Nortel Business Secure Router 222 Configuration — Advanced

BSR222

Business Secure Router

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NORTEL

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Preface

Before you begin

This guide is designed to assist you with advanced configuration of your Business Secure Router for its various applications.

Note: This guide explains how to use the System Management Terminal (SMT) or the command interpreter interface to configure your Business Secure Router. See the basic manual for how to use the WebGUI to configure your Business Secure Router. Not all features can be configured through all interfaces.

The SMT parts of this manual contain background information solely on features not configurable by the WebGUI. The WebGUI parts of the basic manual contain background information on features configurable by the WebGUI and the SMT.

Text conventions

This guide uses the following text conventions:

Enter means for you to type one or more characters and press the [ENTER] key. Select or Choose means for you to use one of the predefined choices.
The SMT menu titles and labels are written in **Bold Times New Roman** font.
Menu choices are written in **Bold Arial** font.

A single keystroke is written in Arial font and enclosed in square brackets, for instance, [ENTER] means the Enter key; [ESC] means the escape key and [SPACE BAR] means the space bar. [UP] and [DOWN] are the up and down arrow keys.
Mouse action sequences are denoted using a comma. For example, “click the **Apple** icon, **Control Panels** and then **Modem**” means first click the **Apple** icon, then point your mouse pointer to **Control Panels** and then click **Modem**.

Related publications

For more information about using the Business Secure Router VPN Switch, refer to the following publications:

- *Nortel Business Secure Router 222 — Fundamentals* (NN47922-301)

  The Fundamentals guide is designed to help you get up and running right away. It contains connection information and instructions on getting started.

- *Nortel Business Secure Router 222 Configuration — Basics* (NN47922-500)

  The basic manual covers how to use the WebGUI to configure your Business Secure Router.

- *WebGUI Online Help*

  Embedded WebGUI help for descriptions of individual screens and supplementary information

Hard-copy technical manuals

You can print selected technical manuals and release notes free, directly from the Internet. Go to www.nortel.com/documentation. Find the product for which you need documentation. Then locate the specific category and model or version for your hardware or software product. Use Adobe Reader to open the manuals and release notes, search for the sections you need, and print them on most standard printers. Go to Adobe Systems at www.adobe.com to download a free copy of the Adobe Reader.

How to get help

If you do not see an appropriate number in this list, go to www.nortel.com/cs.

USA and Canada Authorized Distributors

Technical Support - GNTS/GNPS

Telephone:
1-800-4NORTEL (1-800-466-7835)

If you already have a PIN Code, you can enter Express Routing Code (ERC) 196#. If you do not yet have a PIN Code, or for general questions and first line support, you can enter ERC 338#.

Web Site:
www.nortel.com/cs

Presales Support (CSAN)

Telephone:
1-800-4NORTEL (1-800-466-7835)

Use Express Routing Code (ERC) 1063#

EMEA (Europe, Middle East, Africa)

Technical Support - CTAS

Telephone:
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European Alternative:

United Kingdom	+44 (0)870-907-9009
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Israel	800-945-9779

Calls are not free from all countries in Europe, Middle East, or Africa.

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Thailand	001-800-611-3007
Service Business Centre & Pre-Sales Help Desk	+61-2-8870-5511

Chapter 1
Getting to know your Nortel Business Secure Router 222

This chapter introduces the main features and applications of the Business Secure Router.

Introducing the Nortel Business Secure Router 222

The Nortel Business Secure Router 222 is an ideal secure gateway for all data passing between the Internet and the Local Area Network (LAN).

By integrating Network Address Translation (NAT), firewall and Virtual Private Network (VPN) capability, the Business Secure Router is a complete security solution that protects your Intranet and efficiently manages data traffic on your network.

The embedded WebGUI assists in easy setup and management of the Business Secure Router via an Internet browser.

Features

This section lists the key features of the Business Secure Router.

Table 1 Feature Specifications

Feature	Specification
Number of static routes	12
Number of NAT sessions	4096
Number of SUA servers	12

Table 1 Feature Specifications

Feature	Specification
Number of address mapping rules	10
Maximum number of VPN IP Policies	60
Maximum number of concurrent VPN IPSec Connections	60
Number of IP pools can be used to assign IP addresses to remote users for VPN client termination	3
Number of configurable split networks for VPN client termination	16
Number of configurable inverse split networks for VPN client termination	16
Number of configurable subnets per split network for VPN client termination	64

Physical features

4-Port switch

A combination of switch and router makes your Nortel Business Secure Router 222 a cost effective and viable network solution. You can connect up to four computers or phones to the Business Secure Router without the cost of a switch. Use a switch to add more than four computers or phones to your LAN.

Autonegotiating 10/100 Mb/s Ethernet LAN

The LAN interfaces automatically detect if they are on a 10 or a 100 Mb/s Ethernet.

Autosensing 10/100 Mb/s Ethernet LAN

The LAN interfaces automatically adjust to either a crossover or straight through Ethernet cable.

Autonegotiating 10/100 Mb/s Ethernet WAN

The 10/100 Mb/s Ethernet WAN port attaches to the Internet via broadband modem or router and automatically detects if it is on a 10 or a 100 Mb/s Ethernet.

Auxiliary port

The Business Secure Router uses the same port for console management and for an auxiliary WAN backup. The AUX port can be used in reserve as a traditional dial-up connection when or if ever the broadband connection to the WAN port fails.

Time and date

Using the Business Secure Router, you can get the current time and date from an external server when you turn on your Business Secure Router. You can also set the time manually.

Reset button

The Business Secure Router reset button is built into the rear panel. Use this button to restart the Business Secure Router or restore the factory default password to PlsChgMe!, IP address to 192.168.1.1, subnet mask to 255.255.255.0, and DHCP server enabled with a pool of 126 IP addresses starting at 192.168.1.2.

Nonphysical features

IPSec VPN capability

Establish Virtual Private Network (VPN) tunnels to connect home or office computers to your company network using data encryption and the Internet; thus providing secure communications without the expense of leased site-to-site lines. VPN is based on the IPSec standard and is fully interoperable with other IPSec-based VPN products.

Nortel Contivity Client Termination

The Business Secure Router supports VPN connections from computers using Nortel Contivity VPN Client 3.0, 5.01, 5.11, 6.01, 6.02, or 7.01 software.

Certificates

The Business Secure Router can use certificates (also called digital IDs) to authenticate users. Certificates are based on public-private key pairs. Certificates provide a way to exchange public keys for use in authentication.

SSH

The Business Secure Router uses the SSH (Secure Shell) secure communication protocol to provide secure encrypted communication between two hosts over an unsecured network.

HTTPS

HyperText Transfer Protocol over Secure Socket Layer, or HTTP over SSL is a web protocol that encrypts and decrypts web sessions. Use HTTPS for secure WebGUI access to the Business Secure Router.

IEEE 802.1x for network security

The Business Secure Router supports the IEEE 802.1x standard for user authentication. With the local user profile in the Business Secure Router, you can configure up 32 user profiles without a network authentication server. In addition, centralized user and accounting management is possible on an optional network authentication server.

Firewall

The Business Secure Router has a stateful inspection firewall with DoS (Denial of Service) protection. By default, when the firewall is activated, all incoming traffic from the WAN to the LAN is blocked unless it is initiated from the LAN. The Business Secure Router firewall supports TCP/UDP inspection, DoS detection and protection, real time alerts, reports and logs.

Brute force password guessing protection

The Business Secure Router has a special protection mechanism to discourage brute force password guessing attacks on the Business Secure Router's management interfaces. You can specify a wait time that must expire before you can enter a fourth password after entering three incorrect passwords.

Content filtering

The Business Secure Router can block web features such as ActiveX controls, Java applets, and cookies, as well as disable web proxies. The Business Secure Router can block specific URLs by using the keyword feature. The administrator can also define time periods and days during which content filtering is enabled.

Packet filtering

The packet filtering mechanism blocks unwanted traffic from entering or leaving your network.

Universal Plug and Play (UPnP)

Using the standard TCP/IP protocol, the Business Secure Router and other UPnP-enabled devices can dynamically join a network, obtain an IP address, and convey its capabilities to other devices on the network.

Call scheduling

Configure call time periods to restrict and allow access for users on remote nodes.

PPPoE

PPPoE facilitates the interaction of a host with an Internet modem to achieve access to high-speed data networks via a familiar dial-up networking user interface.

PPTP Encapsulation

Point-to-Point Tunneling Protocol (PPTP) is a network protocol that enables secure transfer of data from a remote client to a private server, creating a Virtual Private Network (VPN) using a TCP/IP-based network.

PPTP supports on-demand, multiprotocol, and virtual private networking over public networks, such as the Internet. The Business Secure Router supports one PPTP server connection at any given time.

Dynamic DNS support

With Dynamic DNS (Domain Name System) support, you can have a static host name alias for a dynamic IP address, so the host is more easily accessible from various locations on the Internet. You must register for this service with a Dynamic DNS service provider.

IP Multicast

The Business Secure Router can use IP multicast to deliver IP packets to a specific group of hosts. IGMP (Internet Group Management Protocol) is the protocol used to support multicast groups. The Business Secure Router supports versions 1 and 2.

IP Alias

Using IP Alias, you can partition a physical network into logical networks over the same Ethernet interface. The Business Secure Router supports three logical LAN interfaces via its single physical Ethernet LAN interface with the Business Secure Router itself as the gateway for each LAN network.

Central Network Management

With Central Network Management (CNM), an enterprise or service provider network administrator can manage your Business Secure Router. The enterprise or service provider network administrator can configure your Business Secure Router, perform firmware upgrades, and do troubleshooting for you.

SNMP

SNMP (Simple Network Management Protocol) is a protocol used for exchanging management information between network devices. SNMP is a member of the TCP/IP protocol suite. Your Business Secure Router supports SNMP agent functionality, which means that a manager station can manage and monitor the Business Secure Router through the network. The Business Secure Router supports SNMP versions 1 and 2 (SNMPv1 and SNMPv2).

Network Address Translation (NAT)

NAT (Network Address Translation — NAT, RFC 1631) translate multiple IP addresses used within one network to different IP addresses known within another network.

Traffic Redirect

Traffic Redirect forwards WAN traffic to a backup gateway when the Business Secure Router cannot connect to the Internet, thus acting as an auxiliary backup when your regular WAN connection fails.

Port Forwarding

Use this feature to forward incoming service requests to a server on your local network. You can enter a single port number or a range of port numbers to be forwarded, and the local IP address of the desired server.

DHCP (Dynamic Host Configuration Protocol)

With DHCP (Dynamic Host Configuration Protocol), individual client computers can obtain the TCP/IP configuration at start-up from a centralized DHCP server. The Business Secure Router has built in DHCP server capability, enabled by default, which means it can assign IP addresses, an IP default gateway, and DNS servers to all systems that support the DHCP client. The Business Secure Router can also act as a surrogate DHCP server, where it relays IP address assignment from another DHCP server to the clients.

Full network management

The embedded web configurator is an all platform, web based utility that you can use to easily manage and configure the Business Secure Router. Most functions of the Business Secure Router are also software configurable via the SMT (System Management Terminal) interface. The SMT is a menu driven interface that you can access from a terminal emulator through the console port or over a Telnet connection.

Road Runner support

In addition to standard cable modem services, the Business Secure Router supports Time Warner's Road Runner Service.

Logging and tracing

The Business Secure Router supports the following logging and tracing functions to help with management:

- Built in message logging and packet tracing
- Unix syslog facility support

Upgrade Business Secure Router Firmware

The firmware of the Business Secure Router can be upgraded via the console port or the LAN.

Embedded FTP and TFTP Servers

The Business Secure Router's embedded FTP and TFTP Servers enable fast firmware upgrades, as well as configuration file backups and restoration.

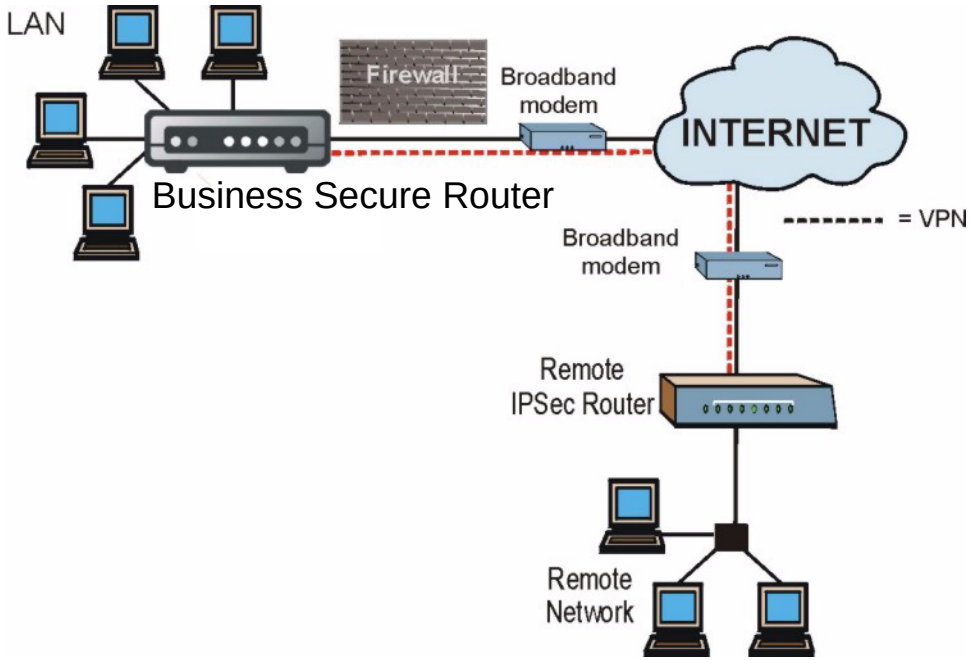
Applications for the Nortel Business Secure Router 222

Secure broadband internet access and VPN

You can connect a cable, DSL, or other modem to the Nortel Business Secure Router 222 via Ethernet WAN port for broadband Internet access. The Business Secure Router also provides IP address sharing and a firewall protected local network with traffic management.

VPN is an ideal, cost effective way to connect branch offices and business partners over the Internet without the need (and expense) of leased lines between sites. The LAN computers can share the VPN tunnels for secure connections to remote computers.

Figure 1 Secure Internet Access and VPN Application



Hardware Setup

Refer to *Nortel Business Secure Router 222 — Fundamentals* (NN47922-301) for hardware connection instructions.

Note: To keep the Business Secure Router operating at optimal internal temperature, keep the bottom, sides, and rear clear of obstructions and away from the exhaust of other equipment.

After installing your Nortel Business Secure Router 222, continue with the rest of this guide for configuration instructions.

Chapter 2
Introducing the SMT

This chapter explains how to access the System Management Terminal and gives an overview of its menus.

Introduction to the SMT

The Business Secure Router SMT (System Management Terminal) is a menu-driven interface that you can access from a terminal emulator through the console port or over a Telnet connection. This chapter shows you how to access the SMT (System Management Terminal) menus via the console port, how to navigate the SMT, and how to configure SMT menus.

Accessing the SMT via the console port

Make sure you have the physical connection properly set up as described in the hardware installation chapter.

When configuring using the console port, you need a computer equipped with communications software configured to the following parameters:

- VT100 terminal emulation
- 9 600 baud
- No parity, 8 data bits, 1 stop bit, flow control set to none

Initial screen

When you turn on your Business Secure Router, it performs several internal tests as well as line initialization.

After the tests, the Business Secure Router asks you to press [ENTER] to continue, as shown in Figure 2.

Figure 2 Initial screen

```
initialize ch =0, ethernet address: 00:A0:C5:22:1A:03
initialize ch =1, ethernet address: 00:A0:C5:22:1A:04
Press ENTER to continue...
```

Logging on to the SMT

The logon screen appears after you press [ENTER], prompting you to enter the username, as shown in Figure 3.

Type the username (nnadmin is the default) and press [ENTER].

The logon screen prompts you to enter the password.

Figure 3 SMT Login

```
Enter Username : XXXX

Enter Password : XXXX
```

Type the password (PlsChgMe! is the default) and press [ENTER]. As you type the password, the screen displays an X for each character you type.

Note that if there is no activity for longer than five minutes after you log on, your Business Secure Router will automatically log you off and display a blank screen. If you see a blank screen, press [ENTER] to bring up the logon screen again.

Navigating the SMT interface

The SMT is an interface that you use to configure your Business Secure Router.

Table 2 lists several operations you must be familiar with before attempting to modify the configuration.

Table 2 Main menu commands

Operations	Keystrokes	Descriptions
Move down to another menu	[ENTER]	To move forward to a submenu, type in the number of the desired submenu and press [ENTER].
Move up to a previous menu	[ESC]	Press the [ESC] key to move back to the previous menu.
Move to a “hidden” menu	Press [SPACE BAR] to change **No** to **Yes** then press [ENTER].	Fields beginning with “Edit” lead to hidden menus and have a default setting of **No**. Press [SPACE BAR] to change **No** to **Yes**, and then press [ENTER] to go to a “hidden” menu.
Move the cursor	[ENTER] or [UP] or [DOWN] arrow keys	Within a menu, press [ENTER] to move to the next field. You can also use the [UP] or [DOWN] arrow keys to move to the previous or the next fields, respectively. When you are at the top of a menu, press the [UP] arrow key to move to the bottom of a menu.
Entering information	Fill in, or press [SPACE BAR], then press [ENTER] to select from choices.	There are two types of fields. The first requires you to type in the appropriate information. The second allows you to cycle through the available choices by pressing [SPACE BAR].
Required fields	<? >	All fields with the symbol <?> must be filled in order be able to save the new configuration.
N/A fields	<N/A>	Some of the fields in the SMT will show a <N/A>. This symbol refers to an option that is Not Applicable.
Save your configuration	[ENTER]	Save your configuration by pressing [ENTER] at the message “Press ENTER to confirm or ESC to cancel”. Saving the data on the screen will take you, in most cases, to the previous menu. Make sure you save your settings in each screen that you configure.
Exit the SMT	Type 99, then press [ENTER].	Type 99 at the main menu prompt and press [ENTER] to exit the SMT interface.

Main menu

After you enter the password, the SMT displays the Business Secure Router **Main Menu**, as shown in Figure 4. Not all models have all the features shown.

Figure 4 Main menu

```
                    Business Secure Router Main Menu

Getting Started                     Advanced Management

     1. General Setup                 21. Filter and Firewall Setup
     2. WAN Setup                     22. SNMP Configuration
     3. LAN Setup                     23. System Security
     4. Internet Access Setup         24. System Maintenance
                                      26. Schedule Setup

     Advanced Applications
     11. Remote Node Setup
     12. Static Routing Setup
     14. Dial-in User Setup
     15. NAT Setup                    99.Exit

Enter Menu Selection Number:
```

Table 3 describes the fields in Figure 4.

Table 3 Main menu summary

No.	Menu Title	Function
1	General Setup	Use this menu to set up dynamic DNS and administrative information.
2	WAN Setup	Use this menu to clone a MAC address from a computer on your LAN and configure the backup WAN dial-up connection.
3	LAN Setup	Use this menu to apply LAN filters, configure LAN DHCP and TCP/IP settings.
4	Internet Access Setup	Configure your Internet Access setup (Internet address, gateway IP address, and logon) with this menu.
11	Remote Node Setup	Use this menu to configure detailed remote node settings (your ISP is also a remote node) as well as apply WAN filters.
12	Static Routing Setup	Configure IP static routes in this menu.
14	Dial-in User Setup	Use this menu to configure the Dial-in User information
15	NAT Setup	Use this menu to configure Network Address Translation.
21	Filter and Firewall Setup	Configure filters, activate or deactivate the firewall, and view the firewall log.

Table 3 Main menu summary

No.	Menu Title	Function
22	SNMP Configuration	Use this menu to configure SNMP-related parameters.
23	System Security	Use this menu to change your password and enable network user authentication.
24	System Maintenance	From displaying system status to uploading firmware, this menu provides comprehensive system maintenance.
26	Schedule Setup	Use this menu to schedule outgoing calls.
99	Exit	Use this menu to exit (necessary for remote configuration).

Changing the system password

To change the Business Secure Router administrator password:.

1. From the main menu, enter 23 to display **Menu 23 – System Security**.
2. Enter 1 to display **Menu 23.1 – System Security – Change Password**.

Figure 5 Menu 23.1 System Security: Change Password

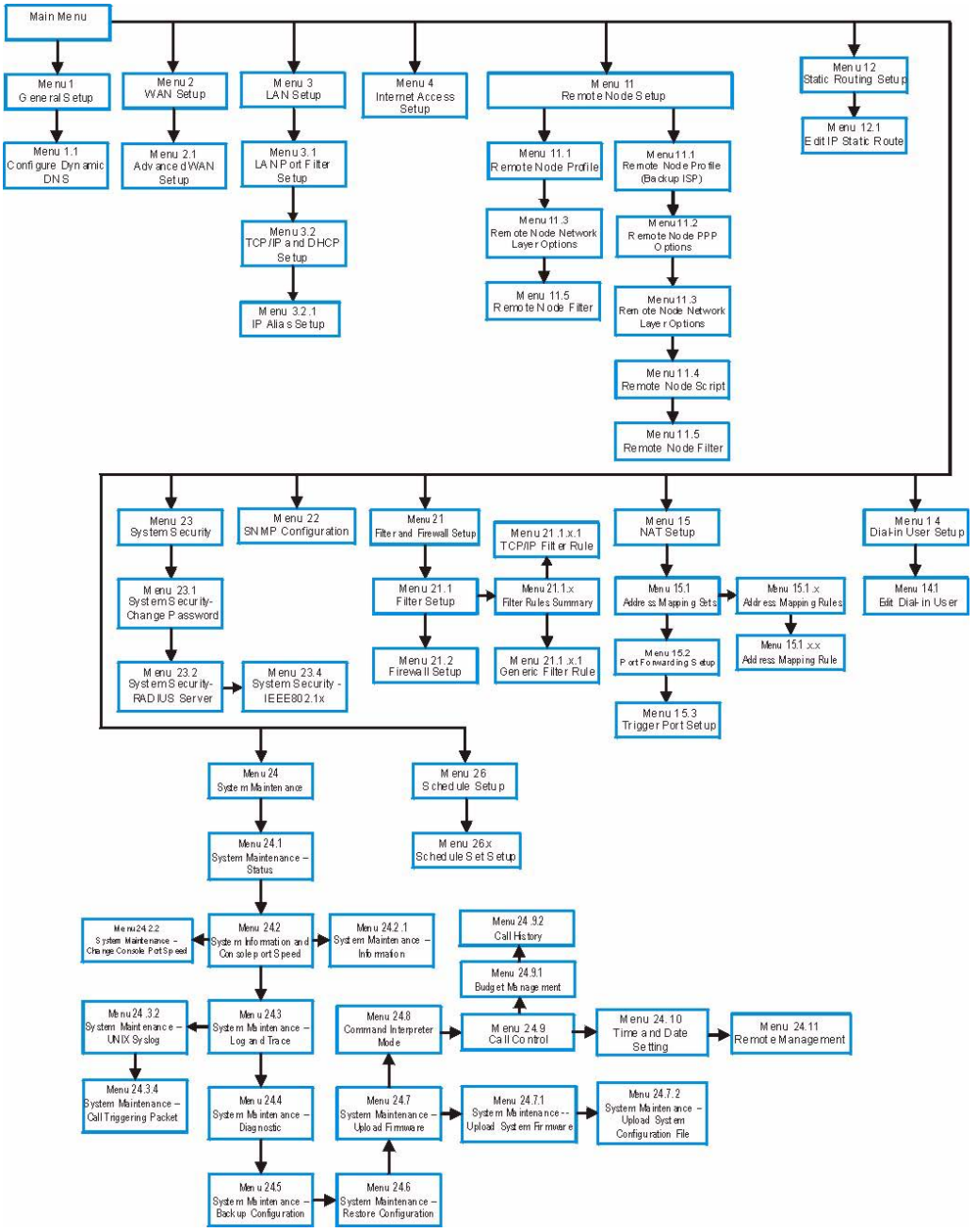
```
Menu 23.1 – System Security – Change Password
   Old Password= ****
   New Password= ?
   Retype to confirm= ?
    Enter here to CONFIRM or ESC to CANCEL:
```

3. Type your existing system password in the **Old Password** field, and press [ENTER].
4. Type your new system password in the **New Password** field (up to 30 characters), and press [ENTER].
5. Retype your new system password in the **Retype to confirm** field for confirmation and press [ENTER].

Note that as you type a password, the screen displays an asterisk * for each character you type.

SMT menus at a glance

Figure 6 SMT overview



SMT menu 1 - general setup

Introduction to general setup

Menu 1 - general setup contains administrative and system-related information.

Configuring general setup

Enter 1 in the main menu to open **Menu 1: general setup**.

The **Menu 1 - General Setup** screen appears, as shown in Figure 7. Fill in the required fields.

Figure 7 menu 1: general setup

```
Menu 1 - General Setup

System Name= Business Secure Router
Domain Name= www.nortel.com
First System DNS Server= From ISP
        IP Address= N/A
   Second System DNS Server= From ISP
IP Address= N/A
Third System DNS Server= From ISP
     IP Address= N/A
Edit Dynamic DNS= No
```

Press ENTER to confirm or ESC to cancel:

Table 4 describes the fields in Figure 7.

Table 4 General setup menu fields

Field	Description	Example
System name	Choose a descriptive name for identification purposes. Nortel recommends you enter your computer name in this field. This name can be up to 30 alphanumeric characters long. Spaces, dashes - and underscores _ are accepted.	Business Secure Router
Domain name	Enter the domain name (if you know it) here. If you leave this field blank, the ISP assigns a domain name via DHCP. You can go to menu 24.8 and type sys domain name to see the current domain name used by your router. The domain name entered by you is given priority over the ISP-assigned domain name. If you want to clear this field just press [SPACE BAR] and then [ENTER].	nortel.com

Table 4 General setup menu fields

Field	Description	Example
First system DNS server Second system DNS server Third system DNS server	DNS (Domain Name System) is for mapping a domain name to its corresponding IP address and vice versa. The DNS server is extremely important because without it, you must know the IP address of a machine before you can access it. The Business Secure Router uses a system DNS server (in the order you specify here) to resolve domain names for VPN, DDNS and the time server. Press [SPACE BAR] and then [ENTER] to select an option. Select **From ISP** if your ISP dynamically assigns DNS server information (and the Business Secure Router's WAN IP address). The **IP Address** field below displays the (read-only) DNS server IP address that the ISP assigns. If you chose **From ISP**, but the Business Secure Router has a fixed WAN IP address, **From ISP** changes to **None** after you save your changes. If you select **From ISP** for the second or third DNS server, but the ISP does not provide a second or third IP address, **From ISP** changes to **None** after you save your changes. Select **User-Defined** if you have the IP address of a DNS server. The IP address can be public or a private address on your local LAN. Enter the DNS server's IP address in the field to the right. A **User-Defined** entry with the IP address set to 0.0.0.0 changes to **None** after you save your changes. A duplicate **User-Defined** entry changes to **None** after you save your changes. Select **None** if you do not want to configure DNS servers. If you do not configure a system DNS server, you must use IP addresses when configuring VPN, DDNS and the time server. Select **Private DNS** if the DNS server has a private IP address and is located behind a VPN peer. Enter the DNS server IP address in the field to the right. With a private DNS server, you must also configure the first DNS server entry in SMT menu 3.1 to use **DNS Relay**.	

Table 4 General setup menu fields

Field	Description	Example
	You must also configure a VPN branch office rule since the Business Secure Router uses a VPN tunnel when it relays DNS queries to the private DNS server. One of the rule's IP policies must include the LAN IP address of the Business Secure Router as a local IP address and the IP address of the DNS server as a remote IP address. A **Private DNS** entry with the IP address set to 0.0.0.0 changes to **None** after you click **Apply**. A duplicate **Private DNS** entry changes to **None** after you save your changes.	
Edit dynamic DNS	Press [SPACE BAR] and then [ENTER] to select **Yes** or **No** (default). Select **Yes** to configure **Menu 1.1: Configure Dynamic DNS,** discussed next.	**No** (default)
	After you complete this menu, press [ENTER] at the prompt "Press ENTER to Confirm…" to save your configuration, or press [ESC] at any time to cancel.	

Configuring dynamic DNS

To configure Dynamic DNS, go to **Menu 1: General Setup** and press [SPACE BAR] to select **Yes** in the **Edit Dynamic DNS** field. Press [ENTER] to display **Menu 1.1— Configure Dynamic DNS** (Figure 8). Not all models have every field shown.

