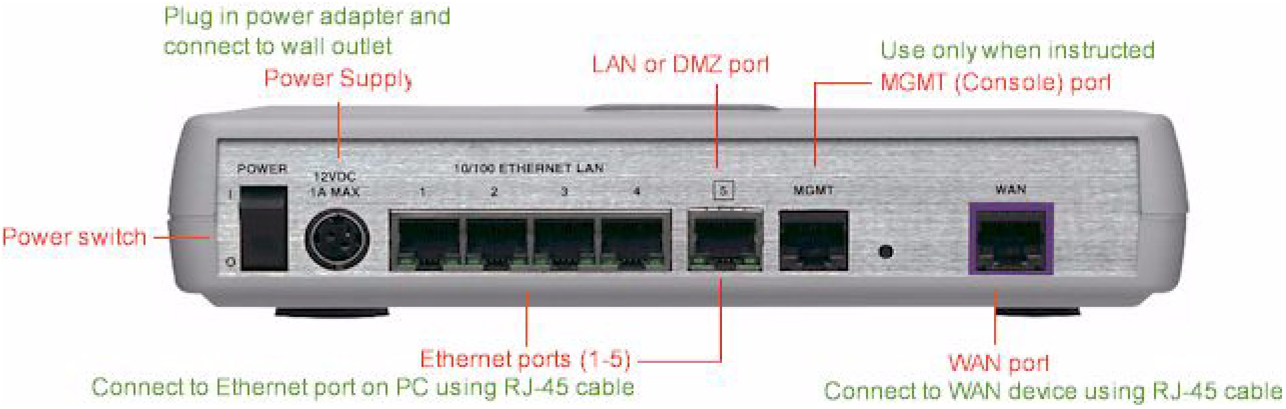
Hardware Installation

You may position the Siemens broadband router at any convenient location where it will be well ventilated. Do not stack it with other devices or place it on the carpet. You can connect the router to an existing Ethernet port on your computer.



To connect the SpeedStream device via the Ethernet interface, your computer must have an Ethernet adapter (also called a network interface card, or NIC) installed. If your computer does not have this adapter, install it before proceeding further. Refer to your Ethernet adapter documentation for complete installation instructions. Once you verify installation of an Ethernet adapter, perform the following procedure to connect the router to your computer.

To set up the harware connections:



1. With the PC powered off, connect the Ethernet cable to an Ethernet port on the router.
2. Connect the other end of the Ethernet cable to the Ethernet port on the PC.
3. Connect your router's WAN port to the DSL phone jack using the remaining RJ-45 cable. To reduce the risk of fire, use only 26 AWG gauge telecommunication cord.
4. Connect the power adapter to the rear of the router.
5. Plug the power adapter into the electrical wall outlet.
6. Flip the power switch on the router.
7. Power on all connected computers.

You can now configure the TCP/IP settings as detailed in the PC Configuration section.

PC Configuration

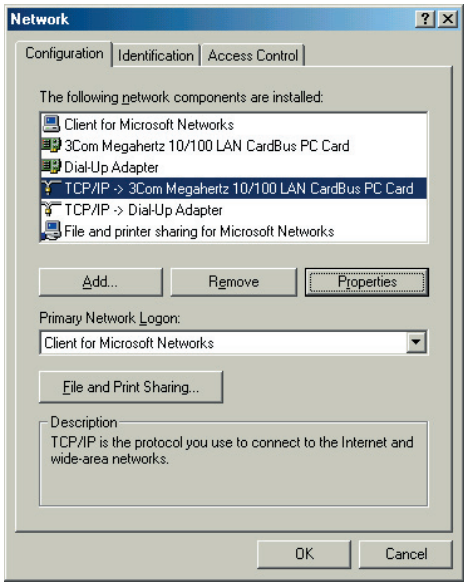
Your PC must be configured to use the TCP/IP protocol suite over the Internet, and to accept Dynamic Host Configuration Protocol address assignments from the router. Although this is the default settings for the PC, it is a good idea to verify that they have not been changed.

Each supported PC Operating System varies slightly in how the configuration windows are presented. Select the Operating System installed on the PC connected to the router from the list below and follow the associated procedure.

- Windows 98/ME
- Windows XP
- Windows NT 4
- Mac OS 9.x
- Linux OS
- Windows 2000
- Mac OS X

Windows 98/ME

1. Click **Start >Control Panel > Network**. This displays the **Configuration** tab on the Network window.
2. Select **TCP/IP** protocol for your network card.
3. Click **Properties**. This displays the TCP/IP Properties window.

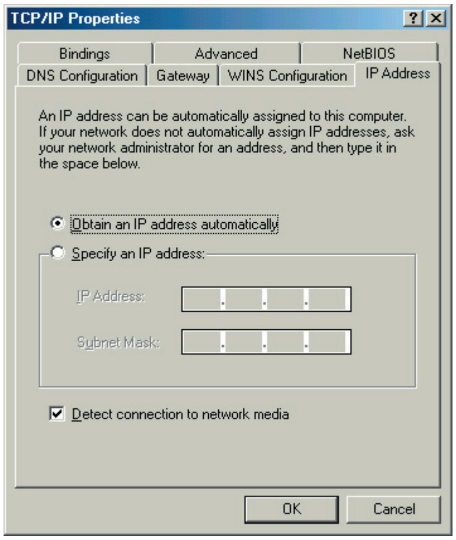


The following network components are installed:

Client for Microsoft Networks
3Com Megahertz 10/100 LAN CardBus PC Card
Dial-Up Adapter
TCP/IP -> 3Com Megahertz 10/100 LAN CardBus PC Card
TCP/IP -> Dial-Up Adapter
File and printer sharing for Microsoft Networks

Primary Network Logon: Client for Microsoft Networks

Description
TCP/IP is the protocol you use to connect to the Internet and wide-area networks.



An IP address can be automatically assigned to this computer. If your network does not automatically assign IP addresses, ask your network administrator for an address, and then type it in the space below.

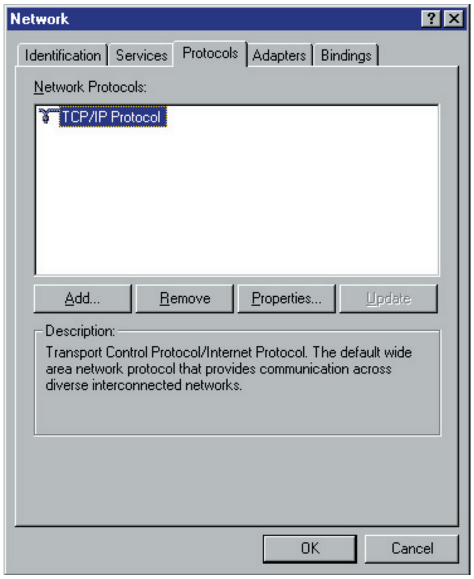
● Obtain an IP address automatically
○ Specify an IP address:
IP Address: . . .
Subnet Mask: . . .

☑ Detect connection to network media

4. Click the **IP Address** tab.
5. Ensure that the **Obtain an IP address automatically** option is selected. This is the default Windows setting.
6. Click **OK** to close each dialog.
7. Restart the PC to ensure it obtains an IP address from the router.
8. Configure the router.

Windows NT 4

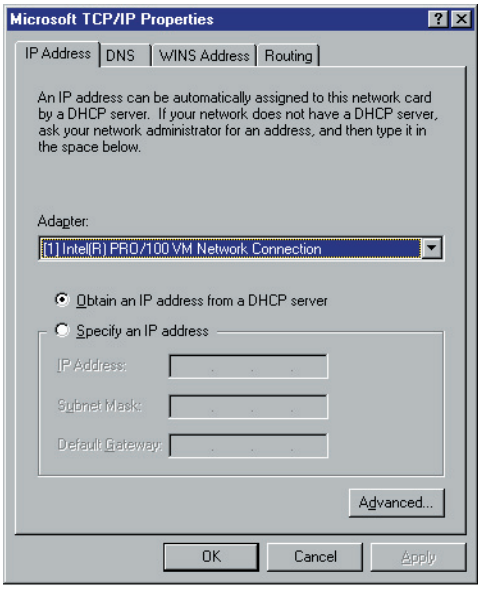
1. On your desktop, right click on the **Network Neighborhood** icon. This displays the Network window.
2. Click the **Protocols** tab.
3. Select **TCP/IP Protocol** from the **Network Protocols** list.
4. Click **Properties**. This displays the Microsoft TCP/IP Properties window.



Network Protocols:

TCP/IP Protocol

Description:
Transport Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.



An IP address can be automatically assigned to this network card by a DHCP server. If your network does not have a DHCP server, ask your network administrator for an address, and then type it in the space below.

Adapter:
[1] Intel(R) PRO/100 VM Network Connection

● Obtain an IP address from a DHCP server

○ Specify an IP address

IP Address: . . .

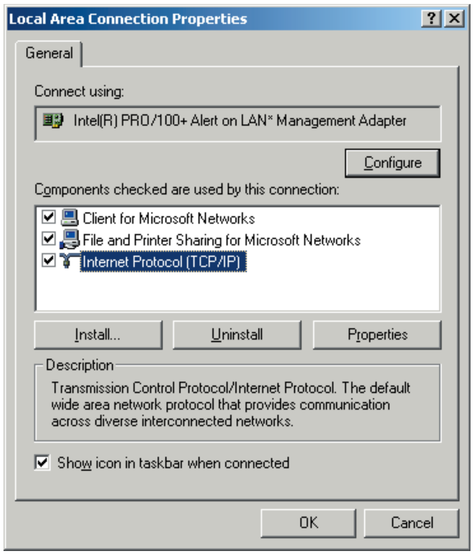
Subnet Mask: . . .

Default Gateway: . . .

5. Click the **IP Address** tab.
6. On the **IP Address** tab, select **Obtain an IP address from a DHCP server**.
7. Click **OK** to close each dialog.
8. Restart the PC to ensure it obtains an IP address from the router.
9. Configure the router.

Windows 2000

1. Select **Start >Settings >Control Panel**. This displays the Control Panel window.
2. Double-click the **Network and Dial-up Connection** icon. This displays the Network and Dialup Connection window.
3. Right-click **Local Area Connections** and select **Properties**. This displays the Local Area Connections Properties window.
4. Select **Internet Protocol (TCP/IP)** from the list of components.
5. Click **Properties**. This displays the Internet Protocol (TCP/IP) Properties window.

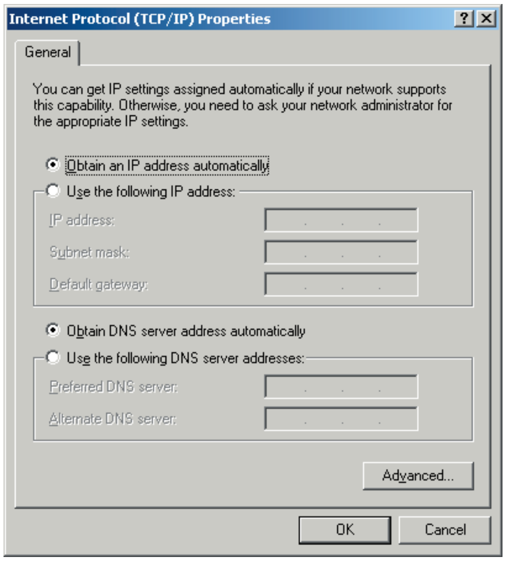

Local Area Connection Properties

Connect using:
Intel(R) PRO/100+ Alert on LAN* Management Adapter

Components checked are used by this connection:
☑ Client for Microsoft Networks
☑ File and Printer Sharing for Microsoft Networks
☑ Internet Protocol (TCP/IP)

Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

☑ Show icon in taskbar when connected


Internet Protocol (TCP/IP) Properties

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

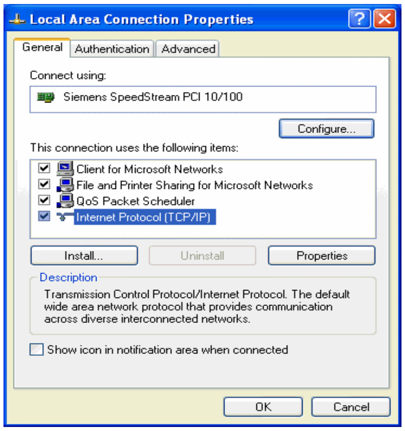
● Obtain an IP address automatically
○ Use the following IP address:
IP address:
Subnet mask:
Default gateway:

● Obtain DNS server address automatically
○ Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:

6. Ensure that the **Obtain an IP address automatically** and **Obtain DNS server address automatically** options are selected.
7. Click **OK** to close each dialog.
8. Restart the PC to ensure it obtains an IP address from the router.
9. Configure the router.

Windows XP

1. Click **Start >Control Panel**. This displays the Control Panel window.
2. Double-click the Network Connections icon. This displays the Network Connection window.
3. Right-click **Local Area Connection**, then click **Properties.** This displays the Local Area Connection Properties window.



Connect using:
Siemens SpeedStream PCI 10/100

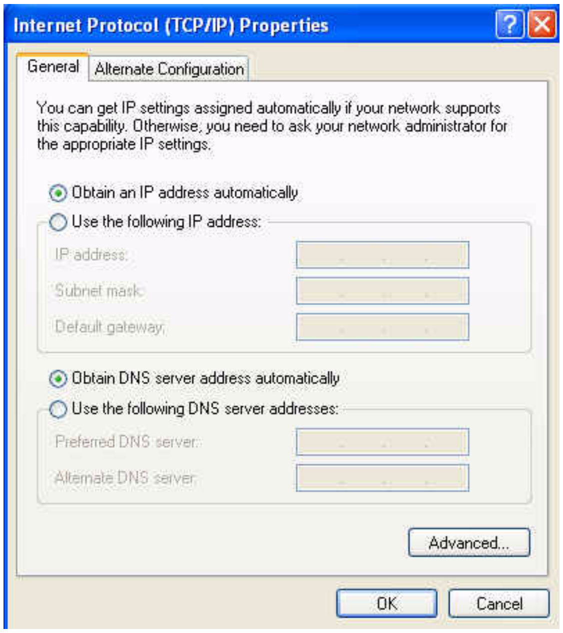
This connection uses the following items:

- ☑ Client for Microsoft Networks
- ☑ File and Printer Sharing for Microsoft Networks
- ☑ QoS Packet Scheduler
- ☑ Internet Protocol (TCP/IP)

Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

☐ Show icon in notification area when connected

4. Select **Internet Protocol TCP/IP**.
5. Click **Properties**. This displays the Internet Protocol (TCP/IP) Properties window.



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

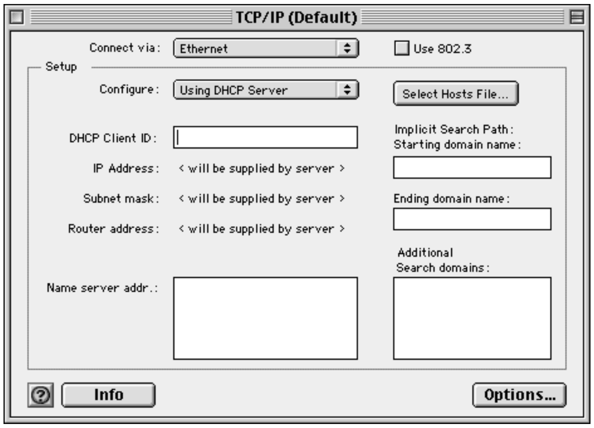
● Obtain an IP address automatically
○ Use the following IP address:
IP address: . . .
Subnet mask: . . .
Default gateway: . . .

● Obtain DNS server address automatically
○ Use the following DNS server addresses:
Preferred DNS server: . . .
Alternate DNS server: . . .

6. Ensure the **Obtain an IP address automatically** and **Obtain DNS server address automatically** options are selected.
7. Restart the PC to ensure it obtains an IP address from the router.
8. Configure the router.

Mac OS 9.x

1. Click **Apple -> Control Panels -> TCP/IP**. This displays the TCP/IP Control Panel window.



TCP/IP (Default)

Connect via: Ethernet

☐ Use 802.3

Setup

Configure: Using DHCP Server

DHCP Client ID:

IP Address: < will be supplied by server >

Subnet mask: < will be supplied by server >

Router address: < will be supplied by server >

Name server addr.:

Implicit Search Path:
Starting domain name:

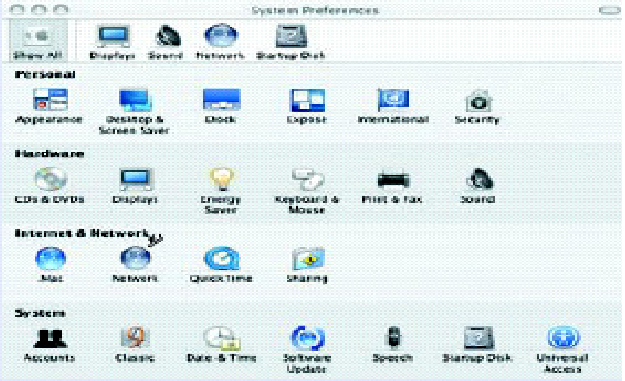
Ending domain name:

Additional
Search domains:

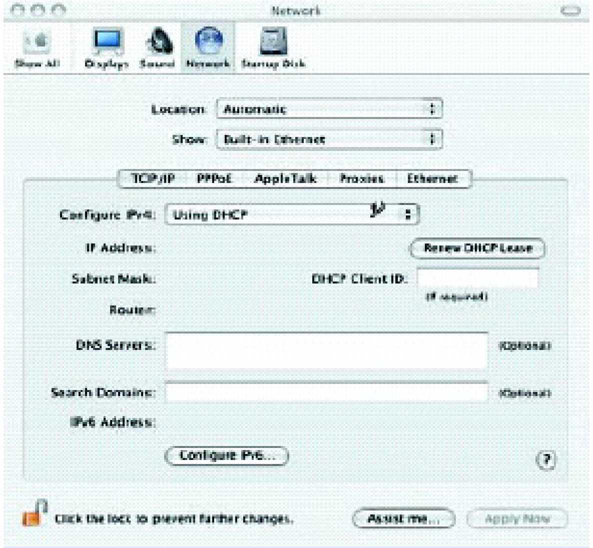
2. Select **Ethernet** from the **Connect via** drop-down menu.
3. Select **Using DHCP Server** from the **Configure** drop-down menu.
4. Complete the fields shown with any information supplied by your service provider.
5. Close window and save changes.
6. Configure the router.

Mac OSX

1. Click **Apple -> System Preferences**. This displays the System Preferences window.



2. Double-click the **Network** icon under the **Internet & Network** section. This displays the Network window.



Location: Automatic

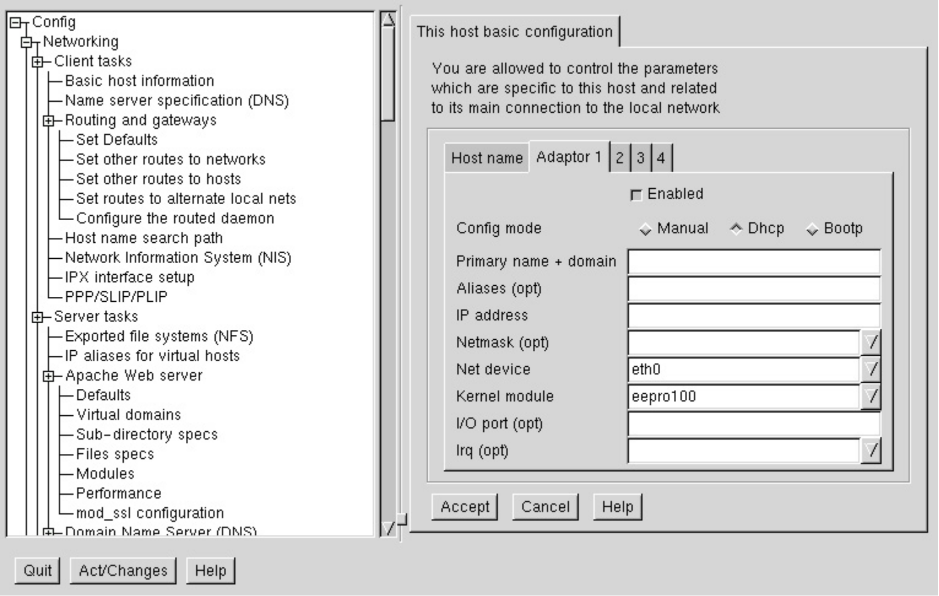
Show: Built-in Ethernet

Configure IPv4: Using DHCP

3. Select **Ethernet** from the **Connect via** drop-down menu.
4. Select **Using DHCP Server** from the **Configure** drop-down menu.
5. Enter any information supplied by your service provider.
6. Click **Apply Now** to save and exit the Network window.
7. Configure the router.

Linux

1. From a terminal window, run **linuxconfig**. This displays the Config window.



This host basic configuration

You are allowed to control the parameters
which are specific to this host and related
to its main connection to the local network

□ Enabled

Config mode ◇ Manual ◇ Dhcp ◇ Bootp

Primary name + domain

Aliases (opt)

IP address

Netmask (opt)

Net device: eth0

Kernel module: eepro100

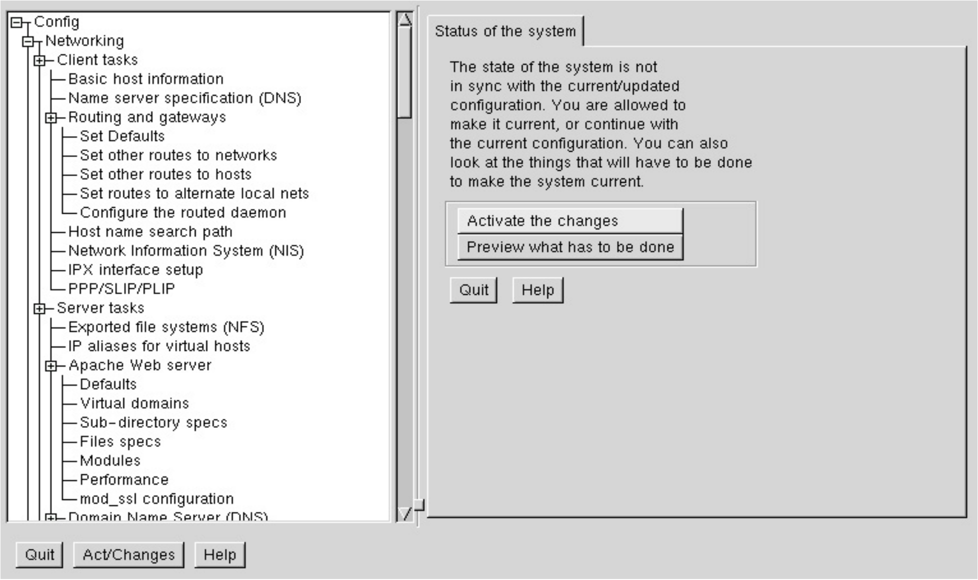
I/O port (opt)

Irq (opt)

2. Click the **Adaptor** tab.

3. Enter any information specified by your service provider in the fields under the appropriate Adapter tab.

4. When settings are completed, click **Accept**. This displays the **Status of the system** tab.



Status of the system

The state of the system is not
in sync with the current/updated
configuration. You are allowed to
make it current, or continue with
the current configuration. You can also
look at the things that will have to be done
to make the system current.

5. To update the system status, ensure that the **Activate the changes** button is highlighted, then click **Act/Changes**.

6. Configure the router.

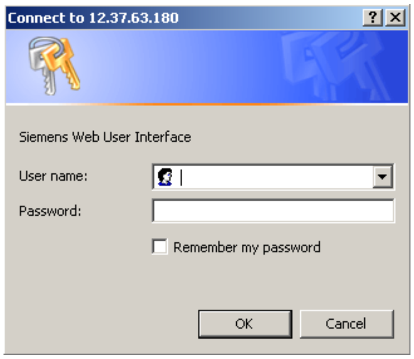
Configuring the Router

The Siemens Business Class Router family of products provides two user interfaces: a Web Management Interface and a console-based Command Line Interface (CLI). The Web Management Interface uses an HTTP server housed in the router. Using this server, you can connect to and manage the router using your Web browser. The Web Management Interface is accessible through most HTML browsers, though Internet Explorer 4.0 or Netscape 4.0 and higher are recommended. Refer to the Technical Reference Guide for details on managing the router through the CLI.

Establish Connection

To establish a connection from your computer to the router through your Web browser:

1. Open your Internet Explorer or Netscape Navigator Web browser.
2. In the **Address** bar, enter the default router IP address: **192.168.254.254**. This displays the Login Dialog page.



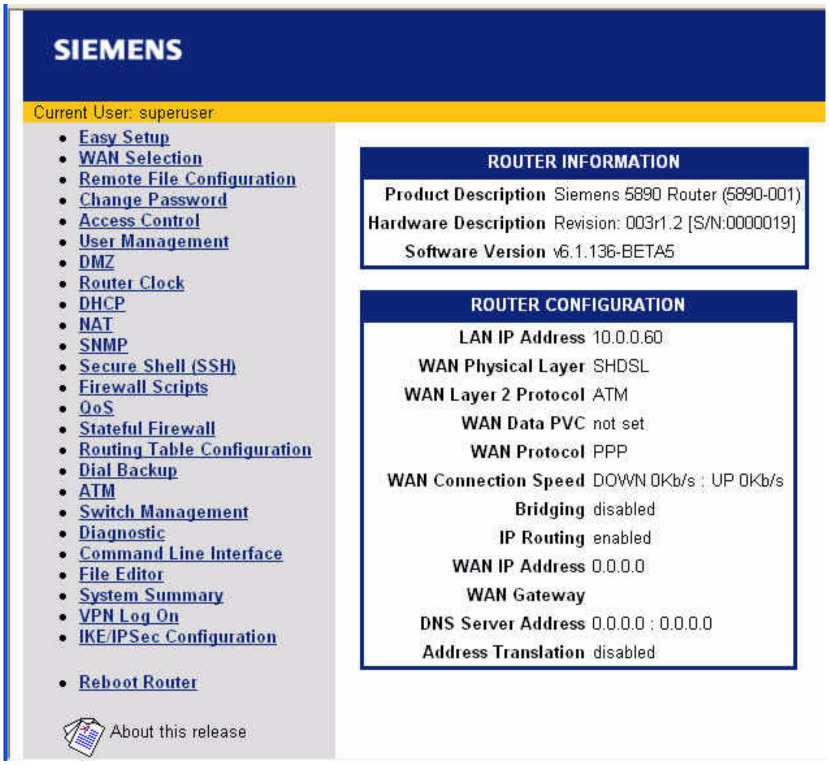
Connect to 12.37.63.180

Siemens Web User Interface

3. Enter the administrative **User name** and **Password**. The default settings are User name: **superuser** and Password: **admin**. This displays the Router Information page.

Router Information Page

The Router Information Page is the first page you encounter after logging into the router.



ROUTER INFORMATION	
Product Description	Siemens 5890 Router (5890-001)
Hardware Description	Revision: 003r1.2 [S/N:0000019]
Software Version	v6.1.136-BETA5

ROUTER CONFIGURATION	
LAN IP Address	10.0.0.60
WAN Physical Layer	SHDSL
WAN Layer 2 Protocol	ATM
WAN Data PVC	not set
WAN Protocol	PPP
WAN Connection Speed	DOWN 0Kb/s : UP 0Kb/s
Bridging	disabled
IP Routing	enabled
WAN IP Address	0.0.0.0
WAN Gateway	
DNS Server Address	0.0.0.0 : 0.0.0.0
Address Translation	disabled

The Router Information page displays basic router information and configuration settings. On the Router Information page, the following information is presented:

- **Router Information**: Including the model number, software version number, and hardware description.
- **Router Configuration**: Displays router configuration details such as LAN IP address, WAN Data Link Connection Identifier DLCI, WAN protocol and WAN network settings.

In the left navigation pane of this page, there are configuration, diagnostic, and status and statistic options for the router. In this document, these features are grouped according to User Access Control, Advanced Router Functions, Security, and Monitoring Health and Status.

Use the table below to locate detailed instructions for the desired function.

To do this:	Refer to:
Perform Easy Setup	Chapter titled "Easy Setup"
Configure users on the router.	Chapter titled "User Setup"
Configure advanced features.	Chapter titled "Advanced Setup"
Configure security features.	Chapter titled "Security Setup"
Monitor the health of the router.	Chapter titled "Monitoring Router"
Manage router using Command Line Interface	Command Line Interface Guide

Chapter 3 Easy Setup

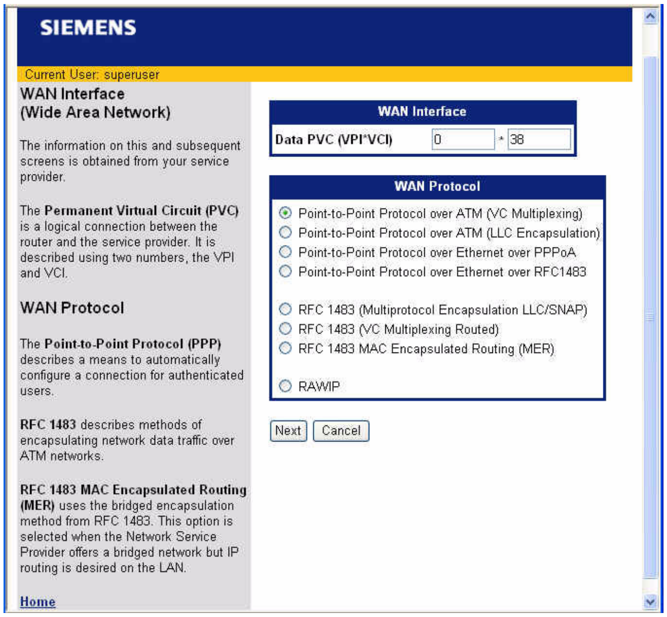
This chapter describes how to define router configuration settings using the Easy Setup Wizard. These settings control access to the Wide Area Network (WAN) and Local Area Network (LAN). During the Easy Setup procedure, you will be prompted to specify configuration parameters that may require information from your service provider.

Access Easy Setup Wizard

To access the Easy Setup Wizard, click **Easy Setup** in the left navigation pane of the Router Information window. This wizard will walk you through the configuration screens necessary to setup the router. You can exit the Easy Setup Wizard at anytime by clicking **Cancel** on the bottom of the configuration page. If the wizard is cancelled, no changes will be made and you will need to begin again.

Select Protocol

When you click **Easy Setup** in the left navigation pane of the Router Information page, the WAN Interface page is displayed. This page is used to enter and review information about Wide Area Network (WAN) settings.



SIEMENS

Current User: superuser

WAN Interface
(Wide Area Network)

The information on this and subsequent screens is obtained from your service provider.

The **Permanent Virtual Circuit (PVC)** is a logical connection between the router and the service provider. It is described using two numbers, the VPI and VCI.

WAN Protocol

The **Point-to-Point Protocol (PPP)** describes a means to automatically configure a connection for authenticated users.

RFC 1483 describes methods of encapsulating network data traffic over ATM networks.

RFC 1483 MAC Encapsulated Routing (MER) uses the bridged encapsulation method from RFC 1483. This option is selected when the Network Service Provider offers a bridged network but IP routing is desired on the LAN.