Figure 8 Configure dynamic DNS

```
Menu 1.1 - Configure Dynamic DNS

 Service Provider= WWW.DynDNS.ORG
     Active= No
     DDNS Type= DynamicDNS
     Host Name 1=
     Host Name 2=
     Host Name 3=
     Username=
     Password= ********
     Enable Wildcard Option= No
     Enable Off Line Option= N/A
     IP Address Update Policy:
       DDNS Server Auto Detect IP Address= No
       Use Specified IP Address= No
       Use IP Address= N/A
Press ENTER to confirm or ESC to cancel:
```

Follow the instructions in Table 5 to configure Dynamic DNS parameters.

Table 5 Configure dynamic DNS menu fields

Field	Description	Example
Service Provider	This is the name of your Dynamic DNS service provider.	www.dyndns.org (default)
Active	Press [SPACE BAR] to select **Yes** and then press [ENTER] to make dynamic DNS active.	Yes
DDNS Type	Press [SPACE BAR] and then [ENTER] to select **DynamicDNS** if you have a dynamic IP address. Select **StaticDNS** if you have a static IP address. Select **CustomDNS** to have dyns.org provide DNS service for a domain name that you already have from a source other than dyndns.org.	**DynamicDNS** (default)
Host1-3	Enter your host names in the fields provided. You can specify up to two host names separated by a comma in each field.	me.dyndns.org
EMAIL	Enter your e-mail address.	mail@mailserver
User	Enter your username.	
Password	Enter the password assigned to you.	
Enable Wildcard	Your Business Secure Router supports DYNDNS Wildcard. Press [SPACE BAR] and then [ENTER] to select **Yes** or **No** This field is **N/A** when you choose DDNS client as your service provider.	

Table 5 Configure dynamic DNS menu fields

Field	Description	Example
Offline	This field is only available when **CustomDNS** is selected in the **DDNS Type** field. Press [SPACE BAR] and then [ENTER] to select **Yes**. When **Yes** is selected, http://www.dyndns.org/ traffic is redirected to a URL that you have previously specified (see www.dyndns.org for details).	
IP Address Update Policy:	You can select **Yes** in either the **DDNS Server Auto Detect IP Address** field (recommended) or the **Use Specified IP Address** field, but not both. With the **DDNS Server Auto Detect IP Address** and **Use Specified IP Address** fields both set to **No**, the DDNS server automatically updates the IP address of the host names with the Business Secure Router's WAN IP address. DDNS does not work with a private IP address. When both fields are set to **No**, the Business Secure Router must have a public WAN IP address in order for DDNS to work.	
DDNS Server Auto Detect IP Address	Press [SPACE BAR] to select **Yes** and then press [ENTER] to have the DDNS server automatically update the IP address of the host names with the public IP address that the Business Secure Router uses or is behind. You can set this field to **Yes** whether the IP address is public or private, static or dynamic.	Yes
Use Specified IP Address	Press [SPACE BAR] to select **Yes** and then press [ENTER] to update the IP address of the host names to the IP address specified below. Only select **Yes** if the Business Secure Router uses or is behind a static public IP address.	No
Use IP Address	Enter the static public IP address if you select **Yes** in the **Use Specified IP Address** field.	N/A
	After you complete this menu, press [ENTER] at the prompt "Press ENTER to Confirm…" to save your configuration, or press [ESC] at any time to cancel.	

The IP address updates when you reconfigure menu 1 or perform DHCP client renewal.

Chapter 3
WAN and Dial Backup Setup

This chapter describes how to configure the WAN using menu 2 and dial-backup using menus 2.1 and 11.1.

Introduction to WAN and dial backup setup

This chapter explains how to configure settings for your WAN port and how to configure the Business Secure Router for a dial backup connection.

WAN setup

From the main menu, enter 2 to open menu 2

Figure 9 Menu 2

```
                Menu 2 - WAN Setup
          MAC Address:
            Assigned By= Factory default
            IP Address= N/A
          Dial-Backup:
            Active= No

            Port Speed= 115200
            AT Command String:
              Init= at&fs0=0
            Edit Advanced Setup= No
        Press ENTER to Confirm or ESC to Cancel:
Press Space Bar to Toggle.
```

Table 6 describes the MAC address fields in Figure 9. See Table 7 for descriptions of the dial-backup fields.

Table 6 MAC address cloning in WAN setup

Field	Description	Example
MAC Address		
Assigned By	Press [SPACE BAR] and then [ENTER] to choose one of two methods to assign a MAC Address. Choose **Factory Default** to select the factory-assigned default MAC Address. Choose **IP address attached on LAN** to use the MAC Address of that workstation whose IP you give in the following field.	IP address attached on LAN
IP Address	This field is applicable only if you choose the **IP address attached on LAN** method in the **Assigned By** field. Enter the IP address of the computer on the LAN whose MAC you are cloning.	192.168.1.35
	After you complete this menu, press [ENTER] at the prompt “Press ENTER to Confirm…” to save your configuration, or press [ESC] at any time to cancel.	

Dial backup

The Dial Backup port or CON/AUX port can be used in reserve as a traditional dial-up connection if the broadband connection to the WAN port fail. This feature is not available on all models. To set up the auxiliary port (Dial Backup or CON/AUX) for use in the event that the regular WAN connection is dropped, first make sure you have set up the switch and port connection (see the Hardware Installation chapter), then configure:

- Menu 2 - WAN Setup
- Menu 2.1 - Advanced WAN Setup
- Menu 11.1 - Remote Node Profile (Backup ISP), as shown in Figure 26 on page 87

Refer also to the traffic redirect section for information on an alternate backup WAN connection.

Configuring dial backup in menu 2

From the main menu, enter 2 to open menu 2.

Figure 10 Menu 2: dial backup setup

```
                    Menu 2 - WAN Setup
                MAC Address:
                  Assigned By= Factory default
                  IP Address= N/A
                Dial-Backup:
                  Active= No

                  Port Speed= 115200
                  AT Command String:
                    Init= at&fs0=0
                  Edit Advanced Setup= No
            Press ENTER to Confirm or ESC to Cancel:
Press Space Bar to Toggle.
```

Table 7 describes the fields in Figure 10.

Table 7 Menu 2: dial backup setup

Field	Description	Example
Dial-Backup:		
Active	Use this field to turn the dial-backup feature on (**Yes**) or off (**No**).	No
Port Speed	Press [SPACE BAR] and then press [ENTER] to select the speed of the connection between the Dial Backup port and the external device. Available speeds are: 9 600, 19 200, 38 400, 57 600, 115 200 or 230 400 b/s.	115200
AT Command String:		
Init	Enter the AT command string to initialize the WAN device. Consult the manual of your WAN device connected to your Dial Backup port for specific AT commands.	at&fs0=0

Table 7 Menu 2: dial backup setup

Field	Description	Example
Edit Advanced Setup	To edit the advanced setup for the Dial Backup port, move the cursor to this field; press the [SPACE BAR] to select **Yes** and then press [ENTER] to go to **Menu 2.1: Advanced Setup**.	Yes
	After you complete this menu, press [ENTER] at the prompt “Press ENTER to Confirm…” to save your configuration, or press [ESC] at any time to cancel.	

Advanced WAN setup

Note: Consult the manual of your WAN device connected to your Dial Backup port for specific AT commands

To edit the advanced setup for the Dial Backup port, move the cursor to the **Edit Advanced Setup** field in **Menu 2 - WAN Setup**, press the [SPACE BAR] to select **Yes,** and then press [ENTER].

Figure 11 Menu 2.1 advanced WAN setup

```
          Menu 2.1 - Advanced WAN Setup
AT Command Strings:                  Call Control:
  Dial= atdt                           Dial Timeout(sec)= 60
  Drop= ~~+++~~ath                     Retry Count= 0
  Answer= ata                          Retry Interval(sec)= N/A
                                       Drop Timeout(sec)= 20
Drop DTR When Hang Up= Yes             Call Back Delay(sec)= 15
AT Response Strings:
  CLID= NMBR =
  Called Id=
  Speed= CONNECT
              Press ENTER to Confirm or ESC to Cancel:
```

Table 8 describes the fields in Figure 11.

Table 8 Advanced WAN port setup: AT commands fields

Field	Description	Default
AT Command Strings:		
Dial	Enter the AT Command string to make a call.	atdt
Drop	Enter the AT Command string to drop a call. ~ represents a one second wait. For example, ~~~+++~~ath can be used if your modem has a slow response time.	+++ath
Answer	Enter the AT Command string to answer a call.	ata
Drop DTR When Hang Up	Press the [SPACE BAR] to choose either **Yes** or **No**. When **Yes** is selected (the default), the DTR (Data Terminal Ready) signal is dropped after the “AT Command String: Drop” is sent out.	Yes
AT Response String:		
CLID (Calling Line Identification)	Enter the keyword that precedes the CLID (Calling Line Identification) in the AT response string. This lets the Business Secure Router capture the CLID in the AT response string that comes from the WAN device. CLID is required for CLID authentication.	NMBR =
Called Id	Enter the keyword preceding the dialed number.	TO

Table 8 Advanced WAN port setup: AT commands fields

Field	Description	Default
Speed	Enter the keyword preceding the connection speed.	CONNECT
Call Control		
Dial Timeout (sec)	Enter a number of seconds for the Business Secure Router to keep trying to set up an outgoing call before timing out (stopping). The Business Secure Router times out and stops if it cannot set up an outgoing call within the timeout value.	60 seconds
Retry Count	Enter a number of times for the Business Secure Router to retry a busy or no-answer phone number before blacklisting the number.	0 to disable the blacklist control
Retry Interval (sec)	Enter a number of seconds for the Business Secure Router to wait before trying another call after a call has failed. This applies before a phone number is blacklisted.	
Drop Timeout (sec)	Enter a number of seconds for the Business Secure Router to wait before dropping the DTR signal if it does not receive a positive disconnect confirmation.	20 seconds
Call Back Delay (sec)	Enter a number of seconds for the Business Secure Router to wait between dropping a callback request call and dialing the corresponding callback call.	15 seconds

Remote node profile (Backup ISP)

Enter **2** in **Menu 11 Remote Node Setup** to open **Menu 11.2 Remote Node Profile (Backup ISP)** (Figure 12) and configure the setup for your Dial Backup port connection. This feature is not available on all models.

Figure 12 Menu 11.2 remote node profile (Backup ISP)

```
                Menu 11.2 - Remote Node Profile (Backup ISP)

Rem Node Name= GUI                    Edit PPP Options= No
Active= No                            Rem IP Addr= 0.0.0.0
                                      Edit IP= No
Outgoing:                             Edit Script Options= No
  My Login=
  My Password= ********               Telco Option:
 Retype to Confirm= ********           Allocated Budget(min)= 0
  Authen= CHAP/PAP                        Period(hr)= 0
  Pri Phone #= ?                        Schedules=
  Sec Phone #=                         Nailed-Up Connection= No

                                      Session Options:
                                        Edit Filter Sets= No
                                        Idle Timeout(sec)= 100



                    Press ENTER to Confirm or ESC to Cancel:
Press ENTER to Confirm or ESC to Cancel:
```

Table 10 describes the fields in Figure 12.

Table 9 Fields in menu 11.2 remote node profile (Backup ISP)

Field	Description	Example
Rem Node Name	Enter a descriptive name for the remote node. This field can be up to eight characters.	LAoffice
Active	Press [SPACE BAR] and then [ENTER] to select **Yes** to enable the remote node or **No** to disable the remote node.	Yes
Outgoing		
My Login	Enter the login name assigned by your ISP for this remote node.	jim
My Password	Enter the password assigned by your ISP for this remote node.	*****
Retype to Confirm	Type the password again to make sure you have it correct.	*****

Table 9 Fields in menu 11.2 remote node profile (Backup ISP)

Field	Description	Example
Authen	This field sets the authentication protocol used for outgoing calls. Options for this field are: **CHAP/PAP** - Your Business Secure Router will accept either **CHAP** or **PAP** when requested by this remote node. **CHAP** - accept CHAP only. **PAP** - accept PAP only.	CHAP/PAP
Pri Phone # Sec Phone #	Enter the first (primary) phone number from the ISP for this remote node. If the Primary Phone number is busy or does not answer, your Business Secure Router dials the Secondary Phone number, if available. Some areas require dialing the pound sign # before the phone number for local calls. Include a # symbol at the beginning of the phone numbers as required.	
Edit PPP Options	Move the cursor to this field and use the space bar to select [Yes] and press [Enter] to edit the PPP options for this remote node. This brings you to **Menu 11.2.1 - Remote Node PPP Options** (See “Editing PPP options” on page 62).	**No** (default)
Rem IP Addr	Leave the field set to 0.0.0.0 (default) if the remote gateway has a dynamic IP address. Enter the remote gateway’s IP address here if it is static.	0.0.0.0 (default)
Edit IP	This field leads to a “hidden” menu. Press [SPACE BAR] to select **Yes** and press [ENTER] to go to **Menu 11.2.2 - Remote Node Network Layer Options**. See “Editing TCP/IP options” on page 63 for more information.	**No** (default)
Edit Script Options	Press [SPACE BAR] to select **Yes** and press [ENTER] to edit the AT script for the dial backup remote node (**Menu 11.2.3 - Remote Node Script**). See “Editing logon script” on page 66 for more information.	**No** (default)
Telco Option		
Allocated Budget	Enter the maximum number of minutes that this remote node can be called within the time period configured in the **Period** field. The default for this field is 0, meaning there is no budget control and no time limit for accessing this remote node.	0 (default)
Period(hr)	Enter the time period (in hours) for how often the budget should be reset. For example, to allow calls to this remote node for a maximum of 10 minutes every hour, set the **Allocated Budget** to 10 (minutes) and the **Period** to 1 (hour).	0 (default)

Table 9 Fields in menu 11.2 remote node profile (Backup ISP)

Field	Description	Example
Schedules	You can apply up to four schedule sets here. For more details, refer to Chapter 18, “Call scheduling,” on page 213.	1,3,5
Nailed-Up Connection	Press [SPACE BAR] to select **Yes** to set this connection to always be on, regardless of whether or not there is any traffic. Select **No** to have this connection act as a dial-up connection.	**No** (default)
Session Options		
Edit Filter sets	This field leads to another “hidden” menu. Use [SPACE BAR] to select **Yes** and press [ENTER] to open menu 11.2.4 to edit the filter sets. See “Remote node filter” on page 69 for more details.	**No** (default)
Idle Timeout	Enter the number of seconds of idle time (when there is no traffic from the Business Secure Router to the remote node) that can elapse before the Business Secure Router automatically disconnects the PPP connection. This option only applies when the Business Secure Router initiates the call.	100 seconds (default)
	After you configure this menu, press [ENTER] at the message “Press ENTER to Confirm...” to save your configuration, or press [ESC] at any time to cancel.	

Editing PPP options

The Business Secure Router dial back-up feature uses PPP. To edit the remote node PPP options, move the cursor to the **[Edit PPP Options]** field in **Menu 11.2 - Remote Node Profile**, and use the space bar to select **[Yes].** Press [Enter] to open **Menu 11.2.1** as shown in Figure 13.

Figure 13 Menu 11.2.1: Remote node PPP options

```
Menu 11.2.1 - Remote Node PPP Options
                    Encapsulation= Standard PPP
                    Compression= No
                     Enter here to CONFIRM or ESC to CANCEL:
Press Space Bar to Toggle.
```

Table 10 describes the Remote Node PPP Options Menu, and contains instructions about how to configure the PPP options fields.

Table 10 Remote node PPP options menu fields

FIELD	DESCRIPTION	EXAMPLE
Encapsulation	Press [SPACE BAR] and then [ENTER] to select **CISCO PPP** if your Dial Backup WAN device uses Cisco PPP encapsulation, otherwise select **Standard PPP**.	**Standard PPP** (default)
Compression	Press [SPACE BAR] and then [ENTER] to select **Yes** to enable or **No** to disable Stac compression.	**No** (default)

Editing TCP/IP options

Move the cursor to the **Edit IP** field in menu 11.2, then press [SPACE BAR] to select **Yes**. Press [ENTER] to open **Menu 11.2.2 - Network Layer Options**.

Figure 14 Menu 11.2.2: remote node network layer options

```
Menu 11.2.2 - Remote Node Network Layer Options
                    IP Address Assignment= Dynamic
                    Rem IP Addr= 0.0.0.0
                    Rem Subnet Mask= 0.0.0.0
                    My WAN Addr= 0.0.0.0

                    Network Address Translation= None
                    Metric= 15
                    Private= No
                    RIP Direction= Both
                      Version= RIP-2B
                    Multicast= None

                     Enter here to CONFIRM or ESC to CANCEL:
```

Table 11 describes the fields in Figure 14.

Table 11 Remote node network layer options menu fields

Field	Description	Example
IP Address Assignment	If your ISP did not assign you an explicit IP address, press [SPACE BAR] and then [ENTER] to select **Dynamic**; otherwise select **Static** and enter the IP address & subnet mask in the following fields.	**Dynamic** (default)
Rem IP Address	Leave this field set to 0.0.0.0 to have the ISP or other remote router dynamically (automatically) send its IP address if you do not know it. Enter the remote gateway's IP address here if you know it (static).	0.0.0.0 (default)
Rem Subnet Mask	Leave this field set to 0.0.0.0 to have the ISP or other remote router dynamically send its subnet mask if you do not know it. Enter the remote gateway's subnet mask here if you know it (static).	0.0.0.0 (default)
My WAN Addr	Leave the field set to 0.0.0.0 to have the ISP or other remote router dynamically (automatically) assign your WAN IP address if you do not know it. Enter your WAN IP address here if you know it (static). This is the address assigned to your local Business Secure Router, not the remote router.	0.0.0.0 (default)

Table 11 Remote node network layer options menu fields

Field	Description	Example
Network Address Translation	With Network Address Translation (NAT), you can translate an Internet protocol address used within one network (for example a private IP address used in a local network) to a different IP address known within another network (for example, a public IP address used on the Internet). Press [SPACE BAR] and then [ENTER] to select either **Full Feature, None** or **SUA Only.** Choose **None** to disable NAT**.** Choose **SUA Only** if you have a single public IP address. SUA (Single User Account) is a subset of NAT that supports two types of mapping: **Many-to-One** and **Server**. Choose **Full Feature** if you have multiple public IP addresses. **Full Feature** mapping types include: **One-to-One**, **Many-to-One** (SUA/PAT), **Many-to-Many Overload**, **Many- One-to-One** and **Server**. When you select **Full Feature** you must configure at least one address mapping set! See Chapter 9, “Network Address Translation (NAT),” on page 107 for a full discussion on this feature.	**None** (default)
Metric	Enter a number from 1 to 15 to set this route’s priority. The smaller the number, the higher priority the route has.	15 (default)
Private	This parameter determines if the Business Secure Router includes the route to this remote node in its RIP broadcasts. If set to **Yes**, this route is kept private and not included in RIP broadcasts. If **No**, the route to this remote node is propagated to other hosts through RIP broadcasts.	No (default)
RIP Direction	Press [SPACE BAR] and then [ENTER] to select the **RIP direction** from **Both/ None/In Only/Out Only** and **None**.	**Both** (default)
Version	Press [SPACE BAR] and then [ENTER] to select the RIP version from **RIP-1/RIP-2B/RIP-2M.**	RIP-1
Multicast	IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a Multicast group. The Business Secure Router supports both IGMP version 1 (**IGMP-v1**) and version 2 (**IGMP-v2**). Press the [SPACE BAR] to enable IP Multicasting or select **None** to disable it. See Chapter 4, “LAN setup,” on page 71 for more information on this feature.	**None** (default)
	Once you have completed filling in **Menu 11.2.2 Remote Node Network Layer Options**, press [ENTER] at the message “Press ENTER to Confirm...” to save your configuration and return to menu 11.2, or press [ESC] at any time to cancel.	

Editing logon script

For some remote gateways, text logon is required before PPP negotiation is started. The Business Secure Router provides a script facility for this purpose. The script has six programmable sets; each set is composed of an Expect string and a ‘Send’ string. After matching a message from the server to the ‘Expect’ field, the Business Secure Router returns the set’s Send string to the server.

For instance, a typical logon sequence starts with the server printing a banner, a logon prompt for you to enter the username and a password prompt to enter the password:

```
Welcome to Acme, Inc.
Login: myLogin
Password:
```

To handle the first prompt, you specify ogin: as the Expect string and myLogin as the Send string in set 1. The reason for leaving out the leading L is to avoid having to know exactly whether it is upper or lower case. Similarly, you specify word: as the Expect string and your password as the Send string for the second prompt in set 2.

You can use two variables, $USERNAME and $PASSWORD (all upper case), to represent the actual username and password in the script, so they do not show in clear text. They are replaced with the outgoing login name and password in the remote node when the Business Secure Router sees them in a ‘Send’ string. Note that both variables must be entered exactly as shown. No other characters can appear before or after, either, i.e., they must be used alone in response to logon and password prompts.

Note that the ordering of the sets is significant, i.e., starting from set 1, the Business Secure Router waits until the ‘Expect’ string is matched before it proceeds to set 2, and so on for the rest of the script. When both the ‘Expect’ and the ‘Send’ fields of the current set are empty, the Business Secure Router terminates the script processing and start PPP negotiation. This implies two things: first, the sets must be contiguous; the sets after an empty one are ignored. Second, the last set must match the final message sent by the server. For instance, if the server prints:

login successful.

```
Starting PPP...
```

after you enter the password, then you must create a third set to match the final “PPP...” but without a “Send” string. Otherwise, the Business Secure Router starts PPP prematurely right after sending your password to the server.

If there are errors in the script and it gets stuck at a set for longer than the “Dial Timeout” in menu 2 (default 60 seconds), the Business Secure Router times out and drops the line. To debug a script, go to Menu 24.4 to initiate a manual call and watch the trace display to see if the sequence of messages and prompts from the server differs from what you expect.

Figure 15 Menu 11.2.3: remote node setup script

```
Menu 11.2.3 - Remote Node Script
     Active= No

     Set 1:                                Set 5:
       Expect=                               Expect=
       Send=                                 Send=
     Set 2:                                Set 6:
       Expect=                               Expect=
       Send=                                 Send=
     Set 3:
       Expect=
       Send=
     Set 4:
       Expect=
       Send=
                     Enter here to CONFIRM or ESC to CANCEL:
Press Space Bar to Toggle.
```

Table 12 describes the fields in Figure 15.

Table 12 Menu 11.2.3: remote node script menu fields

Field	Description	Example
Active	Press [SPACE BAR] and then [ENTER] to select either **Yes** to enable the AT strings or **No** to disable them.	No (default)
Set 1-6: Expect	Enter an Expect string to match. After matching the Expect string, the Business Secure Router returns the string in the **Send** field.	
Set 1-6: Send	Enter a string to send out after the Expect string is matched.	0.0.0.0

Remote node filter

Move the cursor to the field **Edit Filter Sets** in menu 11.2, and then press [SPACE BAR] to set the value to **Yes**. Press [ENTER] to open **Menu 11.2.4 - Remote Node Filter**.

Use menu 11.2.4 to specify the filter sets to apply to the incoming and outgoing traffic between this remote node and the Business Secure Router to prevent certain packets from triggering calls. You can specify up to four filter sets separated by commas, for example, 1, 5, 9, 12, in each filter field. Note that spaces are accepted in this field. Refer to Chapter 11, “Filter configuration,” on page 135 for more information about defining the filters.

Figure 16 Menu 11.2.4: dial backup remote node filter

```
Menu 11.2.4 - Remote Node Filter

                    Input Filter Sets:
                      protocol filters=
                        device filters=
                    Output Filter Sets:
                      protocol filters=
                        device filters=
                    Call Filter Sets:
                      protocol filters=
                        device filters=

                     Enter here to CONFIRM or ESC to CANCEL:
```

Chapter 4
LAN setup

This chapter describes how to configure the LAN using **Menu 3: LAN Setup**.

Introduction to LAN setup

This section describes how to configure the Business Secure Router for LAN connections.

Accessing the LAN menus

From the main menu, enter 3 to open **Menu 3 – LAN setup**

Figure 17 Menu 3: LAN setup.

```
Menu 3 - LAN Setup

                1. LAN Port Filter Setup
                2. TCP/IP and DHCP Setup
                      Enter Menu Selection Number:
```

LAN port filter setup

With Menu 3, you can specify the filter sets that you wish to apply to the LAN traffic. You seldom need to filter the LAN traffic, however, the filter sets are useful to block certain packets, reduce traffic, and prevent security breaches.

Figure 18 Menu 3.1: LAN port filter setup

```
Menu 3.1 – LAN Port Filter Setup
Input Filter Sets:
  protocol filters=
    device filters=
Output Filter Sets:
  protocol filters=
    device filters=
Press ENTER to Confirm or ESC to Cancel:
```

TCP/IP and DHCP ethernet setup menu

From the main menu, enter 3 to open **Menu 3 - LAN Setup** to configure TCP/IP (RFC 1155) and DHCP Ethernet setup.

Figure 19 Menu 3: TCP/IP and DHCP setup

```
                Menu 3 - LAN Setup


     1. LAN Port Filter Setup
     2. TCP/IP and DHCP Setup
           Enter Menu Selection Number:
```

From menu 3, select the submenu option **TCP/IP and DHCP Setup** and press [ENTER]. The screen now displays **Menu 3.2: TCP/IP and DHCP Ethernet Setup**, as shown in Figure 20.

Figure 20 Figure 21-4 menu 3.2: TCP/IP and DHCP Ethernet setup

```
                Menu 3.2 - TCP/IP and DHCP Ethernet Setup

     DHCP= Server                          TCP/IP Setup:
     Client IP Pool:
 Starting Address= 192.168.1.2          IP Address= 192.168.1.1
       Size of Client IP Pool= 126 IP Subnet Mask= 255.255.255.0
     First DNS Server= From ISP            RIP Direction= None
       IP Address= N/A                       Version= N/A
     Second DNS Server= From ISP           Multicast= None
       IP Address= N/A                     Edit IP Alias= No
     Third DNS Server= From ISP
       IP Address= N/A
     DHCP Server Address= N/A



                Press ENTER to Confirm or ESC to Cancel:
Press Space Bar to Toggle.
```

Follow the instructions in Table 13 to configure the DHCP fields.

Table 13 DHCP Ethernet setup menu fields

Field	Description	Example
DHCP	This field enables and disables the DHCP server. If set to **Server**, your Business Secure Router will act as a DHCP server. If set to **None**, the DHCP server will be disabled.	Server
Configuration:		
Client IP Pool Starting Address	This field specifies the first of the contiguous addresses in the IP address pool.	192.168.1.2

Table 13 DHCP Ethernet setup menu fields

Field	Description	Example
Size of Client IP Pool	This field specifies the size or count of the IP address pool.	126
First DNS Server Second DNS Server Third DNS Server	The Business Secure Router passes a DNS (Domain Name System) server IP address (in the order you specify here) to the DHCP clients. Select **From ISP** if your ISP dynamically assigns DNS server information (and the Business Secure Router's WAN IP address). The **IP Address** field below displays the (read-only) DNS server IP address that the ISP assigns. If you chose **From ISP**, but the Business Secure Router has a fixed WAN IP address, **From ISP** changes to **None** after you save your changes. If you chose **From ISP** for the second or third DNS server, but the ISP does not provide a second or third IP address, **From ISP** changes to **None** after you save your changes. Select **User-Defined** if you have the IP address of a DNS server. Enter the DNS server's IP address in the **IP Address** field below. If you chose **User-Defined**, but leave the IP address set to 0.0.0.0, **User-Defined** changes to **None** after you save your changes. If you set a second choice to **User-Defined**, and enter the same IP address, the second **User-Defined** changes to **None** after you save your changes. Select **DNS Relay** to have the Business Secure Router act as a DNS proxy. The Business Secure Router's LAN IP address displays in the **IP Address** field below (read-only). The Business Secure Router tells the DHCP clients on the LAN that the Business Secure Router itself is the DNS server. When a computer on the LAN sends a DNS query to the Business Secure Router, the Business Secure Router forwards the query to the Business Secure Router's system DNS server (configured in the **SYSTEM General** screen) and relays the response back to the computer. You can only select **DNS Relay** for one of the three servers; if you select DNS Relay for a second or third DNS server, that choice changes to **None** after you save your changes. Select **None** if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a machine in order to access it.	

Use the instructions in Table 14 to configure TCP/IP parameters for the LAN port.

Table 14 LAN TCP/IP setup menu fields

Field	Description	Example
TCP/IP Setup:		
IP Address	Enter the IP address of your Business Secure Router in dotted decimal notation.	192.168.1.1 (default)
IP Subnet Mask	Your Business Secure Router automatically calculates the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the Business Secure Router.	255.255.255.0
RIP Direction	Press [SPACE BAR] and then [ENTER] to select the RIP direction. Options are: **Both**, **In Only**, **Out Only** or **None**.	Both (default)
Version	Press [SPACE BAR] and then [ENTER] to select the RIP version. Options are: **RIP-1**, **RIP-2B** or **RIP-2M**.	**RIP-1** (default)
Multicast	IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a Multicast group. The Business Secure Router supports both IGMP version 1 (**IGMP-v1**) and version 2 (**IGMP-v2**). Press [SPACE BAR] and then [ENTER] to enable IP Multicasting or select **None** (default) to disable it.	None
Edit IP Alias	The Business Secure Router supports three logical LAN interfaces via its single physical Ethernet interface with the Business Secure Router itself as the gateway for each LAN network. Press [SPACE BAR] to select **Yes** and then press [ENTER] to display menu 3.2.1.	Yes

IP Alias Setup

You must use menu 3.2 to configure the first network. Move the cursor to the **Edit IP Alias** field, press [SPACE BAR] to choose **Yes** and press [ENTER] to configure the second and third network.

Press [ENTER] to open **Menu 3.2.1 - IP Alias Setup**, as shown in Figure 21.

Figure 21 Menu 3.2.1: IP Alias setup

```
Menu 3.2.1 - IP Alias Setup

                    IP Alias 1= No
                      IP Address= N/A
                      IP Subnet Mask= N/A
                      RIP Direction= N/A
                        Version= N/A
                      Incoming protocol filters= N/A
                      Outgoing protocol filters= N/A
                    IP Alias 2= No
                      IP Address= N/A
                      IP Subnet Mask= N/A
                      RIP Direction= N/A
                        Version= N/A
                      Incoming protocol filters= N/A
                      Outgoing protocol filters= N/A

                     Enter here to CONFIRM or ESC to CANCEL:

Press Space Bar to Toggle.
```

Use the instructions in Table 15 to configure IP Alias parameters.s

Table 15 IP Alias setup menu field

Field	Description	Example
IP Alias	Choose **Yes** to configure the LAN network for the Business Secure Router.	Yes
IP Address	Enter the IP address of your Business Secure Router in dotted decimal notation.	192.168.1.1
IP Subnet Mask	Your Business Secure Router automatically calculates the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the Business Secure Router.	255.255.255.0

Table 15 IP Alias setup menu field

Field	Description	Example
RIP Direction	Press [SPACE BAR] and then [ENTER] to select the RIP direction. Options are **Both**, **In Only, Out Only** or **None**.	None
Version	Press [SPACE BAR] and then [ENTER] to select the RIP version. Options are **RIP-1**, **RIP-2B** or **RIP-2M**.	RIP-1
Incoming Protocol Filters	Enter the filter sets you wish to apply to the incoming traffic between this node and the Business Secure Router.	1
Outgoing Protocol Filters	Enter the filter sets you wish to apply to the outgoing traffic between this node and the Business Secure Router.	2

Chapter 5
Internet access

This chapter shows you how to configure your Business Secure Router for Internet access.

Introduction to internet access setup

Use the information from your ISP along with the instructions in this chapter to set up your Business Secure Router to access the Internet. There are three different menu 4 screens, depending on whether you chose **Ethernet, PPTP** or **PPPoE Encapsulation**. Contact your ISP to determine which encapsulation type you should use.

Ethernet encapsulation

If you choose **Ethernet** in menu 4 you will see Figure 22.

Figure 22 Menu 4: internet access setup (Ethernet)

```
Menu 4 - Internet Access Setup

ISP's Name= ChangeMe
Encapsulation= Ethernet
  Service Type= Standard
  My Login= N/A
  My Password= N/A
  Retype to Confirm= N/A
  Login Server IP= N/A

IP Address Assignment= Dynamic
  IP Address= N/A
  IP Subnet Mask= N/A
  Gateway IP Address= N/A
Network Address Translation= SUA Only
Press ENTER to Confirm or ESC to Cancel:
```

Table 16 describes the fields in Figure 22.

Table 16 Menu 4: internet access setup menu fields

Field	Description
ISP’s Name	Enter the name of your Internet Service Provider, e.g., myISP. This information is for identification purposes only.
Encapsulation	Press [SPACE BAR] and then press [ENTER] to choose **Ethernet**. The encapsulation method influences your choices for the **IP Address** field.
Service Type	Press [SPACE BAR] and then [ENTER] to select **Standard**, **RR-Toshiba** (Road Runner Toshiba authentication method), **RR-Manager** (Road Runner Manager authentication method) or **RR-Telstra**. Choose a Road Runner flavor if your ISP is Time Warner's Road Runner; otherwise choose **Standard**.
	DSL users must choose the **Standard** option only. The **My Login**, **My Password** and **Login Server** fields are not applicable in this case.
My Login	Enter the logon name given to you by your ISP.
My Password	Enter the password associated with the login name above.

Table 16 Menu 4: internet access setup menu fields

Field	Description
Retype to Confirm	Enter the password again to make sure that you have entered it correctly.
Login Server	The Business Secure Router finds the Road Runner Server IP if this field is left blank. If it does not, then you must enter the authentication server IP address.
IP Address Assignment	If your ISP did not assign you a fixed IP address, press [SPACE BAR] and then [ENTER] to select **Dynamic**, otherwise select **Static** and enter the IP address and subnet mask in the following fields.
IP Address	Enter the (fixed) IP address assigned to you by your ISP (static IP address Assignment is selected in the previous field).
IP Subnet Mask	Enter the subnet mask associated with your static IP.
Gateway IP Address	Enter the gateway IP address associated with your static IP.
Network Address Translation	With the NAT, you can translate an Internet protocol address used within one network (for example a private IP address used in a local network) to a different IP address known within another network (for example a public IP address used on the Internet). Choose **None** to disable NAT**.** Choose **SUA Only** if you have a single public IP address. SUA (Single User Account) is a subset of NAT that supports two types of mapping: **Many-to-One** and **Server**. Choose **Full Feature** if you have multiple public IP addresses. **Full Feature** mapping types include: **One-to-One**, **Many-to-One** (SUA/PAT), **Many-to-Many Overload**, **Many-One-to-One** and **Server**. When you select **Full Feature** you must configure at least one address mapping set! See Chapter 9, “Network Address Translation (NAT),” on page 107 for a more detailed discussion on the Network Address Translation feature.

Configuring the PPTP client

Note: The Business Secure Router supports only one PPTP server connection at any given time.

To configure a PPTP client, you must configure the **My Login** and **Password** fields for a PPP connection and the PPTP parameters for a PPTP connection.

After configuring **My Login** and **Password** for PPP connection, press [SPACE BAR] and then [ENTER] in the **Encapsulation** field in **Menu 4 -Internet Access Setup** to choose **PPTP** as your encapsulation option. This brings up the screen show in Figure 23.

Figure 23 Internet access setup (PPTP)

```
Menu 4 - Internet Access Setup

        ISP's Name= ChangeMe
        Encapsulation= PPTP
          Service Type= N/A
          My Login= username
        My Password= ******
        Retype to Confirm= ******
        Idle Timeout= 100

         IP Address Assignment= Dynamic
        IP Address= N/A
        IP Subnet Mask= N/A
        Gateway IP Address=N/A
         Network Address Translation= SUA Only

                Press ENTER to Confirm or ESC to Cancel:
```

Table 17 contains instructions about the new fields when you choose **PPTP** in the **Encapsulation** field in menu 4.

Table 17 New fields in menu 4 (PPTP) Screen

Field	Description	Example
Encapsulation	Press [SPACE BAR] and then press [ENTER] to choose **PPTP**. The encapsulation method influences your choices for the **IP Address** field.	PPTP
Idle Timeout	This value specifies the time, in seconds, that elapses before the Business Secure Router automatically disconnects from the PPTP server.	100 (default)

Configuring the PPPoE client

If you enable PPPoE in menu 4, you will see the screen in figure 24. For more information about PPPoE, see Appendix E, “PPPoE,” on page 253.

Figure 24 Internet access setup (PPPoE)

```
Menu 4 - Internet Access Setup
ISP's Name= ChangeMe
Encapsulation= PPPoE
  Service Type= N/A
  My Login=
  My Password= ********
  Retype to Confirm= ******
  Idle Timeout= 100
IP Address Assignment= Dynamic
  IP Address= N/A
  IP Subnet Mask= N/A
  Gateway IP Address= N/A
Network Address Translation= Full Feature
Press ENTER to Confirm or ESC to Cancel:
Press Space Bar to Toggle.
```

Table 18 describes the fields in Figure 24.

Table 18 New fields in menu 4 (PPPoE) screen

Field	Description	Example
Encapsulation	Press [SPACE BAR] and then press [ENTER] to choose **PPPoE**. The encapsulation method influences your choices in the **IP Address** field.	PPPoE
Idle Timeout	This value specifies the time in seconds that elapses before the Business Secure Router automatically disconnects from the PPPoE server.	100 (default)

If you need a PPPoE service name to identify and reach the PPPoE server, go to menu 11 and enter the PPPoE service name provided to you in the **Service Name** field.

Basic setup complete

Well done! You have successfully connected, installed and set up your Business Secure Router to operate on your network, as well as access the Internet.

Note: When the firewall is activated, the default policy can communicate to the Internet if the communication originates from the LAN, and blocks all traffic to the LAN that originates from the Internet.

You can deactivate the firewall in menu 21.2 or via the Business Secure Router embedded WebGUI. You can also define additional firewall rules or modify existing ones, but exercise extreme caution in doing so. See the chapters on firewalls in *Nortel Business Secure Router 222 Configuration — Basics* (NN47922-500) for more information on the firewall.

Chapter 6
Remote Node setup

This chapter shows you how to configure a remote node.

Introduction to Remote Node setup

A remote node is required for placing calls to a remote gateway. A remote node represents both the remote gateway and the network behind it across a WAN connection. Note that when you use menu 4 to set up Internet access, you are actually configuring a remote node. The following describes how to configure **Menu 11.1 Remote Node Profile, Menu 11.1.2 - Remote Node Network Layer Options** and **Menu 11.1.4 - Remote Node Filter**.

Remote Node setup

From the main menu, select menu option 11 to open **Menu 11 Remote Node Setup** (Figure 25).

Enter **1** to open **Menu 11.1 Remote Node Profile** and configure the setup for your regular ISP. Enter **2** to open **Menu 11.1 Remote Node Profile (Backup ISP)** and configure the setup for your Dial Backup port connection.

Figure 25 Menu 11 Remote Node Setup

```
Menu 11 - Remote Node Setup

  1. ChangeMe (ISP, SUA)
  2. -GUI (BACKUP_ISP, SUA)


           Enter Node # to Edit:
```

Remote Node profile setup

This section explains how to configure the remote node profile menu.

Ethernet Encapsulation

There are two variations of menu 11.1 depending on whether you choose **Ethernet Encapsulation** or **PPPoE Encapsulation.** You must choose the **Ethernet** option when the WAN port is used as a regular Ethernet. The first menu 11.1 screen you see is for Ethernet encapsulation shown in Figure 26.

Figure 26 Menu 11.1: Remote Node profile for Ethernet Encapsulation

```
                    Menu 11.1 - Remote Node Profile

  Rem Node Name= ChangeMe             Route= IP
  Active= Yes

  Encapsulation= Ethernet             Edit IP= No
  Service Type= Standard              Session Options:
  Service Name= N/A                     Edit Filter Sets= No
  Outgoing:
    My Login= N/A
    My Password= N/A                  Edit Traffic Redirect= No
    Retype to Confirm= N/A
    Server= N/A




                Press ENTER to Confirm or ESC to Cancel:
Press Space Bar to Toggle.
```

Table 19 describes the fields in Figure 26.

Table 19 Fields in menu 11.1

Field	Description	Example
Rem Node Name	Enter a descriptive name for the remote node. This field can be up to eight characters.	LAoffice
Active	Press [SPACE BAR] and then [ENTER] to select **Yes** (activate remote node) or **No** (deactivate remote node).	Yes
Encapsulation	**Ethernet** is the default encapsulation. Press [SPACE BAR] and then [ENTER] to change to **PPPoE** or **PPTP** encapsulation.	Ethernet
Service Type	Press [SPACE BAR] and then [ENTER] to select from **Standard**, **RR-Toshiba** (Road Runner Toshiba authentication method) or **RR-Manager** (Road Runner Manager authentication method). Choose one of the Road Runner methods if your ISP is Time Warner's Road Runner; otherwise choose **Standard**.	Standard

Table 19 Fields in menu 11.1

Field	Description	Example
Service Name	If you are using **PPPoE** encapsulation, then type the name of your PPPoE service here. Only valid with **PPPoE** encapsulation.	poellc
Outgoing My Login	This field is applicable for **PPPoE** encapsulation only. Enter the logon name assigned by your ISP when the Business Secure Router calls this remote node. Some ISPs append this field to the **Service Name** field above (e.g., jim@poellc) to access the PPPoE server.	jim
My Password	Enter the password assigned by your ISP when the Business Secure Router calls this remote node. Valid for **PPPoE** encapsulation only.	*****
Retype to Confirm	Type your password again to make sure that you have entered it correctly.	*****
Server IP	This field is valid only when **Road Runner** is selected in the **Service Type** field. The Business Secure Router finds the Road Runner Server IP automatically if this field is left blank. If it does not, then you must enter the authentication server IP address here.	
Route	This field refers to the protocol that is routed by your Business Secure Router.	IP
Edit IP	This field leads to a “hidden” menu. Press [SPACE BAR] to select **Yes** and press [ENTER] to go to M**enu 11.1.2 - Remote Node Network Layer Options**.	**No** (default)
Session Options Edit Filter sets	This field leads to another “hidden” menu. Use [SPACE BAR] to select **Yes** and press [ENTER] to open menu 11.1.4 to edit the filter sets. See “Remote Node filter” on page 95 for more details.	**No** (default)
	After you configure this menu, press [ENTER] at the message “Press ENTER to Confirm...” to save your configuration, or press [ESC] at any time to cancel.	

PPPoE Encapsulation

The Business Secure Router supports PPPoE (Point-to-Point Protocol over Ethernet). You can only use PPPoE encapsulation when you are using the Business Secure Router with a DSL modem as the WAN device. If you change the Encapsulation to **PPPoE,** you then see Figure 27. Please see Appendix E, “PPPoE,” on page 253 for more information about PPPoE.

Figure 27 Menu 11.1: Remote Node profile for PPPoE Encapsulation

```
                        Menu 11.1 - Remote Node Profile

     Rem Node Name= ChangeMe              Route= IP
     Active= Yes

     Encapsulation= PPPoE                 Edit IP= No
     Service Type= Standard               Telco Option:
     Service Name=                          Allocated Budget(min)= 0
     Outgoing:                              Period(hr)= 0
       My Login=                            Schedules=
       My Password= ********                Nailed-Up Connection= No
       Retype to Confirm= ********
       Authen= CHAP/PAP
                                          Session Options:
                                            Edit Filter Sets= No
                                            Idle Timeout(sec)= 100

                                          Edit Traffic Redirect= No

                    Press ENTER to Confirm or ESC to Cancel:
Press Space Bar to Toggle.
```

Outgoing Authentication Protocol

Generally speaking, you must employ the strongest authentication protocol possible. However, some vendors' implementation includes a specific authentication protocol in the user profile. It disconnects if the negotiated protocol is different from that in the user profile, even when the negotiated protocol is stronger than specified. If you encounter a case where the peer disconnects right after a successful authentication, make sure that you specify the correct authentication protocol when connecting to such an implementation.

Nailed-Up Connection

A nailed-up connection is a dial-up line where the connection is always up, regardless of traffic demand. The Business Secure Router does two things when you specify a nailed-up connection. The first is that idle timeout is disabled. The second is that the Business Secure Router tries to bring up the connection when turned on and whenever the connection is down. A nailed-up connection can be very expensive.

Do not specify a nailed-up connection unless your telephone company offers flat-rate service or you need a constant connection and the cost is of no concern.

Table 20 describes the fields specific to PPPoE encapsulation.

Table 20 Fields in Menu 11.1 (PPPoE Encapsulation Specific)

Field	Description	Example
Authen	This field sets the authentication protocol used for outgoing calls. Options for this field are: **CHAP/PAP** - Your Business Secure Router accepts either **CHAP** or **PAP** when requested by this remote node. **CHAP** - accept CHAP only. **PAP** - accept PAP only.	CHAP/PAP
Telco Option Allocated Budget	 The field sets a ceiling for outgoing call time for this remote node. The default for this field is 0, meaning no budget control.	 0 (default)
Period(hr)	This field is the time period in which the budget is reset. For example, if we are allowed to call this remote node for a maximum of 10 minutes every hour, then the **Allocated Budget** is (10 minutes) and the **Period(hr)** is 1 (hour).	0 (default)
Schedules	You can apply up to four call schedule sets here.	
Nailed-Up Connection	This field specifies if you want to make the connection to this remote node a nailed-up connection. More details are given earlier in this section.	**No** (default)
Session Options Idle Timeout	Type the length of idle time (when there is no traffic from the Business Secure Router to the remote node) in seconds that can elapse before the Business Secure Router automatically disconnects the PPPoE connection. This option only applies when the Business Secure Router initiates the call.	100 seconds (default)

PPTP Encapsulation

If you change the Encapsulation to **PPTP** in menu 11.1, then you will see the next screen. See Appendix F, “PPTP,” on page 257 for information about PPTP.

Figure 28 Menu 11.1: Remote Node Profile for PPTP Encapsulation

```
                    Menu 11.1 - Remote Node Profile

     Rem Node Name= ChangeMe              Route= IP
     Active= Yes
    Encapsulation= PPTP                  Edit IP= No
     Service Type= Standard              Telco Option:
     Service Name= N/A                     Allocated Budget(min)= 0
     Outgoing:                             Period(hr)= 0
       My Login=                           Schedules=
       My Password= ********               Nailed-Up Connection= No
       Retype to Confirm= ********
       Authen= CHAP/PAP
     PPTP:                               Session Options:
       My IP Addr=                         Edit Filter Sets= No
       My IP Mask=                         Idle Timeout(sec)= 100
       Server IP Addr=
       Connection ID/Name=               Edit Traffic Redirect= No

                  Press ENTER to Confirm or ESC to Cancel:
Press Space Bar to Toggle.
```

Table 21 shows how to configure fields in menu 11.1 not previously discussed.

Table 21 Fields in Menu 11.1 (PPTP Encapsulation)

Field	Description	Example
Encapsulation	Press [SPACE BAR] and then [ENTER] to select **PPTP**. You must also go to menu 11.1.2 to check the IP Address setting after you select the encapsulation method.	PPTP
My IP Addr	Enter the IP address of the WAN Ethernet port.	10.0.0.140
My IP Mask	Enter the subnet mask of the WAN Ethernet port.	255.255.255.0
My Server IP Addr	Enter the IP address of the ANT modem.	10.0.0.138

Table 21 Fields in Menu 11.1 (PPTP Encapsulation)

Field	Description	Example
Connection ID/ Name	Enter the connection ID or connection name in the ANT. It must follow the “c:id” and “n:name” format. This field is optional and depends on the requirements of your DSL modem.	N:My ISP
Schedules	You can apply up to four call schedule sets here.	
Nailed-Up Connections	Press [SPACE BAR] and then [ENTER] to select **Yes** if you want to make the connection to this remote node a nailed-up connection.	No

Edit IP

Move the cursor to the **Edit IP** field in menu 11.1, then press [SPACE BAR] to select **Yes**. Press [ENTER] to open **Menu 11.1.2 - Network Layer Options**.

Figure 29 Menu 11.1.2: Remote Node Network Layer Options for Ethernet Encapsulation

```
      Menu 11.1.2 - Remote Node Network Layer Options

        IP Address Assignment= Dynamic
        IP Address= N/A
        IP Subnet Mask= N/A
        Gateway IP Addr= N/A

        Network Address Translation= SUA Only
        Metric= N/A
        Private= N/A
        RIP Direction= None
          Version= N/A
        Multicast= None

         Enter here to CONFIRM or ESC to CANCEL:

Press Space Bar to Toggle.
```

This menu displays the **My WAN Addr** field for **PPPoE** and **PPTP** encapsulations and **Gateway IP Addr** field for **Ethernet** encapsulation. Table 22 describes the fields in Figure 29.

Table 22 Remote Node Network Layer Options Menu Fields

Field	Description	Example
IP Address Assignment	If your ISP did not assign you an explicit IP address, press [SPACE BAR] and then [ENTER] to select **Dynamic**; otherwise select **Static** and enter the IP address & subnet mask in the following fields.	**Dynamic** (default)
(Rem) IP Address	If you have a Static IP Assignment, enter the IP address assigned to you by your ISP.	
(Rem) IP Subnet Mask	If you have a Static IP Assignment, enter the subnet mask assigned to you.	

Table 22 Remote Node Network Layer Options Menu Fields

Field	Description	Example
Gateway IP Addr	This field is applicable to **Ethernet** encapsulation only. Enter the gateway IP address assigned to you if you are using a static IP address.	
My WAN Addr	This field is applicable to **PPPoE** and **PPTP** encapsulations only. Some implementations, especially the UNIX derivatives, require the WAN link to have a separate IP network number from the LAN and each end must have a unique address within the WAN network number. If this is the case, enter the IP address assigned to the WAN port of your Business Secure Router. Note that this is the address assigned to your local Business Secure Router, not the remote router.	
Network Address Translation	With Network Address Translation (NAT), the device can translate an Internet protocol address used within one network (for example a private IP address used in a local network) to a different IP address known within another network (for example a public IP address used on the Internet). Choose **None** to disable NAT**.** Choose **SUA Only** if you have a single public IP address. SUA (Single User Account) is a subset of NAT that supports two types of mapping: **Many-to-One** and **Server**. Choose **Full Feature** if you have multiple public IP addresses. **Full Feature** mapping types include: **One-to-One**, **Many-to-One** (SUA/PAT), **Many-to-Many Overload**, **Many- One-to-One** and **Server**. When you select **Full Feature** you must configure at least one address mapping set! See Chapter 9, “Network Address Translation (NAT) for a full discussion on this feature.	**SUA Only** (default)
Metric	Enter a number from 1 to 15 to set this route’s priority among the Business Secure Router routes. The smaller the number, the higher priority the route has.	1
Private	This field is valid only for PPTP/PPPoE encapsulation. This parameter determines if the Business Secure Router includes the route to this remote node in its RIP broadcasts. If set to **Yes**, this route is kept private and not included in RIP broadcast. If **No**, the route to this remote node is propagated to other hosts through RIP broadcasts.	No
RIP Direction	Press [SPACE BAR] and then [ENTER] to select the RIP direction from **Both**/ **None**/**In Only**/**Out Only**. The default for RIP on the WAN side is **None**. Nortel recommends that you do not change this setting.	**None** (default)

Table 22 Remote Node Network Layer Options Menu Fields

Field	Description	Example
Version	Press [SPACE BAR] and then [ENTER] to select the RIP version from **RIP-1**/**RIP-2B**/**RIP-2M** or **None**.	N/A
Multicast	IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a Multicast group. The Business Secure Router supports both IGMP version 1 (**IGMP-v1**) and version 2 (**IGMP-v2)**. Press [SPACE BAR] to enable IP Multicasting or select **None** to disable it.	**None** (default)
	After you complete filling in **Menu 11.1.2 Remote Node Network Layer Options**, press [ENTER] at the message "Press ENTER to Confirm..." to save your configuration and return to menu 11.1, or press [ESC] at any time to cancel.	

Remote Node filter

Move the cursor to the field **Edit Filter Sets** in menu 11.1, and then press [SPACE BAR] to set the value to **Yes**. Press [ENTER] to open **Menu 11.1.4-Remote Node Filter**.

Use menu 11.1.4 to specify the filter sets to apply to the incoming and outgoing traffic between this remote node and the Business Secure Router to prevent certain packets from triggering calls. You can specify up to 4 filter sets separated by commas, for example, 1, 5, 9, 12, in each filter field. Note that spaces are accepted in this field. For more information about defining the filters, refer to Chapter 11, "Filter configuration," on page 135. For PPPoE or PPTP encapsulation, you have the additional option of specifying remote node call filter sets.

Figure 30 Menu 11.1.4: Remote Node filter (Ethernet Encapsulation)

```
                Menu 11.1.4 - Remote Node Filter

            Input Filter Sets:
              protocol filters=
                device filters=
            Output Filter Sets:
              protocol filters=
                device filters=

             Enter here to CONFIRM or ESC to CANCEL:
```

Figure 31 Menu 11.1.4: Remote Node filter (PPPoE or PPTP Encapsulation)

```
  Menu 11.1.4 - Remote Node Filter
        Input Filter Sets:
          protocol filters=
            Device filters=
        Output Filter Sets:
          protocol filters=
            device filters=
        Call Filter Sets:
          protocol filters=
            Device filters=

Enter here to CONFIRM or ESC to CANCEL:
```

To configure the parameters for traffic redirect, enter 11 from the main menu to display **Menu 11.1—Remote Node Profile** as shown in Figure 32.

Figure 32 Menu 11.1: Remote Node Profile

```
                    Menu 11.1 - Remote Node Profile

  Rem Node Name= ChangeMe             Route= IP
  Active= Yes

  Encapsulation= Ethernet             Edit IP= No
  Service Type= Standard              Session Options:
  Service Name= N/A                     Edit Filter Sets= No
  Outgoing:
    My Login= N/A
    My Password= N/A                  Edit Traffic Redirect= No
    Retype to Confirm= N/A
    Server= N/A




                Press ENTER to Confirm or ESC to Cancel:
Press Space Bar to Toggle.
```

To configure traffic redirect properties, press [SPACE BAR] to select **Yes** in the **Edit Traffic Redirect** field and then press [ENTER].

Table 23 Menu 11.1: Remote Node profile (Traffic Redirect Field)

Field	Description	Example
Edit Traffic Redirect	Press [SPACE BAR] to select **Yes** or **No**. Select **No** (default) if you do not want to configure this feature. Select **Yes** and press [ENTER] to configure **Menu 11.1.5 — Traffic Redirect Setup**.	Yes
	Press [ENTER] at the message “Press ENTER to Confirm...” to save your configuration, or press [ESC] at any time to cancel.	

Traffic Redirect setup

Configure parameters that determine when the Business Secure Router forwards WAN traffic to the backup gateway using **Menu 11.1.5 — Traffic Redirect Setup**.

Figure 33 Menu 11.1.5: Traffic Redirect setup

```
Menu 11.1.5 - Traffic Redirect Setup

   Active= Yes
   Configuration:
     Backup Gateway IP Address= 0.0.0.0
     Metric= 15
     Check WAN IP Address= 0.0.0.0
       Fail Tolerance= 3
       Period (sec)= 5
       Timeout (sec)= 3

Press ENTER to Confirm or ESC to Cancel:
```

Table 24 describes the fields in Figure 33.

Table 24 Menu 11.1.5: Traffic Redirect setup

Field	Description	Example
Active	Press [SPACE BAR] and select **Yes** (to enable) or **No** (to disable) traffic redirect setup. The default is **No**.	Yes
Configuration: Backup Gateway IP Address	Enter the IP address of your backup gateway in dotted decimal notation. The Business Secure Router automatically forwards traffic to this IP address if the Business Secure Router Internet connection terminates.	0.0.0.0
Metric	Enter a number from 1 to 15 to set this route's priority among the Business Secure Router routes. The smaller the number, the higher priority the route has.	15 (default)

Table 24 Menu 11.1.5: Traffic Redirect setup

Field	Description	Example
Check WAN IP Address	Enter the IP address of a reliable nearby computer (for example, your ISP's DNS server address) to test your Business Secure Router's WAN accessibility. The Business Secure Router uses the default gateway IP address if you do not enter an IP address here. If you are using PPTP or PPPoE Encapsulation, enter 0.0.0.0 to configure the Business Secure Router to check the PVC (Permanent Virtual Circuit) or PPTP tunnel.	0.0.0.0
Fail Tolerance	Enter the number of times your Business Secure Router can attempt and fail to connect to the Internet before traffic is forwarded to the backup gateway. A good number is 2 to 5 seconds.	3
Period (sec)	Enter the time interval (in seconds) between WAN connection checks. A good number is 5 to 60 seconds.	5
Timeout (sec)	Enter the number of seconds the Business Secure Router waits for a ping response from the IP Address in the **Check WAN IP Address** field before it times out. The number in this field should be less than the number in the **Period** field. A good number is 3 to 50 seconds. The WAN connection is considered "down" after the Business Secure Router times out the number of times specified in the **Fail Tolerance** field.	3
	After you complete this menu, press [ENTER] at the prompt "Press [ENTER] to confirm or [ESC] to cancel" to save your configuration or press [ESC] to cancel and go back to the previous screen.	