Home

WAN Interface

Data PVC (VPI*VCI) 0 * 38

WAN Protocol

● Point-to-Point Protocol over ATM (VC Multiplexing)
○ Point-to-Point Protocol over ATM (LLC Encapsulation)
○ Point-to-Point Protocol over Ethernet over PPPoA
○ Point-to-Point Protocol over Ethernet over RFC1483

○ RFC 1483 (Multiprotocol Encapsulation LLC/SNAP)
○ RFC 1483 (VC Multiplexing Routed)
○ RFC 1483 MAC Encapsulated Routing (MER)

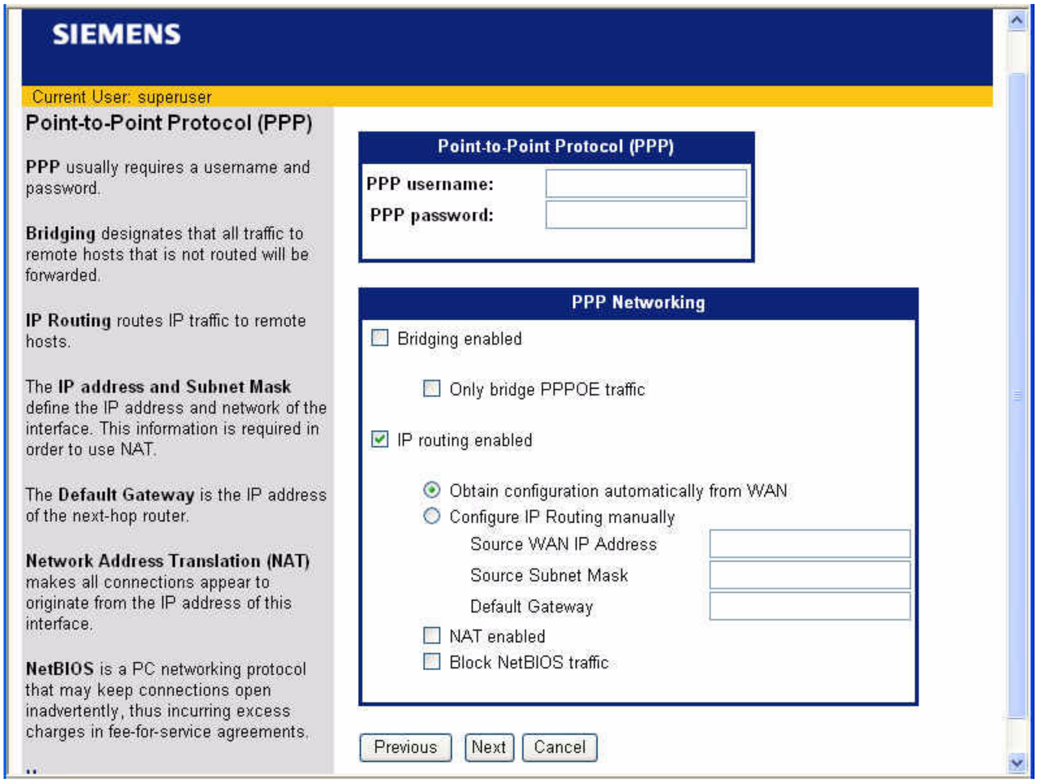
○ RAWIP

To configure the WAN interface:

1. In **Data PVC**, enter the ATM Permanent Virtual Circuit (PVC) information: **VPI** / **VCI**.
2. From the **Wan Protocol** list, select the protocol to use for the WAN connection.
3. Click **Next** to continue. This displays the page required to configure the selected protocol. In the list below, click on the protocol you selected to jump to the appropriate page.
   - Point-to-Point Protocol over ATM (VC Multiplexing)
   - Point-to-Point Protocol over ATM (LLC Encapsulation)
   - Point-to-Point Protocol over Ethernet over PPPoA
   - Point-to-Point Protocol over Ethernet over RFC1483
   - RFC 1483 (Multiprotocol Encapsulation LLC/SNAP)
   - RFC 1483 (VC Multiplexing Routed)
   - RFC 1483 MAC Encapsulated Routing (MER)
   - RAWIP

Point-to-Point Protocol over ATM (VC Multiplexing)

If you selected **Point-to-Point Protocol over ATM (VC Multiplexing)** from the Wan Interface page, the Point-to-Point Protocol page is displayed when you click **Next**.



SIEMENS

Current User: superuser

Point-to-Point Protocol (PPP)

PPP usually requires a username and password.

Bridging designates that all traffic to remote hosts that is not routed will be forwarded.

IP Routing routes IP traffic to remote hosts.

The **IP address and Subnet Mask** define the IP address and network of the interface. This information is required in order to use NAT.

The **Default Gateway** is the IP address of the next-hop router.

Network Address Translation (NAT) makes all connections appear to originate from the IP address of this interface.

NetBIOS is a PC networking protocol that may keep connections open inadvertently, thus incurring excess charges in fee-for-service agreements.

Point-to-Point Protocol (PPP)

PPP username:

PPP password:

PPP Networking

□ Bridging enabled

□ Only bridge PPPOE traffic

☑ IP routing enabled

● Obtain configuration automatically from WAN

○ Configure IP Routing manually

Source WAN IP Address

Source Subnet Mask

Default Gateway

□ NAT enabled

□ Block NetBIOS traffic

Previous | Next | Cancel

To configure Point-to-Point Protocol:

1. Enter **PPP User Name** and **Password** to use for authentication when establishing a WAN connection using PPP protocol.

2. Select one or more of the following PPP Networking options:

   - **Bridging Enabled:**
     Forward all traffic for remote hosts that is not routed to the WAN (non-IP). If bridging is enabled, you can optionally select **Only bridge PPPoE traffic**. If selected, only PPPoE traffic is bridged; all other traffic is stopped.

3. **IP Routing Enabled:**
   Route all IP traffic to remote hosts.

4. If you enabled IP routing, select one of the following methods for configuring IP routing:

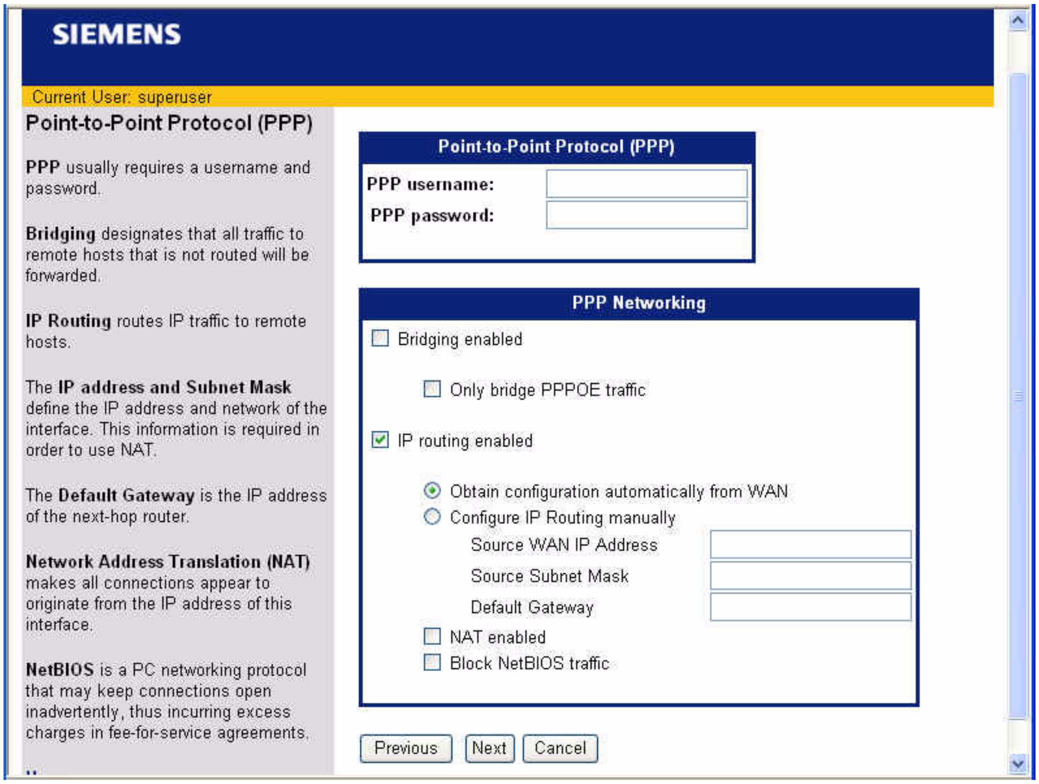
   - **Obtain configuration automatically from WAN**
     IP routing parameters are obtained from the WAN.

   - **Configure IP Routing manually**
     IP routing parameters are set manually. If you select this options, you must provide the **Source WAN IP Address**, **Subnet Mask**, and **Default Gateway**.

5. If you enabled IP routing, optionally select one or more of the following:
   - **NAT Enabled:**
     Network Address Translation (NAT) allows multiple workstations on your LAN to share a single, public IP address. All outgoing traffic appears to originate from the router's IP address.
   - **Block Net BIOS Traffic:**
     NetBIOS is a PC networking protocol that can keep network connections open inadvertently. To avoid excess connection charges, such traffic should be blocked on any metered network service.
6. Click **Next**. This displays the Dynamic Host Configuration Protocol page.

Point-to-Point Protocol over ATM (LLC Encapsulation)

If you selected **Point-to-Point Protocol over ATM (LLC Encapsulation)** from the Wan Interface page, the Point-to-Point Protocol page is displayed when you click **Next**.



Current User: superuser

Point-to-Point Protocol (PPP)

PPP usually requires a username and password.

Bridging designates that all traffic to remote hosts that is not routed will be forwarded.

IP Routing routes IP traffic to remote hosts.

The **IP address and Subnet Mask** define the IP address and network of the interface. This information is required in order to use NAT.

The **Default Gateway** is the IP address of the next-hop router.

Network Address Translation (NAT) makes all connections appear to originate from the IP address of this interface.

NetBIOS is a PC networking protocol that may keep connections open inadvertently, thus incurring excess charges in fee-for-service agreements.

Point-to-Point Protocol (PPP)

PPP username:

PPP password:

PPP Networking

□ Bridging enabled

□ Only bridge PPPOE traffic

☑ IP routing enabled

● Obtain configuration automatically from WAN

○ Configure IP Routing manually

Source WAN IP Address

Source Subnet Mask

Default Gateway

□ NAT enabled

□ Block NetBIOS traffic

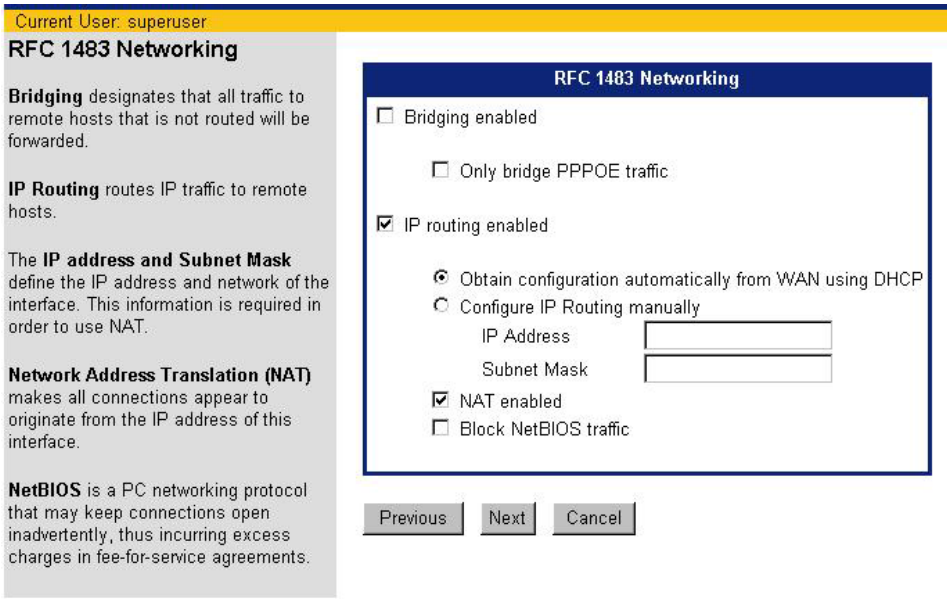
To configure Point-to-Point Protocol:

1. Enter **PPP User Name** and **Password** to use for authentication when establishing a WAN connection using PPP protocol.
2. Select one or more of the following PPP Networking options:
   - **Bridging Enabled:**
     Forward all traffic for remote hosts that is not routed to the WAN (non-IP). If bridging is enabled, you can optionally select **Only bridge PPPoE traffic**. If selected, only PPPoE traffic is bridged; all other traffic is stopped.
3. **IP Routing Enabled:**
   Route all IP traffic to remote hosts.
4. If you enabled IP routing, select one of the following methods for configuring IP routing:
   - **Obtain configuration automatically from WAN**
     IP routing parameters are obtained from the WAN.
   - **Configure IP Routing manually**
     IP routing parameters are set manually. If you select this options, you must the **Source WAN IP Address**, **Subnet Mask**, and **Default Gateway**.

5. If you enabled IP routing, optionally select one or more of the following:
   - **NAT Enabled:**
     Network Address Translation (NAT) allows multiple workstations on your LAN to share a single, public IP address. All outgoing traffic appears to originate from the router's IP address.
   - **Block Net BIOS Traffic:**
     NetBIOS is a PC networking protocol that can keep network connections open inadvertently. To avoid excess connection charges, such traffic should be blocked on any metered network service.
6. Click **Next**. This displays the Dynamic Host Configuration Protocol page.

RFC 1483 (Multiprotocol Encapsulation LLC/SNAP)

If you selected **RFC 1483 (**Multiprotocol Encapsulation LLC/SNAP**)** from the Wan Interface page, the RFC 1483 Networking page is displayed when you click **Next**.



Current User: superuser

RFC 1483 Networking

Bridging designates that all traffic to remote hosts that is not routed will be forwarded.

IP Routing routes IP traffic to remote hosts.

The **IP address and Subnet Mask** define the IP address and network of the interface. This information is required in order to use NAT.

Network Address Translation (NAT) makes all connections appear to originate from the IP address of this interface.

NetBIOS is a PC networking protocol that may keep connections open inadvertently, thus incurring excess charges in fee-for-service agreements.

RFC 1483 Networking

□ Bridging enabled

□ Only bridge PPPOE traffic

☑ IP routing enabled

● Obtain configuration automatically from WAN using DHCP

○ Configure IP Routing manually

IP Address

Subnet Mask

☑ NAT enabled

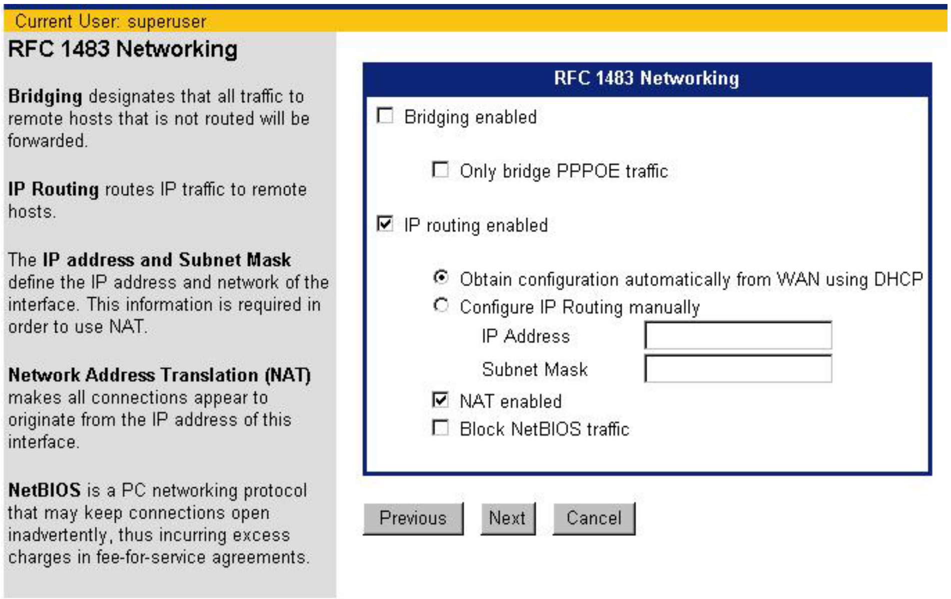
□ Block NetBIOS traffic

To configure RFC 1483:

1. Select one or more of the following RFC 1483 networking options:
   - **Bridging Enabled:**
     Forward all traffic for remote hosts that is not routed to the WAN (non-IP). If bridging is enabled, you can optionally select **Only bridge PPPoE traffic**. If selected, only PPPoE traffic is bridged; all other traffic is stopped.
   - **IP Routing Enabled:**
     Routes all IP packets for remote hosts to the WAN. If IP Routing is enabled, you must specify how to obtain an IP address and subnet mask. This can be one of the following:
     – **Obtain configuration automatically from Wan using DHCP** to have an IP address assigned automatically using DHCP.
     – **Configure IP Routing manually** to assign IP addresses manually. If you select this option, you must specify an **IP Address** and **Subnet Mask** in the appropriate fields.
2. If you enabled IP routing, optionally select one or more of the following:
   - **NAT Enabled:**
     Network Address Translation (NAT) allows multiple workstations on your LAN to share a single, public IP address. All outgoing traffic appears to originate from the router's IP address.
   - **Block Net BIOS Traffic:**
     NetBIOS is a PC networking protocol that can keep network connections open inadvertently. To avoid excess connection charges, such traffic should be blocked on any metered network service.
3. Click **Next**. This displays the Dynamic Host Configuration Protocol page.

RFC 1483 (VC Multiplexing Routed)

If you selected **RFC 1483 (VC Multiplexing Routed)** from the Wan Interface page, the RFC 1483 Networking page is displayed when you click **Next**.



Current User: superuser

RFC 1483 Networking

Bridging designates that all traffic to remote hosts that is not routed will be forwarded.

IP Routing routes IP traffic to remote hosts.

The **IP address and Subnet Mask** define the IP address and network of the interface. This information is required in order to use NAT.

Network Address Translation (NAT) makes all connections appear to originate from the IP address of this interface.

NetBIOS is a PC networking protocol that may keep connections open inadvertently, thus incurring excess charges in fee-for-service agreements.

RFC 1483 Networking

□ Bridging enabled

□ Only bridge PPPOE traffic

☑ IP routing enabled

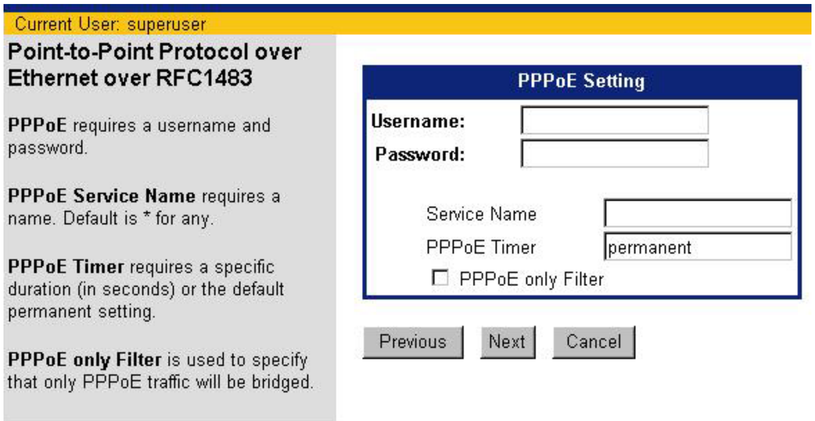
● Obtain configuration automatically from WAN using DHCP
○ Configure IP Routing manually
IP Address
Subnet Mask
☑ NAT enabled
□ Block NetBIOS traffic

To configure RFC 1483:

1. Select one or more of the following RFC 1483 networking options:
   - **Bridging Enabled:**
     Forward all traffic for remote hosts that is not routed to the WAN (non-IP). If bridging is enabled, you can optionally select **Only bridge PPPoE traffic**. If selected, only PPPoE traffic is bridged; all other traffic is stopped.
   - **IP Routing Enabled:**
     Routes all IP packets for remote hosts to the WAN. If IP Routing is enabled, you must specify how to obtain an IP address and subnet mask. This can be one of the following:
     – **Obtain configuration automatically from Wan using DHCP** to have an IP address assigned automatically using DHCP.
     – **Configure IP Routing manually** to assign IP addresses manually. If you select this option, you must specify an **IP Address** and **Subnet Mask** in the appropriate fields.
2. If you enabled IP routing, optionally select one or more of the following:
   - **NAT Enabled:**
     Network Address Translation (NAT) allows multiple workstations on your LAN to share a single, public IP address. All outgoing traffic appears to originate from the router's IP address.
   - **Block Net BIOS Traffic:**
     NetBIOS is a PC networking protocol that can keep network connections open inadvertently. To avoid excess connection charges, such traffic should be blocked on any metered network service.
3. Click **Next**. This displays the Dynamic Host Configuration Protocol page.

Point-to-Point Protocol over Ethernet over RFC1483

If you selected **Point-to-Point Protocol over Ethernet over RFC 1483** from the Wan Interface page, the Point-to-Point Protocol over Ethernet over RFC 1483 page is displayed when you click **Next**.



Current User: superuser

Point-to-Point Protocol over Ethernet over RFC1483

PPPoE requires a username and password.

PPPoE Service Name requires a name. Default is * for any.

PPPoE Timer requires a specific duration (in seconds) or the default permanent setting.

PPPoE only Filter is used to specify that only PPPoE traffic will be bridged.

PPPoE Setting

Username:	
Password:	
Service Name	
PPPoE Timer	permanent

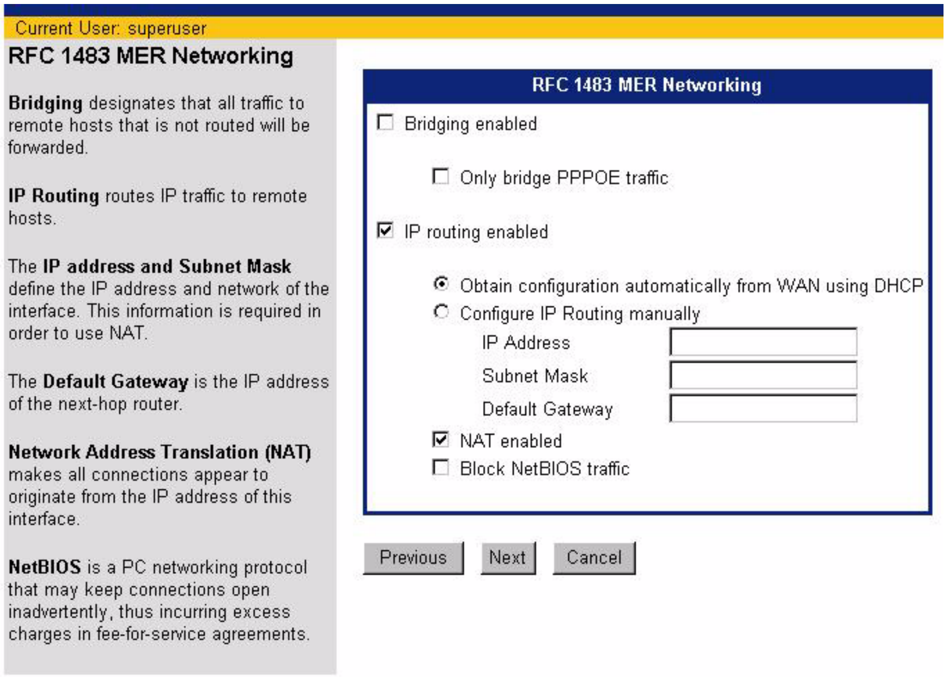
□ PPPoE only Filter

To configure Point-to-Point Protocol over Ethernet over RFC 1483:

1. Enter **PPPoE User Name** and **Password** to use for authentication when establishing a WAN connection using PPPoE protocol.
2. In **Service Name**, enter the domain name of your network service provider. Use * as a default (for all services).
3. In **PPPoE Timer**, enter the number of seconds of inactivity that must elapse before the PPP connection closes. This helps to limit connection charges from your service provider during times of inactivity. The default entry of "permanent" will keep the PPP connection open constantly, with no time out interval.
4. Optionally select **PPPoE only Filter**. When selected, all traffic on the bridge is filtered to allow PPPoE only. Select this option if you will only connect to your network service using PPPoE.
5. Click **Next**. This displays the Dynamic Host Configuration Protocol page.

RFC 1483 MAC Encapsulated Routing (MER)

If you selected **RFC 1483 MAC Encapsulated Routing** from the Wan Interface page, the RFC 1483 MER Networking page is displayed when you click **Next**.



Current User: superuser

RFC 1483 MER Networking

Bridging designates that all traffic to remote hosts that is not routed will be forwarded.

IP Routing routes IP traffic to remote hosts.

The **IP address and Subnet Mask** define the IP address and network of the interface. This information is required in order to use NAT.

The **Default Gateway** is the IP address of the next-hop router.

Network Address Translation (NAT) makes all connections appear to originate from the IP address of this interface.

NetBIOS is a PC networking protocol that may keep connections open inadvertently, thus incurring excess charges in fee-for-service agreements.

RFC 1483 MER Networking

□ Bridging enabled

□ Only bridge PPPOE traffic

☑ IP routing enabled

● Obtain configuration automatically from WAN using DHCP
○ Configure IP Routing manually

IP Address
Subnet Mask
Default Gateway

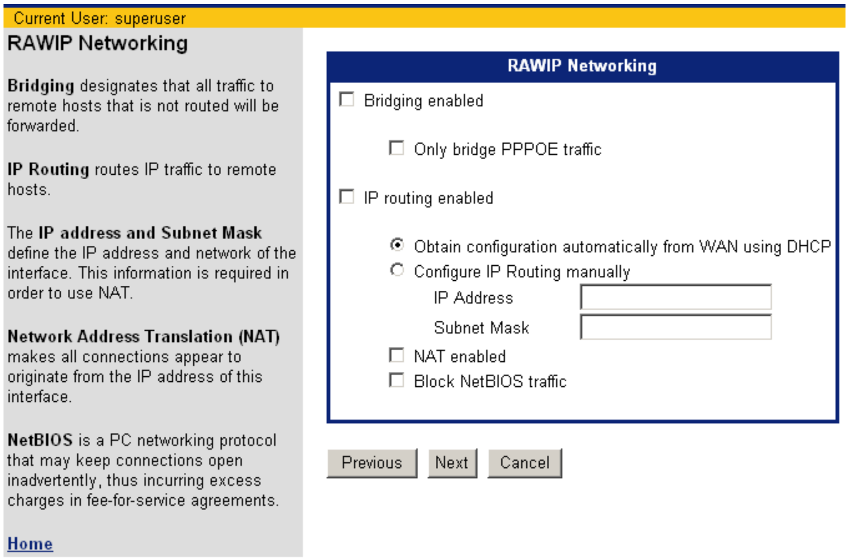
☑ NAT enabled
□ Block NetBIOS traffic

To configure RFC 1483 MER Networking:

1. Select one or more of the following RFC 1483 MER Networking options:
   - **Bridging Enabled:**
     Forward all traffic for remote hosts that is not routed to the WAN (non-IP). If bridging is enabled, you can optionally select **Only bridge PPPoE traffic**. If selected, only PPPoE traffic is bridged; all other traffic is stopped.
   - **IP Routing Enabled:**
     Routes all IP packets for remote hosts to the WAN. If IP Routing is enabled, you must specify how to obtain an IP address and subnet mask. This can be one of the following:
     – **Obtain configuration automatically from Wan using DHCP** to have an IP address assigned automatically using DHCP.
     – **Configure IP Routing manually** to assign IP addresses manually. If you select this option, you must specify an **IP Address**, **Subnet Mask,** and **Default Gateway** in the appropriate fields. Default Gateway assigns the IP address of the next-hop route.
2. If you enabled IP routing, optionally select one or more of the following:
   - **NAT Enabled:**
     Network Address Translation (NAT) allows multiple workstations on your LAN to share a single, public IP address. All outgoing traffic appears to originate from the router's IP address.
   - **Block Net BIOS Traffic:**
     NetBIOS is a PC networking protocol that can keep network connections open inadvertently. To avoid excess connection charges, such traffic should be blocked on any metered network service.
3. Click **Next**. This displays the Dynamic Host Configuration Protocol page.

RAW IP

If you selected **RAWIP** from the Wan Interface page, the RAWIP Networking page is displayed when you click **Next**.



Current User: superuser

RAWIP Networking

Bridging designates that all traffic to remote hosts that is not routed will be forwarded.

IP Routing routes IP traffic to remote hosts.

The **IP address and Subnet Mask** define the IP address and network of the interface. This information is required in order to use NAT.

Network Address Translation (NAT) makes all connections appear to originate from the IP address of this interface.

NetBIOS is a PC networking protocol that may keep connections open inadvertently, thus incurring excess charges in fee-for-service agreements.

Home

RAWIP Networking

□ Bridging enabled

□ Only bridge PPPOE traffic

□ IP routing enabled

● Obtain configuration automatically from WAN using DHCP
○ Configure IP Routing manually

IP Address

Subnet Mask

□ NAT enabled
□ Block NetBIOS traffic

To configure RAWIP Networking:

1. Select one or more of the following RAWIP Networking options:
   - **Bridging Enabled:**
     Forward all traffic for remote hosts that is not routed to the WAN (non-IP). If bridging is enabled, you can optionally select **Only bridge PPPoE traffic**. If selected, only PPPoE traffic is bridged; all other traffic is stopped
   - **IP Routing Enabled:**
     Routes all IP packets for remote hosts to the WAN. If IP Routing is enabled, you must specify how to obtain an IP address and subnet mask. This can be one of the following:
     - **Obtain configuration automatically from Wan using DHCP** to have an IP address assigned automatically using DHCP.
     - **Configure IP Routing manually** to assign IP addresses manually. If you select this option, you must specify an **IP Address** and **Subnet Mask** in the appropriate fields.
2. If you enabled IP routing, optionally select one or more of the following:
   - **NAT Enabled:**
     Network Address Translation (NAT) allows multiple workstations on your LAN to share a single, public IP address. All outgoing traffic appears to originate from the router's IP address.
   - **Block Net BIOS Traffic:**
     NetBIOS is a PC networking protocol that can keep network connections open inadvertently. To avoid excess connection charges, such traffic should be blocked on any metered network service.

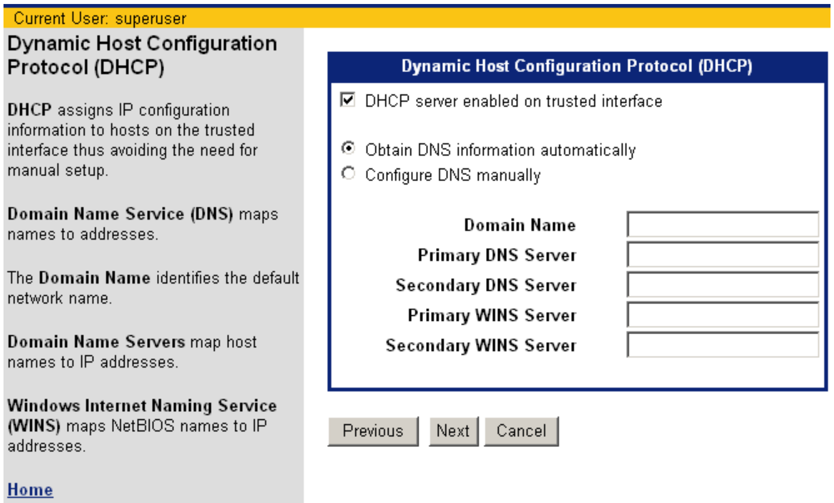
If your Network Service Provider has not provided specifics for use in making these settings, select **Obtain configuration automatically from Wan using DHCP** and **NAT Enabled.**

3. Click **Next**. This displays the Dynamic Host Configuration Protocol page.

Dynamic Host Configuration Protocol

Dynamic Host Configuration Protocol (DHCP) provides a dynamic, "upon request," IP address to computers and other networked devices. The router can act as a DHCP server for devices on your local network.

The router provides the flexibility to use different ranges of IP addresses to be assigned by the DHCP server housed in the router. DHCP configuration is done from the DHCP Configuration page.



Current User: superuser

Dynamic Host Configuration Protocol (DHCP)

DHCP assigns IP configuration information to hosts on the trusted interface thus avoiding the need for manual setup.

Domain Name Service (DNS) maps names to addresses.

The **Domain Name** identifies the default network name.

Domain Name Servers map host names to IP addresses.