Chapter 7
IP Static Route Setup

This chapter shows you how to configure static routes with your Business Secure Router.

IP Static Route Setup

Enter 12 from the main menu. Select one of the IP static routes as shown in Figure 34 to configure IP static routes in menu 12. 1.

Note: The “Reserved” static route entry is for the default WAN route. You cannot modify or delete a static default route.

Figure 34 Menu 12: IP Static Route Setup

```
        Menu 12 - IP Static Route Setup


1. Reserved
2. _________
3. _________
4. _________
5. _________
6. _________
7. _________
8. _________
9. _________
10. _________
11. _________
```

```
                12. _________

                          Enter selection number:
```

Now, enter the index number of the static route that you want to configure.

Figure 35 Menu 12. 1: Edit IP Static Route

```
        Menu 12.1 - Edit IP Static Route
Route #: 2
Route Name= ?
Active= No
Destination IP Address= ?
IP Subnet Mask= ?
Gateway IP Address= ?
Metric= 2
Private= No
    Press ENTER to CONFIRM or ESC to CANCEL:
```

Table 25 describes the IP Static Route Menu fields.

Table 25 IP Static Route Menu Fields

Field	Description
Route #	This is the index number of the static route that you chose in menu 12.
Route Name	Enter a descriptive name for this route. This is for identification purposes only.
Active	This field allows you to activate or deactivate this static route.
Destination IP Address	This parameter specifies the IP network address of the final destination. Routing is always based on network number. If you need to specify a route to a single host, use a subnet mask of 255.255.255.255 in the subnet mask field to force the network number to be identical to the host ID.
IP Subnet Mask	Enter the IP subnet mask for this destination.
Gateway IP Address	Enter the IP address of the gateway. The gateway is an immediate neighbor of your Business Secure Router that forwards the packet to the destination. On the LAN, the gateway must be a router on the same segment as your Business Secure Router; over the WAN, the gateway must be the IP address of one of the remote nodes.

Table 25 IP Static Route Menu Fields

Field	Description
Metric	Enter a number from 1 to 15 to set the priority for the route among the Business Secure Router routes. The smaller the number, the higher priority the route has.
Private	This parameter determines if the Business Secure Router includes the route to this remote node in its RIP broadcasts. If set to **Yes**, this route is kept private and not included in RIP broadcast. If **No**, the route to this remote node is propagated to other hosts through RIP broadcasts.
	After you complete filling in this menu, press [ENTER] at the message "Press ENTER to Confirm…" to save your configuration, or press [ESC] to cancel.

Chapter 8
Dial-in User Setup

This chapter shows you how to create user accounts on the Business Secure Router.

Dial-in User Setup

By storing user profiles locally, your Business Secure Router can authenticate users without interacting with a network RADIUS server.

Follow the steps below to set up user profiles on your Business Secure Router.

From the main menu, enter 14 to display **Menu 14 - Dial-in User Setup**.

Figure 36 Menu 14- Dial-in User Setup

```
                    Menu 14 - Dial-in User Setup

1. _________        9. _________       17. _________       25. _________
2. _________       10. _________       18. _________       26. _________
3. _________       11. _________       19. _________       27. _________
4. _________       12. _________       20. _________       28. _________
5. _________       13. _________       21. _________       29. _________
6. _________       14. _________       22. _________       30. _________
7. _________       15. _________       23. _________       31. _________
8. _________       16. _________       24. _________       32. _________

                    Enter Menu Selection Number:
```

Type a number and press [ENTER] to edit the user profile.

Figure 37 Menu 14.1- Edit Dial-in User

```
    Menu 14.1 - Edit Dial-in User

User Name= test
Active= Yes
Password= ********
Press ENTER to Confirm or ESC to Cancel:
Leave name field blank to delete profile
```

Table 26 describes the fields in Figure 37.

Table 26 Menu 14.1- Edit Dial-in User

Field	Description
User Name	Enter a username up to 31 alphanumeric characters long for this user profile. This field is case sensitive.
Active	Press [SPACE BAR] to select **Yes** and press [ENTER] to enable the user profile.
Password	Enter a password up to 31 characters long for this user profile.
	After you complete this menu, press [ENTER] at the prompt “Press ENTER to confirm or ESC to cancel” to save your configuration or press [ESC] to cancel and go back to the previous screen.

Chapter 9
Network Address Translation (NAT)

This chapter discusses how to configure NAT on the Business Secure Router.

Using NAT

Note: You must create a firewall rule in addition to setting up SUA/NAT, to allow traffic from the WAN to be forwarded through the Business Secure Router.

SUA (Single User Account) Versus NAT

SUA (Single User Account) is an implementation of a subset of NAT that supports two types of mapping, **Many-to-One** and **Server**. For a detailed description of NAT set for SUA, see“Address Mapping Sets” on page 110. The Business Secure Router also supports **Full Feature** NAT to map multiple global IP addresses to multiple private LAN IP addresses of clients or servers using mapping types.

Note: Choose **SUA Only** if you have just one public WAN IP address for your Business Secure Router.

Choose **Full Feature** if you have multiple public WAN IP addresses for your Business Secure Router.

Applying NAT

You apply NAT via menus 4 or 11.1.2 (Figure 39 on page 109). Figure 38 shows you how to apply NAT for Internet access in menu 4. Enter 4 from the main menu to go to **Menu 4 - Internet Access Setup.**

Figure 38 Menu 4: Applying NAT for Internet Access

```
                Menu 4 - Internet Access Setup

        ISP's Name= ChangeMe
        Encapsulation= Ethernet
          Service Type= Standard
          My Login= N/A
          My Password= N/A
          Retype to Confirm= N/A
          Login Server= N/A

        IP Address Assignment= Dynamic
          IP Address= N/A
          IP Subnet Mask= N/A
          Gateway IP Address= N/A
        Network Address Translation= SUA Only




                Press ENTER to Confirm or ESC to Cancel:
Press ENTER to Confirm or ESC to Cancel:
```

Figure 39 shows how you apply NAT to the remote node in menu 11.1.

Enter 11 from the main menu.

Move the cursor to the **Edit IP** field, press [SPACE BAR] to select **Yes** and then press [ENTER] to bring up **Menu 11.1.2 - Remote Node Network Layer Options.**

Figure 39 Menu 11.1.2: Applying NAT to the Remote Node

```
Menu 11.1.2 - Remote Node Network Layer Options

   IP Address Assignment= Dynamic
   IP Address= N/A
   IP Subnet Mask= N/A
   Gateway IP Addr= N/A

   Network Address Translation= Full Feature
   Metric= N/A
   Private= N/A
   RIP Direction= None
     Version= N/A
   Multicast= None

    Enter here to CONFIRM or ESC to CANCEL:
```

Table 27 describes the fields in Figure 39.

Table 27 Applying NAT in Menus 4 & 11.1.2

Field	Description	Options
Network Address Translation	When you select this option the SMT uses Address Mapping Set 1 (menu 15.1 - "Address Mapping Sets" on page 110 for further discussion). Choose **Full Feature** if you have multiple public WAN IP addresses for your Business Secure Router. When you select **Full Feature** you must configure at least one address mapping set!	Full Feature
	NAT is disabled when you select this option.	None
	When you select this option the SMT uses Address Mapping Set 255 (menu 15.1 - "Address Mapping Sets" on page 110). Choose **SUA Only** if you have just one public WAN IP address for your Business Secure Router.	SUA Only

NAT setup

Use the address mapping sets menus and submenus to create the mapping table used to assign global addresses to computers on the LAN. You can see two NAT address mapping sets in menu 15.1. You can only configure **Set 1**. **Set 255** is used for SUA. When you select **Full Feature** in menu 4 or 11.1.2, the SMT uses **Set 1**. When you select **SUA Only**, the SMT uses the pre-configured **Set 255** (read only).

The server set is a list of LAN servers mapped to external ports. To use this set, a server rule must be set up inside the NAT address mapping set. To configure NAT, enter 15 from the main menu to bring up the screen shown in Figure 40.

Figure 40 Menu 15: NAT Setup

```
                Menu 15 – NAT Setup

1. Address Mapping Sets
2. Port Forwarding Setup
3. Trigger Port Setup


        Enter Menu Selection Number:
```

Note: Configure LAN IP addresses in NAT menus 15.1 and 15.2.

Address Mapping Sets

Enter 1 to bring up **Menu 15.1—Address Mapping Sets**.

Figure 41 Menu 15.1: Address Mapping Sets

```
Menu 15.1 – Address Mapping Sets

  1. NAT_SET
255. SUA (read only)



    Enter Menu Selection Number:
```

SUA Address Mapping Set

Enter 255 to display the screen shown in Figure 42 (see "SUA (Single User Account) Versus NAT" on page 107). The fields in this menu cannot be changed.

Figure 42 Menu 15.1.255: SUA Address Mapping Rules

```
                    Menu 15.1.255 - Address Mapping Rules

 Set Name= SUA

Idx  Local Start IP   Local End IP     Global Start IP  Global End IP    Type
---  ---------------  ---------------  ---------------  ---------------  ------
 1.  0.0.0.0          255.255.255.255  0.0.0.0                           M-1
 2.                                    0.0.0.0                          Server
 3.
 4.
 5.
 6.
 7.
 8.
 9.
10.

                Press ENTER to Confirm or ESC to Cancel:
```

Table 28 explains the fields in Figure 42.

Note: Menu 15.1.255 is read-only.

Table 28 SUA Address Mapping Rules

Field	Description	Example
Set Name	This is the name of the set you selected in menu 15.1 or enter the name of a new set you want to create.	SUA
Idx	This is the index or rule number.	1
Local Start IP	**Local Start IP** is the starting local IP address (ILA).	0.0.0.0

Table 28 SUA Address Mapping Rules

Field	Description	Example
Local End IP	**Local End IP** is the ending local IP address (ILA). If the rule is for all local IPs, then the start IP is 0.0.0.0 and the end IP is 255.255.255.255.	255.255.255.255
Global Start IP	This is the starting global IP address (IGA). If you have a dynamic IP, enter 0.0.0.0 as the **Global Start IP**.	0.0.0.0
Global End IP	This is the ending global IP address (IGA).	
Type	These are the mapping types discussed above. With **Server,** you can specify multiple servers of different types behind NAT to this machine. Examples is found in the section “General NAT examples” on page 121.	Server
	After you configure a rule in this menu, press [ENTER] at the message “Press ENTER to Confirm…” to save your configuration, or press [ESC] to cancel.	

User-Defined Address Mapping Sets

Go to menu 15.1. Enter 1 to bring up the menu shown in figure below. Look at the differences from the previous menu. Note the extra **Action** and **Select Rule** fields means you can configure rules in this screen. Note also that the [?] in the **Set Name** field means that this is a required field and you must enter a name for the set.

Note: The entire set is deleted if you leave the **Set Name** field blank and press [ENTER] at the bottom of the screen.

Figure 43 Menu 15.1.1: First Set

```
                    Menu 15.1.1 - Address Mapping Rules

 Set Name= NAT_SET

Idx  Local Start IP   Local End IP     Global Start IP  Global End IP    Type
---  ---------------  ---------------  ---------------  ---------------  ------
 1.
 2
 3.
 4.
 5.
 6.
 7.
 8.
 9.
10.

                    Action= Edit          Select Rule=

                    Press ENTER to Confirm or ESC to Cancel:
```

Note: The **Type**, **Local** and **Global Start/End IP**s are configured in menu 15.1.1.1 (described later) and the values are displayed on the screen shown in Figure 44.

Ordering Your Rules

Ordering your rules is important because the Business Secure Router applies the rules in the order that you specify. When a rule matches the current packet, the Business Secure Router takes the corresponding action and the remaining rules are ignored. If there are any empty rules before your new configured rule, your configured rule is pushed up by that number of empty rules. For example, if you

have already configured rules 1 to 6 in your current set and now you configure rule number 9. In the set summary screen, the new rule will be rule 7, not 9.

If you delete rule 4, rules 5 to 7 will be pushed up by 1 rule, so as old rule 5 becomes rule 4, old rule 6 becomes rule 5 and old rule 7 becomes rule 6.

Table 29 Fields in menu 15.1.1

Field	Description	Example
Set Name	Enter a name for this set of rules. This is a required field. If this field is left blank, the entire set is deleted.	NAT_SET
Action	The default is **Edit**. **Edit** means you want to edit a selected rule (see following field). **Insert Before** means to insert a rule before the rule selected. The rules after the selected rule are then moved down by one rule. **Delete** means to delete the selected rule and all the rules after the selected one advance one rule. **None** disables the **Select Rule** item.	Edit
Select Rule	When you choose **Edit**, **Insert Before** or **Delete** in the previous field, the cursor jumps to this field so you can select the rule to apply the action in question.	1

Note: You must press [ENTER] at the bottom of the screen to save the whole set. You must do this again if you make any changes to the set – including deleting a rule. No changes to the set take place until this action is taken.

Selecting **Edit** in the **Action** field and then selecting a rule brings up the menu shown in Figure 44, **Menu 15.1.1.1 - Address Mapping Rule** in which you can edit an individual rule and configure the **Type**, **Local** and **Global Start/End IPs**.

Note: An **IP End** address must be numerically greater than its corresponding **IP Start** address.

Figure 44 Menu 15.1.1.1: Editing or configuring an individual rule in a set

```
 Menu 15.1.1.1 Address Mapping Rule

Type= One-to-One

Local IP:
  Start=
  End  = N/A

Global IP:
  Start=
  End  = N/A



Press ENTER to Confirm or ESC to Cancel:
```

Table 30 describes the fields in Figure 44.

Table 30 Menu 15.1.1.1: Editing or configuring an individual rule in a set

Field	Description	Example
Type	Press [SPACE BAR] and then [ENTER] to select from a total of five types. If you choose **Server**, you can specify multiple servers of different types behind NAT to this computer. See "Example 3: Multiple public IP addresses with inside servers" on page 124 for an example.	**One-to-One**
Local IP	Only local IP fields are **N/A** for server; Global IP fields must be set for **Server**.	
Start	Enter the starting local IP address (ILA).	0.0.0.0
End	Enter the ending local IP address (ILA). If the rule is for all local IPs, then put the Start IP as 0.0.0.0 and the End IP as 255.255.255.255. This field is **N/A** for One-to-One and Server types.	N/A

Table 30 Menu 15.1.1.1: Editing or configuring an individual rule in a set

Field	Description	Example
Global IP Start	Enter the starting global IP address (IGA). If you have a dynamic IP, enter 0.0.0.0 as the **Global IP Start**. Note that **Global IP Start** can be set to 0.0.0.0 only if the types are **Many-to-One** or **Server**.	0.0.0.0
End	Enter the ending global IP address (IGA). This field is **N/A** for **One-to-One**, **Many-to-One** and **Server types**.	N/A
	After you finish configuring a rule in this menu, press [ENTER] at the message “Press ENTER to Confirm…” to save your configuration, or press [ESC] to cancel.	

Configuring a server behind NAT

Note: If you do not assign a **Default Server** IP address, the Business Secure Router discards all packets received for ports that are not specified here or in the remote management setup.

Follow these steps to configure a server behind NAT:

1. Enter 15 in the main menu to go to **Menu 15 - NAT Setup.**
2. Enter 2 to go to **Menu 15.2 - NAT Server Setup**.

Figure 45 Menu 15.2: NAT Server Sets

```
          Menu 15.2 - NAT Server Setup

        Default Server: 0.0.0.0
 Rule  Act.   Start Port   End Port    IP Address
-------------------------------------------------------
 001   No     0            0           0.0.0.0
 002   No     0            0           0.0.0.0
 003   No     0            0           0.0.0.0
 004   No     0            0           0.0.0.0
 005   No     0            0           0.0.0.0
 006   No     0            0           0.0.0.0
 007   No     0            0           0.0.0.0
 008   No     0            0           0.0.0.0
 009   No     0            0           0.0.0.0
 010   No     0            0           0.0.0.0


Select Command= None           Select Rule= N/A
      Press ENTER to Confirm or ESC to Cancel:
```

3 Select **Edit Rule** in the **Select Command** field; type the index number of the NAT server you want to configure in the **Select Rule** field and press [ENTER] to open **Menu 15.2.1 - NAT Server Configuration** (see the next figure).

Figure 46 15.2.1: NAT Server Configuration

```
            15.2.1 - NAT Server Configuration

                                Index= 1

-------------------------------------------------------------------

    Name=

    Active= No

    Start port= 0                  End port= 0

    IP Address= 0.0.0.0




          Press ENTER to Confirm or ESC to Cancel:
```

The following table describes the fields in this screen.

Table 31 15.2.1: NAT Server Configuration

Field	Description
Index	This is the index number of an individual port forwarding server entry.
Name	Enter a name to identify this port-forwarding rule.
Active	Press [SPACE BAR] and then [ENTER] to select **Yes** to enable the NAT server entry.
Start Port	Enter a port number in the **Start Port** field. To forward only one port, enter it again in the **End Port** field. To specify a range of ports, enter the last port to be forwarded in the **End Port** field.
End Port	
IP Address	Enter the inside IP address of the server.
When you have completed this menu, press [ENTER] at the prompt “Press ENTER to Confirm…” to save your configuration, or press [ESC] at any time to cancel.	

4 Enter a port number in the **Start Port** field. To forward only one port, enter it again in the **End Port** field. To specify a range of ports, enter the last port to be forwarded in the **End Port** field.

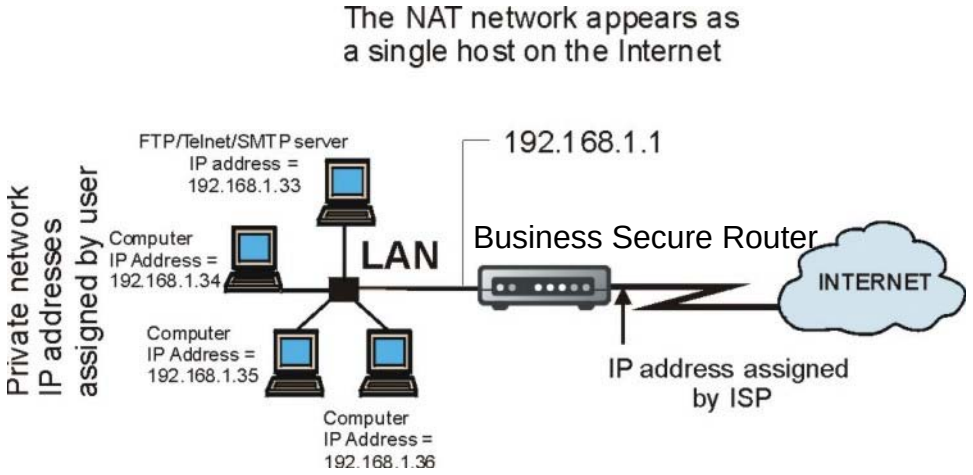
5. Enter the inside IP address of the server in the **IP Address** field. In the following figure, you have a computer acting as an FTP, Telnet and SMTP server (ports 21, 23 and 25) at 192.168.1.33.
6. Press [ENTER] at the "Press ENTER to confirm …" prompt to save your configuration after you define all the servers or press [ESC] at any time to cancel.

Figure 47 Menu 15.2: NAT Server Setup

```
          Menu 15.2 - NAT Server Setup

        Default Server: 0.0.0.0
 Rule  Act.   Start Port   End Port    IP Address
-------------------------------------------------------
 001   No     0            0           0.0.0.0
 002   Yes    21           25          192.168.1.33
 003   No     0            0           0.0.0.0
 004   No     0            0           0.0.0.0
 005   No     0            0           0.0.0.0
 006   No     0            0           0.0.0.0
 007   No     0            0           0.0.0.0
 008   No     0            0           0.0.0.0
 009   No     0            0           0.0.0.0
 010   No     0            0           0.0.0.0


Select Command= None           Select Rule= N/A
      Press ENTER to Confirm or ESC to Cancel:
```

You assign the private network IP addresses. The NAT network appears as a single host on the Internet. A is the FTP/Telnet/SMTP server.

Figure 48 Multiple servers behind NAT example



General NAT examples

The following are some examples of NAT configuration.

Internet access only

In the Internet access example shown in Figure 49, you only need one rule where all your ILAs (Inside Local addresses) map to one dynamic IGA (Inside Global Address) assigned by your ISP.

Figure 49 NAT Example 1

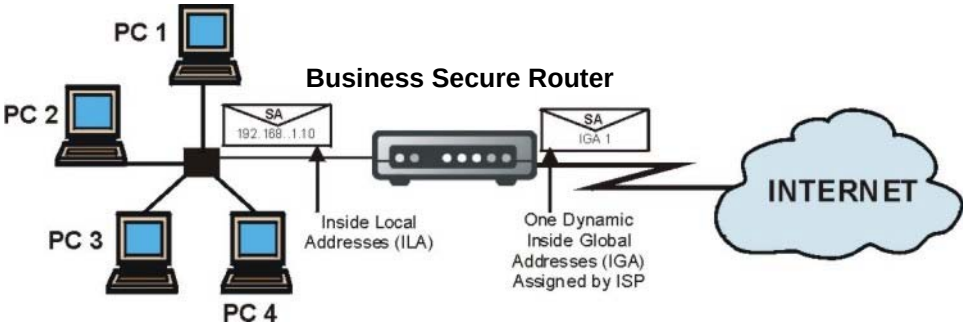


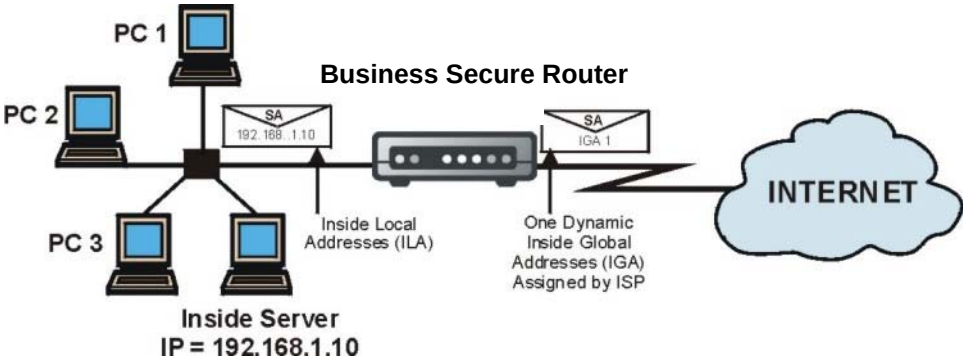
Figure 50 Menu 4: Internet access & NAT example

```
Menu 4 - Internet Access Setup

  ISP's Name= ChangeMe
  Encapsulation= Ethernet
  Service Type= Standard
    My Login= N/A
    My Password= N/A
    Login Server IP= N/A

  IP Address Assignment= Dynamic
    IP Address= N/A
    IP Subnet Mask= N/A
    Gateway IP Address= N/A
  Network Address Translation= SUA Only

  Press ENTER to Confirm or ESC to Cancel:
```

From menu 4 shown above, simply choose the **SUA Only** option from the **Network Address Translation** field. This is the Many-to-One mapping discussed in section “General NAT examples” on page 121. The **SUA Only** read-only option from the **Network Address Translation** field in menus 4 and 11.1.2 is specifically preconfigured to handle this case.

Example 2: Internet access with an inside server

Figure 51 NAT Example 2



In this case, you do exactly as shown in Figure 51 (use the convenient pre-configured **SUA Only** set), and also go to menu 15.2 to specify the Inside Server behind the NAT as shown in Figure 52.

Figure 52 Menu 15.2: Specifying an inside server

```
          Menu 15.2 - NAT Server Setup

        Default Server: 192.168.1.10
 Rule  Act.   Start Port   End Port    IP Address
-------------------------------------------------------
 001   No     0            0           0.0.0.0
 002   No     0            0           0.0.0.0
 003   No     0            0           0.0.0.0
 004   No     0            0           0.0.0.0
 005   No     0            0           0.0.0.0
 006   No     0            0           0.0.0.0
 007   No     0            0           0.0.0.0
 008   No     0            0           0.0.0.0
 009   No     0            0           0.0.0.0
 010   No     0            0           0.0.0.0


Select Command= None           Select Rule= N/A
      Press ENTER to Confirm or ESC to Cancel:
```

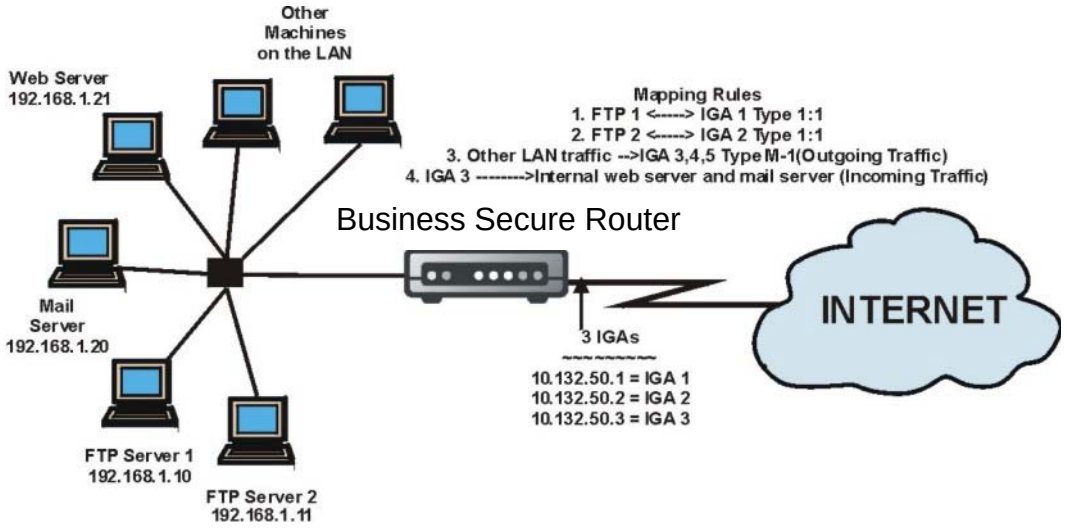
Example 3: Multiple public IP addresses with inside servers

In this example, there are 3 IGAs from our ISP. There are many departments but two have their own FTP server. All departments share the same router. The example reserves one IGA for each department with an FTP server and all departments use the other IGA. Map the FTP servers to the first two IGAs and the other LAN traffic to the remaining IGA. Map the third IGA to an inside web server and mail server. Four rules need to be configured, two bi-directional and two uni-directional, as follows.

1. Map the first IGA to the first inside FTP server for FTP traffic in both directions (**1 : 1** mapping, giving both local and global IP addresses).
2. Map the second IGA to the second internal FTP server for FTP traffic in both directions (**1 : 1** mapping, giving both local and global IP addresses).
3. Map the other outgoing LAN traffic to IGA3 (**Many : 1** mapping).
4. You also map your third IGA to the web server and mail server on the LAN. If you choose type **Server**, you can specify multiple servers, of different types, to other computers behind NAT on the LAN.

The example situation looks like this:

Figure 53 NAT example 3



1. In this case you must configure Address Mapping Set 1 from **Menu 15.1 - Address Mapping Sets.** Therefore, you must choose the **Full Feature** option from the **Network Address Translation** field (in menu 4 or menu 11.1.2) (see Figure 54).
2. Enter 15 from the main menu.
3. Enter 1 to configure the Address Mapping Sets.
4. Enter 1 to begin configuring this new set. Enter a Set Name, choose the **Edit Action** and then enter 1 for the **Select Rule** field. Press [ENTER] to confirm.
5. Select **Type** as **One-to-One** (direct mapping for packets going both ways), and enter the local **Start IP** as 192.168.1.10 (the IP address of FTP Server 1), the global **Start IP** as 10.132.50.1 (our first IGA). (see Figure 55*).*
6. Repeat the previous step for rules 2 to 4 as outlined above.
7. When finished, menu 15.1.1 looks like as shown in Figure 56.

Figure 54 Example 3: Menu 11.1.2

```
     Menu 11.1.2 - Remote Node Network Layer Options

IP Address Assignment= Dynamic
IP Address= N/A
IP Subnet Mask= N/A
Gateway IP Addr= N/A

Network Address Translation= Full Feature
Metric= N/A
Private= N/A
RIP Direction= None
Version= N/A

         Enter here to CONFIRM or ESC to CANCEL:
```

Figure 55 shows how to configure the first rule.