Windows Internet Naming Service (WINS) maps NetBIOS names to IP addresses.

Dynamic Host Configuration Protocol (DHCP)

☑ DHCP server enabled on trusted interface

● Obtain DNS information automatically
○ Configure DNS manually

Domain Name	
Primary DNS Server	
Secondary DNS Server	
Primary WINS Server	
Secondary WINS Server	

To configure DHCP:

1. Optionally select **DHCP server enabled on the LAN**. If selected, the DHCP server dynamically assigns IP addresses to all LAN-side devices.

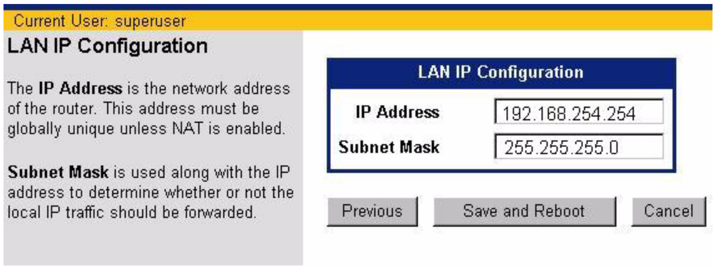
2. Select one of the following to configure the Domain Name Service:

   - **Obtain DNS information automatically:**
     The DNS server address will be learned when DHCP client requests are placed over the WAN link.
   - **Configure DNS manually:**
     Define DNS server address manually from information you get from your service provider. If you select this option, provide the following information.
     - **Domain Name**
       The router's DNS domain name as assigned by your service provider.
     - **Primary DNS Server**
       IP address where DNS requests will be sent.
     - **Secondary DNS Server**
       Optional. IP address where DNS requests will be sent if the primary DNS server is unavailable.
     - **Primary WINS Server**
       IP address of the Windows Internet Naming Service where WINS requests will be sent. This maps NetBIOS names to IP addresses similar to DNS.
     - **Secondary WINS Server**
       Optional. IP address where WINS requests will be sent if the primary WINS server is unavailable.

3. Click **Next**. This displays the LAN IP Configuration page.

Local Area Network Configuration

Local Area Network configuration information is configured on the LAN IP Configuration page.



Current User: superuser

LAN IP Configuration

The **IP Address** is the network address of the router. This address must be globally unique unless NAT is enabled.

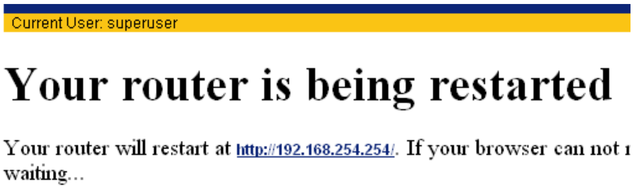
Subnet Mask is used along with the IP address to determine whether or not the local IP traffic should be forwarded.

LAN IP Configuration

IP Address	192.168.254.254
Subnet Mask	255.255.255.0

To configure the Local Area Network:

1. In **IP Address**, enter the network address of the router. This address must be globally unique unless NAT has been enabled.
2. In **Subnet Mask**, enter the subnet mask to use along with the IP address to determine if specific LAN IP traffic should be forwarded to the WAN.
3. Click **Save and Reboot**. The router will reboot with the new configuration settings.



Current User: superuser

Your router is being restarted

Your router will restart at http://192.168.254.254/. If your browser can not
waiting...

On completion of the reboot process, you will be required to login again.

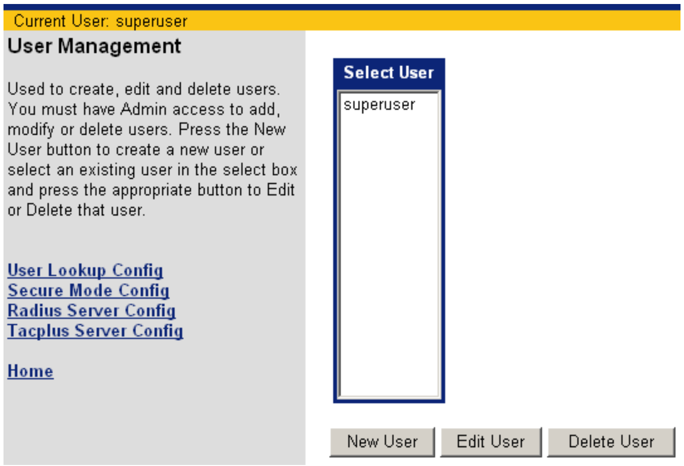
Chapter 4 User Setup

This chapter describes how to set up users on the router and control their access to router functions and to the Internet. The features that control users and their access are listed below. To access one of these options, click the link on the left navigation pane of the Router Information page.

User Management	Manage user accounts.
Change Password	Change user password.
Access Control	Configure remote access to the router configuration settings.

User Management

When you select **User Management** from the left navigation pane of the Router Information page, the User Management page is displayed.



Current User: superuser

User Management

Used to create, edit and delete users. You must have Admin access to add, modify or delete users. Press the New User button to create a new user or select an existing user in the select box and press the appropriate button to Edit or Delete that user.

User Lookup Config
Secure Mode Config
Radius Server Config
Tacplus Server Config

Home

Use this page to add, delete, edit, and view user accounts. You can also use this page to configure secure mode, configure the Radius Server, and configure the Tacplus Server. Click **Home** at anytime to return to the Router Information page. To access one of these options, click its link on the User Management page.

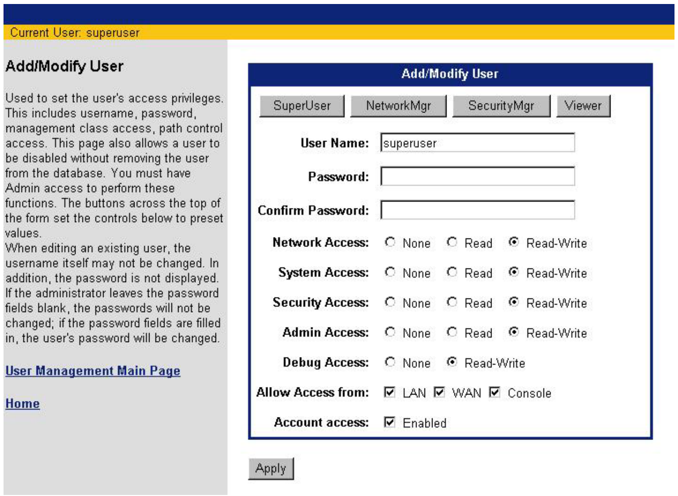
Use the table below to locate detailed instructions for the desired function.

To do this:	Refer to:
Add or modify a user account	Add or Modify A User Account
Delete a user account	Delete a User Account
Specify database for identifying users when logging into the router.	User Lookup
Configure Secure Mode	Secure Mode Configuration
Configure the Radius Server	Configure the Radius Server
Configure the Tacplus Server	Configure the Tacplus Server

Adding/Modifying A User Account

User accounts are used to control access to the router and the Internet. To add a user account:

1. Click **New User** on the User Management page. This displays the Add/Modify User page.



Current User: superuser

Add/Modify User

Used to set the user's access privileges. This includes username, password, management class access, path control access. This page also allows a user to be disabled without removing the user from the database. You must have Admin access to perform these functions. The buttons across the top of the form set the controls below to preset values.
When editing an existing user, the username itself may not be changed. In addition, the password is not displayed. If the administrator leaves the password fields blank, the passwords will not be changed; if the password fields are filled in, the user's password will be changed.

User Management Main Page

Home

Add/Modify User

User Name:	superuser
Password:	
Confirm Password:	
Network Access:	○ None ○ Read ● Read-Write
System Access:	○ None ○ Read ● Read-Write
Security Access:	○ None ○ Read ● Read-Write
Admin Access:	○ None ○ Read ● Read-Write
Debug Access:	○ None ● Read-Write
Allow Access from:	☑ LAN ☑ WAN ☑ Console
Account access:	☑ Enabled

(To modify a user, select the desired name in the **Select User** list and click **Edit User** to display the Add/Modify User page. Note that changing the password or privileges of an existing user account may terminate a user's current activity or connection.)

2. Enter **User Name**, **Password**, and **Confirm Password** in the appropriate boxes. (The User Name cannot be modified for an existing account. When editing an existing account, the Password and Confirm Password values are not displayed. If you leave them blank, the password is not changed.)

3. Do one of the following to assign privileges to this user account:
   - Select one of the buttons at the top of this page to automatically assign pre-set privileges to the user based on common user roles. (Refer to Management Classes for details on the privileges automatically assigned to each role.)
   - Manually select the management activity you want to assign to this user account. For each management activity class, click to select **Read**, **Read-Write** privileges for the user, or select **None** for no privilege.

4. In **Allow Access From**, specify one or more of the following:
   - **LAN**: Can access from the LAN side.
   - **WAN**: Can access from the WAN side.
   - **Console**: Can access from a console.

   User access verification is performed if the user account is verified during user authentication. User access verifies that the user account can access the router through the connectivity method being used, such as over the LAN or through a console.

5. Click **Enabled** for **Account Access** to enable this account. By default, accounts are disabled when added.

6. Click **Apply** to add/modify the user account.

Deleting A User Account

To delete a user account:

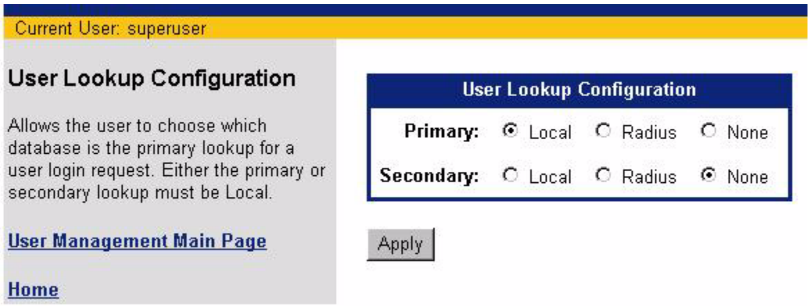
1. Select the name of the account you want to delete in the **Select User** list on the User Management page, then click **Delete User**.
2. When prompted, click **OK** to confirm the account deletion.

User Lookup

User authentication verification is performed when an access request is made to the system. The router checks the user database to verify the user account by username and password, supplied by the user when making the access request. You can specify where user authentication/identification is performed from the User Lookup Configuration page.

You can specify both a primary and secondary database to use to identify users if you desire. If you specify both a primary and secondary database and the user is not found in the primary database, the secondary database is searched. To configure where user's are authenticated/identified:

1. Click **User Lookup Config** on the left navigation pane of the User Management page. This displays the User Lookup Configuration page.



Current User: superuser

User Lookup Configuration

Allows the user to choose which database is the primary lookup for a user login request. Either the primary or secondary lookup must be Local.

User Management Main Page

Home

User Lookup Configuration

Primary: ● Local ○ Radius ○ None

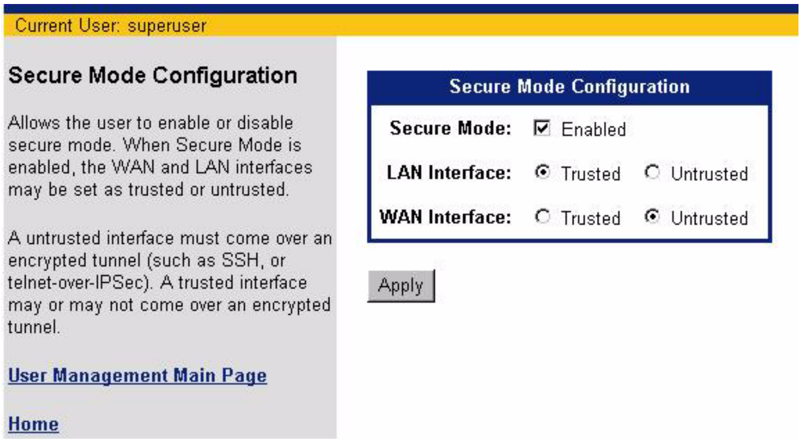
Secondary: ○ Local ○ Radius ● None

2. Specify one of the following databases for **Primary** and for **Secondary**. If the user is not found in the Primary database, the Secondary database is searched.
   - **Local**
     Searches the local database for user login identification. Either the primary or secondary lookup must be Local.
   - **Radius**
     Searches the Radius database for user login identification.
   - **None**
     Searches no database.

Secure Mode Configuration

You can enable secure mode to control whether an interface is trusted or untrusted. To configure Secure Mode:

1. Click **Secure Mode Configuration** on the left navigation pane of the User Management page. This displays the Secure Mode Configuration page.



Current User: superuser

Secure Mode Configuration

Allows the user to enable or disable secure mode. When Secure Mode is enabled, the WAN and LAN interfaces may be set as trusted or untrusted.

A untrusted interface must come over an encrypted tunnel (such as SSH, or telnet-over-IPSec). A trusted interface may or may not come over an encrypted tunnel.

User Management Main Page

Home

Secure Mode Configuration

Secure Mode: ☑ Enabled

LAN Interface: ● Trusted ○ Untrusted

WAN Interface: ○ Trusted ● Untrusted

2. Do one of the following for **Secure Mode**:
   - Click the box next to **Enabled** so a check mark appears. This enables secure mode.
   - Click the box next to **Enabled** so there is no check mark. This disables secure mode.

3. If you enabled secure mode, select one of the following for **LAN Interface** and **WAN Interface**:
   - **Trusted**:
     A trusted interface does not have to come over an encrypted tunnel.
   - **Untrusted**:
     An untrusted interface must come over an encrypted tunnel, such as SSH or telnet-over-IPSec.

Configure the Radius Server

Remote Authentication Dial In User Service (RADIUS) is client-server based access control and authentication feature. The RADIUS client resides locally on the router and works in conjunction with a variety of RADIUS Server applications.

- The client is responsible for passing user information to designated RADIUS servers, then acting on the returned response.
- RADIUS servers are responsible for receiving user connection requests, authenticating the user, then returning all configuration information necessary for the client to deliver service to the user.

Transactions between the client and server are authenticated through the use of a shared secret, which is never sent over the network. In addition, any user passwords are sent encrypted between the client and RADIUS server to further secure account passwords.

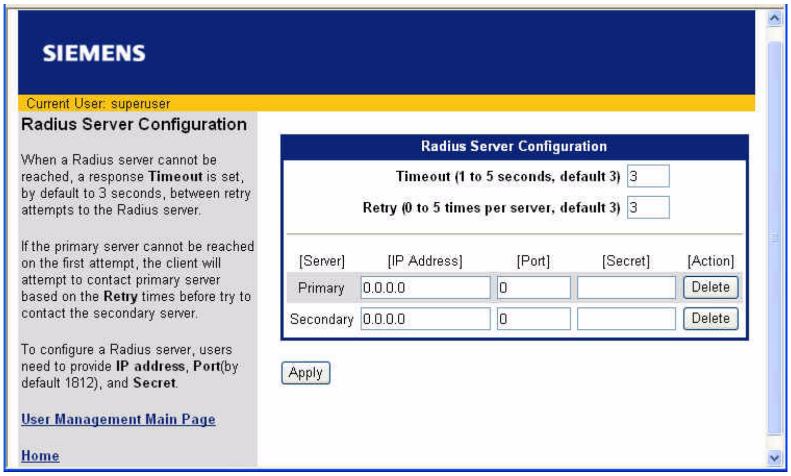
When the router is configured to use RADIUS, a user attempting to login presents authentication information (Username and Password) to the router. Upon receipt, the router's RADIUS Client creates an "access-request" containing username, the user's password, and method being used to access the system. The password is hidden using a method based on the RSA Message Digest Algorithm MD5 [3].

The access request is submitted to the RADIUS server via the network. If no response is returned within a length of time, the request is re-sent a specified number of times. The router's RADIUS client can also forward requests to a secondary server in the event that the primary server is down or unreachable.

Once the RADIUS server receives the request, it validates the RADIUS client that sent the request. A request from a client for which the RADIUS server does not have a shared secret is discarded. If the client is valid, the RADIUS server consults a database of users to find the user whose name matches the request. The user entry in the database contains the required elements for authentication including the username, password, access and management privileges.

To configure the RADIUS Server:

1. Click **Configure Radius Server** on the left navigation pane of the User Management page. This displays the Radius Server Configuration page.



Current User: superuser

Radius Server Configuration

When a Radius server cannot be reached, a response **Timeout** is set, by default to 3 seconds, between retry attempts to the Radius server.

If the primary server cannot be reached on the first attempt, the client will attempt to contact primary server based on the **Retry** times before try to contact the secondary server.

To configure a Radius server, users need to provide **IP address**, **Port**(by default 1812), and **Secret**.

User Management Main Page

Home

Radius Server Configuration

Timeout (1 to 5 seconds, default 3) 3

Retry (0 to 5 times per server, default 3) 3

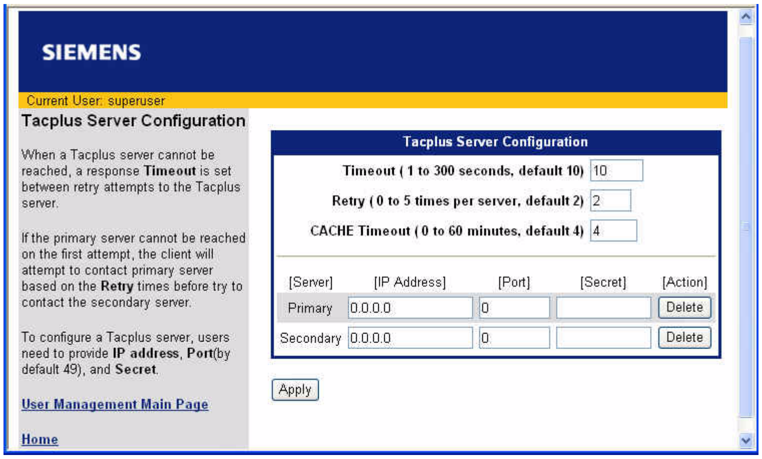
[Server]	[IP Address]	[Port]	[Secret]	[Action]
Primary	0.0.0.0	0		Delete
Secondary	0.0.0.0	0		Delete

2. In **Timeout**, enter the number of seconds to between retry attempts when the Radius Server cannot be reached.
3. In **Retry**, enter the number of times the Radius Server should be contacted before attempting to connect to the secondary server.
4. For **Primary** and optionally **Secondary** servers, provide the **IP Address**, **Port**, and **Secret** for accessing the Radius Server. The **Secret** is used to authenticate requests between servers.

Configure the TacPlus Server

Tacplus allows access control and user authentication to be managed from a remote server.To configure the Tacplus Server:

1. Click **Configure Tacplus Server** on the left navigation pane of the User Management page. This displays the Tacplus Server Configuration page.



Current User: superuser

Tacplus Server Configuration

When a Tacplus server cannot be reached, a response **Timeout** is set between retry attempts to the Tacplus server.

If the primary server cannot be reached on the first attempt, the client will attempt to contact primary server based on the **Retry** times before try to contact the secondary server.

To configure a Tacplus server, users need to provide **IP address**, **Port**(by default 49), and **Secret**.

User Management Main Page

Home

Tacplus Server Configuration

Timeout (1 to 300 seconds, default 10)	10
Retry (0 to 5 times per server, default 2)	2
CACHE Timeout (0 to 60 minutes, default 4)	4

[Server]	[IP Address]	[Port]	[Secret]	[Action]
Primary	0.0.0.0	0		Delete
Secondary	0.0.0.0	0		Delete

Apply

2. In **Timeout**, enter the number of seconds to between retry attempts when the Tacplus Server cannot be reached.
3. In **Retry**, enter the number of times the Tacplus Server should be contacted before attempting to connect to the secondary server.
4. In **CACHE Timeout**, enter the number of seconds that must pass before the user must be authenticated again.
5. For **Primary** and optionally **Secondary** servers, provide the **IP Address**, **Port**, and **Secret** for accessing the Radius Server. The **Secret** is used to authentication requests between servers.

Management Classes

All system operations, are partitioned into functional groups called management classes. Management classes group functions into the following categories.

Class	Functional Areas
Voice	Voice operations and shared network functions.
Network	File system, System Interfaces, SNMP, DHCP, NAT, remote commands.
System	Various system administrative tasks.
Security	SSH, L2TP, IPSec, Firewall.
Admin	User Management functions.
Debug	Debug functions.

When creating a user account, you can manually configure the management classes and access methods for the account by issuing multiple commands, or you can use one of the pre-defined templates that group multiple management classes for a logically defined user type. When using the template method, Access privileges for WAN, LAN, and Console are granted by default.

The following table lists the privileges given to each logically defined user type.

Super User

Mgmt Class (read):	Network, System, Admin, Voice, Security, Debug
Mgmt Class (write):	Network, System, Admin, Voice, Security, Debug
Access:	WAN, LAN, Console
Status:	Enabled

Voice Manager

Mgmt Class (read):	System, Voice
Mgmt Class (write):	System, Voice
Access:	WAN, LAN, Console
Status:	Enabled

Network Manager

Mgmt Class (read):	Network, System
Mgmt Class (write):	Network, System
Access:	WAN, LAN, Console
Status:	Enabled

Security Manager

Mgmt Class (read):	System, Security
Mgmt Class (write):	System, Security
Access:	WAN, LAN, Console
Status:	Enabled

Viewer

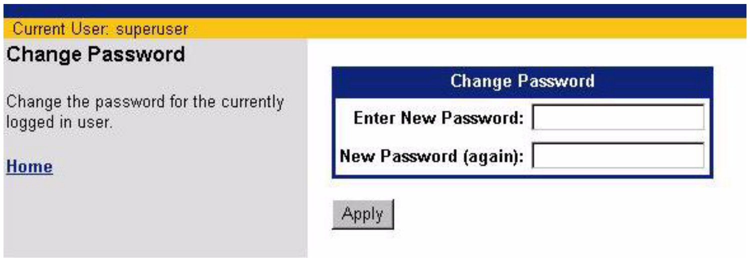
Mgmt Class (read):	Network, System, Voice, Security
Mgmt Class (write):	None
Access:	WAN, LAN, Console
Status:	Enabled

Change Password

User passwords are changed from the Change Password page.

To change a user password:

1. Click **Change Password** from the left navigation pane on the Router Information page. This displays the Change Password page.



Current User: superuser

Change Password

Change the password for the currently logged in user.

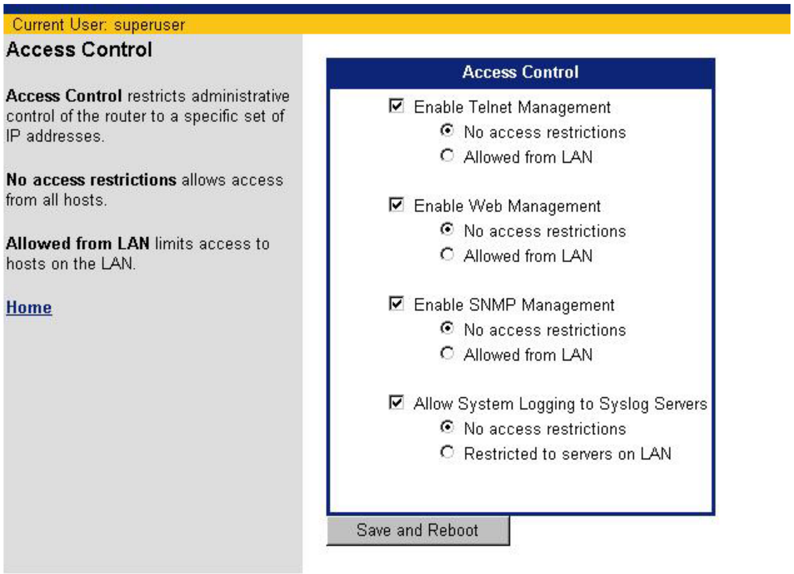
2. Enter the new password for the Current User in **Enter New Password** and **New Password (again)** boxes.
3. Click **Apply** to save the new password.

Access Control

Restrict administrative control of the router to a specific set of IP addresses. Each remote access method (Telnet, Web, and SNMP) can be configured separately.

To set Access Control parameters:

1. Click **Access Control** from the left navigation pane of the Router Information page. This displays the Access Control page.



Current User: superuser

Access Control

Access Control restricts administrative control of the router to a specific set of IP addresses.

No access restrictions allows access from all hosts.

Allowed from LAN limits access to hosts on the LAN.

Home

Access Control

☑ Enable Telnet Management
- ● No access restrictions
- ○ Allowed from LAN

☑ Enable Web Management
- ● No access restrictions
- ○ Allowed from LAN

☑ Enable SNMP Management
- ● No access restrictions
- ○ Allowed from LAN

☑ Allow System Logging to Syslog Servers
- ● No access restrictions
- ○ Restricted to servers on LAN

2. Optionally, select one or more of the following remote access methods to enable that method of remote access. A check in the box next to the method specifies enabled. If disabled, any access restriction specification is disregarded.
   - **Telnet**
   - **Web**
   - **SNMP**

3. For each remote access method selected, specify any access restrictions. This can be one of the following:
   - **No access restrictions:**
     Remote access method is enabled and not restricted. This setting allows access from all hosts.
   - **Allowed from LAN:**
     Limits access to the host from the LAN.

4. Optionally select Allow System Logging to Syslog Servers. If selected, specify any access restrictions. This can be one of the following:
   - **No access restrictions:**
     System Logging is not restricted. This setting allows access from all servers.
   - **Allowed from LAN:**
     Limits access for System Logging to servers on the LAN.

5. Click **Save and Reboot**.

Chapter 5 Advanced Setup

This chapter describes how to configure advanced features on the router. Advanced features are listed below. To configure one of these features, click the link on the left navigation pane of the Router Information page.

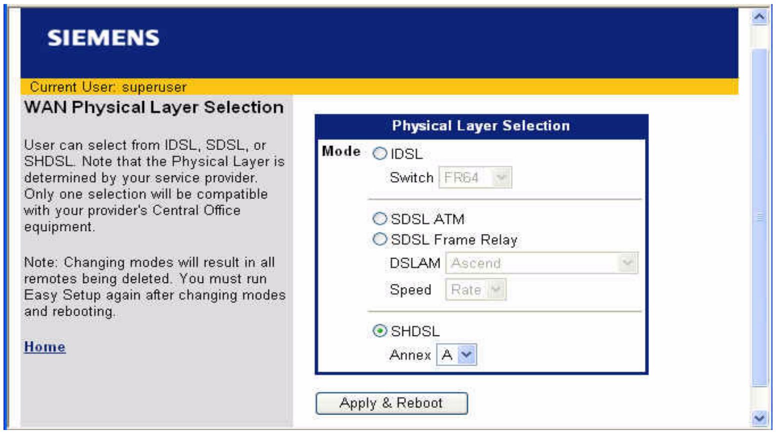
WAN Selection	Select WAN physical layer mode.
Remote File Configuration	Add, delete, and modify remote routers to which the target router can connect
DMZ	Configure unrestricted two-way communication with servers or individual users on the internet.
Router Clock	Set the date and time on your router.
DHCP	View and configure the current DHCP settings.
Quality of Service (QoS)	Configure QoS, which actively manages network resources to sustain service levels for priority applications.
Routing Table Configuration	Configure multiple routing tables for a single host.
Dial Backup	Enable a backup connection to the Internet through an internal V.90 (model 5835 only) or an external asynchronous modem connected to the Console port.
ATM	Define the level of service for each configured interface (Virtual Path (VP) and Virtual Circuit (VC) connections).
Switch Management	Manage the Ethernet 10/100 switching ports located on the rear panel of the router.
Command Line Interface	Enter any CLI command over the web interface. For complete command line syntax, refer to the Command Line Interface Guide.
File Editor	Create and edit files stored on the router. These files contain configuration and other data used by the router.

WAN Selection

The router can be connected to the internet using IDSL, SDSL, or SHDSL. The connection mode is usually dictated by your service provider. Only one selection is compatible with your ISP's central office equipment.

To specify the WAN connection mode compatible with your ISP:

1. Click **WAN Selection** on the left navigation pane of the Router Information page. This displays the WAN Physical Layer Selection page.



SIEMENS

Current User: superuser

WAN Physical Layer Selection

User can select from IDSL, SDSL, or SHDSL. Note that the Physical Layer is determined by your service provider. Only one selection will be compatible with your provider's Central Office equipment.

Note: Changing modes will result in all remotes being deleted. You must run Easy Setup again after changing modes and rebooting.

Home

Physical Layer Selection

Mode ○ IDSL
Switch FR64
○ SDSL ATM
○ SDSL Frame Relay
DSLAM Ascend
Speed Rate
● SHDSL
Annex A

Apply & Reboot

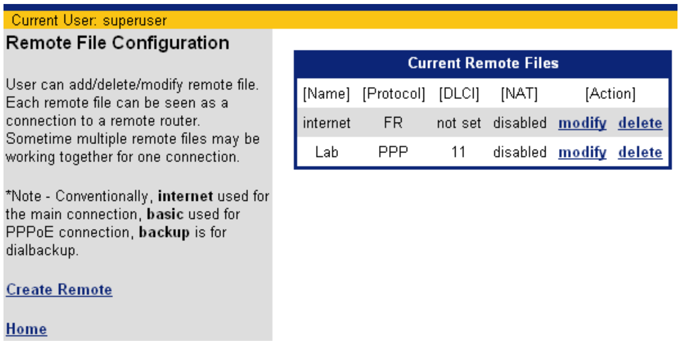
2. Select one of the following WAN connection modes:
   - **IDSL**
     Be sure to select the switch type from the Switch drop-down menu.
   - **SDSL ATM or SDSL Frame Relay**
     Be sure to select the DSLAM from the **DSLAM** drop-down menu and the **Speed** from the Speed drop-down menu. This can be one of the following:
     - Rate: You must select a speed in the **Rate** drop-down menu.
     - List: The rate is selected from the list based on successful connection. If one rate is unsuccessful, the next rate will be tried, and so on until a rate is successful.
     - Auto = Automode if supported. Uses the highest attainable rate allowed by both the line conditions and what is configured in the DSLAM. This is only supported on a few DSLAMs.
   - **SHDSL**
     Be sure to select Annex A or Annex B from the **Annex** drop-down menu. Annex A is typically used in the US and Annex B is typically used in Europe.
3. Click **Apply & Reboot**. Changing modes results in the deletion of all remotes. You must run Easy Setup again after the reboot completes.

Remote File Configuration

Using the **Remote File Configuration** option to add, modify, or delete a remote file. Each remote file represents a connection to a remote router. It is possible that multiple remote files are used in conjunction for a single connection.

To create a remote file:

1. Click **Remote File Configuration** on the left navigation pane of the Router Information page. This displays the Remote File Configuration page that lists all current remote connections.



Current User: superuser

Remote File Configuration

User can add/delete/modify remote file. Each remote file can be seen as a connection to a remote router. Sometime multiple remote files may be working together for one connection.

*Note - Conventionally, **internet** used for the main connection, **basic** used for PPPoE connection, **backup** is for dialbackup.

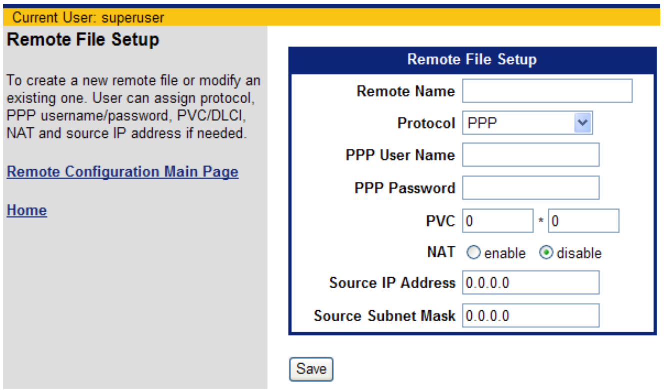
Create Remote

Home

Current Remote Files

[Name]	[Protocol]	[DLCI]	[NAT]	[Action]	
internet	FR	not set	disabled	modify	delete
Lab	PPP	11	disabled	modify	delete

2. Click **Create Remote** to configure a new remote connection. This displays the Remote File Setup page.



Current User: superuser

Remote File Setup

To create a new remote file or modify an existing one. User can assign protocol, PPP username/password, PVC/DLCI, NAT and source IP address if needed.

Remote Configuration Main Page

Home

Remote File Setup

Remote Name	
Protocol	PPP
PPP User Name	
PPP Password	
PVC	0 * 0
NAT	○ enable ● disable
Source IP Address	0.0.0.0
Source Subnet Mask	0.0.0.0

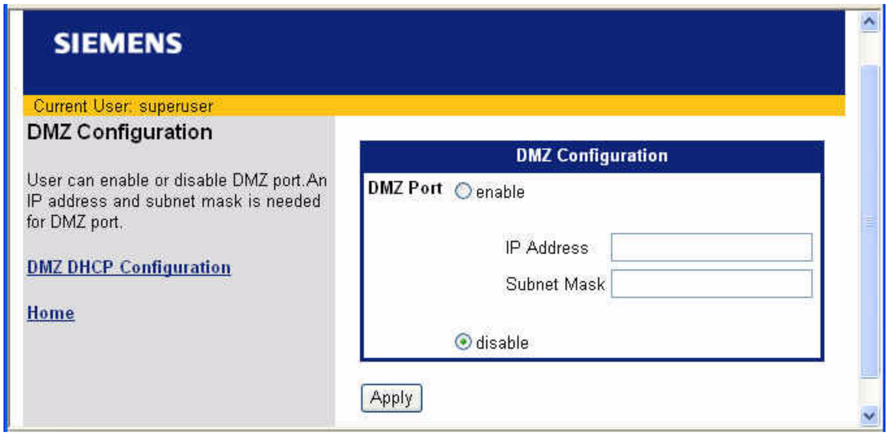
3. In **Remote Name**, enter the name you wish to assign to the remote connection. Typically this is **internet** for the main connection; **basic** for the PPPoE connection, and **backup** for dial backup connection. Spaces are not allowed in the remote name.
4. Select the protocol that supports this remote connection from the **Protocol** drop-down menu.
5. Enter a **PPP User Name** and **PPP Password**. These are required for authentication when the remote connection is being established.
6. In **PVC**, enter the circuit information for the connection. This will be one of the following:
   - For ATM, enter Permanent Virtual Circuit (PVC) information (VPI / VCI).
   - For Frame Relay, enter a DLCI.
7. In **NAT**, specify **enable** or **disable** to enable or disable Network Address Translation for this connection. If enabled, outgoing traffic appears as if it originated from the router's IP address.
8. In **IP Address** and **Subnet Mask**, enter the IP Address and subnet mask of the remote device.
9. Click **Save**.

DMZ

One computer on your local network can be configured to allow unrestricted two-way communication with servers or individual users on the Internet. This provides the ability to run programs that are incompatible with firewalls.This feature is primarily used for gaming. This function is recommended for use only when you require this special level of unrestricted access as it leaves your router and network exposed to the Internet with no firewall protection.

To configure DMZ:

1. Click **DMZ** on the left navigation pane of the Router Information page. This displays the DMZ Configuration page.



DMZ Configuration

User can enable or disable DMZ port.An IP address and subnet mask is needed for DMZ port.

DMZ Configuration

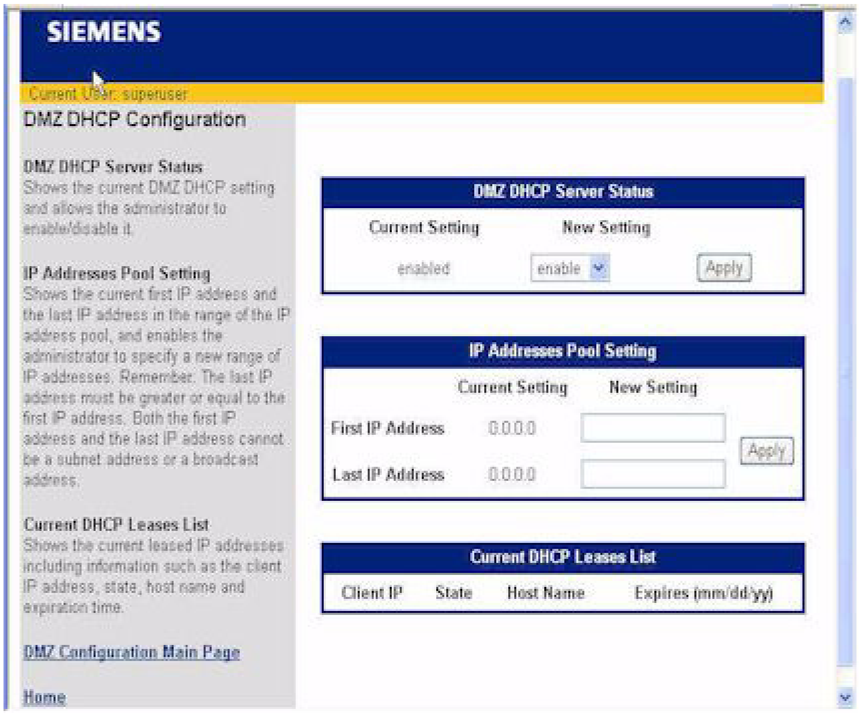
DMZ Port ○ enable

IP Address

Subnet Mask

● disable

2. Select **enable** or **disable** to enable or disable DMZ Port.
3. If you selected enable, enter the **IP Address** and **Subnet Mask** of the DMZ port.
4. Click **Apply**.
5. Configure the DMZ DHCP server. To do this, click **DMZ DHCP Configuration** on the left navigation pane to configure the DMZ DHCP server. This displays the DMZ DHCP Configuration page.



SIEMENS

Current User: superuser

DMZ DHCP Configuration

DMZ DHCP Server Status
Shows the current DMZ DHCP setting and allows the administrator to enable/disable it.

IP Addresses Pool Setting
Shows the current first IP address and the last IP address in the range of the IP address pool, and enables the administrator to specify a new range of IP addresses. Remember: The last IP address must be greater or equal to the first IP address. Both the first IP address and the last IP address cannot be a subnet address or a broadcast address.

Current DHCP Leases List
Shows the current leased IP addresses including information such as the client IP address, state, host name and expiration time.

DMZ Configuration Main Page

Home

DMZ DHCP Server Status

Current Setting	New Setting	
enabled	enable	Apply

IP Addresses Pool Setting

	Current Setting	New Setting	
First IP Address	0.0.0.0		Apply
Last IP Address	0.0.0.0		

Current DHCP Leases List

Client IP	State	Host Name	Expires (mm/dd/yy)

6. To change the server status, select **enable** or **disable** from **DMZ DHCP Server Status**. Disabled, the router will not act as a DHCP server.

7. To define the start and ending address range of the IP address pool, enter the starting address in **First IP Address** and the ending address in **Last IP Address**s.

8. Click **Apply**.

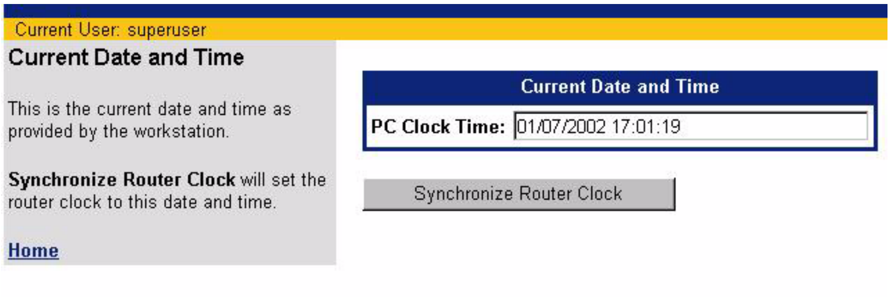
Note that a list of network clients that are currently leasing their IP addresses from the pool are shown in **Current DHCP Leases List**: From left to right, the following information is presented for each client:

- **Client IP**: The leased IP address assigned to the specific client.
- **State**: Whether the IP address is enabled or disabled.
- **Host Name**: Name of the host leasing the specific IP address.
- **Expires (mm/dd/yy)**: Date when the IP address lease will expire. At that time (if not before), the leased IP address will be freed for re-assignment, and the network client will need to request a new IP address from the router.

Router Clock

Use the Router Clock option to set the date and time on the router. To set the current date and time on the router:

1. Click **Router Clock** on the left navigation pane of the Router Information page. This displays the Current Date and Time page.



Current User: superuser

Current Date and Time

This is the current date and time as provided by the workstation.

Synchronize Router Clock will set the router clock to this date and time.

Home

Current Date and Time

PC Clock Time: 01/07/2002 17:01:19

2. The current date and time from your PC are displayed in the field labeled **Current Date and Time**. To synchronize the date and time on your router with the current date and time displayed, click **Synchronize Router Clock**.

DHCP

Dynamic Host Configuration Protocol (DHCP) is a communication protocol that allocates IP address automatically to any DHCP client requesting an IP address. A DHCP client can be any device attached to your network, for example, a PC. (Note that DHCP is effective only if the TCP/IP is installed on the DHCP client.)

The router can act as a DHCP server, automatically providing a suitable IP address and related information to each computer when the computer boots up. Without DHCP, IP addresses must be entered manually at each device.

When configured as a DHCP server, the router acts:

As a DHCP server by assigning IP addresses to workstations attached to the LAN that issue DHCP address requests. Before responding to a DHCP client request, the router's DHCP server attempts to locate other active DHCP servers on the network, such as Windows NT servers. If one is detected or if a DHCP server on the WAN has been explicitly specified, the router's DHCP server disables itself.

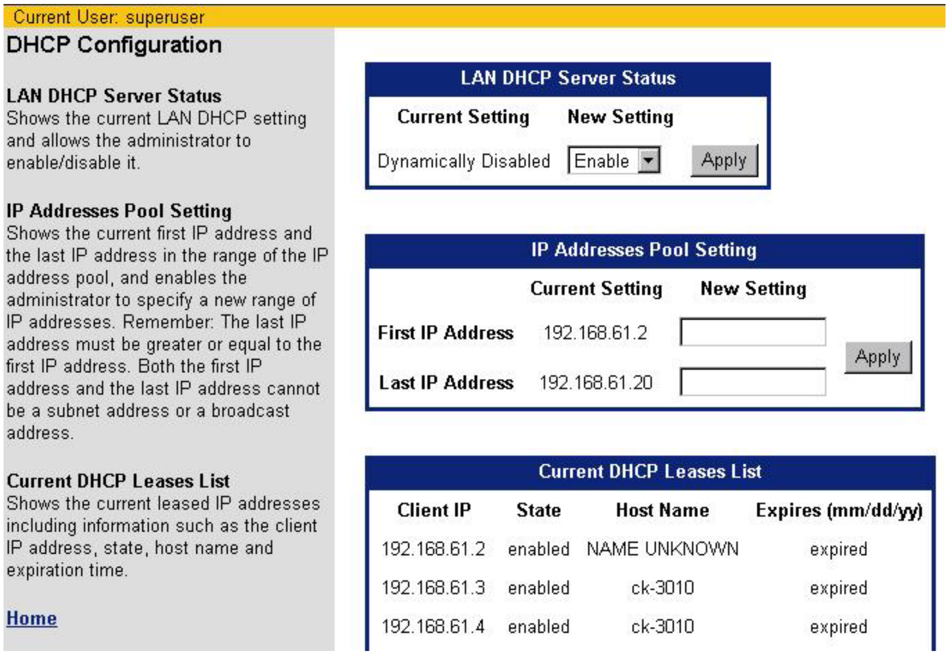
As a DHCP client by requesting that an IP address be assigned to the WAN side port of the router.

As a relay by passing through client requests from the LAN side onto the WAN asking for IP address assignment and relaying responses back to the appropriate client.

DHCP (Dynamic Host Configuration Protocol), is a TCP/IP service protocol that provides dynamic leasing of IP addresses and other configuration information to client hosts on the network. The router can act as a DHCP server, automatically providing a suitable IP address and related information to each computer when the computer boots up.

To configure DHCP:

1. Click **DHCP** in the left navigation pane of the Router Information window. This displays the DHCP Configuration page. This page shows the current settings as well as provides a means to change the current settings.



Current User: superuser

DHCP Configuration

LAN DHCP Server Status
Shows the current LAN DHCP setting and allows the administrator to enable/disable it.

IP Addresses Pool Setting
Shows the current first IP address and the last IP address in the range of the IP address pool, and enables the administrator to specify a new range of IP addresses. Remember: The last IP address must be greater or equal to the first IP address. Both the first IP address and the last IP address cannot be a subnet address or a broadcast address.

Current DHCP Leases List
Shows the current leased IP addresses including information such as the client IP address, state, host name and expiration time.

Home

LAN DHCP Server Status

Current Setting	New Setting	
Dynamically Disabled	Enable ▾	Apply

IP Addresses Pool Setting

	Current Setting	New Setting	
First IP Address	192.168.61.2		Apply
Last IP Address	192.168.61.20		

Current DHCP Leases List

Client IP	State	Host Name	Expires (mm/dd/yy)
192.168.61.2	enabled	NAME UNKNOWN	expired
192.168.61.3	enabled	ck-3010	expired
192.168.61.4	enabled	ck-3010	expired

2. To change the server status, select **Enable** or **Disable** from **LAN DHCP Server Status**. Disabled, the router will not act as a DHCP server.

3. Click **Apply**.
4. When a PC boots and asks for an IP address, the DHCP server assigns it an address from a pool of addresses assigned to the subnetwork where the client request originated. To specify the start and ending address range of the IP address pool, enter the starting address in **First IP Address** and the ending address in **Last IP Addres**s.
5. Click **Apply**.

Note that a list of network clients that are currently leasing their IP addresses from the pool are shown in **Current DHCP Leases List**: From left to right, the following information is presented for each client:

- **Client IP**: The leased IP address assigned to the specific client.
- **State**: Whether the IP address is enabled or disabled.
- **Host Name**: Name of the host leasing the specific IP address.
- **Expires (mm/dd/yy)**: Date when the IP address lease will expire. At that time (if not before), the leased IP address will be freed for re-assignment, and the network client will need to request a new IP address from the router.

QoS

Quality of Service actively manages network resources to sustain service levels for priority applications. Mission-critical and real-time Internet applications demand a network that provides high bandwidth and low latency. Such applications cannot tolerate unpredictable degradations of network services. Therefore, network services must contain features that provide adequate assurance of sustained service levels. Some of the benefits associated with Quality of Service include:

Guaranteed available bandwidth and minimum delays to real-time Voice over IP traffic

Dynamic allocations of bandwidth to non-critical applications

User control over network traffic levels, and potential cost-efficiencies

Advanced differentiation of network services

Measurement and reporting of network service levels

Applications, such as video conference or IP telephony, must be able to communicate their service level requirements to an infrastructure that can consistently meet those requirements. To do this, QoS control mechanisms must be present in each network element. This router provides such QoS control mechanisms and can interpret the service requirements indicated by network applications, fully participating in any differentiated services architecture.

This router provides Quality of Service using two methods: Differentiated Services Framework (DiffServ) and Weighted Fair Queuing (WFQ).

Differentiated Services Framework

(DiffServ) is a facility to prioritize the requirements of each Class of Service (for example e-mail, streaming video, voice) according to defined policies. DiffServ is suited to Metropolitan Area Networks or private networks where control over the infrastructure is guaranteed, and differentiated services can be deployed end-to-end.

To employ DiffServ, each packet of data is tagged with a six-bit pattern known as the DiffServ CodePoint (DSCP), replacing the three IP precedence bits in the ToS byte of the IPv4 header. This tag determines the processing of each packet as a Pre-Hop Behavior (PHB) at each DiffServ node. Each DSCP is read and network resources are allocated to a packet according to the Class of Service defined in its associated policy.

When DiffServ is activated on your router, data packets are read and marked according to their DiffServ priority. The packets are then queued and processed according to the defined QoS policy.

Weighted Fair Queuing

(WFQ) is a flow-based queuing algorithm that performs two functions simultaneously:

- It schedules priority traffic to the front of the queue to reduce response time.
- It fairly distributes remaining bandwidth between remaining queues.

Consequently, WFQ ensures that queues are not starved for bandwidth and that traffic service levels are made more predictable.

Weighted Fair Queuing adapts automatically to changing network conditions and requires minimal configuration. WFQ is implemented on the router and applies to network traffic passing through it. Unlike DiffServ, external nodes have no affect on QoS through Weighted Fair Queuing.

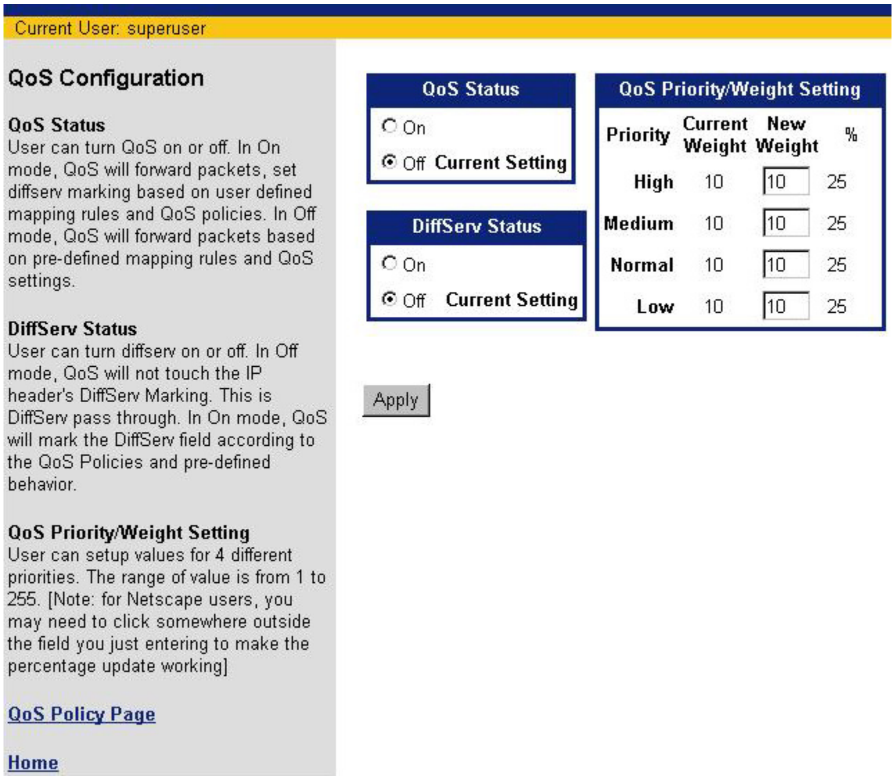
Weighted Fair Queuing provides a means of ensuring that high priority or mission-critical applications receive adequate levels of bandwidth. This is accomplished by controlling two key factors in QoS policies. Manipulation of these two factors determines the quality of service to each application.

- **Priority**. Priority determines the order in which packets will be processed by the router.
- **Weight**. Weight determines the amount of bandwidth to be allocated to a given application.

The router supports four priority levels; High, Medium, Normal and Low. A weight value can be assigned to each of these priority levels from a minimum of 1 to a maximum of 255.

To configure QoS:

1. Click **QoS** in the left navigation pane of the Router Information page. This displays the QoS Configuration page. This page shows the current settings as well as provides a means to change the current settings.



QoS Configuration

QoS Status
User can turn QoS on or off. In On mode, QoS will forward packets, set diffserv marking based on user defined mapping rules and QoS policies. In Off mode, QoS will forward packets based on pre-defined mapping rules and QoS settings.

DiffServ Status
User can turn diffserv on or off. In Off mode, QoS will not touch the IP header's DiffServ Marking. This is DiffServ pass through. In On mode, QoS will mark the DiffServ field according to the QoS Policies and pre-defined behavior.

QoS Priority/Weight Setting
User can setup values for 4 different priorities. The range of value is from 1 to 255. [Note: for Netscape users, you may need to click somewhere outside the field you just entering to make the percentage update working]

QoS Policy Page

Home

QoS Status
○ On
● Off Current Setting

DiffServ Status
○ On
● Off Current Setting

QoS Priority/Weight Setting

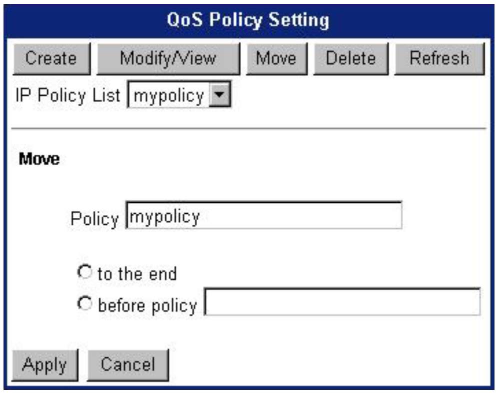
Priority	Current Weight	New Weight	%
High	10	10	25
Medium	10	10	25
Normal	10	10	25
Low	10	10	25

2. Select one of the following from **QoS Status** to enable or disable QoS:
   - **On**: QoS will forward packets and set diffserv marking based on user defined mapping rules and enabled QoS policies.
   - **Off**: QoS will forward packets based on pre-defined mapping rules and enabled QoS policies.
3. To enable or disable marking of the Differentiated Services field of the IP header, select one of the following from **DiffServ Status**:
   - **On**: QoS will mark the DiffServ field according to the QoS Policies and pre-defined behavior.
   - **Off**: DiffServ is not marked; this is DiffServ pass through.
4. Assign weight values to four different priorities. This can be a number between 1 and 255.
5. Click **Apply**.
6. Configure QoS policies.

Configure QoS Policy

QoS policies control how QoS manages network resources. To configure a QoS policy:

1. Click **QoS Policy Page** from the left navigation pane of the QoS Configuration page. This displays the QoS Policy Setting page.



QoS Policy Setting

IP Policy List: mypolicy

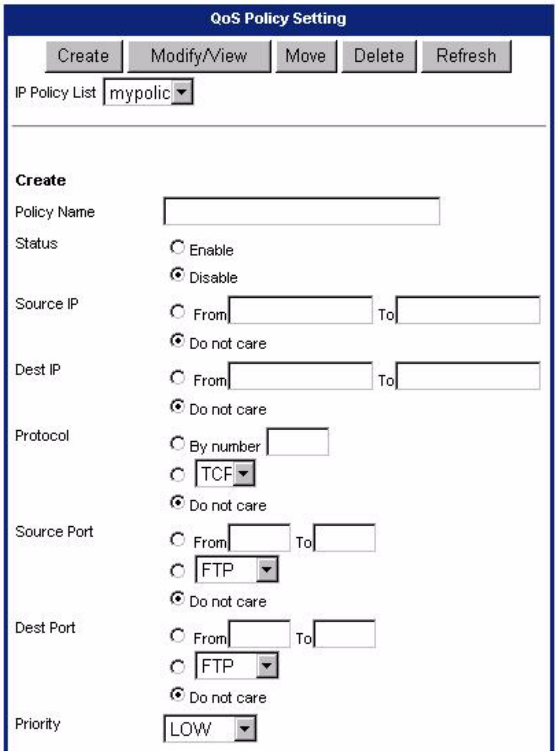
Move

Policy: mypolicy

○ to the end

○ before policy

2. Click **Create**. This expands the QoS Policy Setting page. (To modify or delete an existing policy, select the policy in the **IP Policy List** drop-down menu and click **Modify** or **Delete**.)



QoS Policy Setting

IP Policy List: mypolic

Create

Policy Name:

Status: ○ Enable ● Disable

Source IP: ○ From To ● Do not care

Dest IP: ○ From To ● Do not care

Protocol: ○ By number ○ TCF ● Do not care

Source Port: ○ From To ○ FTP ● Do not care

Dest Port: ○ From To ○ FTP ● Do not care

Priority: LOW

3. In **Policy Name**, enter a unique name to identify the policy.

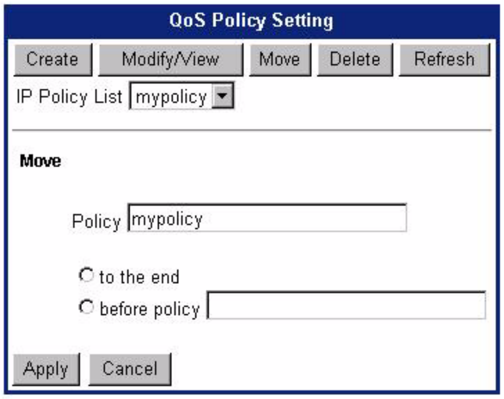
4. In **Status**, select **Enable** or **Disable** to enable or disable the QoS policy. Disabled, the policy will not be used.

5. In **Source IP**, select one of the following:
   - **From/To**: Enables source address checking. Specify the source IP address or range of IP addresses that must match for this policy to be used.
   - **Do not care**: Disables source address checking.
6. In **Dest IP**, select one of the following:
   - **From/To**: Enables destination address checking. Specify the destination IP address or range of IP addresses that must match for this policy to be used.
   - **Do not care**: Disables destination address checking.
7. In **Protocol**, select one of the following:
   - **By number**: Enter the protocol number to match in the protocol check.
   - From the drop-down menu:, select the protocol to match in the protocol check (**TCP** or **UDP**).
   - **Do not care**: Disables protocol checking.
8. In **Source Port**, select one of the following:
   - **From/To**: Enter the source port or range of source ports to match in the source port check.
   - From the drop-down menu, select the application to match in the source port check.
   - **Do not care**: Disables source port checking.
9. In **Destination Port**, select one of the following:
   - **From/To**: Enter the destination port or range of destination ports to match in the destination port check.
   - From the drop-down menu, select the application to match in the destination port check.
   - **Do not care**: Disables destination port checking.
10. From the **Priority** drop-down menu, select the priority to place on this policy if match criteria is met. This can be **High, Medium, Normal**, or **Low**. Normal is the default.
11. In **Code Point - incoming** and **Code Point - outgoing**, select one of the following:
   - Click the button next to the box to specify the Code Point. Be sure to enter the Code Point in the appropriate field.
   - Click **Default** to accept the default Code Point.
12. In **Bidirection**, select one of the following:
   - **On**: Enables bidirectional operation of the policy.
   - **Off**: Disables bidirectional operation of the policy.
13. In **Start Time**, specify the time of day when the policy becomes active.
14. In **Duration**, specify the time period for the policy to remain active.
15. In **Repetition**, select one of the following:
   - **Always on**: Policy is applied every day.
   - **At**: Policy is applied only one time on the specified month (MM), day (DD), and year (YY).
   - **Every**: Policy is applied on the specified day of the week.
16. Click **Save**.

Reorder QoS Policies

To move a QoS policy:

1. On the QoS Policy Setting page, select the policy you want to move in the **IP Policy List** drop-down menu and click **Move**. This expands the QoS Policy Setting page.



QoS Policy Setting

IP Policy List mypolicy

Move

Policy mypolicy

○ to the end
○ before policy

2. To specify the new location, select one of the following:
   - **to the end**:
     Moves the policy to the end of the policy list.
   - **before policy**:
     Select the name of the policy where you want to move the Policy in the **policy** name drop-down menu. The policy will be moved to the location immediately preceding the policy specified in **before policy**.
3. Click **Apply**.

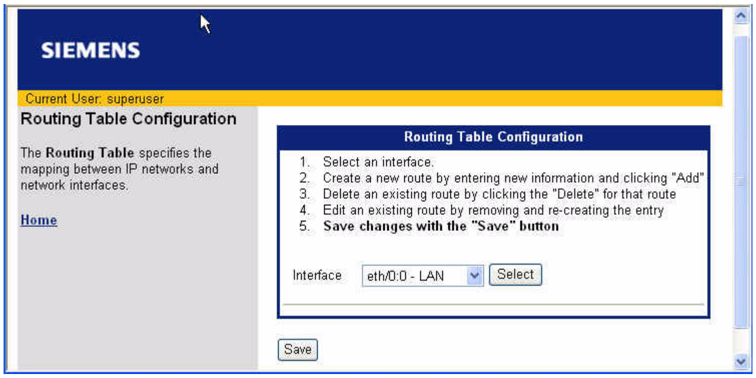
Routing Table Configuration

Every host has a default routing table that it uses to determine which physical interface address to use for outgoing IP traffic. The router supports virtual routing, which allows you to define multiple routing tables for a single host. Each routing table added has a defined range of IP source addresses that use that table. The router determines which routing table to use based on the source address in the packet.

For example, if the router receives a packet whose source address is 192.168.254.10, it checks if that address is within the address range defined for a virtual routing table. If it is, the virtual routing table is used to route the packet. If it is not, the default routing table is used instead.

To configure additional routing tables:

1. Click **Routing Table Configuration** on the left navigation pane of the Router Information page. This displays the Routing Table Configuration page.



Current User: superuser

Routing Table Configuration

The **Routing Table** specifies the mapping between IP networks and network interfaces.

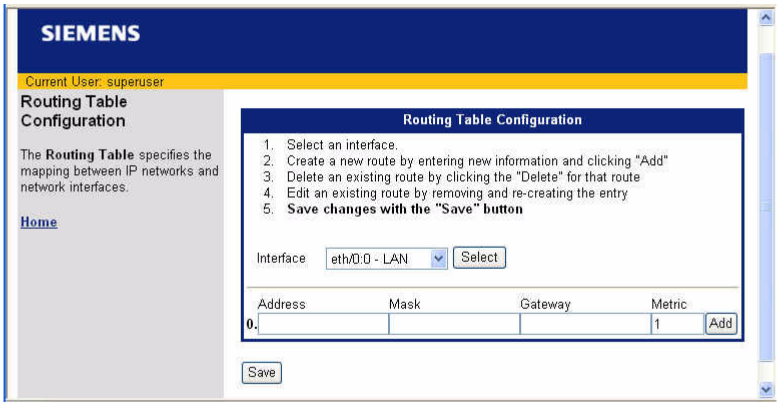
Home

Routing Table Configuration

1. Select an interface.
2. Create a new route by entering new information and clicking "Add"
3. Delete an existing route by clicking the "Delete" for that route
4. Edit an existing route by removing and re-creating the entry
5. **Save changes with the "Save" button**

Interface: eth/0:0 - LAN

2. From the **Interface** drop-down menu, select the interface you want to configure.
3. Click **Select**. This expands the Routing Table Configuration page.



Current User: superuser

Routing Table Configuration

The **Routing Table** specifies the mapping between IP networks and network interfaces.

Home

Routing Table Configuration

1. Select an interface.
2. Create a new route by entering new information and clicking "Add"
3. Delete an existing route by clicking the "Delete" for that route
4. Edit an existing route by removing and re-creating the entry
5. **Save changes with the "Save" button**

Interface: eth/0:0 - LAN

	Address	Mask	Gateway	Metric
0.				1

4. Enter the subnet **Address**, **Mask**, and **Gateway** IP address associated with the routing table.
5. In **Metric**, enter the priority for the routing table. This can be a number between 1 and 15 with 1 being the highest priority.
6. Click **Add**.
7. Click **Save**.

Dial Backup

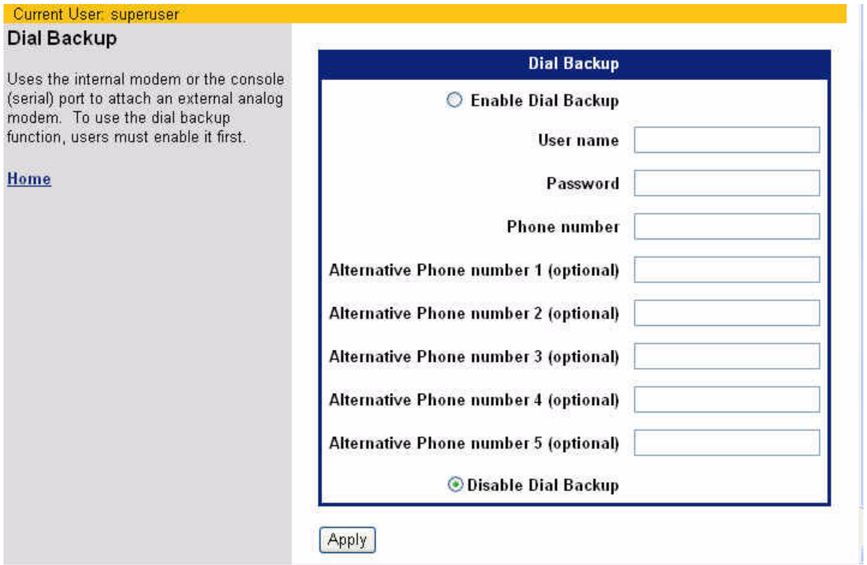
Dial Backup provides a backup to the Internet through an asynchronous modem connection when the default WAN link service experiences interruption. The modem connection can be provided through either an internal V.90 modem or an external V.90 or ISDN modem connected to the MGMT Console port.