Figure 55 Example 3: Menu 15.1.1.1

```
            Menu 15.1.1.1 Address Mapping Rule

Type= One-to-One

Local IP:
  Start= 192.168.1.10
  End  = N/A

Global IP:
  Start= 10.132.50.1
  End  = N/A

               Press ENTER to Confirm or ESC to Cancel:
```

Figure 56 Example 3: Final Menu 15.1.1

```
Menu 15.1.1 - Address Mapping Rules

  Set Name= Example3

 Idx  Local Start IP   Local End IP     Global Start IP  Global End IP    Type
 ---  ---------------  ---------------  ---------------  ---------------  ------
  1. 192.168.1.10                      10.132.50.1                       1-1
  2  192.168.1.11                      10.132.50.2                       1-1
  3. 0.0.0.0           255.255.255.255  10.132.50.3                       M-1
  4.                                   10.132.50.3                      Server
  5.
  6.
  7.
  8.
  9.
 10.
                      Action= Edit          Select Rule=
```

Now configure the IGA3 to map to our web server and mail server on the LAN.

8 Enter 15 from the main menu.

9 Now enter 2 from this menu and configure it as shown in Example 3: Menu 15.2.

Figure 57 Example 3: Menu 15.2

```
            Menu 15.2 - NAT Server Setup

          Default Server: 0.0.0.0
 Rule  Act.   Start Port   End Port    IP Address
-----------------------------------------------------
 001   Yes    80           80          192.168.1.21
 002   Yes    25           25          192.168.1.20
 003   No     0            0           0.0.0.0
 004   No     0            0           0.0.0.0
 005   No     0            0           0.0.0.0
 006   No     0            0           0.0.0.0
 007   No     0            0           0.0.0.0
 008   No     0            0           0.0.0.0
 009   No     0            0           0.0.0.0
 010   No     0            0           0.0.0.0


Select Command= None           Select Rule= N/A
      Press ENTER to Confirm or ESC to Cancel:
```

Configuring Trigger Port forwarding

Note: Only one LAN computer can use a trigger port (range) at a time.

Enter 3 in menu 15 to display **Menu 15.3 — Trigger Port Setup**, shown in Figure 58.

Figure 58 Menu 15.3: Trigger Port Setup

```
                  Menu 15.3 - Trigger Port Setup

                      Incoming                Trigger
Rule    Name          Start Port   End Port   Start Port   End Port
----------------------------------------------------------------------
   1.  Real Audio     6970         7170       7070         7070
   2.                 0            0          0            0
   3.                 0            0          0            0
   4.                 0            0          0            0
   5.                 0            0          0            0
   6.                 0            0          0            0
   7.                 0            0          0            0
   8.                 0            0          0            0
   9.                 0            0          0            0
  10.                 0            0          0            0
  11.                 0            0          0            0
  12.                 0            0          0            0
              Press ENTER to Confirm or ESC to Cancel:
```

Table 32 describes the fields in Figure 58.

Table 32 Menu 15.3: Trigger Port setup description

Field	Description	Example
Rule	This is the rule index number.	1
Name	Enter a unique name for identification purposes. You can enter up to 15 characters in this field. All characters are permitted - including spaces.	Real Audio
Incoming	Incoming is a port (or a range of ports) that a server on the WAN uses when it sends out a particular service. The Business Secure Router forwards the traffic with this port (or range of ports) to the client computer on the LAN that requested the service.	
Start Port	Enter a port number or the starting port number in a range of port numbers.	6970

Table 32 Menu 15.3: Trigger Port setup description

Field	Description	Example
End Port	Enter a port number or the ending port number in a range of port numbers.	7170
Trigger	The trigger port is a port (or a range of ports) that causes (or triggers) the Business Secure Router to record the IP address of the LAN computer that sent the traffic to a server on the WAN.	
Start Port	Enter a port number or the starting port number in a range of port numbers.	7070
End Port	Enter a port number or the ending port number in a range of port numbers.	7070
	Press [ENTER] at the message “Press ENTER to Confirm...” to save your configuration, or press [ESC] at any time to cancel.	

Chapter 10
Introducing the firewall

This chapter shows you how to get started with the firewall.

Using SMT menus

From the main menu enter 21 to go to **Menu 21 - Filter Set and Firewall Configuration** to display the screen shown in Figure 59.

Figure 59 Menu 21: Filter and Firewall Setup

```
  Menu 21 - Filter and Firewall Setup


1. Filter Setup
2. Firewall Setup



                    Enter Menu Selection Number:
```

Activating the firewall

Enter option 2 in this menu to bring up the screen shown in Figure 60. Press [SPACE BAR] and then [ENTER] to select **Yes** in the **Active** field to activate the firewall. The firewall must be active to protect against Denial of Service (DoS) attacks. Use the WebGUI to configure firewall rules.

Figure 60 Menu 21.2: Firewall Setup

```
                Menu 21.2 - Firewall Setup

The firewall protects against Denial of Service (DoS) attacks when
it is active.

Your network is vulnerable to attacks when the firewall is turned off.

Refer to the User's Guide for details about the firewall default
policies.

You may define additional Policy rules or modify existing ones but
please exercise extreme caution in doing so.

    Active: Yes

   You can use the WebGUI to configure the firewall.

            Press ENTER to Confirm or ESC to Cancel:
```

Note: Configure the firewall rules using the WebGUI or CLI commands.

Chapter 11
Filter configuration

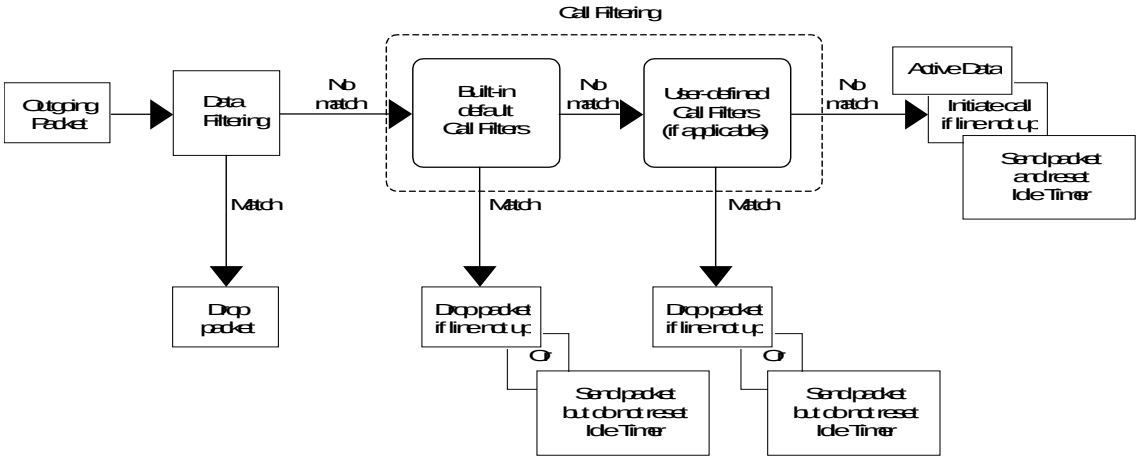
This chapter shows you how to create and apply filters.

Introduction to filters

Your Business Secure Router uses filters to decide whether to allow passage of a data packet, make a call, or both. There are two types of filter applications: data filtering and call filtering. Filters are subdivided into device and protocol filters.

Data filtering screens the data to determine if the packet is allowed to pass. Data filters are divided into incoming and outgoing filters, depending on the direction of the packet relative to a port. Data filtering can be applied on either the WAN side or the LAN side. Call filtering is used to determine if a packet is allowed to trigger a call. Remote node call filtering is only applicable when using PPPoE encapsulation. Outgoing packets must undergo data filtering before they encounter call filtering as shown in Figure 61.

Figure 61 Outgoing packet filtering process



For incoming packets, your Business Secure Router applies data filters only. Packets are processed depending upon whether a match is found. The following sections describe how to configure filter sets.

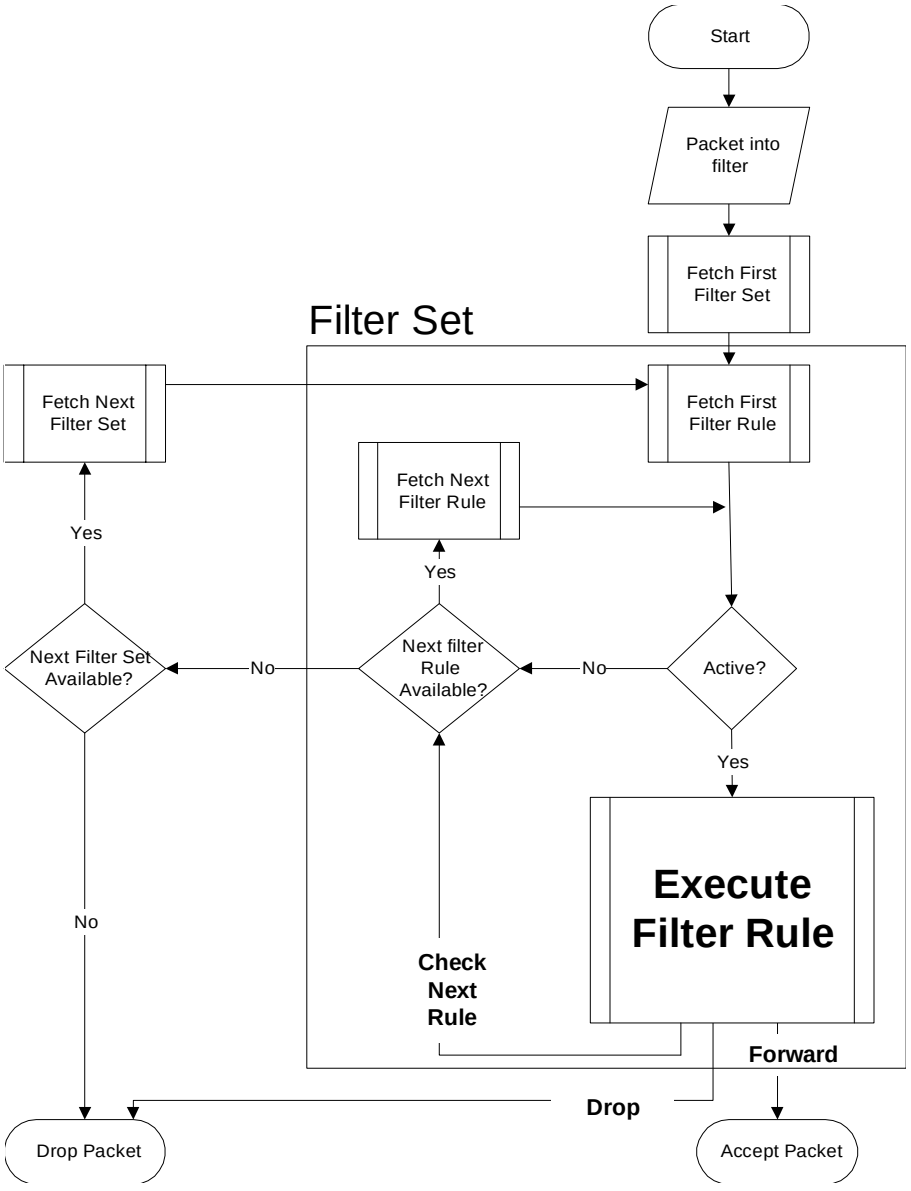
Filter Structure

A filter set consists of one or more filter rules. Usually, you group related rules, for example, all the rules for NetBIOS, into a single set and give it a descriptive name. With the Business Secure Router, you can configure up to twelve filter sets with six rules in each set, for a total of 72 filter rules in the system. You cannot mix device filter rules and protocol filter rules within the same set. You can apply up to four filter sets to a particular port to block multiple types of packets. With each filter set having up to six rules, you can have a maximum of 24 rules active for a single port.

Sets of factory default filter rules are configured in menu 21 to prevent NetBIOS traffic from triggering calls and to prevent incoming Telnet sessions. A summary of their filter rules is shown in the figures that follow.

Figure 62 illustrates the logic flow when executing a filter rule. Also see Figure 66 for the logic flow when executing an IP filter.

Figure 62 Filter rule process



You can apply up to four filter sets to a particular port to block multiple types of packets. With each filter set having up to six rules, you can have a maximum of 24 rules active for a single port.

Configuring a Filter Set

The Business Secure Router includes filtering for NetBIOS over TCP/IP packets by default. To configure another filter set, follow the procedure below.

1 Enter 21 in the main menu to open menu 21.

Figure 63 Menu 21: Filter and Firewall Setup

```
Menu 21 - Filter and Firewall Setup

  1. Filter Setup
  2. Firewall Setup



                          Enter Menu Selection
Number:
```

2 Enter 1 to bring up the menu 21.1.

Figure 64 Menu 21.1: Filter Set Configuration

```
Menu 21.1 - Filter Set Configuration

Filter                              Filter
Set #        Comments               Set #        Comments
------  -----------------          ------  -----------------
  1      _________________            7      _________________
  2      _________________            8      _________________
  3      _________________            9      _________________
  4      _________________           10      _________________
  5      _________________           11      _________________
  6      _________________           12      _________________


                Enter Filter Set Number to Configure= 0

                Edit Comments= N/A

                Press ENTER to Confirm or ESC to Cancel:
```

3 Select the filter set you wish to configure (1-12) and press [ENTER].

4 Enter a descriptive name or comment in the **Edit Comments** field and press [ENTER].

5 Press [ENTER] at the message “Press ENTER to confirm” to open **Menu 21.1.1 - Filter Rules Summary**.

The screen shown in Figure 65 shows the summary of the existing rules in the filter set. Table 33 and Table 34 contain a brief description of the abbreviations used in the previous menus.

Table 33 Abbreviations used in the Filter Rules Summary Menu

Field	Description
#	The filter rule number: 1 to 6.
A	Active: “Y” means the rule is active. “N” means the rule is inactive.
Type	The type of filter rule: “GEN” for Generic, “IP” for TCP/IP.
Filter Rules	These parameters are displayed here.
M	More: “Y” means there are more rules to check which form a rule chain with the present rule. An action cannot be taken until the rule chain is complete. “N” means there are no more rules to check. You can specify an action to be taken for example, forward the packet, drop the packet or check the next rule. For the latter, the next rule is independent of the rule just checked.
m	Action Matched: “F” means to forward the packet immediately and skip checking the remaining rules. “D” means to drop the packet. “N“ means to check the next rule.
n	Action Not Matched: “F” means to forward the packet immediately and skip checking the remaining rules. “D” means to drop the packet. “N” means to check the next rule.

Table 34 Rule abbreviations used

Abbreviation	Description
IP	
Pr	Protocol
SA	Source Address
SP	Source Port number
DA	Destination Address
DP	Destination Port number
GEN	
Off	Offset
Len	Length

The next section provides information on configuring the filter rules.

Configuring a Filter Rule

To configure a filter rule, type its number in **Menu 21.1.1 - Filter Rules Summary** and press [ENTER] to open menu 21.1.1.1 for the rule.

To speed up filtering, all rules in a filter set must be of the same class, for example, protocol filters or generic filters. The class of a filter set is determined by the first rule that you create. When applying the filter sets to a port, separate menu fields are provided for protocol and device filter sets. If you include a protocol filter set in a device filter field or vice versa, the Business Secure Router warns you and prevents you from saving.

Configuring a TCP/IP Filter Rule

This section shows you how to configure a TCP/IP filter rule. Using TCP/IP rules, you can base the rule on the fields in the IP and the upper layer protocol, for example, UDP and TCP headers.

To configure TCP/IP rules, select **TCP/IP Filter Rule** from the **Filter Type** field and press [ENTER] to open **Menu 21.1.1.1 - TCP/IP Filter Rule**, as shown in Figure 65.

Figure 65 Menu 21.1.1.1: TCP/IP Filter Rule

```
                Menu 21.1.1.2 - TCP/IP Filter Rule

           Filter #: 1,2
           Filter Type= TCP/IP Filter Rule
           Active= Yes
           IP Protocol= 0     IP Source Route= No
           Destination: IP Addr=
                        IP Mask=
                        Port #=
                        Port # Comp= None
                Source: IP Addr=
                        IP Mask=
                        Port #=
                        Port # Comp= None
           TCP Estab= N/A
           More= No           Log= None
           Action Matched= Check Next Rule
           Action Not Matched= Check Next Rule

           Press ENTER to Confirm or ESC to Cancel:
Press Space Bar to Toggle.
```

Table 35 describes how to configure your TCP/IP filter rule.

Table 35 TCP/IP Filter Rule Menu fields

Field	Description	Options
Active	Press [SPACE BAR] and then [ENTER] to select **Yes** to activate the filter rule or **No** to deactivate it.	Yes No
IP Protocol	Protocol refers to the upper layer protocol, for example, TCP is 6, UDP is 17 and ICMP is 1. Type a value between 0 and 255. A value of 0 matches ANY protocol.	0-255
IP Source Route	Press [SPACE BAR] and then [ENTER] to select **Yes** to apply the rule to packets with an IP source route option. Otherwise the packets must not have a source route option. The majority of IP packets do not have source route.	Yes No
Destination		

Table 35 TCP/IP Filter Rule Menu fields

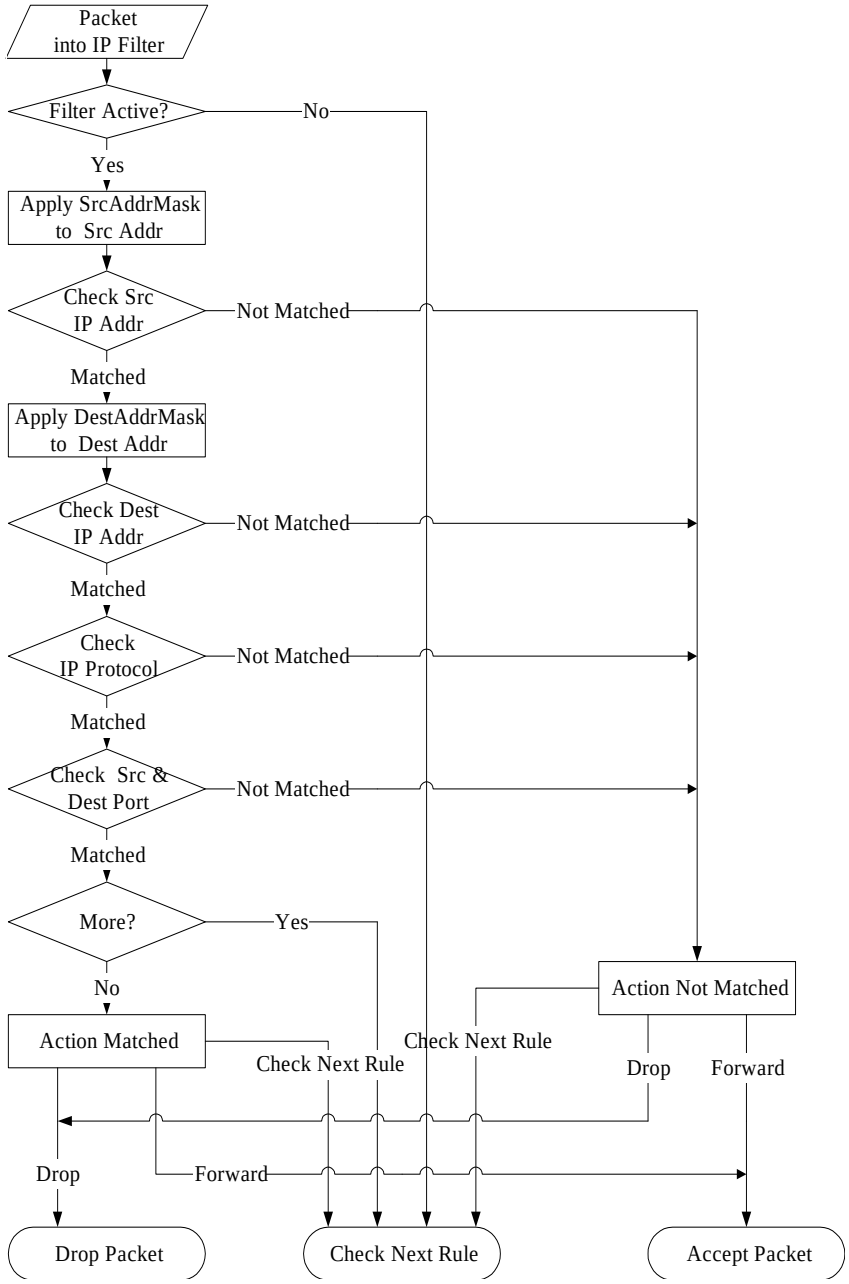
Field	Description	Options
IP Address	Enter the destination IP Address of the packet you wish to filter. This field is ignored if it is 0.0.0.0.	0.0.0.0
IP Mask	Enter the IP mask to apply to the **Destination: IP Addr**.	0.0.0.0
Port #	Enter the destination port of the packets that you wish to filter. The range of this field is 0 to 65 535. This field is ignored if it is 0.	0-65535
Port # Comp	Press [SPACE BAR] and then [ENTER] to select the comparison to apply to the destination port in the packet against the value given in **Destination: Port #**.	None Less Greater Equal Not Equal
Source		
IP Address	Enter the source IP Address of the packet you wish to filter. This field is ignored if it is 0.0.0.0.	0.0.0.0
IP Mask	Enter the IP mask to apply to the **Source: IP Addr**.	0.0.0.0
Port #	Enter the source port of the packets that you wish to filter. The range of this field is 0 to 65 535. This field is ignored if it is 0.	0-65535
Port # Comp	Press [SPACE BAR] and then [ENTER] to select the comparison to apply to the source port in the packet against the value given in **Source: Port #**.	None Less Greater Equal Not Equal
TCP Estab	This field is applicable only when the IP Protocol field is 6, TCP. Press [SPACE BAR] and then [ENTER] to select **Yes** to have the rule match packets that want to establish a TCP connection (SYN=1 and ACK=0); if **No**, it is ignored.	Yes No
More	Press [SPACE BAR] and then [ENTER] to select **Yes** or **No**. If **Yes**, a matching packet is passed to the next filter rule before an action is taken; if **No**, the packet is disposed of according to the action fields. If **More** is **Yes**, then **Action Matched** and **Action Not Matched** will be **N/A**.	Yes No

Table 35 TCP/IP Filter Rule Menu fields

Field	Description	Options
Log	Press [SPACE BAR] and then [ENTER] to select a logging option from the following: **None** – No packets are logged. **Action Matched** - Only packets that match the rule parameters are logged. **Action Not Matched** - Only packets that do not match the rule parameters are logged. **Both** – All packets are logged.	None Action Matched Action Not Matched Both
Action Matched	Press [SPACE BAR] and then [ENTER] to select the action for a matching packet.	Check Next Rule Forward Drop
Action Not Matched	Press [SPACE BAR] and then [ENTER] to select the action for a packet not matching the rule.	Check Next Rule Forward Drop
	After you configure **Menu 21.1.1.1 - TCP/IP Filter Rule**, press [ENTER] at the message “Press ENTER to Confirm” to save your configuration, or press [ESC] to cancel. This data is displayed on **Menu 21.1.1 - Filter Rules Summary**.	

Figure 66 illustrates the logic flow of an IP filter.

Figure 66 Executing an IP filter



Configuring a Generic Filter Rule

This section shows you how to configure a generic filter rule. With generic rules you can filter non-IP packets. For IP packets, it is generally easier to use the IP rules directly.

For generic rules, the Business Secure Router treats a packet as a byte stream as opposed to an IP or IPX packet. You specify the portion of the packet to check with the **Offset** (from 0) and the **Length** fields, both in bytes. The Business Secure Router applies the Mask (using the bit-wise-AND action) to the data portion before comparing the result against the Value to determine a match. The **Mask** and **Value** are specified in hexadecimal numbers. Note that it takes two hexadecimal digits to represent a byte, so if the length is 4, the value in either field will take 8 digits, for example, FFFFFFFF.

To configure a generic rule, select **Generic Filter Rule** in the **Filter Type** field in menu 21.1.4.1 and press [ENTER] to open Generic Filter Rule, as shown in Figure 67.

Figure 67 Menu 21.1.1.1: Generic Filter Rule

```
                Menu 21.1.1.1 - Generic Filter Rule

Filter #: 1,1
Filter Type= Generic Filter Rule
Active= No
Offset= 0
Length= 0
Mask= N/A
Value= N/A
More= No              Log= None
Action Matched= Check Next Rule
Action Not Matched= Check Next Rule

              Press ENTER to Confirm or ESC to Cancel:
                     Press Space Bar to Toggle.
```

Table 36 describes the fields in the Generic Filter Rule menu.

Table 36 Generic Filter Rule Menu fields

Field	Description	Options
Filter #	This is the filter set, filter rule coordinates, for example, 2,3 refers to the second filter set and the third rule of that set.	
Filter Type	Use [SPACE BAR] and then [ENTER] to select a rule type. Parameters displayed below each type will be different. TCP/IP filter rules are used to filter IP packets while generic filter rules allow filtering of non-IP packets.	**Generic Filter Rule** **TCP/IP Filter Rule**
Active	Select **Yes** to turn on the filter rule or **No** to turn it off.	Yes / No
Offset	Enter the starting byte of the data portion in the packet that you wish to compare. The range for this field is from 0 to 255.	0-255
Length	Enter the byte count of the data portion in the packet that you wish to compare. The range for this field is 0 to 8.	0-8
Mask	Enter the mask (in Hexadecimal notation) to apply to the data portion before comparison.	
Value	Enter the value (in Hexadecimal notation) to compare with the data portion.	
More	If **Yes**, a matching packet is passed to the next filter rule before an action is taken; or the packet is disposed of according to the action fields. If **More** is **Yes**, then Action Matched and Action Not Matched are **No**.	Yes No
Log	Select the logging option from the following: **None** - No packets are logged. **Action Matched** - Only packets that match the rule parameters are logged. **Action Not Matched** - Only packets that do not match the rule parameters are logged. **Both** – All packets are logged.	None Action Matched Action Not Matched Both
Action Matched	Select the action for a packet matching the rule.	Check Next Rule Forward Drop

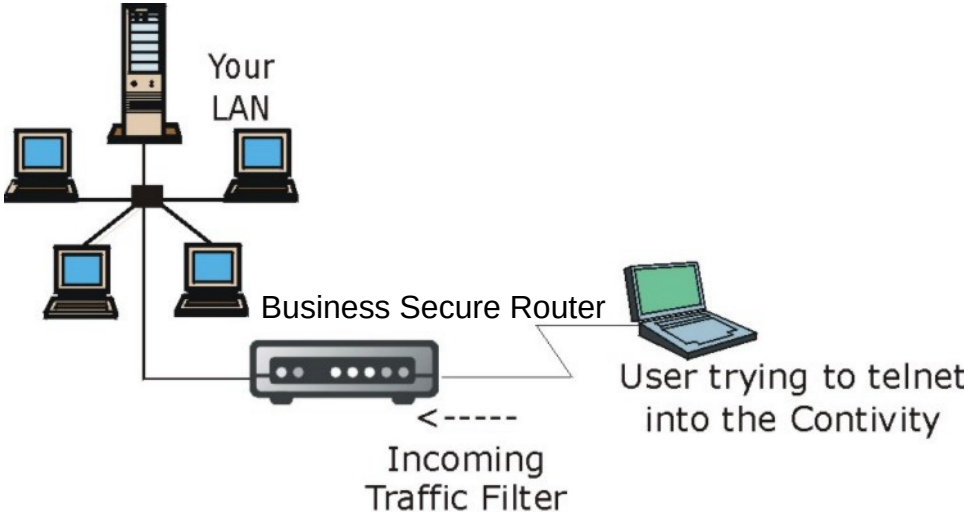
Table 36 Generic Filter Rule Menu fields

Field	Description	Options
Action Not Matched	Select the action for a packet not matching the rule.	Check Next Rule Forward Drop
	After you complete filling in **Menu 21.1.1.1 - Generic Filter Rule**, press [ENTER] at the message “Press ENTER to Confirm” to save your configuration, or press [ESC] to cancel. This data is now be displayed on **Menu 21.1.1 - Filter Rules Summary**.	

Example Filter

The example shown in Figure 68 is set to block outside users from accessing the Business Secure Router via Telnet. See the included disk for more Filter Rules example.

Figure 68 Telnet filter Example



1 Enter 21 from the main menu to open **Menu 21 - Filter and Firewall Setup**.

2 Enter 1 to open **Menu 21.1 - Filter Set Configuration**.

3. Enter the index of the filter set you wish to configure (for example 3) and press [ENTER].
4. Enter a descriptive name or comment in the **Edit Comments** field and press [ENTER].
5. Press [ENTER] at the message [Press ENTER to confirm] to open **Menu 21.1.3 - Filter Rules Summary**.
6. Enter 1 to configure the first filter rule (the only filter rule of this set). Make the entries in this menu as shown in Figure 69.

Figure 69 Example Filter: Menu 21.1.3.1

```
 Menu 21.1.3.1 - TCP/IP Filter Rule

  Filter #: 3,1
  Filter Type= TCP/IP Filter Rule
  Active= Yes
  IP Protocol= 6      IP Source Route= No
  Destination: IP Addr= 0.0.0.0
               IP Mask= 0.0.0.0
               Port #= 23
               Port # Comp= Equal
       Source: IP Addr= 0.0.0.0
               IP Mask= 0.0.0.0
               Port #= 0
               Port # Comp= None
  TCP Estab= No
  More= No             Log= None
  Action Matched= Drop
  Action Not Matched= Forward

Press ENTER to Confirm or ESC to Cancel:
      Press Space Bar to Toggle.
```

When you press [ENTER] to confirm, the screen shown in Figure 70 is displayed. Note that there is only one filter rule in this set. The screen shows you that you have configured and activated (**A = Y**) a TCP/IP filter rule (**Type = IP**, **Pr = 6**) for destination Telnet ports (**DP = 23**). **M = N** means an action can be taken immediately. The action is to drop the packet (**m = D**) if the action is matched and to forward the packet immediately (**n = F**) if the action is not matched, whether or not there are more rules to be checked (there are none in this example).

Figure 70 Example Filter Rules Summary: Menu 21.1.3

```
                    Menu 21.1.3 - Filter Rules Summary

 # A Type                       Filter Rules                              M m n
 - - ---- ------------------------------------------------------------- -
- -
 1 Y IP   Pr=6, SA=0.0.0.0, DA=0.0.0.0, DP=23                            N D F
 2 N
 3 N
 4 N
 5 N
 6 N



                Enter Filter Rule Number (1-6) to Configure: 1
```

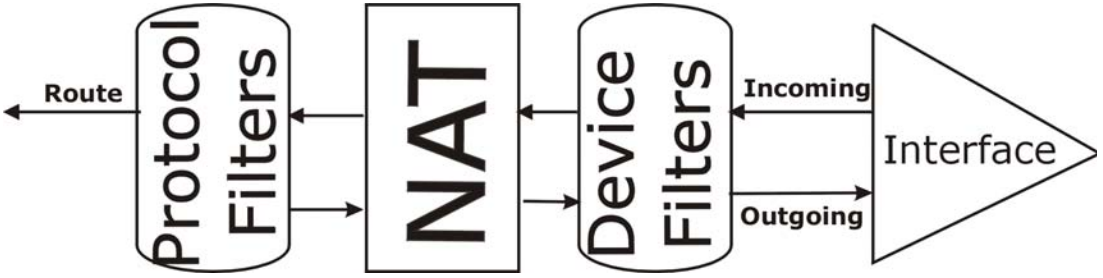
After you have created the filter set, you must apply it.

1. Enter 11 from the main menu to go to menu 11.
2. Then enter **1** to open **Menu 11.1 Remote Node Profile**.
3. Go to the **Edit Filter Sets** field, press [SPACE BAR] to select **Yes** and press [ENTER].
4. This brings you to menu 11.1.4. Apply a filter set (our example is filter set 3) as shown in Figure 73.
5. After you enter the set numbers, press [ENTER] to confirm and leave menu 11.1.4.

Filter Types and NAT

There are two classes of filter rules, **Generic Filter** (Device) rules and protocol filter (**TCP/IP**) rules. Generic filter rules act on the raw data that's going through between LAN and WAN. Protocol filter rules act on the IP packets. Generic and TCP/IP filter rules are discussed in more detail in the next section. When NAT (Network Address Translation) is enabled, the inside IP address and port number are replaced on a connection-by-connection basis, which makes it impossible to know the exact address and port on the wire. Therefore, the Business Secure Router applies the protocol filters to the native IP address and port number before NAT for outgoing packets and after NAT for incoming packets. On the other hand, the generic, or device filters are applied to the raw packets that appear on the wire. They are applied at the point when the Business Secure Router is receiving and sending the packets; for example. the interface. The interface can be an Ethernet port or any other hardware port, as illustrated in Figure 71.

Figure 71 Protocol and Device Filter Sets



Firewall Versus Filters

Firewall configuration is discussed in Chapter 10, "Introducing the firewall," on page 133 chapters of this manual. Further comparisons are also made between filtering, NAT and the firewall.

Applying a Filter

This section shows you where to apply the filters after you design them. The Business Secure Router already has filters to prevent NetBIOS traffic from triggering calls, and block incoming Telnet, FTP and HTTP connections.

Note: Nortel recommends that you apply filters if you do not activate the firewall.

Applying LAN Filters

LAN traffic filter sets are useful to block certain packets, reduce traffic and prevent security breaches. Go to menu 3.1 (shown next) and enter the numbers of the filter sets that you want to apply, as appropriate. You can choose up to four filter sets (from twelve) by entering their numbers separated by commas, for example., 3, 4, 6, 11. Input filter sets filter incoming traffic to the Business Secure Router and output filter sets filter outgoing traffic from the Business Secure Router. For PPPoE or PPTP encapsulation, you have the additional option of specifying remote node call filter sets.

Figure 72 Filtering LAN Traffic

```
Menu 3.1 – LAN Port Filter Setup

 Input Filter Sets:
   protocol filters=
     device filters=
 Output Filter Sets:
   protocol filters=
     device filters=


   Ethernet Interface= 10BaseT
   Input Filter Sets=
   Output Filter Sets=


Press ENTER to Confirm or ESC to Cancel:
```

Applying Remote Node Filters

Go to menu 11.1.4 (shown in Figure 73 – note that call filter sets are only present for PPPoE encapsulation) and enter the numbers of the filter sets, as appropriate. You can cascade up to four filter sets by entering their numbers separated by commas. The Business Secure Router already has filters to prevent NetBIOS traffic from triggering calls, and to block incoming Telnet, FTP and HTTP connections.

Figure 73 Filtering Remote Node Traffic

```
Menu 11.1.4 – Remote Node Filter Setup

       Input Filter Sets:
         protocol filters=
          device filters=
       Output Filter Sets:
         protocol filters=
          device filters=

Press ENTER to Confirm or ESC to Cancel:
```

Chapter 12
SNMP Configuration

This chapter explains SNMP configuration menu 22.

Note: SNMP is only available if TCP/IP is configured.

SNMP Configuration

To configure SNMP, enter 22 from the main menu to display **Menu 22 - SNMP Configuration** as shown next. The community for **Get**, **Set** and **Trap** fields is SNMP terminology for password.

Figure 74 Menu 22: SNMP Configuration

```
          Menu 22 - SNMP Configuration

SNMP:
  Get Community= PlsChgMe!RO
  Set Community= PlsChgMe!RW
  Trusted Host= 0.0.0.0
  Trap:
    Community=
    Destination= 0.0.0.0



  Press ENTER to Confirm or ESC to Cancel:
```

Table 37 describes the SNMP configuration parameters.

Table 37 SNMP Configuration Menu Fields

Field	Description	Example
Get Community	Type the Get community, which is the password for the incoming Get- and GetNext requests from the management station.	**Public** (default)
Set Community	Type the Set community, which is the password for incoming Set requests from the management station.	**Public** (default)
Trusted Host	If you enter a trusted host, your Business Secure Router will only respond to SNMP messages from this address. A blank (default) field means your Business Secure Router will respond to all SNMP messages it receives, regardless of source.	0.0.0.0
Trap Community	Type the Trap community, which is the password sent with each trap to the SNMP manager.	Public
Destination	Type the IP address of the station to send your SNMP traps to.	0.0.0.0
	After you complete this menu, press [ENTER] at the prompt “Press [ENTER] to confirm or [ESC] to cancel” to save your configuration or press [ESC] to cancel and go back to the previous screen.	

SNMP Traps

The Business Secure Router will sends traps to the SNMP manager when any one of the following events occurs:

Table 38 SNMP Traps

Trap #	Trap Name	Description
0	coldStart (defined in *RFC-1215*)	A trap is sent after booting (power on).
1	warmStart (defined in *RFC-1215*)	A trap is sent after booting (software reboot).
4	authenticationFailure (defined in *RFC-1215*)	A trap is sent to the manager when receiving any SNMP get or set requirements with the wrong community (password).

Table 38 SNMP Traps

Trap #	Trap Name	Description
6	whyReboot (defined in MIB)	A trap is sent with the reason of restart before rebooting when the system is going to restart (warm start).
6a	For intentional reboot:	A trap is sent with the message "System reboot by user!" if reboot is done intentionally, (for example, download new files, CI command "sys reboot", and others).
6b	For fatal error:	A trap is sent with the message of the fatal code if the system reboots because of fatal errors.

Chapter 13
System security

This chapter describes how to configure the system security on the Business Secure Router.

System security

You can configure the system password, an external RADIUS server and 802.1x in this menu.

System password

Figure 75 Menu 23 System security

```
                    Menu 23 - System Security

                  1. Change Password
                  2. RADIUS Server

                  4. IEEE802.1x

        Enter Menu Selection Number:
```

Nortel recommends you change the default password. If you forget your password, you have to restore the default configuration file. For more information, see “Restoring the factory-default configuration settings” in *Nortel Business Secure Router 222 Configuration — Basics* (NN47922-500).

Configuring external RADIUS server

Enter 23 in the main menu to display **Menu 23 – System security**.

Figure 76 Menu 23 system security

```
                    Menu 23 - System Security

                1. Change Password
                2. RADIUS Server

                4. IEEE802.1x

        Enter Menu Selection Number:
```

From **Menu 23- System Security**, enter 2 to display **Menu 23.2 – System Security – RADIUS Server,** as shown in Figure 77.

Figure 77 Menu 23.2 System Security: RADIUS server

```
Menu 23.2 - System Security - RADIUS Server

Authentication Server:
Active= No
Server Address= 0.0.0.0
Port #= 1812
Shared Secret= ********

Accounting Server:
Active= No
Server Address= 0.0.0.0
Port #= 1813
Shared Secret= ********

Press ENTER to Confirm or ESC to Cancel:
```

Table 39 describes the fields in Figure 77.

Table 39 Menu 23.2 System Security: RADIUS Server

Field	Description
Authentication Server	
Active	Press [SPACE BAR] to select **Yes** and press [ENTER] to enable user authentication through an external authentication server.
Server Address	Enter the IP address of the external authentication server in dotted decimal notation.
Port #	The default port of the RADIUS server for authentication is **1812**. You need not change this value unless your network administrator instructs you to do so with additional information.
Shared Secret	Specify a password (up to 31 alphanumeric characters) as the key to be shared between the external authentication server and the Business Secure Router. The key is not sent over the network. This key must be the same on the external authentication server and Business Secure Router.
Accounting Server	
Active	Press [SPACE BAR] to select **Yes** and press [ENTER] to enable user authentication through an external accounting server.
Server Address	Enter the IP address of the external accounting server in dotted decimal notation.
Port #	The default port of the RADIUS server for accounting is **1813**. You need not change this value unless your network administrator instructs you to do so with additional information.
Shared Secret	Specify a password (up to 31 alphanumeric characters) as the key to be shared between the external accounting server and the Business Secure Router. The key is not sent over the network. This key must be the same on the external accounting server and Business Secure Router.
After you complete this menu, press [ENTER] at the prompt “Press ENTER to confirm or ESC to cancel” to save your configuration or press [ESC] to cancel and go back to the previous screen.	

IEEE 802.1x

The IEEE 802.1x standards outline enhanced security methods for both the authentication of users and encryption key management.

Follow the steps below to enable EAP authentication on your Business Secure Router.

1 From the main menu, enter 23 to display **Menu23 – System Security**.

Figure 78 Menu 23 System Security

```
   Menu 23 - System Security

1. Change Password
2. RADIUS Server

4. IEEE802.1x

Enter Menu Selection Number:
```

2 Enter 4 to display **Menu 23.4 – System Security – IEEE802.1x**.

Figure 79 Menu 23.4 System Security: IEEE802.1x

```
Menu 23.4 - System Security - IEEE802.1x

Port Control= Authentication Required
ReAuthentication Timer (in second)= 1800
Idle Timeout (in second)= 3600

Authentication Databases= Local User Database Only

                    Press ENTER to Confirm or ESC to Cancel:
Press Space Bar to Toggle.
```

Table 40 describes the fields in Figure 79.

Table 40 Menu 23.4 System Security: IEEE802.1x

Field	Description
Port Control	Press [SPACE BAR] and select a security mode. Select **No Authentication Required** to allow any computer access to your network without entering usernames and passwords. This is the default setting. Selecting **Authentication Required** means computers have to enter usernames and passwords before access to the network is allowed. Select **No Access Allowed** to block all computers from accessing the network. The following fields are not available when you select **No Authentication Required** or **No Access Allowed**.
ReAuthentication Timer (in second)	Specify how often a client has to reenter the username and password to stay connected to the network. This field is activated only when you select **Authentication Required** in the **Port Control** field. Enter a time interval between 10 and 9 999 (in seconds). The default time interval is 1 800 seconds (or 30 minutes).
Idle Timeout (in second)	The Business Secure Router automatically disconnects a client from the network after a period of inactivity. The client needs to enter the username and password again before access to the network is allowed. This field is activated only when you select **Authentication Required** in the **Port Control** field. The default time interval is 3 600 seconds (or 1 hour).

Table 40 Menu 23.4 System Security: IEEE802.1x

Field	Description
Authentication Databases	The authentication database contains user login information. The local user database is the built-in database on the Business Secure Router. The RADIUS is an external server. Use this field to decide which database the Business Secure Router should use (first) to authenticate a user. Before you specify the priority, make sure you have set up the corresponding database correctly first. Select **Local User Database Only** to have the Business Secure Router just check the built-in user database on the Business Secure Router for a user's username and password. Select **RADIUS Only** to have the Business Secure Router just check the user database on the specified RADIUS server for a user's username and password. Select **Local first, then RADIUS** to have the Business Secure Router first check the user database on the Business Secure Router for a user's username and password. If the user name is not found, the Business Secure Router then checks the user database on the specified RADIUS server. Select **RADIUS first, then Local** to have the Business Secure Router first check the user database on the specified RADIUS server for a user's username and password. If the Business Secure Router cannot reach the RADIUS server, the Business Secure Router then checks the local user database on the Business Secure Router. If the username is not found or the password does not match in the RADIUS server, the Business Secure Router does not check the local user database and the authentication fails.
After you complete this menu, press [ENTER] at the prompt “Press ENTER to confirm or ESC to cancel” to save your configuration or press [ESC] to cancel and go back to the previous screen.	

After you enable user authentication, you need to specify an external RADIUS server or create local user accounts on the Business Secure Router for authentication.

Chapter 14
System information and diagnosis

This chapter covers SMT menus 24.1 to 24.4.

Introduction to System Status

This chapter covers the diagnostic tools that help you to maintain your Business Secure Router. These tools include updates on system status, port status and log and trace capabilities.

Select menu 24 in the main menu to open **Menu 24 - System Maintenance**, as shown in Figure 80.

Figure 80 Menu 24: System Maintenance

```
                Menu 24 - System Maintenance


  1. System Status
  2. System Information and Console Port Speed
  3. Log and Trace
  4. Diagnostic
  5. Backup Configuration
  6. Restore Configuration
  7. Upload Firmware
  8. Command Interpreter Mode
  9. Call Control
  10. Time and Date Setting
  11. Remote Management Setup

                 Enter Menu Selection Number:
```

System Status

The first selection, System Status, gives you information on the version of your system firmware and the status and statistics of the ports, as shown in the next figure. System Status is a tool that can be used to monitor your Business Secure Router. Specifically, it gives you information on your system firmware version, number of packets sent, and number of packets received.

To get to the System Status:

1. Enter number 24 to go to **Menu 24 - System Maintenance**.
2. In this menu, enter 1 to open System Maintenance - Status.
3. There are three commands in **Menu 24.1 - System Maintenance - Status**. Entering 1 drops the WAN connection, 9 resets the counters and [ESC] takes you back to the previous screen.

Figure 81 Menu 24.1: System Maintenance: Status

Figure 82 Menu 24.1 — System Maintenance — Status

```
                  Menu 24.1 - System Maintenance - Status          00:02:07
                                                              Thu. Jan. 01, 2004

Port   Status        TxPkts      RxPkts    Cols    Tx B/s    Rx B/s     Up Time
 WAN   Down               0           0       0         0         0     0:00:00
 LAN   100M/Full         12           7       0         0        64     0:00:10

Port   Ethernet Address        IP Address           IP Mask       DHCP
 WAN  00:13:49:00:00:02          0.0.0.0           0.0.0.0     Client
 LAN  00:13:49:00:00:01       192.168.1.1     255.255.255.0     Server

     System up Time:     0:00:15

     Name:
     Routing: IP
     RAS F/W Version: VBSR222_2.6.0.0.003b1 | 07/19/2006


                              Press Command:

               COMMANDS: 1-Drop WAN 9-Reset Counters   ESC-Exit
```

Table 41 describes the fields present in **Menu 24.1 - System Maintenance - Status**. These fields are read-only and meant for diagnostic purposes. The upper right corner of the screen shows the time and date according to the format you set in menu 24.10.

Table 41 System Maintenance: Status Menu Fields

Field	Description
Port	Identifies a port (WAN, or LAN) on the Business Secure Router.
Status	Shows the port speed and duplex setting if you are using **Ethernet Encapsulation** and **Down** (line is down), **idle** (line (ppp) idle), **dial** (starting to trigger a call) or **drop** (dropping a call) if you are using **PPPoE Encapsulation**.
TxPkts	The number of transmitted packets on this port.
RxPkts	The number of received packets on this port.
Cols	The number of collisions on this port.
Tx B/s	Shows the transmission speed in Bytes per second on this port.

Table 41 System Maintenance: Status Menu Fields

Field	Description
Rx B/s	Shows the reception speed in Bytes per second on this port.
Up Time	Total amount of time the line has been up.
Ethernet Address	The Ethernet address of the port listed on the left.
IP Address	The IP address of the port listed on the left.
IP Mask	The IP mask of the port listed on the left.
DHCP	The DHCP setting of the port listed on the left.
System up Time	The total time the Business Secure Router has been on.
RAS F/W Version	The release of firmware currently on the Business Secure Router and the date the release was created.
Name	This is the Business Secure Router system name + domain name assigned in menu 1. For example, System Name= xxx; Domain Name= baboo.mickey.com Name= xxx.baboo.mickey.com
Routing	Refers to the routing protocol used.
	Enter 1 to drop the WAN connection, 9 to reset the counters or [ESC] to return to menu 24

System information and console port speed

With your system you can choose different console port speeds. To get to the System Information and Console Port Speed.

1. Enter 24 to go to **Menu 24 – System Maintenance**.
2. Enter 2 to open **Menu 24.2 - System Information and Console Port Speed**.
3. From this menu you have two choices, as shown in Figure 83:

Figure 83 System Information and Console Port Speed

```
Menu 24.2 - System Information and Console Port Speed

                1. System Information
                2. Console Port Speed
                Please enter selection:
```

System Information

System Information gives you information about your system, as shown in Figure 84. More specifically, it gives you information on your routing protocol, Ethernet address and IP address.

Figure 84 Menu 24.2.1: System Maintenance Information

```
Menu 24.2.1 - System Maintenance - Information

   Name:
   Routing: IP
   RAS F/W Version: VBSR222_2.6.0.0.003b1 | 07/19/2006
   Country Code: 255

   LAN
     Ethernet Address: 00:13:49:00:00:01
     IP Address: 192.168.1.1
     IP Mask: 255.255.255.0
     DHCP: Server




          Press ESC or RETURN to Exit:
```

Table 42 Fields in System Maintenance: Information

Field	Description
Name	This is the Business Secure Router system name + domain name assigned in menu 1. For example, System Name= xxx; Domain Name= baboo.mickey.com Name= xxx.baboo.mickey.com
Routing	Refers to the routing protocol used.
RAS F/W Version	The release of firmware currently on the Business Secure Router and the date the release was created.
Ethernet Address	Refers to the Ethernet MAC (Media Access Control) address of your Business Secure Router.
IP Address	This is the IP address of the Business Secure Router in dotted decimal notation.
IP Mask	This shows the IP mask of the Business Secure Router.
DHCP	This field shows the DHCP setting of the Business Secure Router.
	When finished viewing, press [ESC] or [ENTER] to exit.

Console port speed

You can change the speed of the console port through **Menu 24.2.2 – Console Port Speed**. Your Business Secure Router supports 9 600 (default), 19 200, 38 400, 57 600, and 115 200 b/s for the console port. Press [SPACE BAR] and then [ENTER] to select the desired speed in menu 24.2.2, as shown in Figure 85.

Figure 85 Menu 24.2.2: System Maintenance: Change Console Port Speed

```
Menu 24.2.2 – System Maintenance – Change Console Port Speed

                Console Port Speed: 115200

                Press ENTER to Confirm or ESC to Cancel:
               Press Space Bar to Toggle.
```

Log and trace

The Business Secure Router has a syslog facility for message logging, and a trace function for viewing call-triggering packets.

Figure 86 Menu 24.3: System Maintenance: Log and Trace

```
Menu 24.3 - System Maintenance - Log and Trace

2. Syslog Logging
4. Call-Triggering Packet



Press ENTER to Confirm or ESC to Cancel
```

Syslog logging

The Business Secure Router uses the syslog facility to log the CDR (Call Detail Record) and system messages to a syslog server. Syslog and accounting can be configured in **Menu 24.3.2 - System Maintenance - Syslog Logging**, as shown in Figure 87.

Figure 87 Menu 24.3.2: System Maintenance: Syslog Logging

```
Menu 24.3.2 - System Maintenance - Syslog Logging

Syslog:
Active= No
Syslog Server IP Address= ?
Log Facility= Local 1




Press ENTER to Confirm or ESC to Cancel
```

Configure the syslog parameters described in Table 43 to activate syslog, and then choose what you want to log.

Table 43 System Maintenance Menu Syslog Parameters

Parameter	Description
Syslog: Active	 Press [SPACE BAR] and then [ENTER] to turn syslog on or off.
Syslog Server IP Address	Enter the IP Address of the server that logs the CDR (Call Detail Record) and system messages. For example, the syslog server.
Log Facility	Press [SPACE BAR] and then [ENTER] to select a Local option. Using the log facility, you can log the message to different files in the server. Refer to the documentation of your syslog program for more details.
After you finish configuring this screen, press [ENTER] to confirm or [ESC] to cancel.	

Your Business Secure Router sends five types of syslog messages. Some examples of these syslog messages with their message formats are shown next:

CDR

CDR Message Format
SdcmdSyslogSend(SYSLOG_CDR, SYSLOG_INFO, String); String = board xx line xx channel xx, call xx, str

```
 board = the hardware board ID

 line = the WAN ID in a board

 Channel = channel ID within the WAN

 call = the call reference number which starts from 1 and increments by 1
for each new call

 str = C01 Outgoing Call dev xx ch xx (dev:device No. ch:channel No.)

 L02 Tunnel Connected(L2TP)

 C02 OutCall Connected xxxx (means connected speed) xxxxx (means Remote
Call Number)

 L02 Call Terminated

 C02 Call Terminated
Jul 19 11:19:27 192.168.102.2 RAS: board 0 line 0 channel 0, call 1, C01 Outgoing Call dev=2 ch=0
40002
Jul 19 11:19:32 192.168.102.2 RAS: board 0 line 0 channel 0, call 1, C02
OutCall Connected 64000 40002
Jul 19 11:20:06 192.168.102.2 RAS: board 0 line 0 channel 0, call 1, C02 Call Terminated
```

Packet triggered

```
Packet triggered Message Format
SdcmdSyslogSend( SYSLOG_PKTTRI, SYSLOG_NOTICE, String );

 String = Packet trigger: Protocol=xx Data=xxxxxxxxxx…..x

 Protocol: (1:IP 2:IPX 3:IPXHC 4:BPDU 5:ATALK 6:IPNG)

 Data: We will send forty-eight Hex characters to the server
Jul 19 11:28:39 192.168.102.2 RAS: Packet Trigger: Protocol=1,
Data=4500003c100100001f010004c0a86614ca849a7b08004a5c0200010061626364656
66768696a6b6c6d6e6f7071727374
Jul 19 11:28:56 192.168.102.2 RAS: Packet Trigger: Protocol=1,
Data=4500002c1b0140001f06b50ec0a86614ca849a7b0427001700195b3e00000000600
220008cd40000020405b4
Jul 19 11:29:06 192.168.102.2 RAS: Packet Trigger: Protocol=1,
Data=450000282401400001f06ac12c0a86614ca849a7b0427001700195b451d143013500
4000077600000
```

Filter log

```
Filter log Message Format
 SdcmdSyslogSend(SYSLOG_FILLOG, SYSLOG_NOTICE, String );

String = IP[Src=xx.xx.xx.xx Dst=xx.xx.xx.xx prot spo=xxxx dpo=xxxx]
S04>R01mD
```

```
IP[…] is the packet header and S04>R01mD means filter set 4 (S) and rule
1 (R), match (m) drop (D).

 Src: Source Address

 Dst: Destination Address

 prot: Protocol (“TCP”,”UDP”,”ICMP”)

spo: Source port

dpo: Destination port
Mar 03 10:39:43 202.132.155.97 RAS:
GEN[fffffffffffnordff0080] }S05>R01mF
Mar 03 10:41:29 202.132.155.97 RAS:
GEN[00a0c5f502fnord010080] }S05>R01mF
Mar 03 10:41:34 202.132.155.97 RAS:
IP[Src=192.168.1.33 Dst=202.132.155.93 ICMP]}S04>R01mF
Mar 03 11:59:20 202.132.155.97 RAS:
GEN[00a0c5f502fnord010080] }S05>R01mF
Mar 03 12:00:52 202.132.155.97 RAS:
GEN[ffffffffffff0080] }S05>R01mF
Mar 03 12:00:57 202.132.155.97 RAS:
GEN[00a0c5f502010080] }S05>R01mF
Mar 03 12:01:06 202.132.155.97 RAS:
IP[Src=192.168.1.33 Dst=202.132.155.93 TCP spo=01170 dpo=00021]}S04>R01mF
```

PPP log

PPP Log Message Format
SdcmdSyslogSend(SYSLOG_PPPLOG, SYSLOG_NOTICE, String); String = ppp:Proto Starting / ppp:Proto Opening / ppp:Proto Closing / ppp:Proto Shutdown Proto = LCP / ATCP / BACP / BCP / CBCP / CCP / CHAP/ PAP / IPCP / IPXCP Jul 19 11:42:44 192.168.102.2 RAS: ppp:LCP Closing Jul 19 11:42:49 192.168.102.2 RAS: ppp:IPCP Closing Jul 19 11:42:54 192.168.102.2 RAS: ppp:CCP Closing

Firewall log

```
Firewall Log Message Format
SdcmdSyslogSend(SYSLOG_FIREWALL, SYSLOG_NOTICE, buf);
buf = IP[Src=xx.xx.xx.xx : spo=xxxx Dst=xx.xx.xx.xx : dpo=xxxx | prot |
rule | action]
Src: Source Address
spo: Source port (empty means no source port information)
Dst: Destination Address
dpo: Destination port (empty means no destination port information)
prot: Protocol (“TCP”,”UDP”,”ICMP”, ”IGMP”, ”GRE”, ”ESP”)
rule: <a,b> where a means "set" number; b means "rule" number.
Action: nothing(N) block (B) forward (F)
08-01-2000 11:48:41 Local1.Notice 192.168.10.10 RAS: FW 172.21.1.80 :137
->172.21.1.80 :137 |UDP|default permit:<2,0>|B
08-01-2000 11:48:41 Local1.Notice 192.168.10.10 RAS: FW 192.168.77.88
:520 ->192.168.77.88 :520 |UDP|default permit:<2,0>|B
08-01-2000 11:48:39 Local1.Notice 192.168.10.10 RAS: FW 172.21.1.50
->172.21.1.50 |IGMP<2>|default permit:<2,0>|B
08-01-2000 11:48:39 Local1.Notice 192.168.10.10 RAS: FW 172.21.1.25
->172.21.1.25 |IGMP<2>|default permit:<2,0>|B
```

Call-Triggering packet

Call-Triggering Packet displays information about the packet that triggered a dial-out call in an easily readable format. Equivalent information is available in menu 24.1 in hex format. An example is shown in Figure 88.