Dial Backup is intended for customers with critical applications for which continuous Internet access is vital. If the WAN link for those applications goes down, the router automatically switches traffic to the specified asynchronous modem. Once the WAN link is up and stable, the router automatically switches the modem traffic back to the WAN.

Use the Dial Backup option to configure a backup connection to the Internet through an external asynchronous modem connected to the console port. This backup connection can be activated in the event of WAN service interruption. During an interruption to the WAN interface connection, the router will use the dial backup modem connection while waiting for WAN service to be restored. Once the WAN link is active again, Dial Backup will automatically switch back to the WAN service. (This feature may also be useful for a customer whose WAN connection is not yet installed. The router begins providing service through an asynchronous modem and then automatically switches to the WAN when it becomes available.)

To configure a dial backup connection:

1. Click **Dial Backup** on the left navigation pane of the Router Information page. This displays the Dial Backup page.



Current User: superuser

Dial Backup

Uses the internal modem or the console (serial) port to attach an external analog modem. To use the dial backup function, users must enable it first.

Home

Dial Backup

○ Enable Dial Backup

User name

Password

Phone number

Alternative Phone number 1 (optional)

Alternative Phone number 2 (optional)

Alternative Phone number 3 (optional)

Alternative Phone number 4 (optional)

Alternative Phone number 5 (optional)

● Disable Dial Backup

Apply

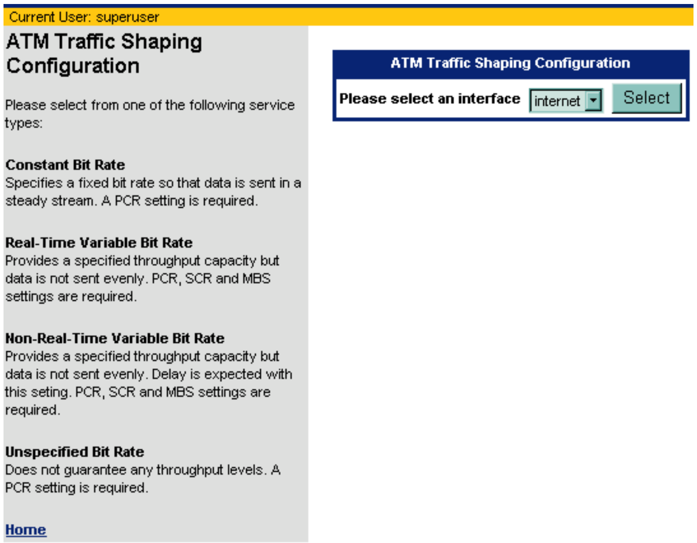
2. Click **Enable Dial Backup**.
3. Enter the **User name** and **Password** to use for the dial up connection. This information is provided by your ISP.
4. In **Phone number**, enter the ISP's dial up phone number.
5. Optionally, in **Alternate Phone number**, enter an alternate phone number to use in the event the first number is unavailable.
6. Click **Apply**.

ATM Traffic Shaping

An ATM network provides Virtual Path (VP) or Virtual Circuit (VC) connections with distinct levels of service. ATM Traffic Shaping defines the level of service to use for each configured interface.

To configure Traffic Shaping:

1. Select **Traffic Shaping** or **ATM Traffic Shaping** from the left navigation pane of the Router Information page. This displays the ATM Traffic Shaping Configuration page.



Current User: superuser

ATM Traffic Shaping Configuration

Please select from one of the following service types:

Constant Bit Rate
Specifies a fixed bit rate so that data is sent in a steady stream. A PCR setting is required.

Real-Time Variable Bit Rate
Provides a specified throughput capacity but data is not sent evenly. PCR, SCR and MBS settings are required.

Non-Real-Time Variable Bit Rate
Provides a specified throughput capacity but data is not sent evenly. Delay is expected with this seting. PCR, SCR and MBS settings are required.

Unspecified Bit Rate
Does not guarantee any throughput levels. A PCR setting is required.

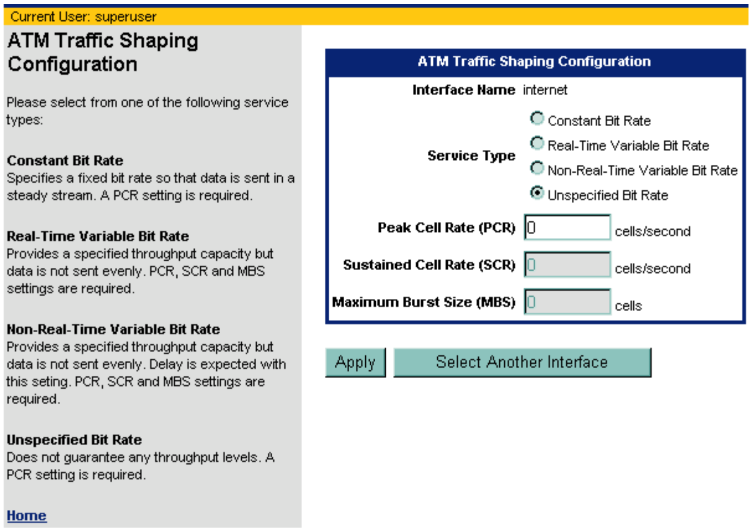
Home

ATM Traffic Shaping Configuration

Please select an interface internet ▾ Select

2. Select the interface you want to configure from the **Please select an interface** drop-down menu.

3. Click **Select**. This displays another form on the ATM Traffic Shaping Configuration page for the selected interface. This page displays the current traffic shaping configuration for the specified interface.



Current User: superuser

ATM Traffic Shaping Configuration

Please select from one of the following service types:

Constant Bit Rate
Specifies a fixed bit rate so that data is sent in a steady stream. A PCR setting is required.

Real-Time Variable Bit Rate
Provides a specified throughput capacity but data is not sent evenly. PCR, SCR and MBS settings are required.

Non-Real-Time Variable Bit Rate
Provides a specified throughput capacity but data is not sent evenly. Delay is expected with this seting. PCR, SCR and MBS settings are required.

Unspecified Bit Rate
Does not guarantee any throughput levels. A PCR setting is required.

Home

ATM Traffic Shaping Configuration

Interface Name	internet	
Service Type	○ Constant Bit Rate ○ Real-Time Variable Bit Rate ○ Non-Real-Time Variable Bit Rate ● Unspecified Bit Rate	
Peak Cell Rate (PCR)	0	cells/second
Sustained Cell Rate (SCR)	0	cells/second
Maximum Burst Size (MBS)	0	cells

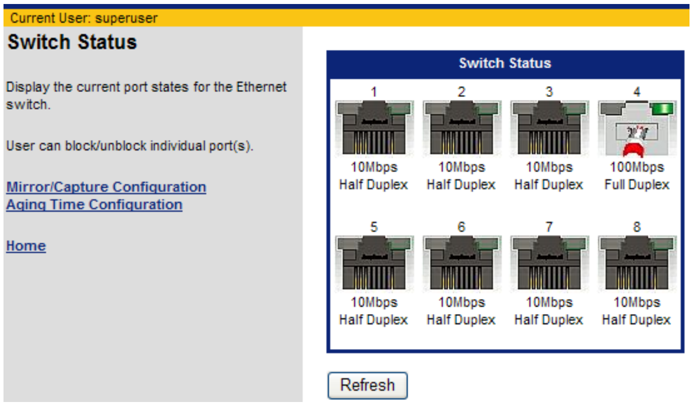
Apply | Select Another Interface

4. Select one of the following **Service Types**.
   - **Constant Bit Rate**:
     Requests a static amount of bandwidth that is continuously available for the lifetime of the connection.This bandwidth amount is characterized by a **Peak Cell Rate** value.
   - **Real-Time Variable Bit Rate**:
     Used for applications that require tightly constrained delay and delay variation, but not necessarily a fixed cell rate. VBR-nrt connections are characterized in terms of a **Peak Cell Rate**, **Sustained Cell Rate**, and a **Maximum Burst Size**.
   - **Non Real-Time Variable Bit Rate**:
     Used for bursty applications that require service guarantees from the network. VBR-rt connections are characterized in terms of a **Peak Cell Rate**, **Sustained Cell Rate**, and a **Maximum Burst Size**. Frame Relay traffic can also use VBR-nrt.
   - **Unspecified Bit Rate**:
     Used for non-real-time, bursty applications that are tolerant of delay and loss. UBR service does not specify service guarantees and is sometimes referred to as "best effort" service.
5. In **Peak Cell Rate**, enter the peak cell rate if you selected an option that requires a peak cell rate value.
6. In **Sustained Cell Rate**, enter the sustained cell rate if you selected an option that requires a sustained cell rate value.
7. In **Maximum Burst Size**, enter the maximum burst size if you selected an option that requires a maximum burst size value.

Switch Management

Each router provides four or eight Ethernet 10/100 switching ports for connection to the local area network (LAN). These RJ-45 ports are located on the rear panel and have individual Link Status LEDs to provide port status and link activity. Labeling is provided for port identification.

To manage the switches using the web interface, click **Switch Management** on the left navigation pane of the Router Information page. This displays the Switch Status page.



Current User: superuser

Switch Status

Display the current port states for the Ethernet switch.

User can block/unblock individual port(s).

Mirror/Capture Configuration
Aging Time Configuration

Home

Switch Status

1	2	3	4
10Mbps Half Duplex	10Mbps Half Duplex	10Mbps Half Duplex	100Mbps Full Duplex
5	6	7	8
10Mbps Half Duplex	10Mbps Half Duplex	10Mbps Half Duplex	10Mbps Half Duplex

The Switch Status page provides a graphical representation of the switch port information (including connection speed, mode, and port status,) and provides links to switch management pages to perform the following tasks.

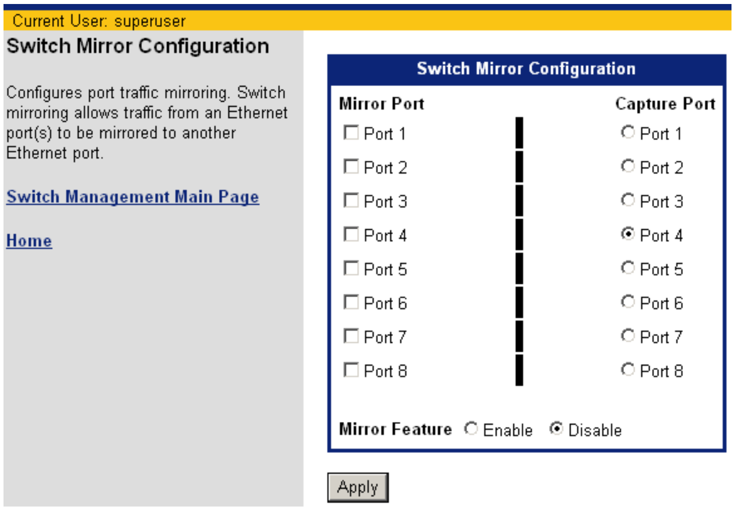
Mirror/Capture Configuration	Configure port traffic mirroring.
Aging Time Configuration	Configure the aging time of the switch

Switch Mirror Configuration

The router supports traffic mirroring on the Ethernet switch. Port mirroring "mirrors" the traffic on one (or more) Ethernet ports to a target (or capture) port where the traffic can be studied. This is useful for unobtrusive monitoring of network traffic for the purposes of detecting intrusions, diagnosing problems, or monitoring switch performance. When configuring port mirroring, you must specify both the port or ports to monitor and the port that will mirror the traffic on the monitored ports.

To configure port traffic mirroring:

1. Click **Mirror/Capture Configuration** from the left navigation pane of the Switch Status page. This displays the Switch Mirror Configuration page.



Current User: superuser

Switch Mirror Configuration

Configures port traffic mirroring. Switch mirroring allows traffic from an Ethernet port(s) to be mirrored to another Ethernet port.

Switch Management Main Page

Home

Switch Mirror Configuration

Mirror Port	Capture Port
☐ Port 1	○ Port 1
☐ Port 2	○ Port 2
☐ Port 3	○ Port 3
☐ Port 4	● Port 4
☐ Port 5	○ Port 5
☐ Port 6	○ Port 6
☐ Port 7	○ Port 7
☐ Port 8	○ Port 8

Mirror Feature ○ Enable ● Disable

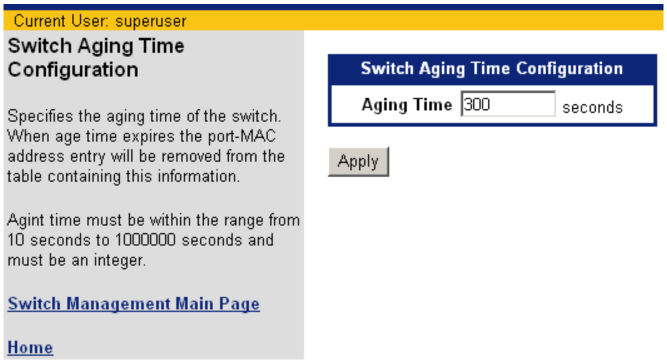
2. Under **Mirror Port**, select one or more of the mapped ports (or source ports) you want to mirror.
3. Under **Capture Port**, select the port to receive the Ethernet traffic for all mirrored ports.
4. For **Mirror Feature**, click **Enable** or **Disable** to enable or disable mirroring.
5. Click **Apply**.

Switch Age Time

When a switch receives a message, the originating MAC address and the originating port is saved in the switch's MAC address table. The switch uses the message's destination MAC address and previous entries in the MAC address table to select a specific port to use to transmit the message to its destination. Entries remain in the MAC address table based on the "switch age time". When the age time expires, the port-MAC address entry is removed from the switch's MAC address table.

To configure Switch Age Time:

1. Click **Aging Time Configuration** from the left navigation pane of the Switch Status page. This displays the Switch Aging Time Configuration page.



Current User: superuser

Switch Aging Time Configuration

Specifies the aging time of the switch. When age time expires the port-MAC address entry will be removed from the table containing this information.

Agint time must be within the range from 10 seconds to 1000000 seconds and must be an integer.

Switch Management Main Page

Home

Switch Aging Time Configuration

Aging Time 300 seconds

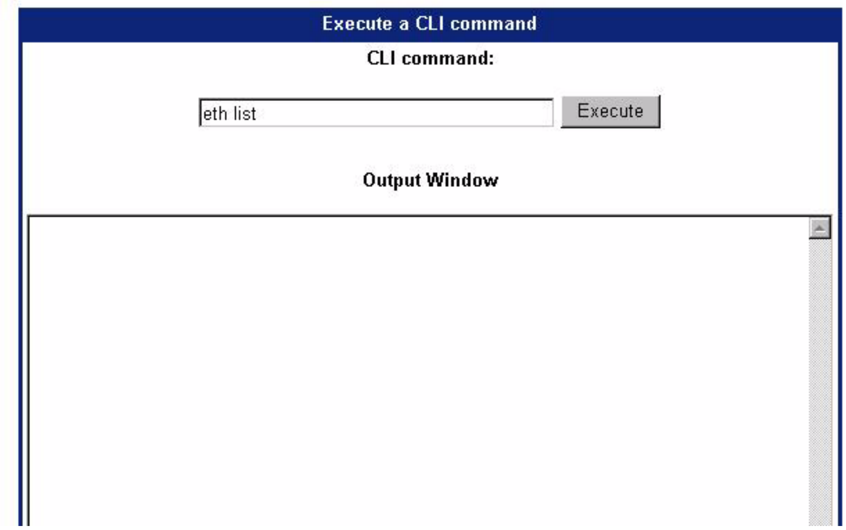
2. In **Aging Time**, enter the number of seconds that must pass before the port MAC address entry is removed from the table. This can be a number between 10 and 100,000.

3. Click **Apply**.

Command Line Interface

Use the Command Line Interface option to use the web interface to enter CLI commands. (Refer to the Command Line Interface Guide for available commands.) To execute a CLI command from the web interface:

1. Click **Command Line Interface** on the left navigation pane of the Router Information window. This displays the Execute a CLI command page.



Execute a CLI command

CLI command: eth list

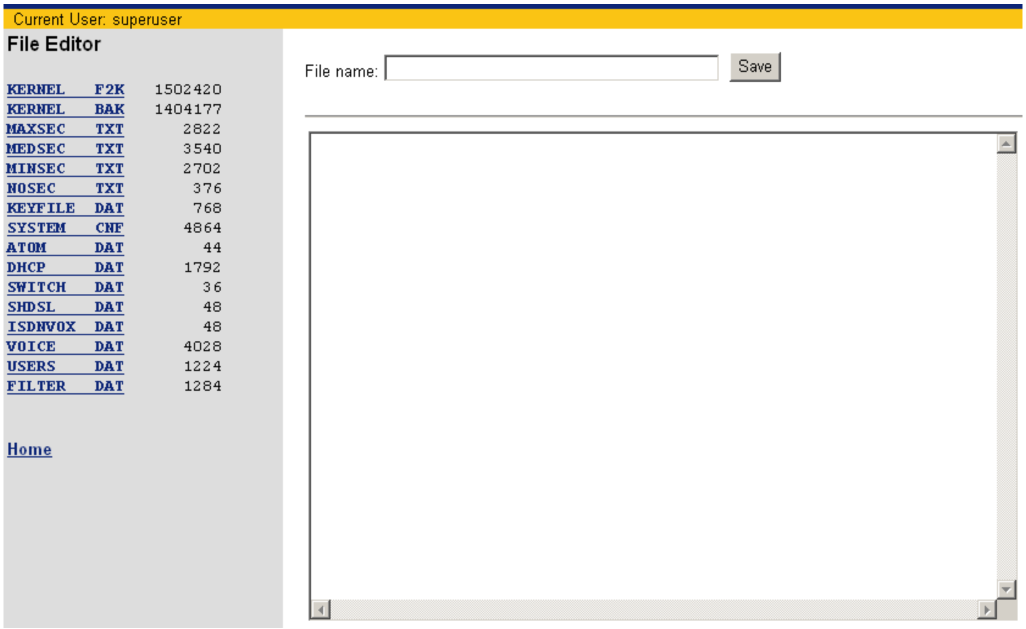
2. In the field provided, enter the desired command.
3. Click **Execute**. The response will be displayed in the Output Window.

File Editor

Use the File Editor to create and edit files stored on the router. These files contain configuration and other data used by the router. For advanced users who understand the file formats and syntax, this method may be more efficient than configuring the router with commands or the web interface, particularly when the amount of data is large or complex.

To use the File Editor:

1. Click **File Editor** on the left navigation pane of the Router Information window. This displays the File Editor page with a list of stored files in the left navigation pane.



Current User: superuser

File Editor

KERNEL	F2K	1502420
KERNEL	BAK	1404177
MAXSEC	TXT	2822
MEDSEC	TXT	3540
MINSEC	TXT	2702
NOSEC	TXT	376
KEYFILE	DAT	768
SYSTEM	CNF	4864
ATOM	DAT	44
DHCP	DAT	1792
SWITCH	DAT	36
SHDSL	DAT	48
ISDNVOX	DAT	48
VOICE	DAT	4028
USERS	DAT	1224
FILTER	DAT	1284

Home

2. Do one of the following:

   - To create a new file, enter file text in the editing window and the name of the file in **File name** (using filename.txt format), then click **Save**.
   - To edit an existing file, click the file you want to edit on the left navigation pane. This displays the contents of the file in the editing window. Make your changes and click **Save**.

Edits can be discarded without saving by clicking the **Home** link at the bottom of the navigation pane. If you save a file with the same name as an existing file, the existing file will be immediately over-written.

Chapter 6 Security Setup

This chapter describes how to configure security features on the router. Security features are listed below. To configure one of these features, click the link on the left navigation pane of the Router Information page.

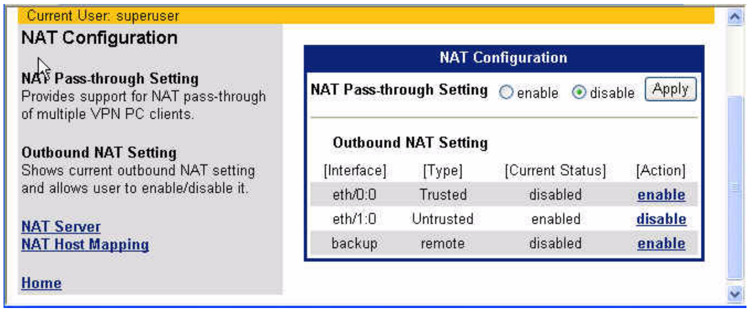
NAT	Network Address Translation provides a level of security by hiding the private IP addresses of your LAN behind a single public IP address of your router.
SNMP	Simple Network Management Protocol controls message exchanges between a management client and a management agent.
Secure Shell	Secure Shell (SSH) secures network services over an insecure network such as the public Internet.
Firewall Scripts	Secures network and data communications with built-in firewall capabilities. A firewall is any combination of hardware and software that secures a network and traffic on the network to prevent interception or intrusion.
Stateful Firewall	An IP filtering firewall that examines the packet's header information and matches it against a set of defined rules.
IKE/IPSec Configuration	Internet Key Exchange/Internet Protocol Security provides authentication and encryption of IP traffic for authenticity, integrity, and privacy.
VPN Log On	Start an IPSec session.

NAT

Network Address Translation (NAT) provides a level of security by hiding the private IP addresses of your LAN behind the single public IP address of your router. All connections pass through the router and are translated by NAT. Network addresses on inbound traffic are translated from public to private IP addresses; while addresses on outbound traffic are translated from private IP addresses to the router's public IP address. Besides translating addresses, NAT also authenticates a request or matches it to a previous request.

Network administrators create a NAT table that does the global-to-local and local-to-global IP address mapping. To confiugre NAT:

1. Click **NAT** on the left navigation pane of the Router Information page. This displays the NAT Configuration page.



Current User: superuser

NAT Configuration

NAT Pass-through Setting
Provides support for NAT pass-through of multiple VPN PC clients.

Outbound NAT Setting
Shows current outbound NAT setting and allows user to enable/disable it.

NAT Configuration

NAT Pass-through Setting ○ enable ● disable

Outbound NAT Setting

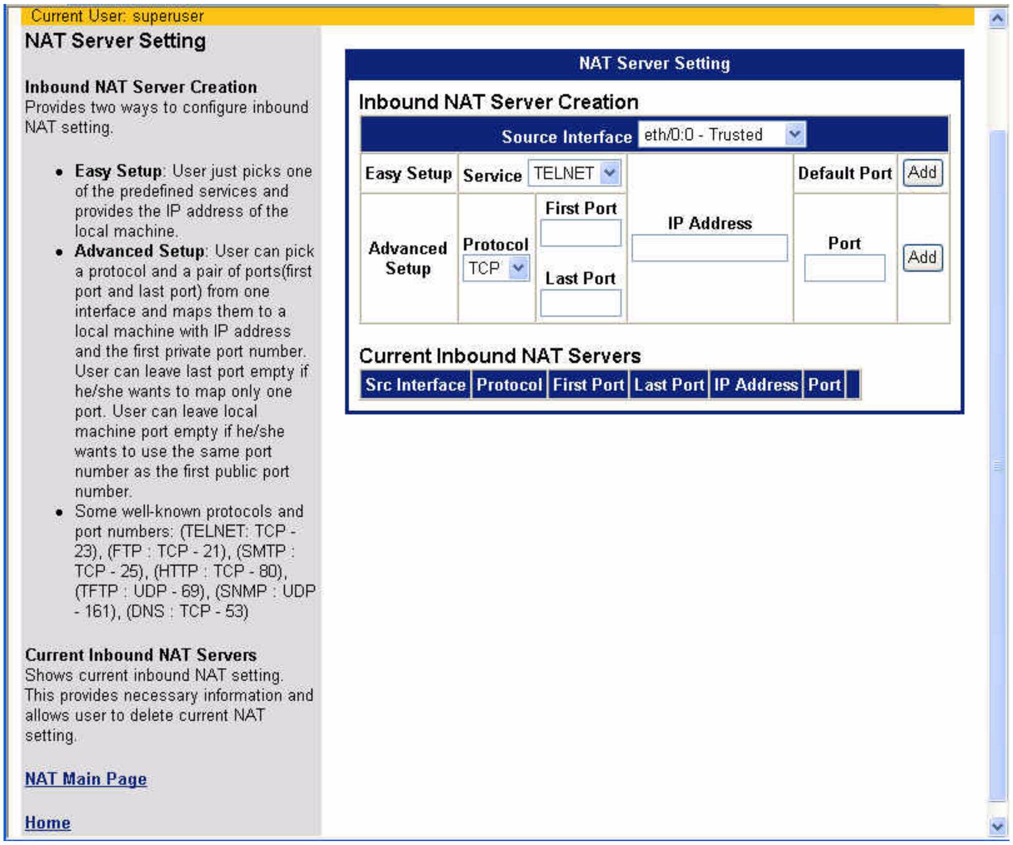
[Interface]	[Type]	[Current Status]	[Action]
eth/0:0	Trusted	disabled	enable
eth/1:0	Untrusted	enabled	disable
backup	remote	disabled	enable

2. In the **NAT Passthrough** section of this page, select **Enable** or **Disable** to specify whether or not multiple VPN clients are allowed. Enabled, multiple VPN clients are allowed; disabled, only a single VPN client is allowed.
3. In the **Outbound NAT Setting** section of this page, select **Enable** or **Disable** to enable or disable NAT for communications from your LAN to the Wide Area Network (WAN).
4. Click **Apply**.
5. Do both of the following:
   - Configure the WAN side for NAT support by clicking NAT Server from the left navigation pane.
   - Configure the Local Machine for NAT support by clicking NAT Host Mapping from the left navigation pane.

NAT Server Configuration

For incoming messages, NAT converts the global address to the local IP address.

1. To configure the Wan side for NAT functionality, click **NAT Server** from the left navigation pane. This displays the NAT Server Settings page.



Current User: superuser

NAT Server Setting

Inbound NAT Server Creation
Provides two ways to configure inbound NAT setting.

- **Easy Setup**: User just picks one of the predefined services and provides the IP address of the local machine.
- **Advanced Setup**: User can pick a protocol and a pair of ports(first port and last port) from one interface and maps them to a local machine with IP address and the first private port number. User can leave last port empty if he/she wants to map only one port. User can leave local machine port empty if he/she wants to use the same port number as the first public port number.
- Some well-known protocols and port numbers: (TELNET: TCP - 23), (FTP : TCP - 21), (SMTP : TCP - 25), (HTTP : TCP - 80), (TFTP : UDP - 69), (SNMP : UDP - 161), (DNS : TCP - 53)

Current Inbound NAT Servers
Shows current inbound NAT setting. This provides necessary information and allows user to delete current NAT setting.

NAT Main Page

Home

NAT Server Setting

Inbound NAT Server Creation

Source Interface: eth/0:0 - Trusted

Easy Setup	Service: TELNET		IP Address	Default Port	Add
Advanced Setup	Protocol: TCP	First Port Last Port		Port	Add

Current Inbound NAT Servers

Src Interface	Protocol	First Port	Last Port	IP Address	Port

2. From the **Source Interface**, drop-down menu, select the interface you are configuring.

3. To configure NAT using Easy Setup:
   - Select the service you want to configure from the **Service** drop-down menu
   - In **IP Address**, specify the IP address of the local machine.
   - Click **Add**.

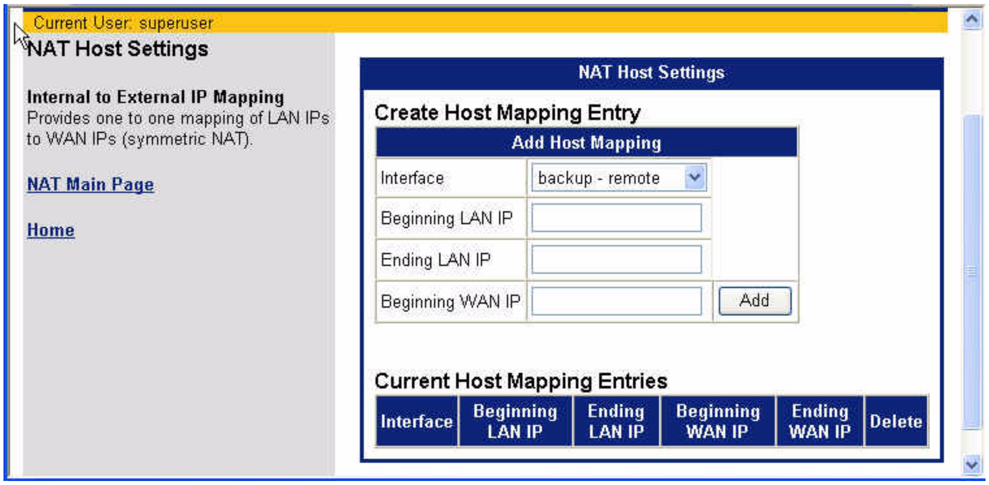
   This configures NAT to support the most common network services.

4. To configure NAT using Advanced Setup:
   - Select a protocol from the **Protocol** drop-down menu.
   - Specify a **First Port #** to assign a port number for the protocol to use. To assign a range of port numbers, specify a **Last Port #** as well.
   - In **IP Address**, specify the IP address of the local machine.
   - In **Port**, specify the default port.
   - Click **Add**.

NAT Host Mapping

Typically, a local network address (internal) is translated to one or more global (external) addresses for outgoing messages.

1. To configure a one to one mapping of LAN IP addresses to WAN IP addresses, click **NAT Host Mapping** from the left navigation pane. This displays the NAT Host Settings page.



Current User: superuser

NAT Host Settings

Internal to External IP Mapping
Provides one to one mapping of LAN IPs to WAN IPs (symmetric NAT).

NAT Main Page

Home

NAT Host Settings

Create Host Mapping Entry

Add Host Mapping

Interface	backup - remote	
Beginning LAN IP		
Ending LAN IP		
Beginning WAN IP		Add

Current Host Mapping Entries

Interface	Beginning LAN IP	Ending LAN IP	Beginning WAN IP	Ending WAN IP	Delete

2. Select the interface you are configuring from the **Interface** drop-down menu.
3. In **Beginning LAN IP**, enter first IP address to map.
4. In **Ending LAN IP**, enter last IP address to map.
5. In **Beginning WAN IP**, enter first WAN IP address to map to the LAN IP addresses. The system calculates the other WAN IP addresses.
6. Click **Add**.

SNMP

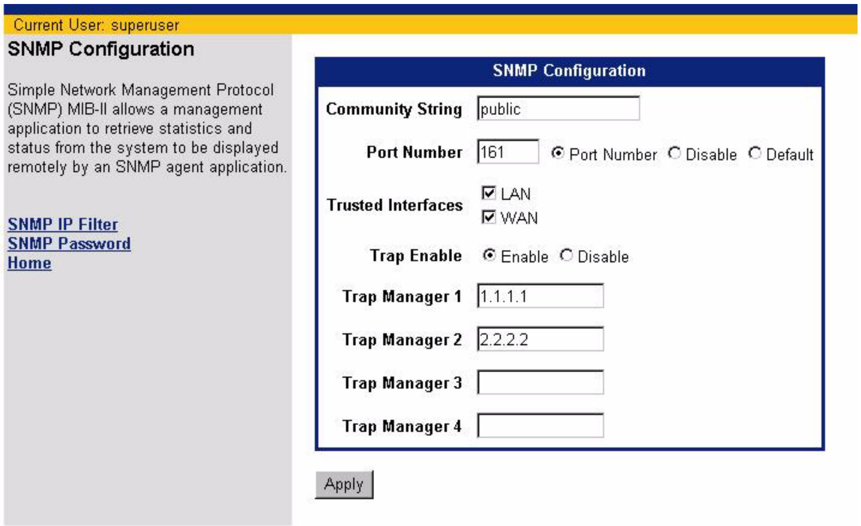
The Simple Network Management Protocol (SNMP) is a standard protocol that communicates management information between network management stations and their managed objects or agents (for example, routers and switches). By using this protocol, network equipment produced by different manufacturers can be managed by a single program.

SNMP is a member of the TCP/IP protocol suite, but is not limited to TCP/IP; it can operate over UDP well-known ports of 161 and 162. Any management application using SNMP over UDP/IP has access to the local SNMP agent. Communication with the SNMP agent occurs over the LAN or WAN connection.

SNMP defines a structure for formatting messages, and provides for the exchange of messages between reporting devices (management agents) and data collection programs (management clients). Management clients issue requests for management operations on behalf of an administrator or application, and receive traps from management agents as well (refer to SNMP Configuration Parameters for more details).

To configure SNMP:

1. Click **SNMP** on the left navigation pane of the Router Information Page. This displays the SNMP Configuration page.



Current User: superuser

SNMP Configuration

Simple Network Management Protocol (SNMP) MIB-II allows a management application to retrieve statistics and status from the system to be displayed remotely by an SNMP agent application.

SNMP IP Filter
SNMP Password
Home

SNMP Configuration

Community String	public
Port Number	161 ● Port Number ○ Disable ○ Default
Trusted Interfaces	☑ LAN ☑ WAN
Trap Enable	● Enable ○ Disable
Trap Manager 1	1.1.1.1
Trap Manager 2	2.2.2.2
Trap Manager 3	
Trap Manager 4	

2. In **Community String**, enter the name of the SNMP community to which the router belongs. This name acts as a identifier between the SNMP manager and agent for requests. The community setting allows the SNMP manager to request information from a *community*, rather than each node (agent) individually.

3. In **Port Number**, select one of the following:
   - **Port Number**:
     Enter the desired number in the field next to **Port Number**.
   - **Disable**:
     Disables the SNMP port.
   - **Default**:
     Sets the port to the default port of 161.

4. In **Trusted Interfaces**, select one or both of the following:
   - LAN designates the Local Area Network as a trusted interface.
   - WAN designates the Wide Area Network as a trusted interface.

5. In **Trap Enable**, select **Enable** or **Disable**. SNMP agents also have the ability to send (unrequested) messages to SNMP managers; these messages are called traps and notify the SNMP managers that an event has happened on the system.

6. If you enabled **Trap Enable**, in **Trap Manager[1-4]** specify the IP address for a node that will receive a Trap event from the router. You can specify up to four trap managers.

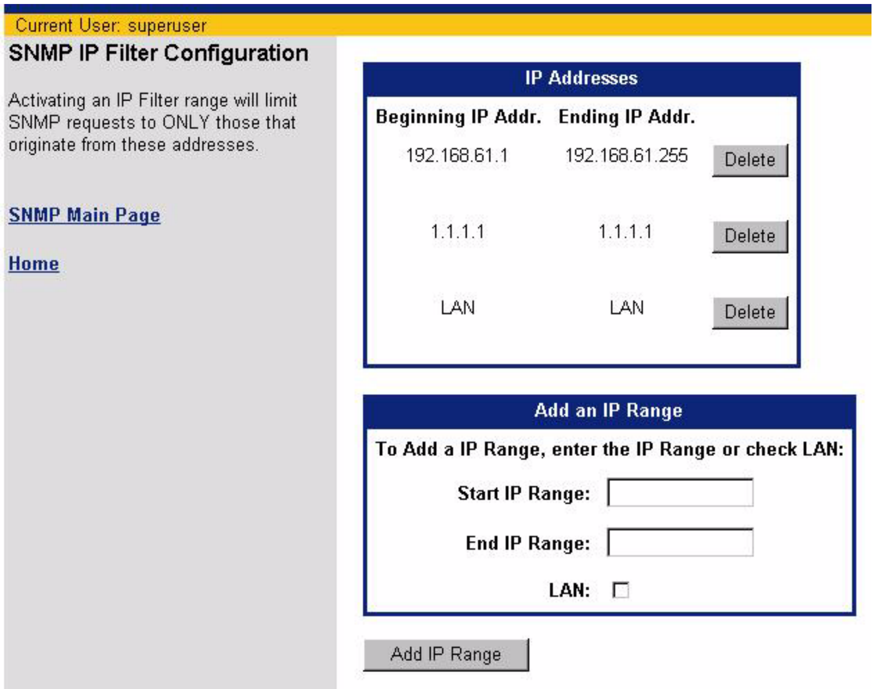
7. Click **Apply**.

8. Configure SNMP IP Filter and SNMP Password.

SNMP IP Filter

Activating an IP Filter range will limit SNMP requests to only those that originate from the designated addresses or LAN. To activate IP filtering:

1. Click **SNMP IP Filter** from the SNMP Configuration page. This displays the SNMP IP Filter Configuration page. The current IP filter ranges are displayed in the IP Addresses.



Current User: superuser

SNMP IP Filter Configuration

Activating an IP Filter range will limit SNMP requests to ONLY those that originate from these addresses.

SNMP Main Page

Home

IP Addresses

Beginning IP Addr.	Ending IP Addr.	
192.168.61.1	192.168.61.255	Delete
1.1.1.1	1.1.1.1	Delete
LAN	LAN	Delete

Add an IP Range

To Add a IP Range, enter the IP Range or check LAN:

Start IP Range:

End IP Range:

LAN: □

2. In **Start IP Range**, enter the first IP address in the range to be filtered.

3. In **End IP Range**, enter the last IP address in the range to be filtered.

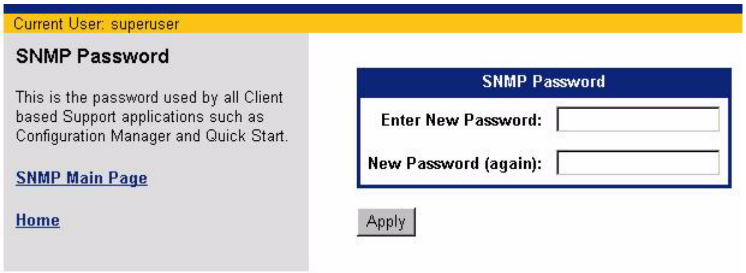
4. Optionally click **LAN**.

5. Click **Add IP Range**.

SNMP Password

An SNMP password is used to authenticate an SNMP Manager. Once authenticated, SNMP set requests will be performed. To set the SNMP Password:

1. Click **SNMP Password** from the SNMP Configuration page. This displays the SNMP Password page.



Current User: superuser

SNMP Password

This is the password used by all Client based Support applications such as Configuration Manager and Quick Start.

2. Enter the **New Password and New Password (again)**.
3. Click **Apply**.

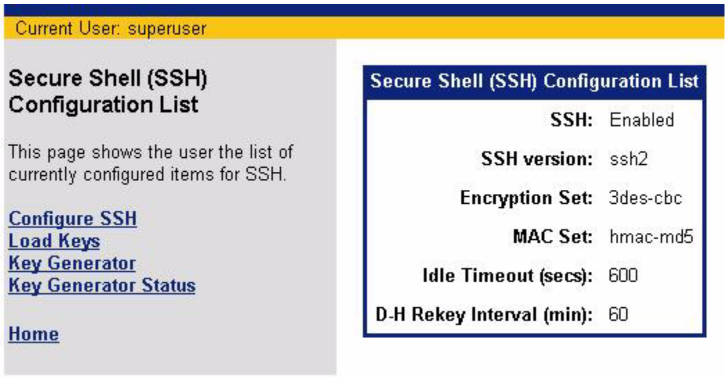
Secure Shell

Secure Shell (SSH) secures network services (such as remote terminal sessions, remote command execution, secure FTP type file transfers, and secure tunneling of TCP traffic between two networks) over an insecure network, such as the public Internet. SSH creates an encrypted and authenticated channel between hosts for all communication. An SSH server, by default, listens on the standard TCP port 22.

The objective of SSH is to make a secure functional equivalent for telnet. Telnet connections and commands are vulnerable to a variety of different kinds of attacks allowing unauthorized system access, and even allowing interception and logging of traffic to and from the system including passwords. SSH protects against:

- IP spoofing, where a remote host sends out packets that pretend to come from another, trusted host. SSH also protects against spoofing on the local network when attempting to deceive, posing as the router to the outside.
- IP source routing, where a host can pretend that an IP packet comes from another trusted host.
- DNS spoofing, where an attacker forges name server records.
- Interception of clear text passwords and other data by intermediate hosts.
- Manipulation of data by users in control of intermediate hosts.

To access the Secure Shell configuration pages, click **Secure Shell** from the left navigation pane on the Router Information page. This displays the Secure Shell (SSH) Configuration List page.



Current User: superuser

Secure Shell (SSH) Configuration List

This page shows the user the list of currently configured items for SSH.

Secure Shell (SSH) Configuration List	
SSH:	Enabled
SSH version:	ssh2
Encryption Set:	3des-cbc
MAC Set:	hmac-md5
Idle Timeout (secs):	600
D-H Rekey Interval (min):	60

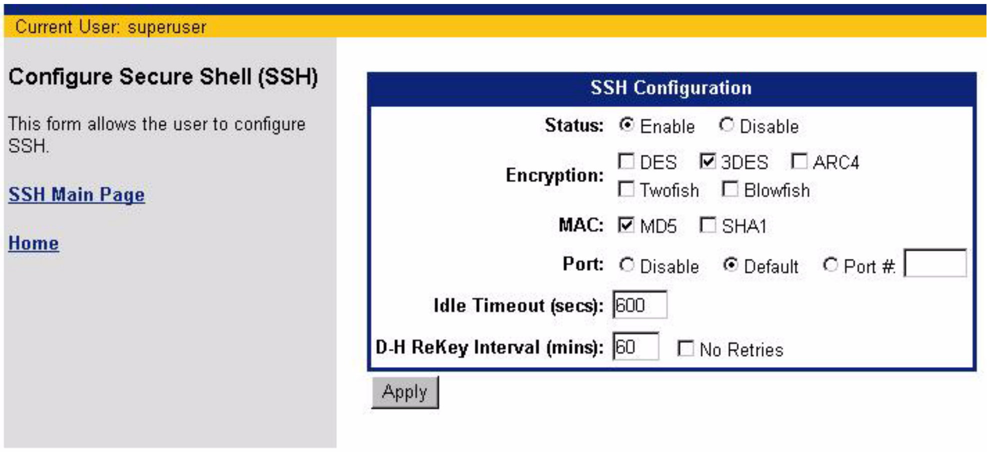
This page displays the current SSH configuration settings as well as provides links to the other SSH configuration pages.

Configure SSH	Configure SSH.
Load Keys	Load public and private SSH keys used to authenticate the SSH server from a source file.
Key Generator	Generate public and private SSH keys.
Key Generator Status	Check the status of the key generation process.

Configure SSH

To configure Secure Shell settings:

1. Click **Configure SSH** from the Secure Shell (SSH) Configuration List page. This displays the Configure Secure Shell (SSH) page.



Current User: superuser

Configure Secure Shell (SSH)

This form allows the user to configure SSH.

SSH Main Page

Home

SSH Configuration

Status: ● Enable ○ Disable

Encryption: □ DES ☑ 3DES □ ARC4 □ Twofish □ Blowfish

MAC: ☑ MD5 □ SHA1

Port: ○ Disable ● Default ○ Port #:

Idle Timeout (secs): 600

D-H ReKey Interval (mins): 60 □ No Retries

2. For **Status**, select **Enable** or **Disable** to enable or disable the SSH feature. Before enabling SSH, a private/public key pair should be loaded on the router using either the Key Generator or Load Keys option.

3. For **Encryption**, select one or more of the encryption methods. The selected method(s) is configured locally on the router (or server). When a client initiates a session, the encryption type is realized and the client adheres to the server encryption mode. If the encryption method is not supported on the client side, the connection will fail.

4. For **MAC**, select the type of Message Authentication Code to use for the SSH connection.

5. For **Port**, select one of the following to specify the port that the SSH server listens on.
   - **Default**: Sets the SSH port to the default port of 22.
   - **Disable**: Disables the SSH port.
   - **Port Number**: Enter the desired number in the field next to **Port #**.

6. In **Idle Timeout**, enter the number of seconds an SSH connection can remain idle before the SSH session is disconnected. This can be a number between 30 and 1200 with 600 being the default.

7. In **D-H ReKey Interval**, enter the number of minutes that must pass between additional key exchanges. This can be a number between 0 and 600 with 600 being the default.

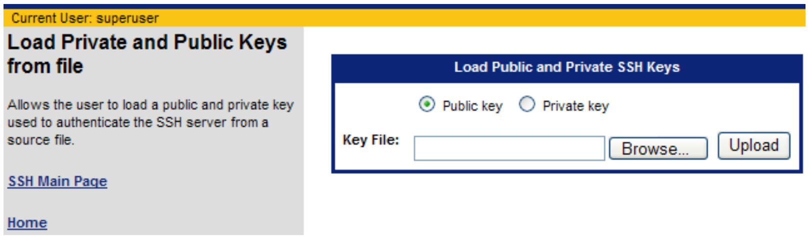
8. Click **Apply**.

Load Keys

Diffie-Hellman is the key exchange system used for authentication in the establishment and maintenance of SSH connections. The key exchange requires a Public Key and a Private Key. This key pair can either be loaded from a source file or generated by the router. This section describes how to load the key pair from a source file. Refer to the section title Key Generator for details on generating the key pair on the router.

To load the key pair from a source file:

1. Click **Load Keys** on the left navigation pane of the Secure Shell (SSH) Configuration List page. This displays the Load Private and Public Keys from file page.



Current User: superuser

Load Private and Public Keys from file

Allows the user to load a public and private key used to authenticate the SSH server from a source file.

SSH Main Page

Home

Load Public and Private SSH Keys

● Public key ○ Private key

Key File: [ ] Browse... Upload

2. Do one of the following:
   - Select **Public key** to load a public key from a file.
   - Select **Private ke**y to load a private key from a file.
3. In **Key File**, specify the file that contains the key. You can optionally **Browse** for the key file.
4. Click **Upload** to load the key file. A confirmation message will be displayed upon file upload completion.

Key Generator

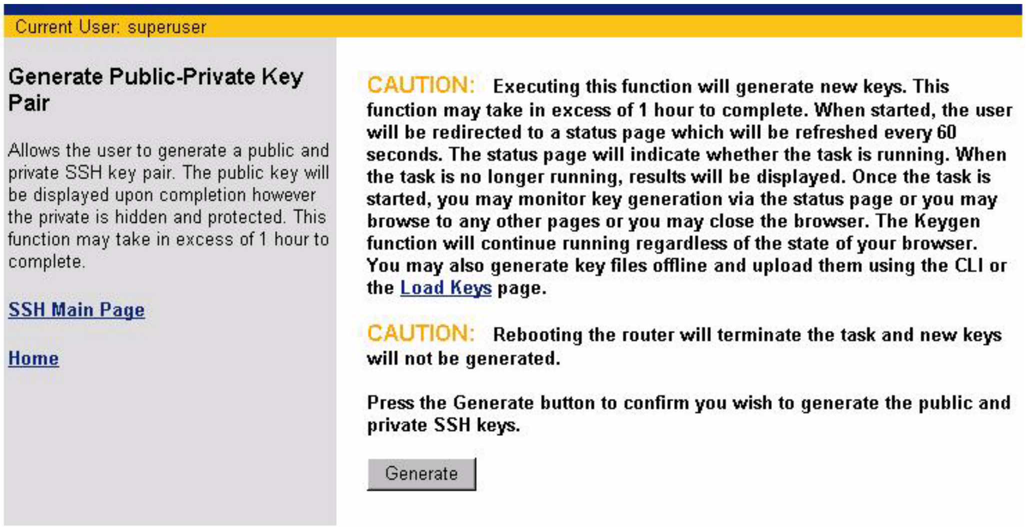
Diffie-Hellman is the key exchange system used for authentication in the establishment and maintenance of SSH connections. The Key exchange requires a Public key and a Private key. This key pair can either be loaded from a source file or generated by the router. This section describes how to generate the key pair on the router. Refer to the section titled Load Keys for details on loading the key pair from a file.

Executing this function will generate new keys. This function may take in excess of one hour to complete. When started, the user will be redirected to a status page that is refreshed every 60 seconds. The status page indicates whether the task is running. When the task is no longer running, results are displayed.

Once the task is started, you can close this page and the Keygen function will continue. You can reopen it anytime by clicking **Key Generator Status** on the left navigation pane of the Secure Shell (SSH) Configuration List page.

To generate the key pair on the router:

1. Click **Key Generator** on the left navigation pane of the Secure Shell (SSH) Configuration List page. This displays the Generate Public-Private Key Pair page.



Current User: superuser

Generate Public-Private Key Pair

Allows the user to generate a public and private SSH key pair. The public key will be displayed upon completion however the private is hidden and protected. This function may take in excess of 1 hour to complete.

CAUTION: Executing this function will generate new keys. This function may take in excess of 1 hour to complete. When started, the user will be redirected to a status page which will be refreshed every 60 seconds. The status page will indicate whether the task is running. When the task is no longer running, results will be displayed. Once the task is started, you may monitor key generation via the status page or you may browse to any other pages or you may close the browser. The Keygen function will continue running regardless of the state of your browser. You may also generate key files offline and upload them using the CLI or the Load Keys page.

CAUTION: Rebooting the router will terminate the task and new keys will not be generated.

Press the Generate button to confirm you wish to generate the public and private SSH keys.

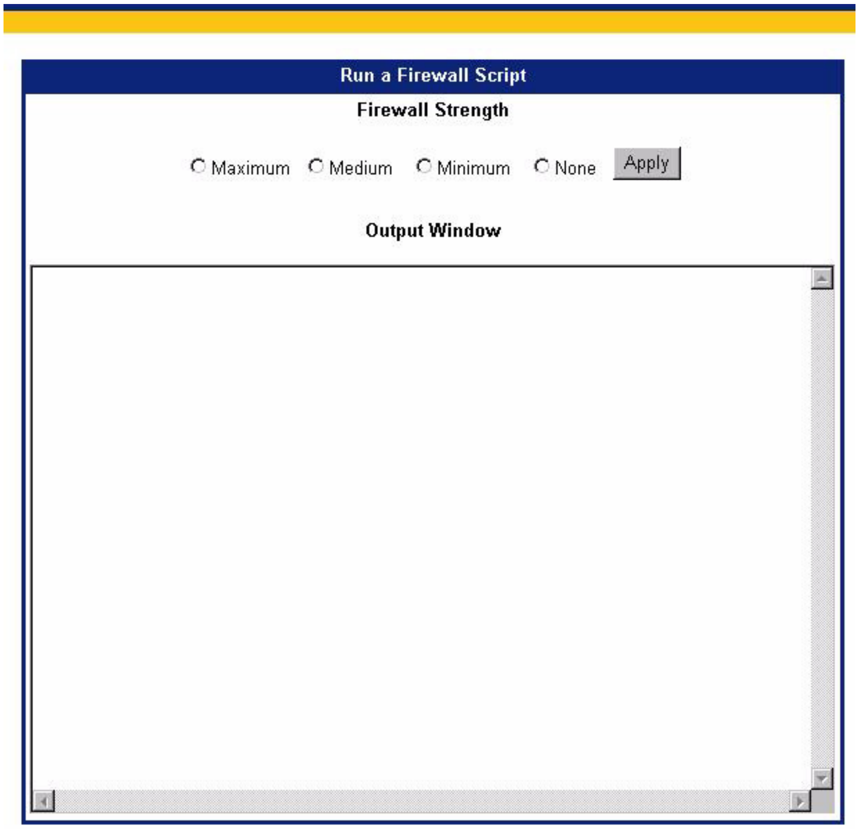
2. Click **Generate** to generate the keys.
3. To monitor the key generation progress, click **Key Generator Status** from the left navigation pane of the Secure Shell (SSH) Configuration List page.

Firewall Scripts

A firewall is any combination of hardware and software that secures a network and traffic to prevent interception or intrusion. The router has built-in firewall capabilities to secure your network and data communications. The router is equipped with predefined scripts that can be modified or used “as is” to construct firewalls. All network security efforts, including firewall configurations, should be performed by an experienced and qualified network security technician who is familiar with the unique architecture and requirements of their network. Siemens Subscriber Networks cannot be liable for security violations due to inadequate or incorrect firewall configurations.

To load a firewall script, perform the following:

1. Click **Firewall Scripts** on the left navigation pane of the Router Information page. This displays the Run a Firewall Script page.



2. Select the desired **Firewall Strength**. This can be one of the following:
   - **Maximum**: Establishes a firewall with the most restrictive policies for maximum network security.
   - **Medium**: Establishes a firewall with flexible policies for a moderate level of network security.
   - **Minimum**: Establishes a firewall with a basic set of policies for a minimum level of network security.
   - **None**: No firewall is established.
3. Click **Apply**. This displays the firewall script in the **Output Window**.

Stateful Firewall

A firewall is a program or hardware device that filters the information coming through the Internet connection into your private network or computer system designed to prevent unauthorized access to or from a private network. If an incoming packet of information is flagged by the filters, it is not allowed through. However, a traditional stateless firewall has no way of matching incoming packets with an existing connection, so cannot prevent some security problems.

A stateful firewall tracks significant attributes of each connection from start to finish (such as the IP address and ports used for the connection, as well as the sequence number of the packets traversing the connection), and matches any packets inspected to an existing or new connection. These attributes are known collectively as the connection state. Only packets that match a known connection state are allowed by the stateful firewall; all others are rejected. Therefore, a stateful firewall offers better control over network traffic.

Stateful firewall varies from the IP filtering firewall in that it gathers and maintains state information about each session.

IP filtering firewall examines the packet's header information and matches it against a set of defined rules. If it finds a match, the corresponding action is performed. If not, the packet is accepted.

Stateful firewall intercepts outgoing packets and gathers information from them (for example IP address information, port number) to create state information for that session. When an incoming packet is received, the stateful firewall checks the packet against the state information it has maintained and accepts the packet if the packet belongs to the session.

The router supports both the traditional IP filtering firewall and a stateful firewall. The IP filtering firewall built-into the router, consists of a set of rules that are examined each time a packet is transmitted or received from the public network. It examines the packet's header information and matches it against a set of defined rules. If it finds a match, the corresponding action is performed. If not, the packet is accepted.

The IP filtering firewall provides an adequate level of security, but is limited in that it does not look beyond the packet's header to collect more information, which could leave the firewall vulnerable to attacks. One example of this vulnerability is in the case when the IP filtering firewall requires a range of port numbers to be opened to allow some protocols to work. For example, the FTP protocol involves an exchange of port number information between the client and server. In this case, the client sends the server the port number to use to connect to the client. In order for such protocols to work with the IP filtering firewall, a range of ports would have to be opened and exposed because the firewall is unaware of exactly which port number is being used. This type of static protection leaves machines behind the firewall vulnerable.

The stateful firewall overcomes these limitations by maintaining state information about each session. The stateful firewall gathers information about outgoing packets and stores state information for that session in a state table. When an incoming packet is received, the stateful firewall checks the packet against the maintained information and accepts the packet if the packet belongs to the session. Once the session ends, its entry in the state-table is discarded. As an added security measure against port scanning, stateful inspection firewalls close off ports until connection to the specific port is requested.

By default, the stateful firewall is disabled, and your system is vulnerable until this feature is enabled.

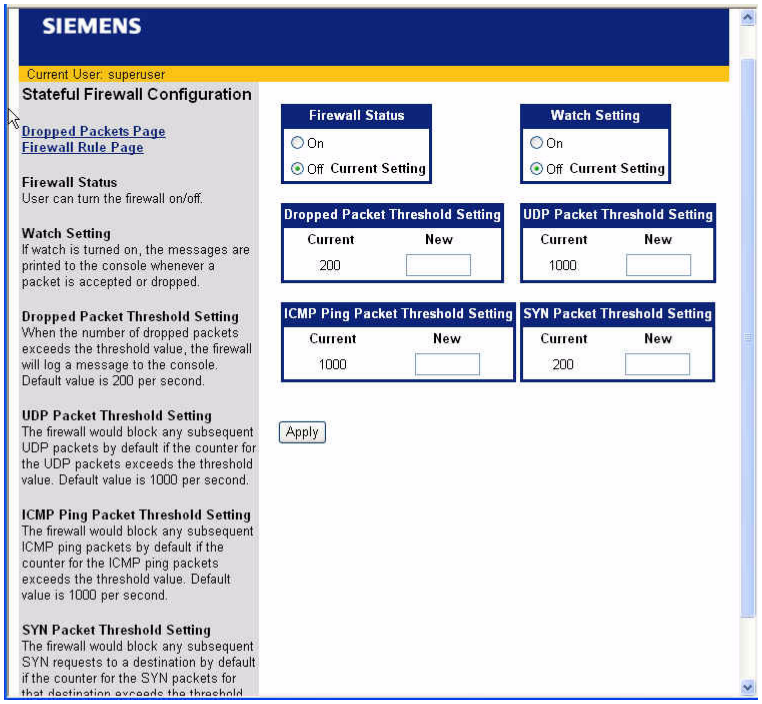
This section describes how to perform the following tasks.

Configure Stateful Firewall	Configure settings that control how the Stateful Firewall performs.
Dropped Packets	View the most recent dropped packets.
Firewall Rules	Configure Stateful Firewall rules.

Configure Stateful Firewall

To configure the Stateful Firewall:

1. Click **Stateful Firewall** from the left navigation pane of the Router Information page. This displays the Stateful Firewall Configuration page.



Current User: superuser

Stateful Firewall Configuration

Firewall Status
User can turn the firewall on/off.

Watch Setting
If watch is turned on, the messages are printed to the console whenever a packet is accepted or dropped.

Dropped Packet Threshold Setting
When the number of dropped packets exceeds the threshold value, the firewall will log a message to the console. Default value is 200 per second.

UDP Packet Threshold Setting
The firewall would block any subsequent UDP packets by default if the counter for the UDP packets exceeds the threshold value. Default value is 1000 per second.

ICMP Ping Packet Threshold Setting
The firewall would block any subsequent ICMP ping packets by default if the counter for the ICMP ping packets exceeds the threshold value. Default value is 1000 per second.

SYN Packet Threshold Setting
The firewall would block any subsequent SYN requests to a destination by default if the counter for the SYN packets for that destination exceeds the threshold

Firewall Status
○ On
● Off Current Setting

Watch Setting
○ On
● Off Current Setting

Dropped Packet Threshold Setting	
Current	New
200	

UDP Packet Threshold Setting	
Current	New
1000	

ICMP Ping Packet Threshold Setting	
Current	New
1000	

SYN Packet Threshold Setting	
Current	New
200	

2. For **Firewall Status**, select **On** or **Off** to turn Stateful Firewall on or off.

3. For **Watch Settin**g, select **On** or **Off** to control whether or not messages are printed to the console whenever a packet is accepted or dropped.

4. In **Dropped Packet Threshold Setting**, specify the number of packets per second that must be dropped before a message is logged to the console. The default value is 200 packets per second.

5. In **UDP Packet Threshold Setting**, specify the number of UDP Packets per second that can be received. When this number is exceeded, the firewall blocks any subsequent UDP packets. The default value is 1000 UDP packets per second.

6. In **ICMP Ping Packet Threshold Setting**, specify the number of ICMP Ping Packets per second that can be received. When this number is exceeded, the firewall blocks any subsequent ICMP ping packets. The default value is 1000 ICMP Ping Packets per second.

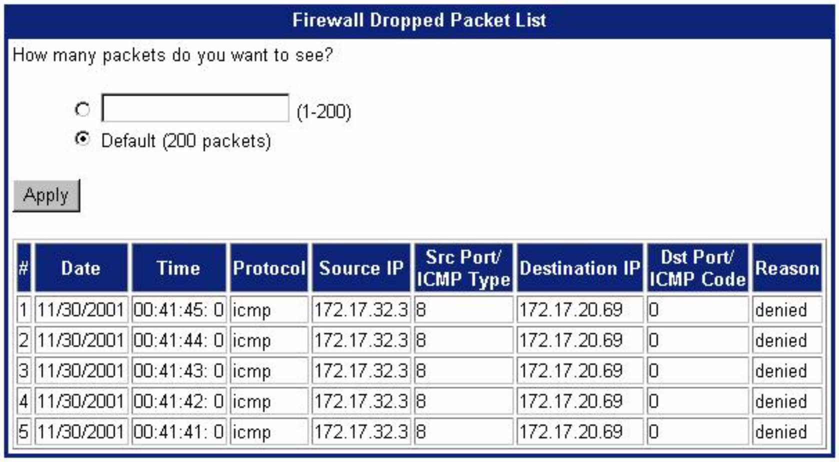
7. In **SYN Packet Threshold Setting**, specify the number of SYN requests per second that can be received. When this number is exceeded, the firewall blocks any subsequent SYN requests. The default value is 200 SYN packets per second.

8. Click **Apply**.

View Dropped Packets

To view the most recent dropped packets:

1. Click **Dropped Packe**ts from the left navigation pane of the Stateful Firewall Configuration page. This displays the Firewall Dropped Packet List page.



Firewall Dropped Packet List

How many packets do you want to see?

○ ▭ (1-200)

● Default (200 packets)

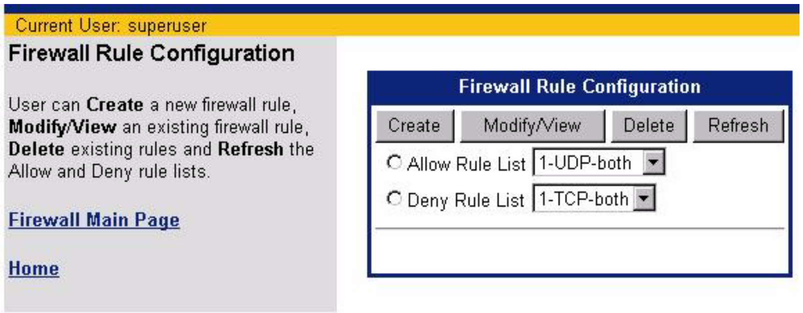
#	Date	Time	Protocol	Source IP	Src Port/ ICMP Type	Destination IP	Dst Port/ ICMP Code	Reason
1	11/30/2001	00:41:45: 0	icmp	172.17.32.3	8	172.17.20.69	0	denied
2	11/30/2001	00:41:44: 0	icmp	172.17.32.3	8	172.17.20.69	0	denied
3	11/30/2001	00:41:43: 0	icmp	172.17.32.3	8	172.17.20.69	0	denied
4	11/30/2001	00:41:42: 0	icmp	172.17.32.3	8	172.17.20.69	0	denied
5	11/30/2001	00:41:41: 0	icmp	172.17.32.3	8	172.17.20.69	0	denied

2. Do one of the following:
   - **Specify the number of dropped packets to view** from 1 to 200. Netscape 4 users, may have to wait a very long time to get the complete list of 200 displayed. Select a smaller value for viewing if this is the case.
   - Click **Default** to view the most recent 200 dropped packets.
3. Click **Apply**.

Configure Firewall Rules

To configure firewall rules:

1. Click **Firewall Rules** from the left navigation pane of the Stateful Firewall Configuration page. This displays the Firewall Rule Configuration page.