Figure 88 Call-Triggering packet example

```
IP Frame: ENET0-RECV Size: 44/ 44 Time: 17:02:44.262
 Frame Type:

 IP Header:
 IP Version = 4
 Header Length = 20
 Type of Service = 0x00 (0)
 Total Length = 0x002C (44)
 Identification = 0x0002 (2)
```

```
Flags = 0x00
Fragment Offset = 0x00
Time to Live = 0xFE (254)
Protocol = 0x06 (TCP)
Header Checksum = 0xFB20 (64288)
Source IP = 0xC0A80101 (192.168.1.1)
Destination IP = 0x00000000 (0.0.0.0)

TCP Header:
Source Port = 0x0401 (1025)
Destination Port = 0x000D (13)
Sequence Number = 0x05B8D000 (95997952)
Ack Number = 0x00000000 (0)
Header Length = 24
Flags = 0x02 (....S.)
Window Size = 0x2000 (8192)
Checksum = 0xE06A (57450)
Urgent Ptr = 0x0000 (0)
Options =
0000: 02 04 02 00

RAW DATA:
0000: 45 00 00 2C 00 02 00 00-FE 06 FB 20 C0 A8 01 01 E.........  ....
0010: 00 00 00 00 04 01 00 0D-05 B8 D0 00 00 00 00 00 ................
0020: 60 02 20 00 E0 6A 00 00-02 04 02 00
Press any key to continue...
```

With the diagnostic facility, you can test the different aspects of your Business Secure Router to determine if it is working properly. In Menu 24.4, you can choose among various types of diagnostic tests to evaluate your system, as shown in Figure 89.

Follow the procedure below to get to **Menu 24.4 - System Maintenance – Diagnostic.**

1. From the main menu, select option 24 to open **Menu 24 - System Maintenance**.
2. From this menu, select option 4. Diagnostic. This opens **Menu 24.4 - System Maintenance - Diagnostic**.

Figure 89 Menu 24.4: System Maintenance: Diagnostic

```
Menu 24.4 - System Maintenance - Diagnostic

                  TCP/IP
                     1. Ping Host
                     2. WAN DHCP Release
                     3. WAN DHCP Renewal
                     4. PPPoE/PPTP Setup Test

                   System
                     11. Reboot System



                     Enter Menu Selection Number:


                     Host IP Address= N/A
```

WAN DHCP

DHCP functionality can be enabled on the LAN or WAN as shown in WAN & LAN DHCP. LAN DHCP is discussed in *Nortel Business Secure Router 222 Configuration — Basics* (NN47922-500). The Business Secure Router can act either as a WAN DHCP client (IP Address Assignment field in menu 4 or menu 11.1.2 is Dynamic and the Encapsulation field in menu 4 or menu 11 is Ethernet) or None, (when you have a static IP). Using the WAN Release and Renewal fields in menu 24.4, you can release or renew the assigned WAN IP address, subnet mask and default gateway, or do both. This is similar to using the file winipcfg.

Figure 90 WAN & LAN DHCP

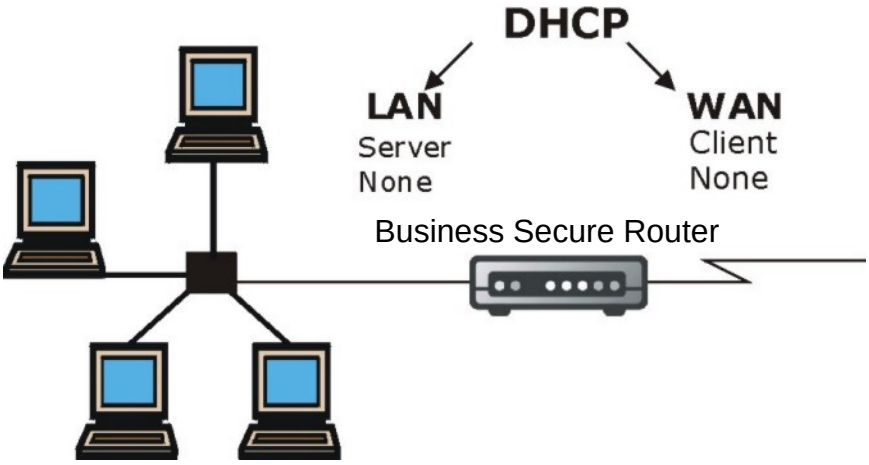


Table 44 describes the diagnostic tests available in menu 24.4 for your Business Secure Router and associated connections.

Table 44 System Maintenance menu diagnostic

Field	Description
Ping Host	Enter 1 to ping any machine (with an IP address) on your LAN or WAN. Enter its IP address in the **Host IP Address** field below.
WAN DHCP Release	Enter 2 to release your WAN DHCP settings.
WAN DHCP Renewal	Enter 3 to renew your WAN DHCP settings.
Internet Setup Test	This feature is only available for dial-up connections using PPPoE or PPTP encapsulation. Enter 4 to test the Internet setup. You can also test the Internet setup in **Menu 4 - Internet Access**. Refer to Chapter 5, “Internet access,” on page 79 for more details.
Reboot System	Enter 11 to reboot the Business Secure Router.
Host IP Address=	If you entered 1 in **Ping Host**, enter the IP address of the computer you want to ping in this field.
	Enter the number of the selection you want to perform or press [ESC] to cancel.

Chapter 15
Firmware and configuration file maintenance

This chapter tells you how to backup and restore your configuration file, as well as upload new firmware and configuration files.

Filename conventions

The configuration file (often called the romfile or rom-0) contains the factory default settings in the menus such as password, DHCP Setup and TCP/IP Setup. It comes with a rom filename extension. Once you have customized the Business Secure Router settings, they can be saved back to your computer under a filename of your choosing.

The system firmware (sometimes referred to as the ras file) has a bin filename extension. With many FTP and TFTP clients, the filenames are similar to those seen next.

Note: Only use firmware for your Business Secure Router specific model. Refer to the label on the bottom of your Business Secure Router.

```
ftp> put firmware.bin ras
```

This is a sample FTP session showing the transfer of the computer file firmware.bin to the Business Secure Router.

```
ftp> get rom-0 config.cfg
```

This is a sample FTP session saving the current configuration to the computer file config.cfg.

If your (T)FTP client does not allow you to have a destination filename different than the source, you must rename the firmware and config file names as the Business Secure Router only recognizes rom-0 and ras. Be sure you keep unaltered copies of both files for later use.

Table 45 is a summary. Note that the internal filename refers to the filename on the Business Secure Router and the external filename refers to the filename not on the Business Secure Router, that is, on your computer, local network or FTP site and so the name (but not the extension) can vary. After uploading new firmware, see the F/W version field in **Menu 24.2.1 – System Maintenance – Information** to confirm that you have uploaded the correct firmware version. The AT command is the command you enter after you press y when prompted in the SMT menu to go into debug mode.

Table 45 Filename Conventions

File Type	Internal Name	External Name	Description
Configuration File	Rom-0	This is the configuration filename on the Business Secure Router. Uploading the rom-0 file replaces the entire ROM file system, including your Business Secure Router configurations, system-related data (including the default password), the error log and the trace log.	*.rom
Firmware	Ras	This is the name for the firmware on the Contivity.	*.bin

Backup configuration

Note: The Business Secure Router displays different messages explaining different ways to backup, restore and upload files in menus 24.5, 24.6, 24. 7.1 and 24.7.2; depending on whether you use the console port or Telnet.

Using Option 5 from **Menu 24 – System Maintenance,** you can back up the current Business Secure Router configuration to your computer. Backup is highly recommended once your Business Secure Router is functioning properly. FTP is the preferred method for backing up your current configuration to your computer

since it is faster. You can also perform backup and restore using menu 24 through the console port. Any serial communications program should work fine; however, you must use Xmodem protocol to perform the download or upload and you do not have to rename the files.

Note that terms download and upload are relative to the computer. Download means to transfer from the Business Secure Router to the computer, while upload is a transfer from your computer to the Business Secure Router.

Backup configuration

Follow the instructions as shown in **Menu 24.5** (Figure 91).

Figure 91 Menu 24.5 - System Maintenance - Backup Configuration

```
                Menu 24.5 - System Maintenance - Backup Configuration
To transfer the configuration file to your workstation, follow the
procedure below:

1. Launch the FTP client on your workstation.
2. Type "open" and the IP address of your Business Secure Router. Then type
"nnadmin" and SMT password as requested.
3. Locate the 'rom-0' file.
4. Type 'get rom-0' to back up the current Business Secure Router
configuration to
   your workstation.
For details on FTP commands, please consult the documentation of your FTP
client program. For details on backup using TFTP (note that you must remain
in this menu to back up using TFTP), please see your Business Secure Router
manual.

                Press ENTER to Exit:
```

Using the FTP command from the command line

1. Launch the FTP client on your computer.
2. Enter open, followed by a space and the IP address of your Business Secure Router.
3. Press [ENTER] when prompted for a username.
4. Enter your password as requested (the default password is PlsChgMe!).

5. Enter **bin** to set transfer mode to binary.
6. Use **get** to transfer files from the Business Secure Router to the computer, for example, **get rom-0 config.rom** transfers the configuration file on the Business Secure Router to your computer and renames it **config.rom**. See earlier in this chapter for more information on filename conventions.
7. Enter **quit** to exit the ftp prompt.

Example of FTP commands from the command line

Figure 92 FTP Session Example

```
331 Enter PASS command
Password:
230 Logged in
ftp> bin
200 Type I OK
ftp> get rom-0 config.rom
200 Port command okay
150 Opening data connection for STOR ras
226 File received OK
ftp: 16384 bytes sent in 1.10Seconds 297.89Kbytes/sec.
ftp> quit
```

GUI-based FTP clients

Table 46 describes some of the commands that you can see in GUI-based FTP clients.

Table 46 General commands for GUI-based FTP clients

Command	Description
Host Address	Enter the address of the host server.
Logon Type	Anonymous. This is when a user ID and password is automatically supplied to the server for anonymous access. Anonymous logons will work only if your ISP or service administrator has enabled this option. Normal. The server requires a unique User ID and Password to log on.
Transfer Type	Transfer files in either ASCII (plain text format) or in binary mode.

Table 46 General commands for GUI-based FTP clients

Command	Description
Initial Remote Directory	Specify the default remote directory (path).
Initial Local Directory	Specify the default local directory (path).

TFTP and FTP over WAN Management Limitations

TFTP, FTP and Telnet over WAN do not work when:

- You disable Telnet service in menu 24.11.
- You apply a filter in menu 3.1 (LAN) or in menu 11.1.4 (WAN) to block Telnet service.
- The IP address in the **Secured Client IP** field in menu 24.11 does not match the client IP. If it does not match, the Business Secure Router disconnects the Telnet session immediately.
- You are running an SMT console session.

Backup configuration using TFTP

The Business Secure Router supports the uploading and downloading of the firmware and the configuration file using TFTP (Trivial File Transfer Protocol) over LAN. Nortel does not recommend using TFTP over WAN, although it can work.

To use TFTP, your computer must have both Telnet and TFTP clients. To back up the configuration file, follow the procedure shown next.

1. Use Telnet from your computer to connect to the Business Secure Router and log on. Because TFTP does not have any security checks, the Business Secure Router records the IP address of the Telnet client and accepts TFTP requests only from this address.
2. Put the SMT in command interpreter (CI) mode by entering 8 in **Menu 24 – System Maintenance**.
3. Enter command “sys stdio 0” to disable the SMT timeout, so the TFTP transfer is not interrupted. Enter command “sys stdio 5” to restore the five-minute SMT timeout (default) after the file transfer is complete.

4 Launch the TFTP client on your computer and connect to the Business Secure Router. Set the transfer mode to binary before starting data transfer.

5 Use the TFTP client (see the example below) to transfer files between the Business Secure Router and the computer. The file name for the configuration file is “rom-0” (rom-zero, not capital o).

Note: Telnet connection must be active and the SMT must be in CI mode before and during the TFTP transfer. For details on TFTP commands (see “TFTP command example” on page 184), consult the documentation of your TFTP client program. For UNIX, use “get” to transfer from the Business Secure Router to the computer and “binary” to set binary transfer mode.

TFTP command example

The following is an example TFTP command:

```
tftp [-i] host get rom-0 config.rom
```

where “i” specifies binary image transfer mode (use this mode when transferring binary files), “host” is the Business Secure Router IP address, “get” transfers the file source on the Business Secure Router (rom-0, name of the configuration file on the Business Secure Router) to the file destination on the computer and renames it config.rom.

GUI-based TFTP clients

Table 47 describes some of the fields that appear in GUI-based TFTP clients.

Table 47 General commands for GUI-based TFTP clients

Command	Description
Host	Enter the IP address of the Business Secure Router. 192.168.1.1 is the Business Secure Router’s default IP address when shipped.
Send/Fetch	Use Send to upload the file to the Business Secure Router and Fetch to back up the file on your computer.
Local File	Enter the path and name of the firmware file (*.bin extension) or configuration file (*.rom extension) on your computer.

Table 47 General commands for GUI-based TFTP clients

Command	Description
Remote File	This is the filename on the Business Secure Router. The filename for the firmware is “ras” and for the configuration file, is “rom-0”.
Binary	Transfer the file in binary mode.
Abort	Stop transfer of the file.

Refer to Chapter 17, “Remote Management,” on page 209 for information about configurations that disallow TFTP and FTP over WAN.

Back up via console port

Back up configuration via the console port by following the HyperTerminal procedure. Procedures using other serial communications programs are similar.

Display menu 24.5 and enter “y” at the screen shown in Figure 93.

Figure 93 Menu 24.5 System Maintenance: Backup Configuration

```
Ready to backup Configuration via Xmodem.
Do you want to continue (y/n):
```

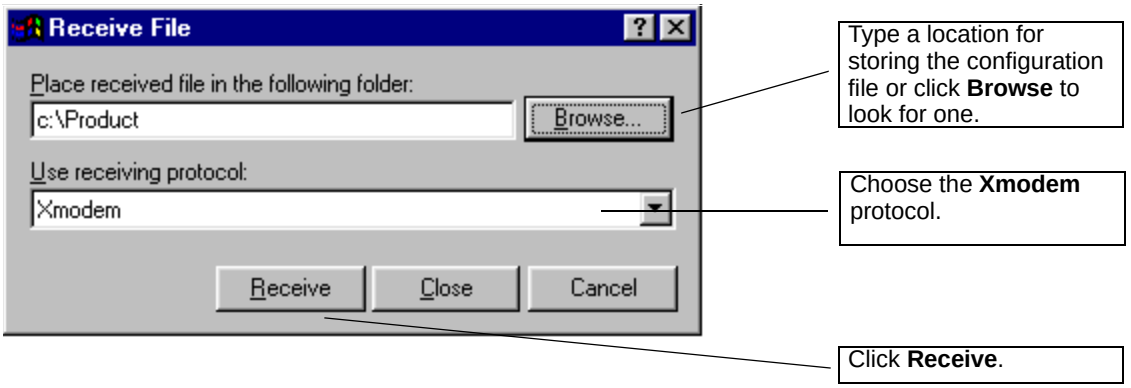
Figure 94 shows the screen which indicates that the Xmodem download has started.

Figure 94 Menu 24.5 System Maintenance: Starting Xmodem Download Screen

```
You can enter ctrl-x to terminate operation any time.
Starting XMODEM download...
```

Run the HyperTerminal program by clicking **Transfer**, then **Receive File** as shown in Figure 95.

Figure 95 Backup Configuration Example



After a successful backup, the screen shown in Figure 96 appears. Press any key to return to the SMT menu.

Figure 96 Successful Backup Confirmation Screen

```
** Backup Configuration completed. OK.
### Hit any key to continue.###
```

Restore configuration

This section shows you how to restore a previously saved configuration. Note that this function erases the current configuration before restoring a previous back up configuration; do not attempt to restore unless you have a backup configuration file stored on disk.

FTP is the preferred method for restoring your current computer configuration to your Business Secure Router since FTP is faster. note that you must wait for the system to automatically restart after the file transfer is complete.

Warning: Do not interrupt the file transfer process as this can permanently damage your Business Secure Router.

Restore Using FTP

For details about back up using FTP and TFTP, refer to “Backup configuration” on page 180.

Figure 97 Telnet into Menu 24.6

```
                Menu 24.6 -- System Maintenance - Restore Configuration

To transfer the firmware and configuration file to your workstation,
follow the procedure below:

1. Launch the FTP client on your workstation.
2. Type "open" and the IP address of your Business Secure Router. Then type
"nnadmin" and SMT password as requested.
3. Type "put backupfilename rom-0" where backupfilename is the name of
   your backup configuration file on your workstation and rom-0 is the
   remote file name on the Business Secure Router. This restores the
configuration to your Business Secure Router.
4. The system reboots automatically after a successful file transfer

For details on FTP commands, please consult the documentation of your FTP
client program. For details on backup using TFTP (note that you must remain
in this menu to back up using TFTP), please see your Business Secure Router
manual.

                Press ENTER to Exit:
```

1. Launch the FTP client on your computer.
2. Enter **open**, followed by a space and the IP address of your Business Secure Router.
3. Press [ENTER] when prompted for a username.
4. Enter your password as requested (the default is “PlsChgMe!”).
5. Enter **bin** to set transfer mode to binary.
6. Find the rom file (on your computer) that you want to restore to your Business Secure Router.
7. Use **put** to transfer files from the Business Secure Router to the computer, for example, “put config.rom rom-0” transfers the configuration file config.rom on your computer to the Business Secure Router. See “Filename conventions” on page 179 for more information about filename conventions.

8 Enter quit to exit the ftp prompt. The Business Secure Router automatically restarts after a successful restore process.

Restore using FTP session example

Figure 98 Restore using FTP session example

```
ftp> put config.rom rom-0
200 Port command okay
150 Opening data connection for STOR rom-0
226 File received OK
221 Goodbye for writing flash
ftp: 16384 bytes sent in 0.06Seconds 273.07Kbytes/sec.
ftp>quit
```

Refer to Chapter 17, “Remote Management,” on page 209 to read about configurations that disallow TFTP and FTP over WAN.

Restore via console port

Restore configuration via console port by following the HyperTerminal procedure. Procedures using other serial communications programs are similar.

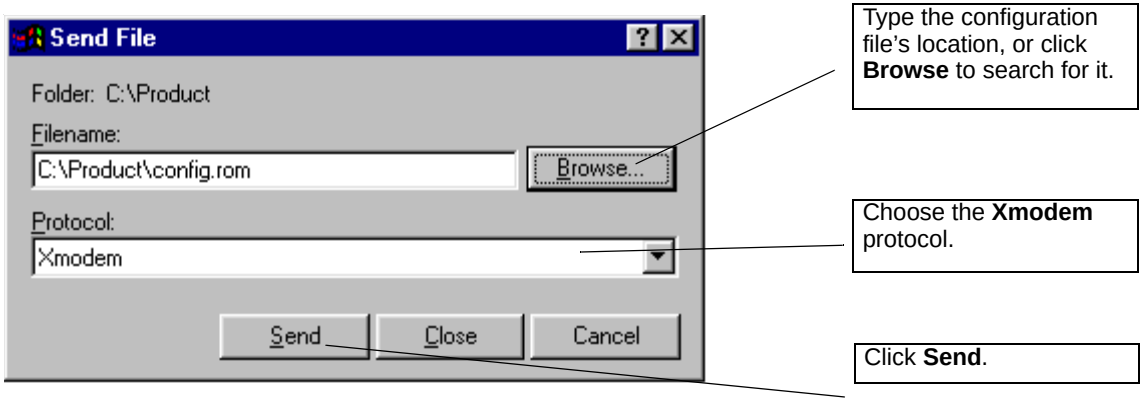
Display menu 24.6 and enter y at the prompt.

Figure 99 System Maintenance: Restore Configuration

```
Ready to restore Configuration via Xmodem.
Do you want to continue (y/n):
```

Figure 100 indicates that the Xmodem download has started.

Figure 100 System Maintenance: Starting Xmodem Download Screen



Run the HyperTerminal program by clicking **Transfer**, then **Send File**.

```
Starting XMODEM download (CRC mode) ...
CCCCCCCCC
```

After a successful restoration, the screen shown in Figure 101 appears. Press any key to restart the Business Secure Router and return to the SMT menu.

Figure 101 Successful Restoration Confirmation Screen

```
Save to ROM
Hit any key to start system reboot.
```

Uploading Firmware and Configuration Files

This section shows you how to upload firmware and configuration files. You can upload configuration files by following the procedure "Restore configuration" on page 186, or by following the instructions in **Menu 24.7.2 – System Maintenance – Upload System Configuration File**.

Warning: Do not interrupt the file transfer process as this can permanently damage your Business Secure Router.

Firmware file upload

FTP is the preferred method for uploading the firmware and configuration. To use this feature, your computer must have an FTP client.

When you use Telnet to access the Business Secure Router, the screens for uploading firmware and the configuration file using FTP appear.

Figure 102 Telnet Into Menu 24.7.1 Upload System Firmware

```
                Menu 24.7.1 - System Maintenance - Upload System Firmware

To upload the system firmware, follow the procedure below:
  1. Launch the FTP client on your workstation.
  2. Type "open" and the IP address of your system. Then type "nnadmin" and
     SMT password as requested.
  3. Type "put firmwarefilename ras" where "firmwarefilename" is the name
     of your firmware upgrade file on your workstation and "ras" is the
     remote file name on the system.
  4. The system reboots automatically after a successful firmware upload.
For details on FTP commands, please consult the documentation of your FTP
client program. For details on uploading system firmware using TFTP (note
that you must remain on this menu to upload system firmware using TFTP),
please see your manual.


                Press ENTER to Exit:
```

Configuration file upload

The screen shown in Figure 103 appears when you access menu 24.7.2 via Telnet.

Figure 103 Telnet Into Menu 24.7.2 System Maintenance

```
Menu 24.7.2 - System Maintenance - Upload System Configuration File

To upload the system configuration file, follow the procedure below:
  1. Launch the FTP client on your workstation.
  2. Type "open" and the IP address of your system. Then type "nnadmin" and
     SMT password as requested.
  3. Type "put configurationfilename rom-0" where "configurationfilename"
     is the name of your system configuration file on your workstation,
which
     will be transferred to the "rom-0" file on the system.
  4. The system reboots automatically after the upload system configuration
     file process is complete.
For details on FTP commands, please consult the documentation of your FTP
client program. For details on uploading system firmware using TFTP (note
that you must remain on this menu to upload system firmware using TFTP),
please see your manual.


                Press ENTER to Exit:
```

To upload the firmware and the configuration files, follow the examples in the rest of this chapter:

FTP file upload command from the DOS prompt example

1. Launch the FTP client on your computer.
2. Enter “open”, followed by a space and the IP address of your Business Secure Router.
3. Press [ENTER] when prompted for a username.
4. Enter your password as requested (the default is “PlsChgMe!”).
5. Enter “bin” to set transfer mode to binary.
6. Use “put” to transfer files from the computer to the Business Secure Router, for example, “put firmware.bin ras” transfers the firmware on your computer (firmware.bin) to the Business Secure Router and renames it “ras”. Similarly, “put config.rom rom-0” transfers the configuration file on your computer

(config.rom) to the Business Secure Router and renames it rom-0. Likewise get rom-0 config.rom transfers the configuration file on the Business Secure Router to your computer and renames it "config.rom." See "Filename conventions" on page 179 for more information about filename conventions.

7 Enter "quit" to exit the ftp prompt.

Note: The Business Secure Router automatically restarts after a successful file upload.

FTP Session Example of Firmware File Upload

Figure 104 FTP Session Example of Firmware File Upload

```
331 Enter PASS command
Password:
230 Logged in
ftp> bin
200 Type I OK
ftp> put firmware.bin ras
200 Port command okay
150 Opening data connection for STOR ras
226 File received OK
ftp: 1103936 bytes sent in 1.10Seconds 297.89Kbytes/sec.
ftp> quit
```

More commands (found in GUI-based FTP clients) are listed earlier in this chapter.

Refer to the "Remote Management" on page 209 section to read about configurations that disallow TFTP and FTP over WAN.

TFTP file upload

The Business Secure Router also supports the uploading of firmware files using TFTP (Trivial File Transfer Protocol) over LAN. Although TFTP also works over WAN, Nortel does not recommend doing this.

1 To use TFTP, your computer must have both Telnet and TFTP clients. To transfer the firmware and the configuration file, follow the procedure shown next.

2. Use Telnet from your computer to connect to the Business Secure Router and log on. Because TFTP does not have any security checks, the Business Secure Router records the IP address of the Telnet client and accepts TFTP requests only from this address.
3. Put the SMT in command interpreter (CI) mode by entering 8 in **Menu 24 – System Maintenance**.
4. Enter the command sys stdio 0 to disable the management timeout, so the TFTP transfer is not interrupted. Enter command sys stdio 5 to restore the five-minute management timeout (default) when the file transfer is complete.
5. Launch the TFTP client on your computer and connect to the Business Secure Router. Set the transfer mode to binary before starting data transfer.
6. Use the TFTP client (see the example below) to transfer files between the Business Secure Router and the computer. The file name for the firmware is ras.

Note that the telnet connection must be active and the Business Secure Router must be in CI mode before and during the TFTP transfer. For details about TFTP commands (see “TFTP upload command example” on page 193), consult the documentation of your TFTP client program. For UNIX, use get to transfer from the Business Secure Router to the computer, put to transfer from the computer to the Business Secure Router, and binary to set binary transfer mode.

TFTP upload command example

The following is an example TFTP command:

```
tftp [-i] host put firmware.bin ras
```

where “i” specifies binary image transfer mode (use this mode when transferring binary files), “host” is the Business Secure Router’s IP address and “put” transfers the file source on the computer (firmware.bin – name of the firmware on the computer) to the file destination on the remote host (ras - name of the firmware on the Business Secure Router).

Commands that appear in GUI-based TFTP clients are listed earlier in this chapter.

Uploading via console port

FTP or TFTP are the preferred methods for uploading firmware to your Business Secure Router. However, in the event of your network being down, uploading files is only possible with a direct connection to your Business Secure Router via the console port. Under normal conditions, Nortel does not recommend uploading files via the console port, as FTP or TFTP are faster. Any serial communications program should work fine; however, you must use the Xmodem protocol to perform the download or upload.

Uploading Firmware File Via Console Port

Select 1 from **Menu 24.7 – System Maintenance – Upload Firmware** to display **Menu 24.7.1 – System Maintenance – Upload System Firmware**, then follow the instructions as shown in Figure 105.

Figure 105 Menu 24.7.1 as seen using the Console Port

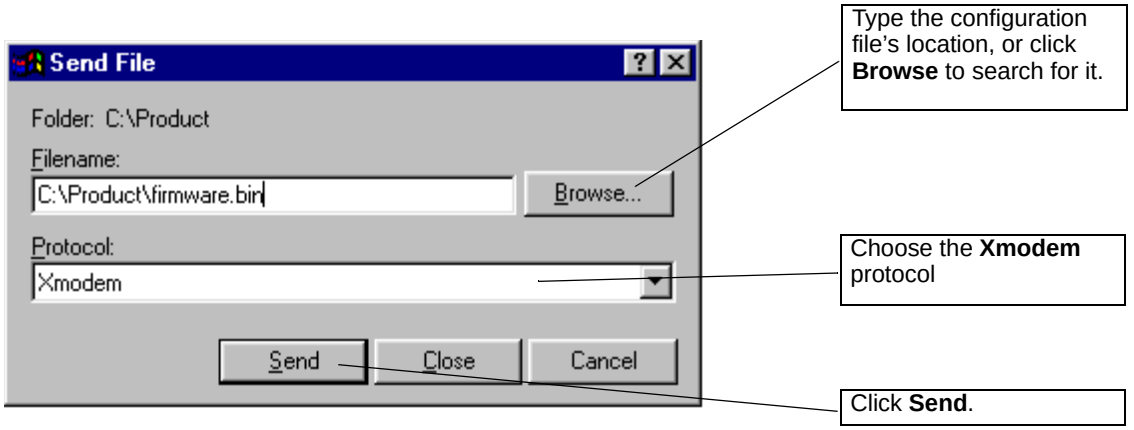
```
Menu 24.7.1 - System Maintenance - Upload System Firmware

          To upload system firmware:
          1. Enter "y" at the prompt below to go into debug mode.
          2. Enter "atur" after "Enter Debug Mode" message.
          3. Wait for "Starting XMODEM upload" message before activating
             Xmodem upload on your terminal.
          4. After successful firmware upload, enter "atgo" to restart the
             Business Secure Router.

         Warning: Proceeding with the upload will erase the current system
          firmware.

 Do You Wish To Proceed:(Y/N)
```

After the "Starting Xmodem upload" message appears, activate the Xmodem protocol on your computer. Follow the procedure as shown previously for the HyperTerminal program. The procedure for other serial communications programs is similar.