Current User: superuser

Firewall Rule Configuration

User can **Create** a new firewall rule, **Modify/View** an existing firewall rule, **Delete** existing rules and **Refresh** the Allow and Deny rule lists.

Firewall Main Page

Home

Firewall Rule Configuration

○ Allow Rule List 1-UDP-both

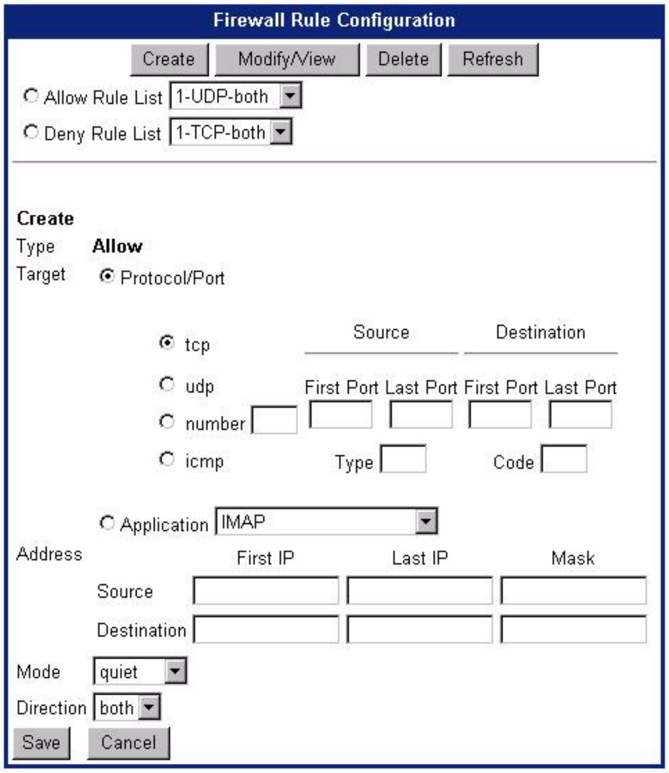
○ Deny Rule List 1-TCP-both

When firewall rules are created, they are specified as Allow or Deny rules. When a packet is evaluated, the Deny rules are applied first, then the Allow rules.

2. From the **Allow Rule List** drop-down menu, optionally select the list of protocols where the rule is allowed. If you do not select an **Allow Rule Lis**t, you must select a **Deny Rule Lis**t.

3. From the **Deny Rule List** drop-down menu, optionally select the list of protocols where the rule is denied. If you do not select a **Deny Rule Lis**t, you must select an **Allow Rule Lis**t.

4. Click **Create**. This expands the Firewall Rule Configuration page to include appropriate fields for the **Allow Rule List** and **Deny Rule List** selection.



Firewall Rule Configuration

○ Allow Rule List 1-UDP-both

○ Deny Rule List 1-TCP-both

Create

Type **Allow**

Target ● Protocol/Port

● tcp

○ udp

○ number

○ icmp

	Source		Destination	
	First Port	Last Port	First Port	Last Port

Type Code

○ Application IMAP

Address

	First IP	Last IP	Mask
Source			
Destination			

Mode quiet

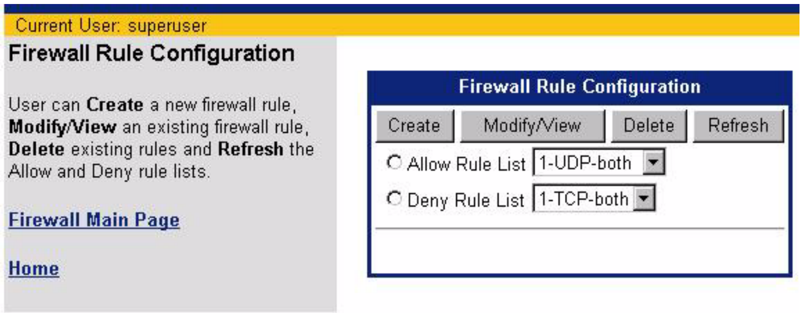
Direction both

5. For **Target**, select one of the following to specify the characteristics a packet must have in order to match the firewall rule:
   - **Protocol/Port**
     Specifies the protocol or port that applies to the rule. This can be one of the following:
     - **tcp** to specify TCP protocol for this rule. You can specify a source and destination port or port range. If only one source/destination port is specified, the packet must have the specified port. If a range is defined, the packet can have a port within the specified range. If no source/destination port is specified, the firewall rule matches any port in the range 0 - 65535.
     - **udp** to specify UDP protocol for this rule. You can specify a source and destination port or port range. If only one source/destination port is specified, the packet must have the specified port. If a range is defined, the packet can have a port within the specified range. If no source/destination port is specified, the firewall rule matches any port in the range 0 - 65535.
     - **number** to specify a protocol number.
     - **icmp** to specify ICMP protocol for this rule. If you select this protocol, my must specify an ICMP Type for matching the packet source and ICMP Code for matching the packet destination.
   - **Application**
     Select the application that must match from the **Application** drop-down menu.
6. For **Source** and **Destination** under **Address**, optionally specify the **First IP** and **Last IP** addresses to define the source and destination IP address boundaries to apply to the firewall rule. The packet must have a source/destination IP address within the specified address range. If only **First IP** address is specified, the packet must have that source/destination IP address. If no source/destination IP address is specified, the firewall rule matches any valid IPV4 address.
7. For **Source** and **Destination** under **Address**, optionally specify a **Mask** that must match for the rule to apply. If no mask is specified, 255.255.255.255 is used.
8. From the **Mode** drop-down menu, select one of the following to specify when watch messages are displayed for this firewall rule. The messages are sent to the console serial port and a Syslog server.
   - **Quiet**: No messages are displayed for this firewall rule, even if the rule causes a packet to be dropped. This is the default setting for firewall *allow* rules.
   - **Verbose**: A message is displayed every time this firewall rule matches a packet, regardless of the rule action.
9. From the **Direction** drop-down menu, select the direction of the packet to which the firewall rule is applied. The default is **both**.
10. Click **Save**.

Delete Firewall Rules

To delete firewall rules:

1. Click **Firewall Rules** from the left navigation pane of the Stateful Firewall Configuration page. This displays the Firewall Rule Configuration page.



Current User: superuser

Firewall Rule Configuration

User can **Create** a new firewall rule, **Modify/View** an existing firewall rule, **Delete** existing rules and **Refresh** the Allow and Deny rule lists.

Firewall Main Page

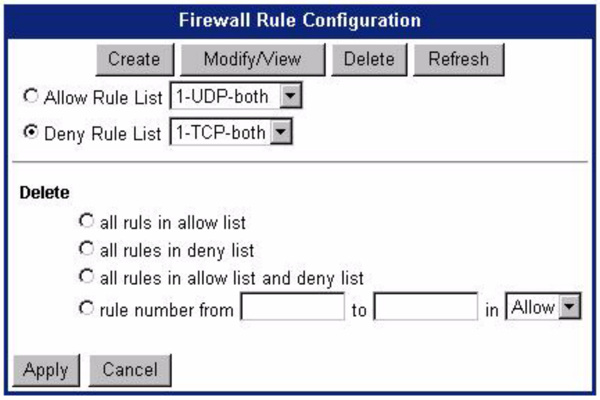
Home

Firewall Rule Configuration

○ Allow Rule List 1-UDP-both

○ Deny Rule List 1-TCP-both

2. Click **Delete**. This expands the Firewall Rule Configuration page.



Firewall Rule Configuration

○ Allow Rule List 1-UDP-both

● Deny Rule List 1-TCP-both

Delete

○ all ruls in allow list

○ all rules in deny list

○ all rules in allow list and deny list

○ rule number from ____ to ____ in Allow

3. Select the rule list(s) or range of rules you want to delete. To delete a single rule, only enter a number in the **from** field. When entering a range of rules to be deleted, the rule range specified is inclusive of the first and last rules.

4. Click **Apply**.

IKE/IPSec Configuration

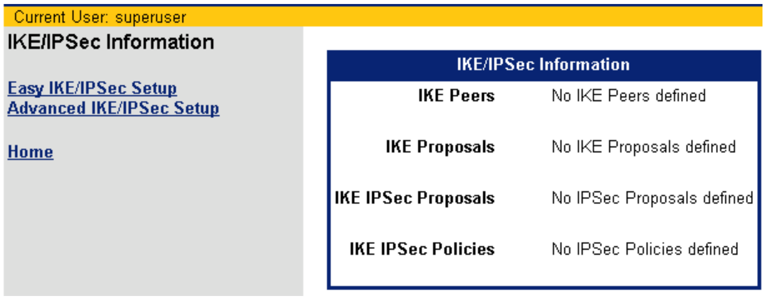
IPSec (Internet Protocol Security) is an open standard that defines optional authentication and encryption methods at the IP packet level. IPSec can only handle IP packets.

IPsec is especially useful for implementing Virtual Private Networks and for remote user access through dial-up connections to private networks. IPSec is a true network layer protocol that provides authentication, privacy, and data integrity. IPSec must be supported at both ends of the connection.

IPSec does not require modification of individual applications or devices for secure data transport. Because it does require global IP addresses for all peers, Network Address Translation (NAT) can be used with IPSec.

To configure IKE/IPSec:

1. Click **IKE/IPSec Configuration** from the left navigation pane of the Router Information window. This displays the IKE/IPSec Information page.



Current User: superuser

IKE/IPSec Information

IKE/IPSec Information	
IKE Peers	No IKE Peers defined
IKE Proposals	No IKE Proposals defined
IKE IPSec Proposals	No IPSec Proposals defined
IKE IPSec Policies	No IPSec Policies defined

2. Select one of the following from the left navigation pane:

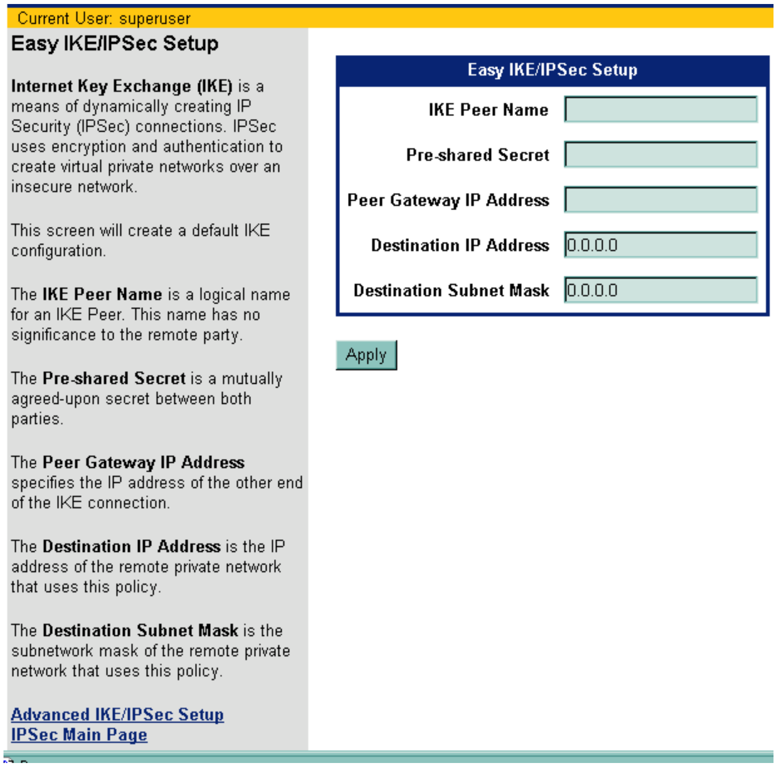
Easy IKE/IPSec Setup	Perform basic IKE/IPSec setup.
Advanced IKE/IPSec Setup	Perform advanced IKE/IPSec setup.

Easy IKE/IPSec Setup

Internet Key Exchange (IKE) is a means of dynamically creating secure IP (IPSec) connections, which uses encryption and authentication to virtual private networks over an insecure network.

The Easy IKE/IPSec Setup form is used to create a default IKE configuration. To perform Easy IKE/IPSec setup:

1. Click **Easy IKE/IPSec Setup** from the left navigation pane of the IKE/IPSec Information page. This displays the Easy IKE/IPSec Setup page.



Current User: superuser

Easy IKE/IPSec Setup

Internet Key Exchange (IKE) is a means of dynamically creating IP Security (IPSec) connections. IPSec uses encryption and authentication to create virtual private networks over an insecure network.

This screen will create a default IKE configuration.

The **IKE Peer Name** is a logical name for an IKE Peer. This name has no significance to the remote party.

The **Pre-shared Secret** is a mutually agreed-upon secret between both parties.

The **Peer Gateway IP Address** specifies the IP address of the other end of the IKE connection.

The **Destination IP Address** is the IP address of the remote private network that uses this policy.

The **Destination Subnet Mask** is the subnetwork mask of the remote private network that uses this policy.

Advanced IKE/IPSec Setup
IPSec Main Page

Easy IKE/IPSec Setup

IKE Peer Name	
Pre-shared Secret	
Peer Gateway IP Address	
Destination IP Address	0.0.0.0
Destination Subnet Mask	0.0.0.0

2. In **IKE Peer Name**, enter a logical name for an IKE Peer. This name is of no importance to the remote IKE peer. Choose a name that is meaningful to you.

3. In **Pre-shared Secret**, enter a case-sensitive character string used for authentication. This secret can be up to 256 characters, with no spaces or non-printable characters. The pre-shared secret must be mutually agreed upon by both parties to the IKE connection.

4. In **Peer Gateway IP Address**, enter the IP address of the gateway at the remote end of the IKE connection.

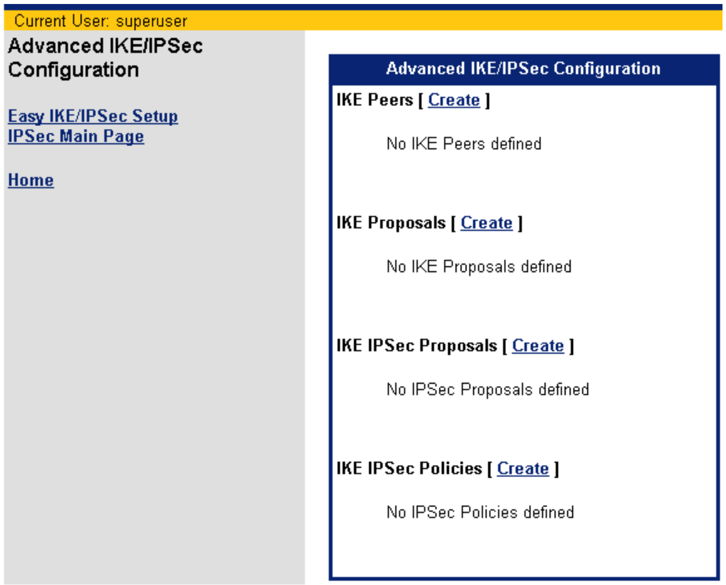
5. In **Destination IP Address**, enter the IP address of the remote private network that your system will authenticate using this IKE policy.

6. In **Destination Subnet Mask**, enter the destination subnet mask of the remote private network that your system will authenticate using this IKE policy.

7. Click **Apply**.

Advanced IKE/IPSec Setup

The Advanced IKE/IPSec Setup page presents information about current IKE and IPSec peers, policies and proposals. To perform Advanced IKE/IPSec setup, click **Advanced IKE/IPSec Setup** from the left navigation pane of the IKE/IPSec Information page. This displays the Advanced IKE/IPSec Configuration page. This page shows the current configuration and includes a **Create** button for each category to create new IKE and IPSec definitions.



Current User: superuser

Advanced IKE/IPSec Configuration

Advanced IKE/IPSec Configuration

IKE Peers [Create]

No IKE Peers defined

IKE Proposals [Create]

No IKE Proposals defined

IKE IPSec Proposals [Create]

No IPSec Proposals defined

IKE IPSec Policies [Create]

No IPSec Policies defined

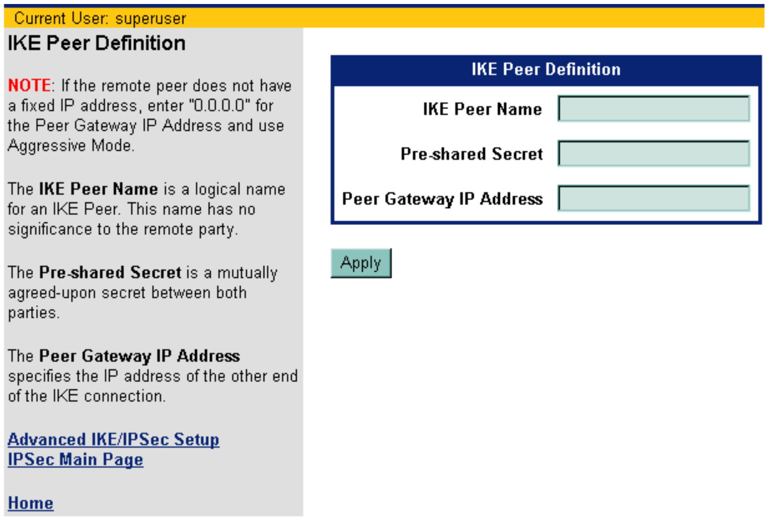
This section describes how to perform the following tasks:

IKE Peers	Create IKE peers. IKE peers are those devices known to your ADSL Internal Modem as capable of participating in IKE connections.
IKE Proposals	Create IKE proposals. IKE I proposals specify how packets will be encrypted/authenticated for Phase I.
IKE IPSec Proposals	Create IKE IPSec proposals. IKE IPSec proposals specify how packets will be encrypted/authenticated for the final SA.
IKE IPSec Policies	Create IKE IPSec policies. IPSec policies are criteria for packets that IPSec will recognize, and actions that IPSec will take upon recognition.

IKE Peers Definition

IKE peers are those devices known to your internal modem as capable of participating in IKE connections. To define a new IKE Peer:

1. Click **Create** next to IKE Peers from the Advanced IKE/IPSec Setup page. This displays the IKE Peer Definition page.



Current User: superuser

IKE Peer Definition

NOTE: If the remote peer does not have a fixed IP address, enter "0.0.0.0" for the Peer Gateway IP Address and use Aggressive Mode.

The **IKE Peer Name** is a logical name for an IKE Peer. This name has no significance to the remote party.

The **Pre-shared Secret** is a mutually agreed-upon secret between both parties.

The **Peer Gateway IP Address** specifies the IP address of the other end of the IKE connection.

Advanced IKE/IPSec Setup
IPSec Main Page

Home

IKE Peer Definition	
IKE Peer Name	
Pre-shared Secret	
Peer Gateway IP Address	

2. In **IKE Peer Name**, enter a logical name for an IKE Peer. This name is of no importance to the remote IKE peer. Choose a name that is meaningful to you.

3. In **Pre-shared Secret**, enter a case-sensitive character string used for authentication. This secret can be up to 256 characters, with no spaces or non-printable characters. The pre-shared secret must be mutually agreed upon by both parties to the IKE connection.

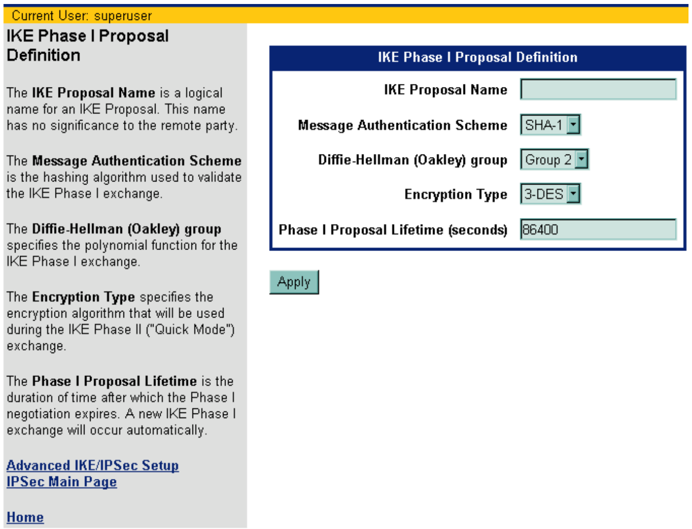
4. In **Peer Gateway IP Address**, enter the IP address of the gateway at the remote end of the IKE connection. If the remote IKE peer does not have a fixed or permanent IP address, enter “0.0.0.0” to use Aggressive Mode in Phase 1 negotiations. (Your system supports two Phase 1 IKE modes: Main and Aggressive. Use Main Mode when both the source and destination IP addresses are known and use Aggressive Mode when either the source or destination IP addresses could change.)

5. Click **Apply**.

IKE Proposals Definition

IKE I proposals specify how packets will be encrypted/authenticated for Phase I. To define a new IKE proposal:

1. Click **Create** next to IKE Proposals from the Advanced IKE/IPSec Setup page. This displays the IKE Proposal Definition page.



Current User: superuser

IKE Phase I Proposal Definition

The **IKE Proposal Name** is a logical name for an IKE Proposal. This name has no significance to the remote party.

The **Message Authentication Scheme** is the hashing algorithm used to validate the IKE Phase I exchange.

The **Diffie-Hellman (Oakley) group** specifies the polynomial function for the IKE Phase I exchange.

The **Encryption Type** specifies the encryption algorithm that will be used during the IKE Phase II ("Quick Mode") exchange.

The **Phase I Proposal Lifetime** is the duration of time after which the Phase I negotiation expires. A new IKE Phase I exchange will occur automatically.

Advanced IKE/IPSec Setup
IPSec Main Page

Home

IKE Phase I Proposal Definition

IKE Proposal Name	
Message Authentication Scheme	SHA-1
Diffie-Hellman (Oakley) group	Group 2
Encryption Type	3-DES
Phase I Proposal Lifetime (seconds)	86400

2. In **IKE Proposal Name**, enter a logical name for the IKE Proposal Definition. This name is of no importance to the remote IKE peer.
3. From the **Message Authentication Scheme** drop-down menu, select one of the following hashing (authentication) options to use to validate IKE Phase I exchange:
   - **MD5**: Performs message authentication using Message Digest 5.
   - **SHA1**: Performs message authentication using Secure Hashing Algorithm 1 (default).
4. From the **Diffie-Hellman (Oakley) Group** drop-down menu, select one of the following Diffie-Hellman key generation groups to use during IKE Phase I exchange:
   - **Group 1**: Uses Diffie-Hellman Group 1 (768 bits).
   - **Group 2**: Uses Diffie-Hellman Group 2 (1024 bits).
5. From the **Encryption Type** drop-down menu, select one of the following encryption types to use during IKE Phase II (Quick Mode) exchange:
   - **DES**: Encrypts using a 56-bit key.
   - **3DES**: Encrypts using three 56-bit keys to produce 168-bit encryption.
6. In **Phase I Proposal Lifetime**, enter the number of seconds after which the Phase I negotiation expires. The default is 1800 seconds. Once this time is elapsed, the system will renegotiate the IKE connection.
7. Click **Apply**.

IKE IPSec Proposals Definition

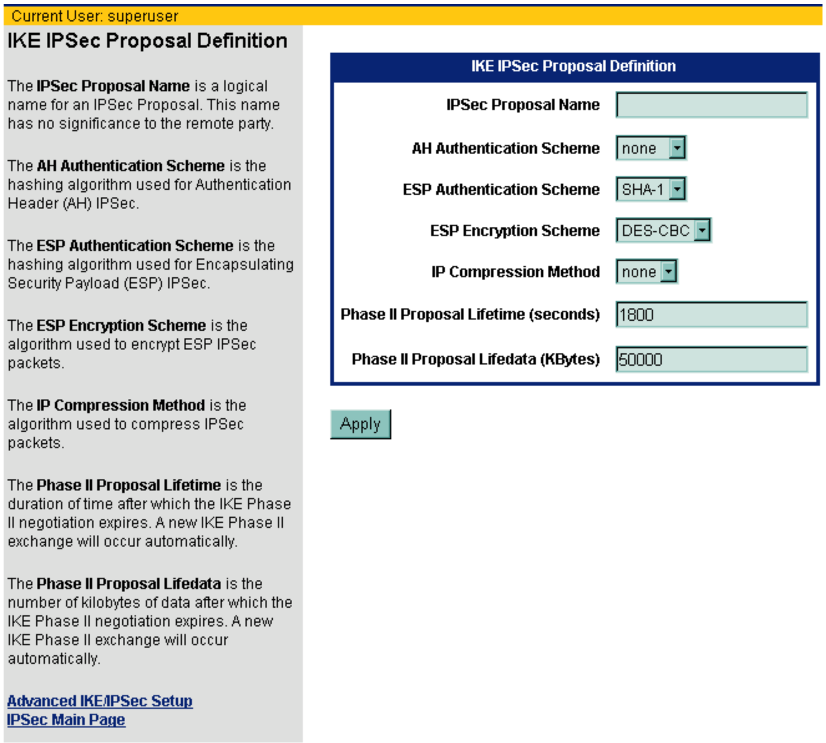
IKE IPSec Proposals specify how packets will be encrypted/authenticated for the final SA. IPSec uses SAs (Security Associations) for making connections between two devices. An SA is an instance of a security policy and keying material applied to a data flow. SAs are negotiated between the two connection endpoints and contain information on sequence numbering.

An IPSec SA is unidirectional, applying to only one direction of data flow, so a set of SAs is needed for a secure connection. For each security protocol used, one SA is needed for each direction (inbound and outbound).

An IPSec connection uses a security protocol (AH or ESP) that authenticates the sender of each data packet. Usually, only one security protocol is used for a connection, so the connection would use two SAs (one inbound and one outbound). However, it is possible for the same connection to be configured to use both the ESP and the AH protocol. In this case, four SAs would be required (one inbound and one outbound for the AH protocol, and one inbound and one outbound for the ESP protocol.

To define a new IKE IPSec proposal:

1. Click **Create** next to IKE IPSec Proposals from the Advanced IKE/IPSec Setup page. This displays the IKE IPSec Proposal Definition page.



Current User: superuser

IKE IPSec Proposal Definition

The **IPSec Proposal Name** is a logical name for an IPSec Proposal. This name has no significance to the remote party.

The **AH Authentication Scheme** is the hashing algorithm used for Authentication Header (AH) IPSec.

The **ESP Authentication Scheme** is the hashing algorithm used for Encapsulating Security Payload (ESP) IPSec.

The **ESP Encryption Scheme** is the algorithm used to encrypt ESP IPSec packets.

The **IP Compression Method** is the algorithm used to compress IPSec packets.

The **Phase II Proposal Lifetime** is the duration of time after which the IKE Phase II negotiation expires. A new IKE Phase II exchange will occur automatically.

The **Phase II Proposal Lifedata** is the number of kilobytes of data after which the IKE Phase II negotiation expires. A new IKE Phase II exchange will occur automatically.

Advanced IKE/IPSec Setup
IPSec Main Page

IKE IPSec Proposal Definition

IPSec Proposal Name	
AH Authentication Scheme	none
ESP Authentication Scheme	SHA-1
ESP Encryption Scheme	DES-CBC
IP Compression Method	none
Phase II Proposal Lifetime (seconds)	1800
Phase II Proposal Lifedata (KBytes)	50000

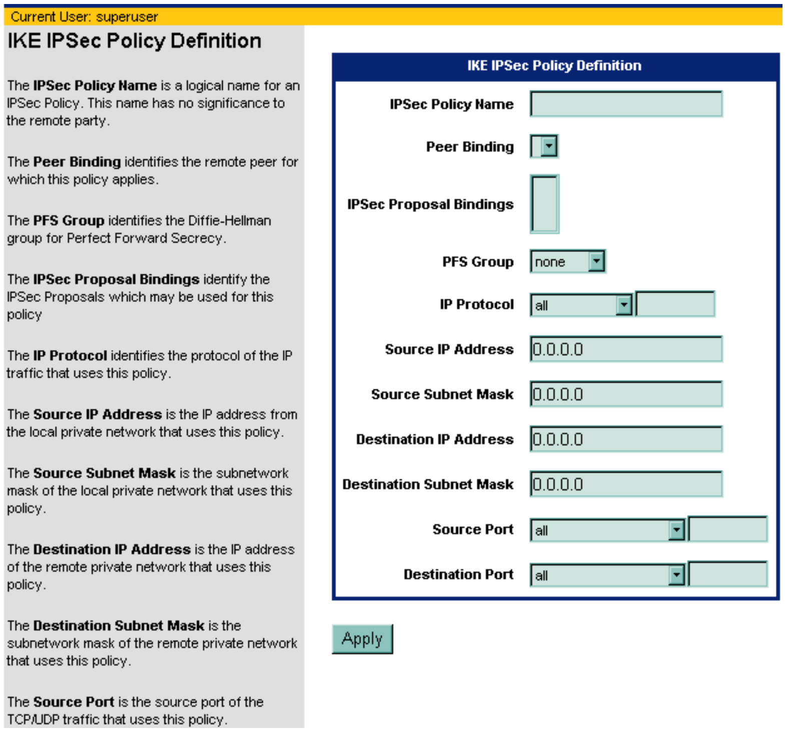
2. In **IPSec Proposal Name**, enter the logical name for the IKE IPSec Proposal Definition. This name is of no importance to the remote IKE peer.

3. Select one of the following security protocols:
   - AH (Authentication Header) method, a security protocol that authenticates the sender of each data packet. If the AH protocol is selected, only packet authentication can be performed, not encryption. To select AH as the authentication method, select one of the following to use as the hashing algorithm for AH authentication from the AH Authentication Scheme drop-down menu:
     - NONE: Requests no AH encapsulation.
     - MD5: Requests AH encapsulation and authenticates using Message Digest 5.
     - SHA1: Requests AH encapsulation and authenticates using Secure Hashing Algorithm 1.
   - ESP (Encapsulating Security Payload) method, a security protocol that completely encapsulates and optionally encrypts user data and/or authenticates the sender of each data packet. If the ESP protocol is selected, encryption, authentication, or both encryption and authentication can be performed.. To select ESP as the authentication method, select one of the following to use as the hashing algorithm hashing algorithm for ESP authentication from the ESP Authentication Scheme drop-down menu.
     - NONE: Requests no ESP encapsulation.
     - MD5: Requests ESP encapsulation and authenticates using Message Digest 5.
     - SHA1: Requests ESP encapsulation and authenticates using Secure Hashing Algorithm 1.
4. If you selected ESP authentication, select one of the following from the ESP Encryption Type drop-down menu to specify the algorithm to use to encrypt ESP IPSec packets:
   - DES: Encrypts using a 56-bit key.
   - 3DES: Encrypts using three 56-bit keys to produce 168-bit encryption.
   - NULL: ESP encapsulation, but no data encryption. ESP encapsulation verifies the source, but data is sent in the clear to increase throughput.
   - NONE: No ESP encapsulation and no encryption is used.
5. From the **IP Compression Method** drop-down menu, select one of the following to specify the algorithm to to use to compress IPSec packets: **LZS IP compressio**n or **None**.
6. In **Phase II Proposal Lifetime**, enter the number of seconds after the IPSec SA expires. The default is 1800 seconds. Once this time is elapsed, the system will renegotiate the IKE connection.
7. In **Phase II Proposal Life Data**, enter the amount of data, measured in kilobytes, before the IPSec SA terminates. After the specified quantity of data has been transferred, the system will renegotiate the IKE connection. If zero is entered, the data quantity will be unlimited. By setting a limit on the amount of data transferred, the risk of a key becoming compromised is reduced.
8. Click **Apply**.

IKE IPSec Policies Definition

IPSec policies are criteria for packets that IPSec will recognize, and actions that IPSec will take upon recognition. To define a new IKE IPSec policy:

1. Click **Create** next to IKE IPSec Policies from the Advanced IKE/IPSec Setup page. This displays the IKE IPSec Policy Definition page.



Current User: superuser

IKE IPSec Policy Definition

The **IPSec Policy Name** is a logical name for an IPSec Policy. This name has no significance to the remote party.

The **Peer Binding** identifies the remote peer for which this policy applies.

The **PFS Group** identifies the Diffie-Hellman group for Perfect Forward Secrecy.

The **IPSec Proposal Bindings** identify the IPSec Proposals which may be used for this policy

The **IP Protocol** identifies the protocol of the IP traffic that uses this policy.

The **Source IP Address** is the IP address from the local private network that uses this policy.

The **Source Subnet Mask** is the subnetwork mask of the local private network that uses this policy.

The **Destination IP Address** is the IP address of the remote private network that uses this policy.

The **Destination Subnet Mask** is the subnetwork mask of the remote private network that uses this policy.

The **Source Port** is the source port of the TCP/UDP traffic that uses this policy.

IKE IPSec Policy Definition	
IPSec Policy Name	
Peer Binding	
IPSec Proposal Bindings	
PFS Group	none
IP Protocol	all
Source IP Address	0.0.0.0
Source Subnet Mask	0.0.0.0
Destination IP Address	0.0.0.0
Destination Subnet Mask	0.0.0.0
Source Port	all
Destination Port	all

2. In **IPSec Policy Name,** enter a logical name for the IPSec policy. The name specified is of no consequence to the other IPSec party.
3. From the **Peer Binding** drop-down menu, select the remote IKE peer to which this policy will apply. This peer must already be defined as an IKE Peer.
4. From the **IPSec Proposal Bindings** drop-down menu, select the IKE IPSec proposal to be used with this policy. The IKE IPSec proposal must be already defined as an IKE IPSec Proposal.
5. From the **PFS Group** drop-down menu, select one of the following the Diffie-Hellman group to use for Perfect Forward Secrecy. Perfect Forward Secrecy enhances the security of the key exchange. In the event of a key becoming compromised, only the data protected by that compromised key becomes vulnerable:
   - **None**
   - **Group 1**: Uses Diffie-Hellman Group 1 (768 bits).
   - **Group 2**: Uses Diffie-Hellman Group 2 (1024 bits).
6. From the **IP Protocol** drop-down menu, select the protocol of the IP traffic that uses this policy.
7. In **Source IP Address**, enter the IP address of the local area network that will use this policy. This will usually be the IP address assigned to the network local to your router.
8. In **Source Subnet Mask**, enter the subnet mask of the local area network that will use this policy. This will usually be the subnet mask assigned to the network local to your router.

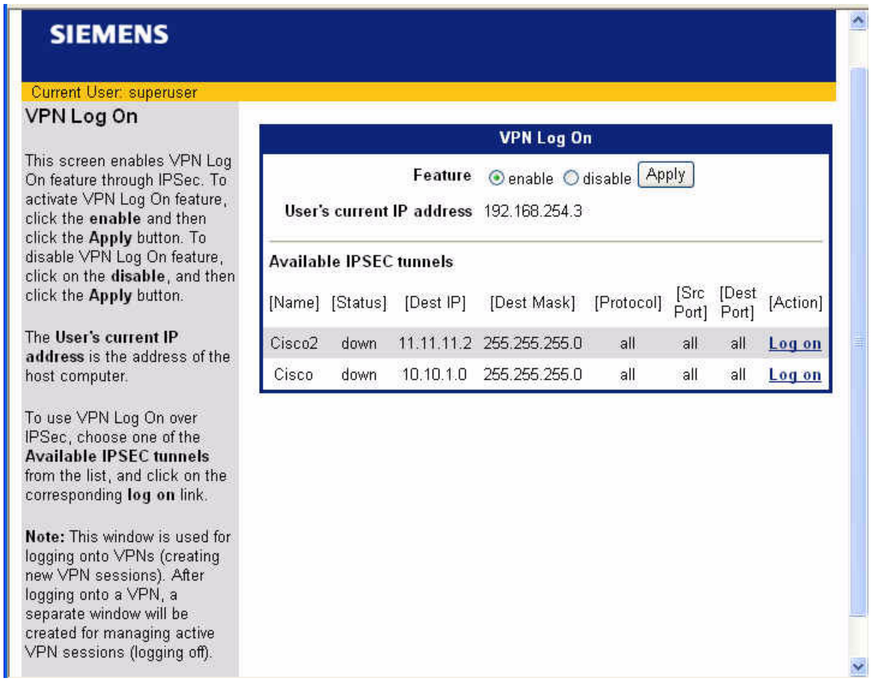
9. In **Destination IP Address**, enter the IP address of the remote private network to which your router will connect using this policy.
10. In **Destination Subnet Mask**, enter the subnet mask of the remote private network to which your router will connect using this policy.
11. In **Source Port**, enter the port that will be the source of TCP/UDP traffic under this policy. You can specify All ports, a port number, or an IP application associated with a particular port. Because port numbers are TCP and UDP specific, a port filter is effective only when the protocol filter is TCP or UDP.
12. In **Destination Port**, enter the port that will be the destination of TCP/UDP traffic under this policy. You can specify All ports, a port number, or an IP application associated with a particular port.
13. Click **Apply**.

VPN Log On

VPN Log On starts an IPSec session. IPSec sessions are initiated through Security Associations (SAs), which allow peers to negotiate a common set of security attributes that assures source authenticity, data integrity and confidentiality of IP packets, providing the level of security required by Virtual Private Networks (VPNs).

To start an IPSec session:

1. Click **VPN Log On** on the left navigation pane of the Router Information page. This displays the VPN Log On page.



Current User: superuser

VPN Log On

This screen enables VPN Log On feature through IPSec. To activate VPN Log On feature, click the **enable** and then click the **Apply** button. To disable VPN Log On feature, click on the **disable**, and then click the **Apply** button.

The **User's current IP address** is the address of the host computer.

To use VPN Log On over IPSec, choose one of the **Available IPSEC tunnels** from the list, and click on the corresponding **log on** link.

Note: This window is used for logging onto VPNs (creating new VPN sessions). After logging onto a VPN, a separate window will be created for managing active VPN sessions (logging off).

VPN Log On

Feature ● enable ○ disable Apply

User's current IP address 192.168.254.3

Available IPSEC tunnels

[Name]	[Status]	[Dest IP]	[Dest Mask]	[Protocol]	[Src Port]	[Dest Port]	[Action]
Cisco2	down	11.11.11.2	255.255.255.0	all	all	all	Log on
Cisco	down	10.10.1.0	255.255.255.0	all	all	all	Log on

2. For **Feature**, click **enable**.
3. For **Available IPSEC tunnels**, select the tunnel you wish to use for the IPSec session.
4. Click **Log on** corresponding to the tunnel you selected.

You must keep the VPN Logon window open to remian logged into the VPN over IPSec. Do not close the window until you have finished using the tunnel.

Chapter 7

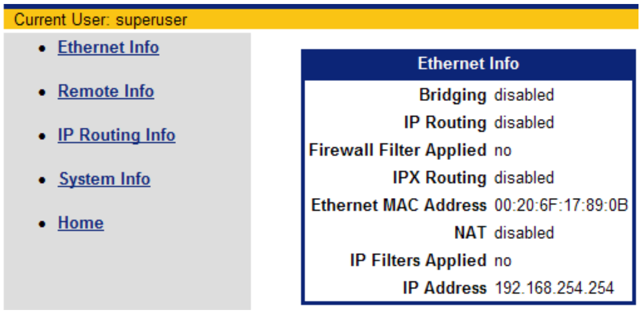
Monitoring Router

This chapter describes how to monitor the health of your router connections. Router health can be monitored using the following functions.

System Summary	View status and statistical information.
Diagnostics	Run diagnostic programs to determine potential problems.

System Summary

To view system summary information, click **System Summary** on the left navigation pane of the Router Information page. This displays the System Summary page.



Current User: superuser

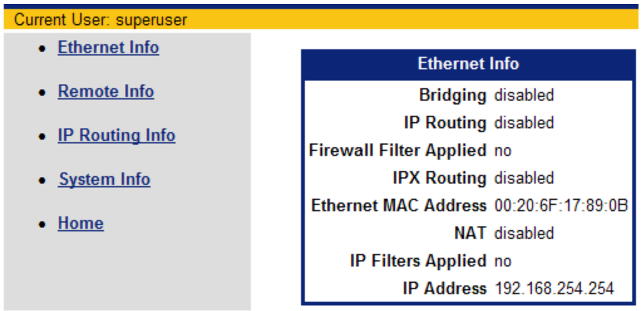
Ethernet Info	
Bridging	disabled
IP Routing	disabled
Firewall Filter Applied	no
IPX Routing	disabled
Ethernet MAC Address	00:20:6F:17:89:0B
NAT	disabled
IP Filters Applied	no
IP Address	192.168.254.254

From the System Summary page, you can view information for the following:

- Ethernet interface
- Remote connections
- IP Routing
- System

Ethernet Interface Information

Click **Ethernet Info** on the left navigation pane of the System Summary page to display information about the Ethernet interface.

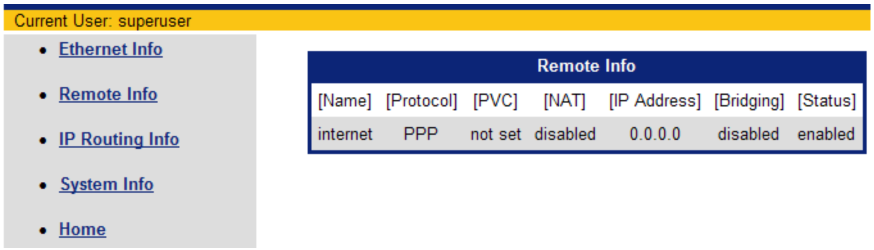


Current User: superuser

Ethernet Info	
Bridging	disabled
IP Routing	disabled
Firewall Filter Applied	no
IPX Routing	disabled
Ethernet MAC Address	00:20:6F:17:89:0B
NAT	disabled
IP Filters Applied	no
IP Address	192.168.254.254

Remote Connection Information

Click **Remote Info** on the left navigation pane of the System Summary page to display information about remote connections for all entries in the Remote Router database.



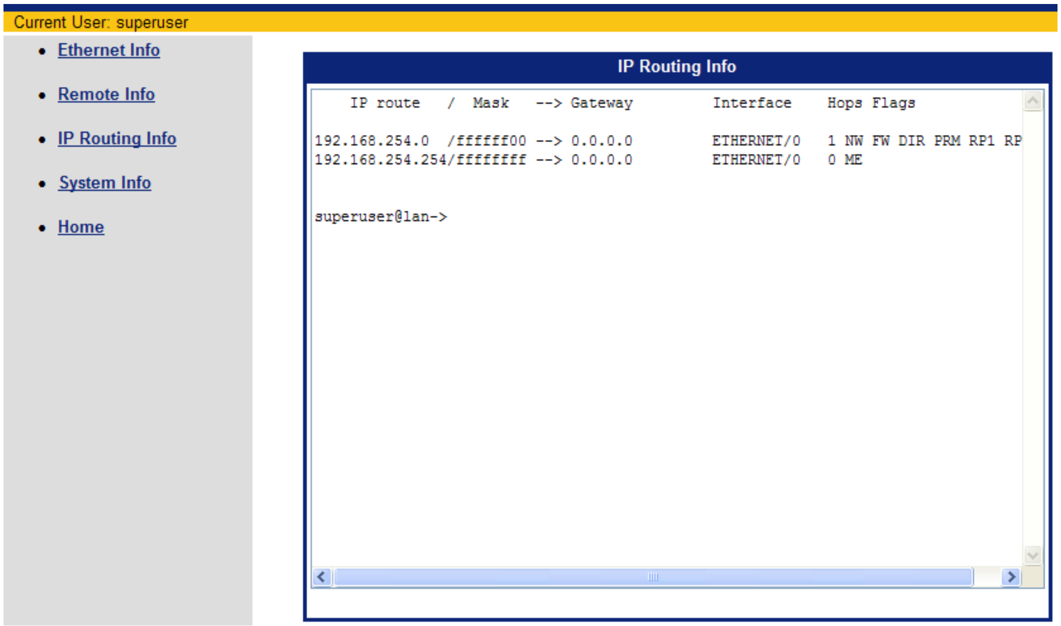
Current User: superuser

Remote Info

[Name]	[Protocol]	[PVC]	[NAT]	[IP Address]	[Bridging]	[Status]
internet	PPP	not set	disabled	0.0.0.0	disabled	enabled

IP Routing Information

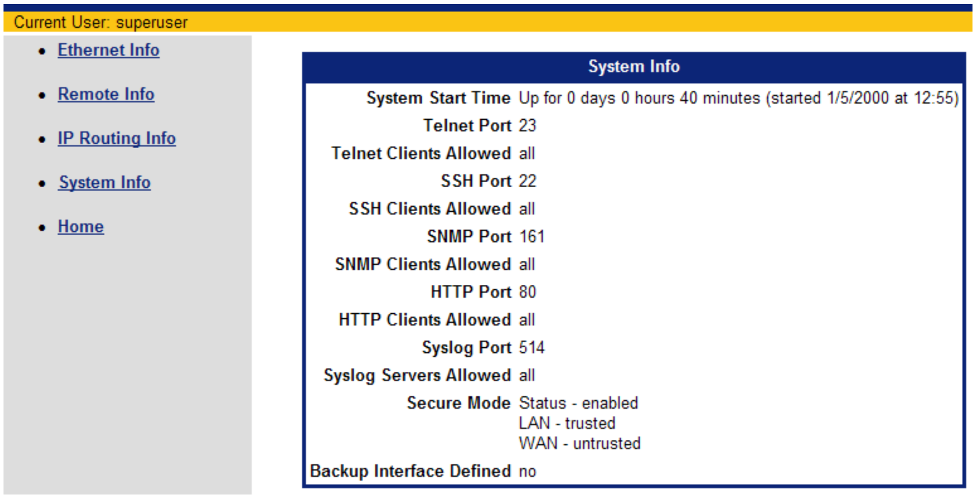
Click **IP Routing Info** on the left navigation pane of the System Summary page to display information about the active interfaces in the IP routing table.



```
   IP route   /  Mask   --> Gateway         Interface    Hops Flags

192.168.254.0  /ffffff00 --> 0.0.0.0         ETHERNET/0   1 NW FW DIR PRM RP1 RP
192.168.254.254/ffffffff --> 0.0.0.0         ETHERNET/0   0 ME


superuser@lan->
```

System Information

Click **System Info** on the left navigation pane of the System Summary page to display general information for select system settings.

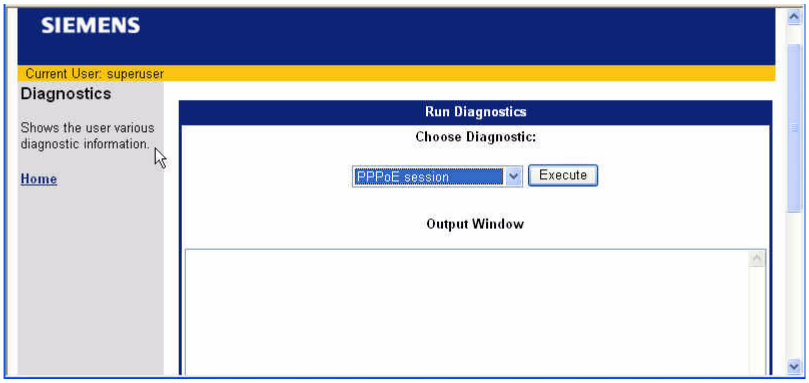


System Info

System Start Time	Up for 0 days 0 hours 40 minutes (started 1/5/2000 at 12:55)
Telnet Port	23
Telnet Clients Allowed	all
SSH Port	22
SSH Clients Allowed	all
SNMP Port	161
SNMP Clients Allowed	all
HTTP Port	80
HTTP Clients Allowed	all
Syslog Port	514
Syslog Servers Allowed	all
Secure Mode	Status - enabled LAN - trusted WAN - untrusted
Backup Interface Defined	no

Diagnostics

The Diagnostic feature provides information about various components of your system that might help in diagnosing a problem. To run diagnostics, click **Diagnostics** on the left navigation pane of the Router Information page. This displays the Run Diagnostics page.



Current User: superuser

Diagnostics

Shows the user various diagnostic information.

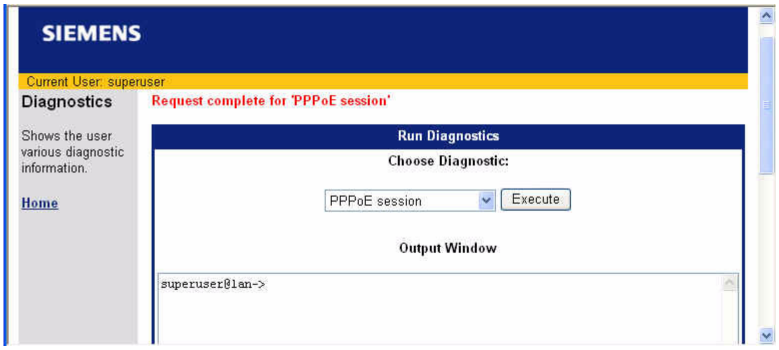
Choose Diagnostic: PPPoE session

From the Run Diagnostics page, you can view information for the following:

- PPPoE session
- Interface information
- ATM statistics
- Routing Table information
- Files information
- Memory usage
- List all configuration data
- TCP/IP statistics

PPPoE Session

Select **PPPoE session** from the drop down menu and click **Execute** to display PPPoE session information. This option is available only if you have a PPPoE session configured.



Current User: superuser

Diagnostics

Request complete for 'PPPoE session'

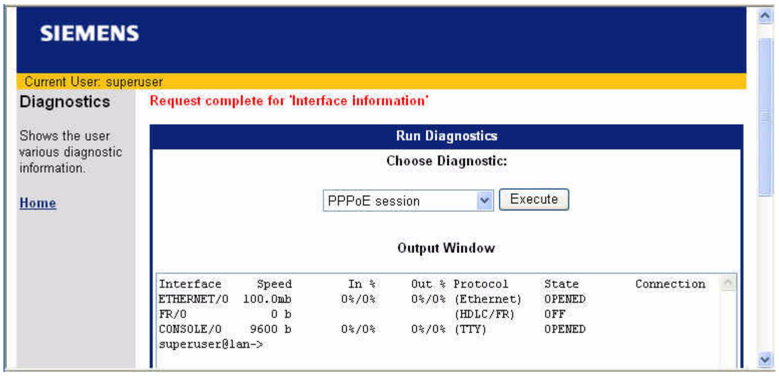
Shows the user various diagnostic information.

Choose Diagnostic: PPPoE session

```
superuser@lan->
```

Interface Information

Select **Interface information** from the drop down menu and click **Execute** to display interface information.

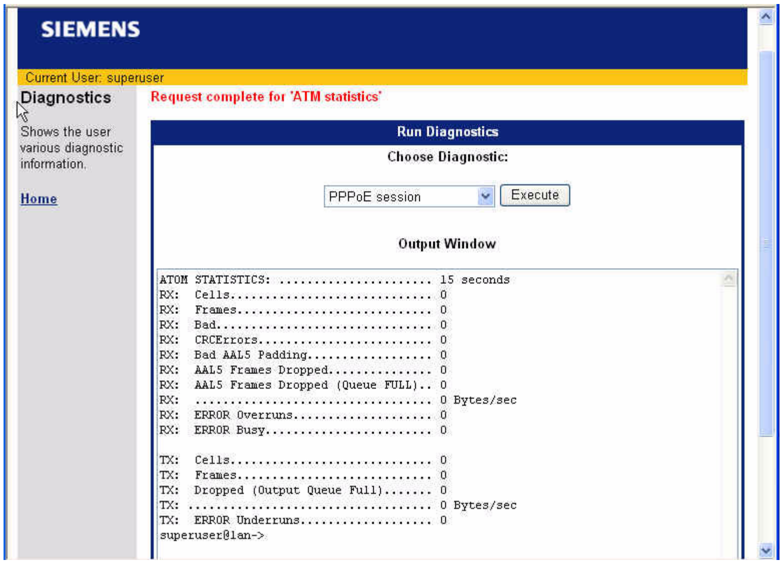


Request complete for 'Interface Information'

```
Interface     Speed          In %       Out % Protocol      State        Connection
ETHERNET/0   100.0mb        0%/0%       0%/0% (Ethernet)    OPENED
FR/0            0 b                           (HDLC/FR)     OFF
CONSOLE/0     9600 b        0%/0%       0%/0% (TTY)         OPENED
superuser@lan->
```

ATM Statistics

Select **ATM Statistics** from the drop down menu and click **Execute** to display ATM statistics.

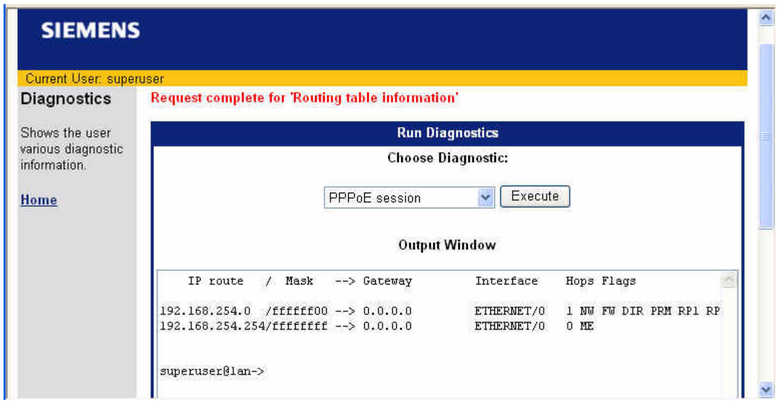


Request complete for 'ATM statistics'

```
ATOM STATISTICS: ...................... 15 seconds
RX:  Cells............................. 0
RX:  Frames............................ 0
RX:  Bad............................... 0
RX:  CRCErrors......................... 0
RX:  Bad AAL5 Padding.................. 0
RX:  AAL5 Frames Dropped............... 0
RX:  AAL5 Frames Dropped (Queue FULL).. 0
RX:  .................................. 0 Bytes/sec
RX:  ERROR Overruns.................... 0
RX:  ERROR Busy........................ 0

TX:  Cells............................. 0
TX:  Frames............................ 0
TX:  Dropped (Output Queue Full)....... 0
TX: ................................... 0 Bytes/sec
TX:  ERROR Underruns................... 0
superuser@lan->
```

Routing Table Information

Select **Routing Table information** from the drop down menu and click **Execute** to display information about the configured routing tables.

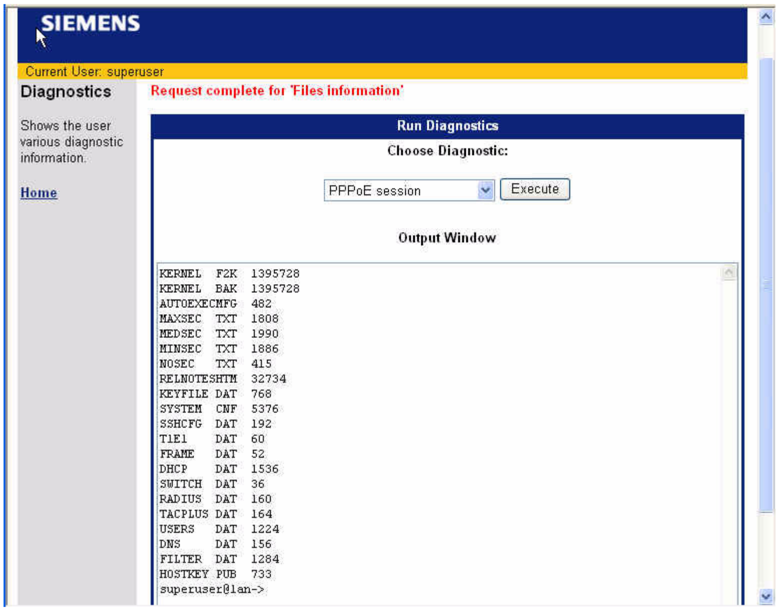


Request complete for 'Routing table information'

```
    IP route   /  Mask   --> Gateway          Interface    Hops Flags

192.168.254.0  /ffffff00 --> 0.0.0.0          ETHERNET/0   1 NW FW DIR PRM RP1 RP
192.168.254.254/ffffffff --> 0.0.0.0          ETHERNET/0   0 ME


superuser@lan->
```

Files Information

Select **Files information** from the drop down menu and click **Execute** to display files store on the router.

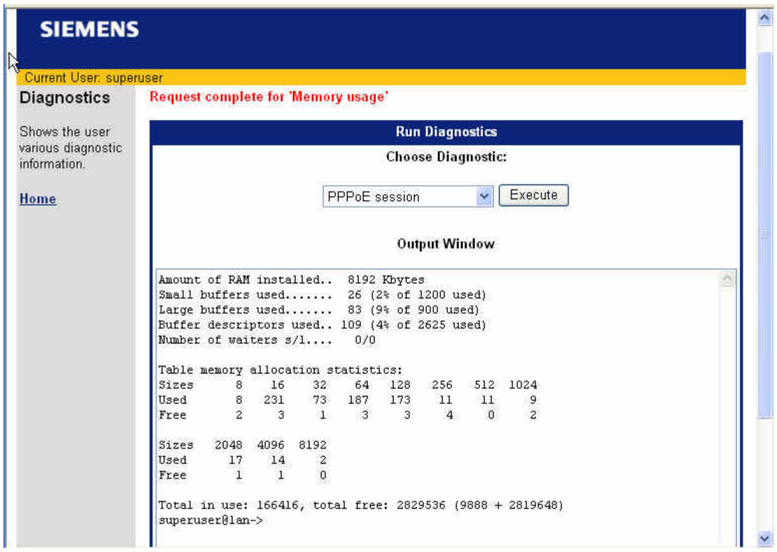


Request complete for 'Files information'

```
KERNEL  F2K  1395728
KERNEL  BAK  1395728
AUTOEXECMFG  482
MAXSEC  TXT  1808
MEDSEC  TXT  1990
MINSEC  TXT  1886
NOSEC   TXT  415
RELNOTESHTM  32734
KEYFILE DAT  768
SYSTEM  CNF  5376
SSHCFG  DAT  192
T1E1    DAT  60
FRAME   DAT  52
DHCP    DAT  1536
SWITCH  DAT  36
RADIUS  DAT  160
TACPLUS DAT  164
USERS   DAT  1224
DNS     DAT  156
FILTER  DAT  1284
HOSTKEY PUB  733
superuser@lan->
```

Memory Usage

Select **Memory usage** from the drop down menu and click **Execute** to display memory usage information.

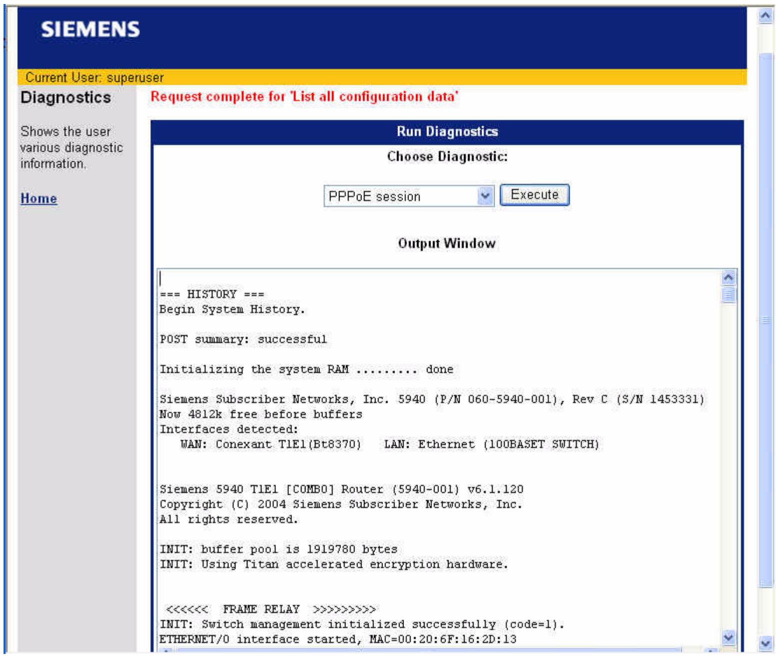


Request complete for 'Memory usage'

```
Amount of RAM installed..  8192 Kbytes
Small buffers used.......  26 (2% of 1200 used)
Large buffers used.......  83 (9% of 900 used)
Buffer descriptors used.. 109 (4% of 2625 used)
Number of waiters s/l....   0/0

Table memory allocation statistics:
Sizes       8     16     32     64    128    256    512   1024
Used        8    231     73    187    173     11     11      9
Free        2      3      1      3      3      4      0      2

Sizes    2048   4096   8192
Used       17     14      2
Free        1      1      0

Total in use: 166416, total free: 2829536 (9888 + 2819648)
superuser@lan->
```

List All Configuration Data

Select **List all configuration data** from the drop down menu and click **Execute** to display configuration information.

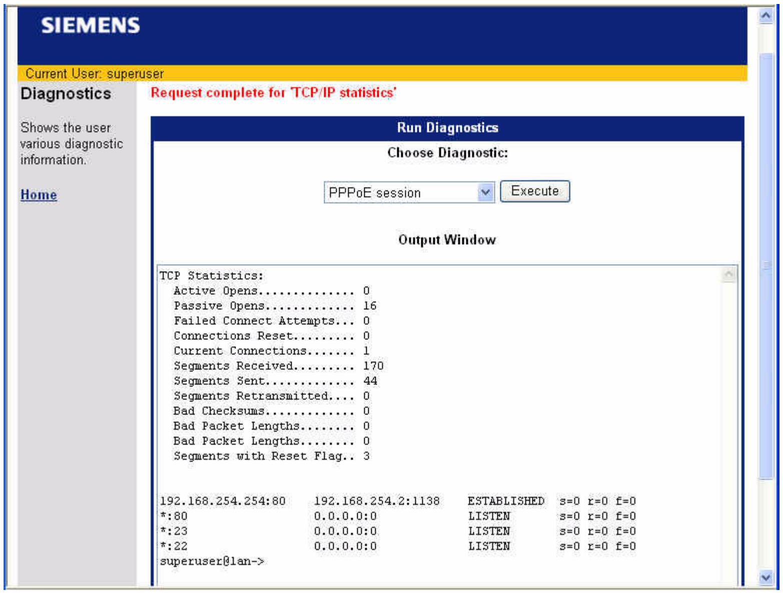


Request complete for 'List all configuration data'

```
=== HISTORY ===
Begin System History.

POST summary: successful

Initializing the system RAM ......... done

Siemens Subscriber Networks, Inc. 5940 (P/N 060-5940-001), Rev C (S/N 1453331)
Now 4812k free before buffers
Interfaces detected:
   WAN: Conexant T1E1(Bt8370)   LAN: Ethernet (100BASET SWITCH)


Siemens 5940 T1E1 [COMBO] Router (5940-001) v6.1.120
Copyright (C) 2004 Siemens Subscriber Networks, Inc.
All rights reserved.

INIT: buffer pool is 1919780 bytes
INIT: Using Titan accelerated encryption hardware.


 <<<<<<  FRAME RELAY  >>>>>>>>>
INIT: Switch management initialized successfully (code=1).
ETHERNET/0 interface started, MAC=00:20:6F:16:2D:13
```

TCP/IP Statistics

Select **TCP/IP statistics** from the drop down menu and click **Execute** to display TCP/IP information.



Request complete for 'TCP/IP statistics'

```
TCP Statistics:
  Active Opens............. 0
  Passive Opens............ 16
  Failed Connect Attempts... 0
  Connections Reset......... 0
  Current Connections....... 1
  Segments Received......... 170
  Segments Sent............. 44
  Segments Retransmitted.... 0
  Bad Checksums............. 0
  Bad Packet Lengths........ 0
  Bad Packet Lengths........ 0
  Segments with Reset Flag.. 3


192.168.254.254:80    192.168.254.2:1138    ESTABLISHED  s=0 r=0 f=0
*:80                  0.0.0.0:0             LISTEN       s=0 r=0 f=0
*:23                  0.0.0.0:0             LISTEN       s=0 r=0 f=0
*:22                  0.0.0.0:0             LISTEN       s=0 r=0 f=0
superuser@lan->
```