Uploading Xmodem firmware using HyperTerminal

1 Click **Transfer**, and then **Send File** to display the screen in Figure 106.

Figure 106 Example Xmodem Upload



2 After the configuration upload process is complete, restart the Business Secure Router by entering `atgo`.

Uploading configuration file via console port

1 Select 2 from **Menu 24.7 – System Maintenance – Upload Firmware** to display **Menu 24.7.2 – System Maintenance – Upload System Configuration File**. Follow the instructions as shown in Figure 107.

Figure 107 Menu 24.7.2 as seen using the Console Port

```
Menu 24.7.2 - System Maintenance - Upload System Configuration File

          To upload system configuration file:
          1. Enter "y" at the prompt below to go into debug mode.
          2. Enter "atlc" after "Enter Debug Mode" message.
          3. Wait for "Starting XMODEM upload" message before activating
             Xmodem upload on your terminal.
          4. After successful firmware upload, enter "atgo" to restart the
             system.

          Warning:
          1. Proceeding with the upload will erase the current
             configuration file.
          2. The system's console port speed (Menu 24.2.2) may change
             when it is restarted; please adjust your terminal's speed
             accordingly. The password may change (menu 23), also.
          3. When uploading the DEFAULT configuration file, the console
             port speed will be reset to 9600 bps and the password to
             "setup".

               Do You Wish To Proceed:(Y/N)
```

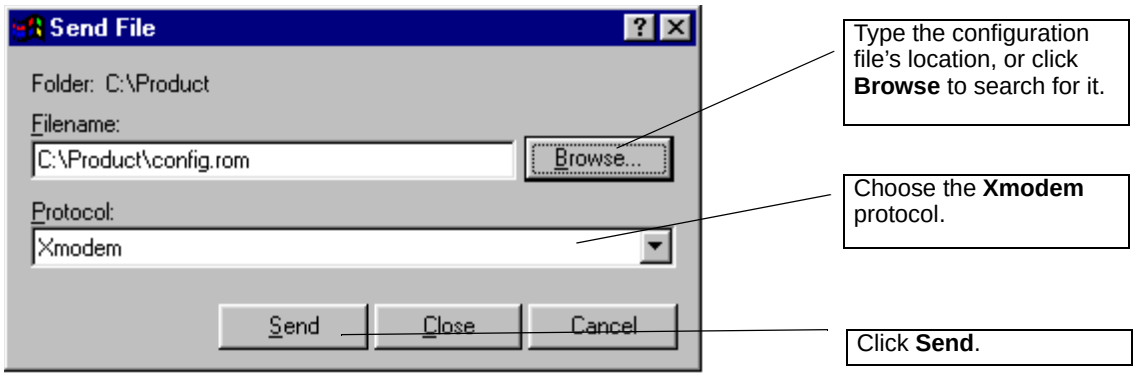
2 After the "Starting Xmodem upload" message appears, activate the Xmodem protocol on your computer. Follow the procedure in "Uploading Xmodem firmware using HyperTerminal" on page 195. The procedure for other serial communications programs is similar.

3 Enter `atgo` to restart the Business Secure Router.

Uploading Xmodem configuration file using HyperTerminal

1 Click **Transfer**, then **Send File** to display the screen shown in Figure 108.

Figure 108 Example Xmodem Upload



2 After the configuration upload process is complete, restart the Business Secure Router by entering `atgo`.

Chapter 16
System Maintenance menus 8 to 10

This chapter leads you through SMT menus 24.8 to 24.10.

Command Interpreter mode

The Command Interpreter (CI) is a part of the main router firmware. The CI provides much of the same functionality as the SMT, while adding some low-level setup and diagnostic functions. Enter the CI from the SMT by selecting menu 24.8. Access can be by Telnet or by a serial connection to the console port, although some commands are only available with a serial connection. See the included disk or www.nortel.com for more detailed information about CI commands. Enter 8 from **Menu 24 - System Maintenance**.

Note: Use of undocumented commands or misconfiguration can damage the unit and possibly render it unusable.

Figure 109 Command mode in Menu 24

```
Menu 24 - System Maintenance

 1. System Status
 2. System Information and Console Port Speed
 3. Log and Trace
 4. Diagnostic
 5. Backup Configuration
 6. Restore Configuration
 7. Firmware Update
 8. Command Interpreter Mode
 9. Call Control
 10. Time and Date Setting
 11. Remote Management Setup



 Enter Menu Selection Number:
```

Command syntax

The command keywords are in Courier New font.

Enter the command keywords exactly as shown, do not abbreviate.

The required fields in a command are enclosed in angle brackets <>.

The optional fields in a command are enclosed in square brackets [].

The | symbol means “or”.

For example,

```
sys filter netbios config <type> <on|off>
```

means that you must specify the type of netbios filter and whether to turn it on or off.

Command usage

A list of commands can be found by typing help or ? at the command prompt. Always type the full command. Type exit to return to the SMT main menu when finished.

Figure 110 Valid commands

```
ras> ?

Valid commands are:

sys             exit            ether           ip
ipsec           bm              certificates    radius
8021x
```

Table 48 Valid commands

Command	Description
sys	The system commands display device information and configure device settings.
exit	This command returns you to the SMT main menu.
ether	This commands display Ethernet information and configure Ethernet settings.
ip	This commands display IP information and configure IP settings.
ipsec	This commands display IPSec information and configure IPSec settings.
bm	This commands display bandwidth management information and configure bandwidth management settings.
certificates	This commands display certificate information and configure certificate settings.
radius	This commands display RADIUS information.
8021x	This commands display IEEE 802.1x information.

Call control support

The Business Secure Router provides two call control functions: budget management and call history. Note that this menu is only applicable when **Encapsulation** is set to **PPPoE** or **PPTP** in menu 4 or menu 11.1.

With the budget management function, you can set a limit on the total outgoing call time of the Business Secure Router within certain times. When the total outgoing call time exceeds the limit, the current call is dropped and any future outgoing calls are blocked.

Call history chronicles preceding incoming and outgoing calls.

To access the call control menu, select option 9 in menu 24 to go to **Menu 24.9 - System Maintenance - Call Control**, as shown in Figure 111.

Figure 111 Call Control

```
Menu 24.9 - System Maintenance - Call Control


 1.Budget Management
 2.Call History
Enter Menu Selection Number:
```

Budget management

Menu 24.9.1 shows the budget management statistics for outgoing calls. Enter 1 from **Menu 24.9 - System Maintenance - Call Control** to bring up the Budget Management menu (Figure 112).

Figure 112 Budget Management

```
                    Menu 24.9.1 - Budget Management

Remote Node      Connection Time/Total Budget    Elapsed Time/Total Period
1.ChangeMe       No Budget                       No Budget

2.GUI            No Budget                       No Budget


                    Reset Node (0 to update screen):
```

The total budget is the time limit on the accumulated time for outgoing calls to a remote node. When this limit is reached, the call is dropped and further outgoing calls to that remote node is blocked. After each period, the total budget is reset. The default for the total budget is 0 minutes and the period is 0 hours, meaning no budget control. You can reset the accumulated connection time in this menu by entering the index of a remote node. Enter 0 to update the screen. The budget and the reset period can be configured in menu 11.1 for the remote node.

Table 49 Budget management

Field	Description	Example
Remote Node	Enter the index number of the remote node you want to reset (just one in this case)	1
Connection Time/ Total Budget	This is the total connection time that has gone by (within the allocated budget that you set in menu 11.1).	5/10 means that 5 minutes out of a total allocation of 10 minutes have lapsed.
Elapsed Time/Total Period	The period is the time cycle in hours that the allocation budget is reset (see menu 11.1.) The elapsed time is the time used up within this period.	0.5/1 means that 30 minutes out of the 1-hour time period has lapsed.
	Enter “0” to update the screen or press [ESC] to return to the previous screen.	

Call History

This is the second option in **Menu 24.9 - System Maintenance - Call Control**. It displays information about past incoming and outgoing calls. Enter 2 from **Menu 24.9 - System Maintenance - Call Control**.

Figure 113 Call History

```
Menu 24.9.2 - Call History
Phone Number     Dir   Rate     #call      Max       Min       Total
 1.
 2.
 3.
 4.
 5.
 6.
 7.
 8.
 9.
10.
Enter Entry to Delete(0 to exit):
```

Table 50 describes the fields in Figure 113.

Table 50 Call History Fields

Field	Description
Phone Number	The PPPoE service names are shown here.
Dir	This shows whether the call is incoming or outgoing.
Rate	This is the transfer rate of the call.
#call	This is the number of calls made to or received from that telephone number.
Max	This is the length of time of the longest telephone call.
Min	This is the length of time of the shortest telephone call.
Total	This is the total length of time of all the telephone calls to and from that telephone number.
	Enter an entry number to delete it or 0 to exit.

Time and Date setting

There is a software mechanism to set the time manually or get the current time and date from an external server when you turn on your Business Secure Router. With Menu 24.10, you can update the time and date settings of your Business Secure Router. The real time is then displayed in the Business Secure Router error logs and firewall logs.

Select menu 24 in the main menu to open **Menu 24 - System Maintenance**t.

Figure 114 Menu 24: System Maintenance

```
                Menu 24 - System Maintenance

1. System Status
2. System Information and Console Port Speed
3. Log and Trace
4. Diagnostic
5. Backup Configuration
6. Restore Configuration
7. Upload Firmware
8. Command Interpreter Mode
9. Call Control
10. Time and Date Setting
11. Remote Management Setup

              Enter Menu Selection Number:
```

Enter 10 to go to **Menu 24.10 - System Maintenance - Time and Date Setting** to update the time and date settings of your Business Secure Router, as shown in Figure 115.

Figure 115 Menu 24.10 System Maintenance: Time and Date Setting

```
          Menu 24.10 - System Maintenance - Time and Date Setting

           Time Protocol= NTP (RFC-1305)
           Time Server Address= a.ntp.alphazed.net

           Current Time:                          01 : 07 : 41
           New Time (hh:mm:ss):                   N/A  N/A  N/A

           Current Date:                          2000 - 01 - 01
           New Date (yyyy-mm-dd):                 N/A    N/A  N/A

           Time Zone= GMT

           Daylight Saving= No
           Start Date (mm-nth-week-hr):           Jan. - 1st  - Sat. -  00
           End Date (mm-nth-week-hr):             Jan. - 1st  - Sat. -  00


                     Press ENTER to Confirm or ESC to Cancel:

Press Space Bar to Toggle.
```

Table 51 describes the fields in Figure 115.

Table 51 Time and Date Setting Fields

Field	Description
Time Protocol	Enter the time service protocol that your time server uses. Not all time servers support all protocols, so check with your ISP or network administrator or use trial and error to find a protocol that works. The main differences between the time protocols are the format. **Daytime (RFC 867)** format is the day/month/year/time zone of the server. **Time (RFC-868)** format displays a 4-byte integer giving the total number of seconds since 1970/1/1 at 0:0:0. The default, **NTP (RFC-1305)**, is similar to **Time (RFC-868)**. Select **Manual** to enter the new time and new date manually.
Time Server Address	Enter the IP address or domain name of your timeserver. Check with your ISP or network administrator if you are unsure of this information. The default is a.ntp.alphazed.net.
Current Time	This field displays an updated time only when you reenter this menu.
New Time	Enter the new time in hour, minute and second format. This field is available when you select **Manual** in the **Time Protocol** field.

Table 51 Time and Date Setting Fields

Field	Description
Current Date	This field displays an updated date only when you reenter this menu.
New Date	Enter the new date in year, month and day format. This field is available when you select **Manual** in the **Time Protocol** field.
Time Zone	Press [SPACE BAR] and then [ENTER] to set the time difference between your time zone and Greenwich Mean Time (GMT).
Daylight Saving Time	Daylight Saving Time is a period from late spring to early fall when many countries set their clocks ahead of normal local time by one hour to give more daylight time in the evenings. If you use daylight savings time, then choose **Yes**.
Start Date (mm-nth-week-hr)	Configure the day and time when Daylight Saving Time starts if you select **Yes** in the **Daylight Saving** field. The **hr** field uses the 24-hour format. Here are a couple of examples: Daylight Saving Time starts in most parts of the United States on the first Sunday of April. Each time zone in the United States starts using Daylight Saving Time at 2 a.m. local time. So, in the United States, select **Apr.**, **1st**, **Sun.** and type 02 in the **hr** field. Daylight Saving Time starts in the European Union on the last Sunday of March. All of the time zones in the European Union start using Daylight Saving Time at the same moment (1 a.m. GMT or UTC). So, in the European Union, select **Mar.**, **Last**, **Sun.** The time you type in the **hr** field depends on your time zone. In Germany, for instance, type 02 because Germany's time zone is one hour ahead of GMT or UTC (GMT+1).
End Date (mm-nth-week-hr)	Configure the day and time when Daylight Saving Time ends if you select **Yes** in the **Daylight Saving** field. The **hr** field uses the 24 hour format. Here are a couple of examples: Daylight Saving Time ends in the United States on the last Sunday of October. Each time zone in the United States stops using Daylight Saving Time at 2 a.m. local time. So, in the United States, select **Oct.**, **Last**, **Sun.** and type 02 in the **hr** field. Daylight Saving Time ends in the European Union on the last Sunday of October. All of the time zones in the European Union stop using Daylight Saving Time at the same moment (1 a.m. GMT or UTC). So, in the European Union, select **Oct.**, **Last**, **Sun.** The time you type in the **hr** field depends on your time zone. In Germany, for instance, type 02 because Germany's time zone is one hour ahead of GMT or UTC (GMT+1).
After you fill in this menu, press [ENTER] at the message “Press ENTER to Confirm or ESC to Cancel“ to save your configuration, or press [ESC] to cancel.	

Resetting the Time

The Business Secure Router resets the time in three instances:

- After you make changes to and leave menu 24.10
- After starting up the Business Secure Router starts up, if a time server configured in menu 24.10
- After starting the Business Secure Router, in 24-hour intervals

Chapter 17
Remote Management

This chapter covers remote management found in SMT menu 24.11.

Remote Management

With remote management, you can determine which services and protocols can access which Business Secure Router interface (if any) from which computers.

You can manage your Business Secure Router from a remote location via:

- Internet (WAN only)
- ALL (LAN and WAN)
- LAN only
- Neither (Disable)

Note: When you Choose WAN only or ALL (LAN & WAN), you still need to configure a firewall rule to allow access.

To disable remote management of a service, select **Disable** in the corresponding **Server Access** field.

Enter 11 from menu 24 to bring up **Menu 24.11 – Remote Management Control**.

Figure 116 Menu 24.11 – Remote Management Control

```
                Menu 24.11 - Remote Management Control

TELNET Server:     Port = 23         Access = Disable
                   Secure Client IP = 0.0.0.0
FTP Server:        Port = 21         Access = Disable
                   Secure Client IP = 0.0.0.0
SSH Server:        Certificate = auto_generated_self_signed_cert
                   Port = 22         Access = Disable
                   Secure Client IP = 0.0.0.0
HTTPS Server:      Certificate = auto_generated_self_signed_cert
                   Authenticate Client Certificates = No
                   Port = 443        Access = Disable
                   Secure Client IP = 0.0.0.0
HTTP Server:       Port = 80         Access = LAN only
                   Secure Client IP = 0.0.0.0
SNMP Service:      Port = 161        Access = Disable
                   Secure Client IP = 0.0.0.0
DNS Service:       Port = 53         Access = LAN only
                   Secure Client IP = 0.0.0.0
               Press ENTER to Confirm or ESC to Cancel:
```

Table 52 describes the fields in Figure 116.

Table 52 Menu 24.11 – Remote Management control

Field	Description
Telnet Server FTP Server SSH Server HTTPS Server HTTP Server SNMP Service DNS Service	Each of these read-only labels denotes a service that you can use to remotely manage the Business Secure Router.
Port	This field shows the port number for the service or protocol. You can change the port number if needed, but you must use the same port number to access the Business Secure Router.
Access	Select the access interface (if any) by pressing [SPACE BAR], then [ENTER] to choose from: **LAN only**, **WAN only**, **ALL** or **Disable**.
Secure Client IP	The default 0.0.0.0 allows any client to use this service to remotely manage the Business Secure Router. Enter an IP address to restrict access to a client with a matching IP address.

Table 52 Menu 24.11 – Remote Management control

Field	Description
Certificate	Press [SPACE BAR] and then [ENTER] to select the certificate that the Business Secure Router uses to identify itself. The Business Secure Router is the SSL server and must always authenticate itself to the SSL client (the computer that requests the HTTPS connection with the Business Secure Router).
Authenticate Client Certificates	Select **Yes** by pressing [SPACE BAR], then [ENTER] to require the SSL client to authenticate itself to the Business Secure Router by sending the Business Secure Router a certificate. To do that, the SSL client must have a CA-signed certificate from a CA that has been imported as a trusted CA on the Business Secure Router (see Appendix C, “Importing certificates,” on page 233 for details).
After you fill this menu, press [ENTER] at the message "Press ENTER to Confirm or ESC to Cancel" to save your configuration, or press [ESC] to cancel.	

Remote Management Limitations

Remote management over LAN or WAN does not work when:

1. A filter in menu 3.1 (LAN) or in menu 11.1.4 (WAN) is applied to block a Telnet, FTP, or Web service.
2. You disable that service in menu 24.11.
3. The IP address in the **Secured Client IP** field (menu 24.11) does not match the client IP address. If it does not match, the Business Secure Router disconnects the session immediately.
4. There is an SMT console session running.
5. There is already another remote management session of the same type (web, FTP or Telnet) running. Only one remote management session of the same type can run at one time.
6. There is a web remote management session running with a Telnet session. A Telnet session is disconnected if you begin a web session; it does not begin if a Web session is already running.
7. There is a firewall rule that blocks remote management.

Chapter 18
Call scheduling

Using call scheduling (applicable only for PPPoA or PPPoE encapsulation), you can dictate when a remote node is called and for how long.

Introduction

Using the call scheduling feature, the Business Secure Router can manage a remote node and dictate when a remote node is called and for how long. This feature is similar to the scheduler in a video cassette recorder (you can specify a time period for the VCR to record). You can apply up to 4 schedule sets in **Menu 11.1 — Remote Node Profile**. From the main menu, enter 26 to access **Menu 26 — Schedule Setup** as shown in Figure 117.

Figure 117 Menu 26 Schedule Setup

```
                    Menu 26 - Schedule Setup

Schedule                              Schedule
Set #          Name                   Set #          Name
------  -----------------             ------  -----------------
  1     AlwaysOn                        7     _________________
  2     _________________               8     _________________
  3     _________________               9     _________________
  4     _________________              10     _________________
  5     _________________              11     _________________
  6     _________________              12     _________________


          Enter Schedule Set Number to Configure= 0
          Edit Name= N/A
          Press ENTER to Confirm or ESC to Cancel:
```

Lower numbered sets take precedence over higher numbered sets, thereby avoiding scheduling conflicts. For example, if sets 1, 2, 3, and 4 are applied in the remote node then set 1 takes precedence over sets 2, 3, and 4 as the Business Secure Router, by default, applies the lowest numbered set first. Set 2 takes precedence over sets 3 and 4, and so on.

You can design up to 12 schedule sets, but you can only apply up to four schedule sets for a remote node.

Note: To delete a schedule set, enter the set number and press [SPACE BAR] and then [ENTER] (or delete) in the Edit Name field.

To set up a schedule set, select the schedule set you want to setup from menu 26 (1-12) and press [ENTER] to see **Menu 26.1 — Schedule Set Setup** as shown in Figure 118.

Figure 118 Menu 26.1 Schedule Set Setup

```
                    Menu 26.1 - Schedule Set Setup


Active= Yes
Start Date(yyyy/mm/dd) = 2000 – 01 - 01
How Often= Once
Once:
  Date(yyyy/mm/dd)= 2000 – 01 - 01
Weekdays:
  Sunday= N/A
  Monday= N/A
  Tuesday= N/A
  Wednesday= N/A
  Thursday= N/A
  Friday= N/A
  Saturday= N/A
Start Time (hh:mm)= 00 : 00
Duration (hh:mm)= 00 : 00
Action= Forced On

                 Press ENTER to Confirm or ESC to Cancel
```

If a connection is already established, your Business Secure Router does not drop it. After the connection is dropped manually or it times out, then that remote node cannot be triggered until the end of the **Duration**.

Table 53 Menu 26.1 Schedule Set Setup

Field	Description	Example
Active	Press [SPACE BAR] to select **Yes** or **No**. Choose **Yes** and press [ENTER] to activate the schedule set.	Yes
Start Date	Enter the start date when you wish the set to take effect in year-month-date format. Valid dates are from the present to 2036-February-5.	2000-01-01
How Often	Press the [SPACE BAR] and then [ENTER] to select **Once** or **Weekly**. Both these options are mutually exclusive. If **Once** is selected, then all weekday settings are **N/A**. After **Once** is selected, the schedule rule deletes automatically after the scheduled time elapses.	Once
Once: Date	If you selected **Once** in the **How Often** field above, enter the date the set should activate here in year-month-date format.	2000-01-01
Weekday: Day	If you selected **Weekly** in the **How Often** field above, select the days when the set should activate (and recur) by going to that days and pressing [SPACE BAR] to select **Yes**. After you complete this menu, press [ENTER] to exit.	Yes No N/A
Start Time	Enter the start time when you wish the schedule set to take effect in hour-minute format.	09:00
Duration	Enter the maximum length of time this connection is allowed, in hour-minute format.	08:00
Action	**Forced On** means that the connection is maintained whether or not there is a demand call on the line and persists for the time period specified in the **Duration** field. **Forced Down** means that the connection is blocked whether or not there is a demand call on the line. **Enable Dial-On-Demand** means that this schedule permits a demand call on the line. **Disable Dial-On-Demand** means that this schedule prevents a demand call on the line.	**Forced On**
After you complete this menu, press [ENTER] at the prompt “Press ENTER to Confirm…” to save your configuration, or press [ESC] at any time to cancel.		

After you configure your schedule sets, you must apply them to the desired remote nodes. Enter 11 from the **Main Menu** and then enter the target remote node index. Using [SPACE BAR], select **PPPoE** or **PPPoA** in the **Encapsulation** field and then press [ENTER] to make the schedule sets field available, as shown in Figure 119.

Figure 119 Applying Schedule Sets to a Remote Node (PPPoE)

```
Menu 11.1 - Remote Node Profile

    Rem Node Name= ChangeMe             Route= IP
    Active= Yes

    Encapsulation= Ethernet             Edit IP= No
    Service Type= Standard              Session Options:
    Service Name= N/A                     Edit Filter Sets= No
    Outgoing:
      My Login= N/A
      My Password= N/A                  Edit Traffic Redirect= No
      Retype to Confirm= N/A
      Server= N/A




                    Press ENTER to Confirm or ESC to Cancel:
Press ENTER to Confirm or ESC to Cancel:
```

You can apply up to four schedule sets, separated by commas, for one remote node. Change the schedule set numbers to your preferences.

Appendix A
Setting up your computer IP address

All computers must have a 10M or 100M Ethernet adapter card and TCP/IP installed.

Windows 95/98/Me/NT/2000/XP, and Macintosh OS 7 and later operating systems and all versions of UNIX/LINUX include the software components you need to install and use TCP/IP on your computer. Windows 3.1 requires the purchase of a third-party TCP/IP application package.

TCP/IP is already installed on computers using Windows NT/2000/XP, or Macintosh OS 7 and later operating systems.

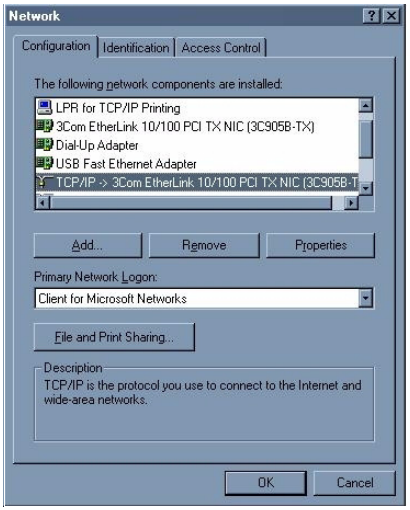
After the appropriate TCP/IP components are installed, configure the TCP/IP settings in order to communicate with your network.

If you manually assign IP information instead of using dynamic assignment, make sure that your computers have IP addresses that place them in the same subnet as the Business Secure Router LAN port.

Windows 95/98/Me

Click **Start**, **Settings**, **Control Panel** and double-click the **Network** icon to open the **Network** window

Figure 120 WIndows 95/98/Me: network: configuration



Installing components

The **Network** window **Configuration** tab displays a list of installed components. You need a network adapter, the TCP/IP protocol and Client for Microsoft Networks.

If you need the adapter:

a In the **Network** window, click **Add**.

b Select **Adapter** and click **Add**.

c Select the manufacturer and model of your network adapter and click **OK**.

If you need TCP/IP:

a In the **Network** window, click **Add**.

b Select **Protocol** and click **Add**.

c Select **Microsoft** from the list of **manufacturers**.

d Select **TCP/IP** from the list of network protocols and click **OK**.

If you need Client for Microsoft Networks:

a Click **Add**.

b Select **Client** and click **Add**.

c Select **Microsoft** from the list of manufacturers.

d Select **Client for Microsoft Networks** from the list of network clients and click **OK**.

e Restart your computer so your changes take effect.

Configuring

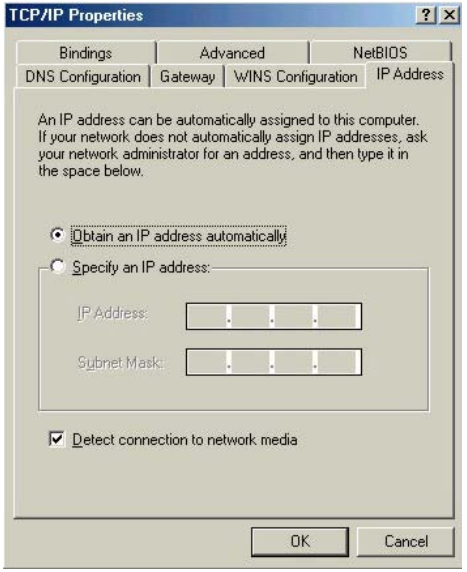
1 In the **Network** window **Configuration** tab, select your network adapter's TCP/IP entry and click **Properties**

2 Click the **IP Address** tab.

— If your IP address is dynamic, select **Obtain an IP address automatically**.

— If you have a static IP address, select **Specify an IP address** and type your information into the **IP Address** and **Subnet Mask** fields.

Figure 121 Windows 95/98/Me: TCP/IP properties: IP address

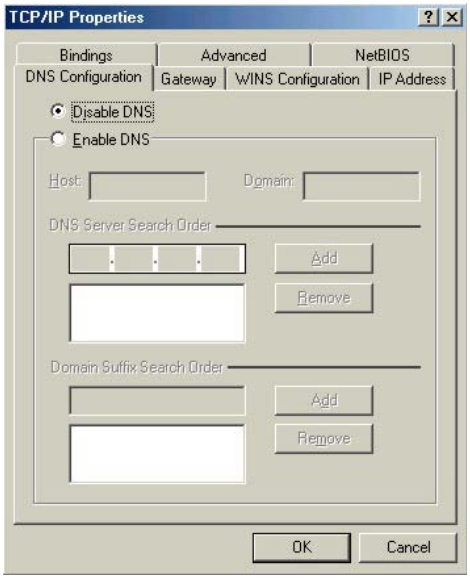


3 Click the **DNS** Configuration tab.

— If you do not know your DNS information, select **Disable DNS**.

— If you know your DNS information, select **Enable DNS** and type the information in the fields below (you do not need to fill them all in).

Figure 122 Windows 95/98/Me: TCP/IP Properties: DNS configuration



4 Click the **Gateway** tab.

— If you do not know your gateway's IP address, remove previously installed gateways.

— If you have a gateway IP address, type it in the **New gateway field** and click **Add**.

5 Click **OK** to save and close the **TCP/IP Properties** window.

6 Click **OK** to close the **Network** window. Insert the Windows CD if prompted.

7 Turn on your Business Secure Router and restart your computer when prompted.

Verifying Settings

1 Click **Start** and then **Run**.

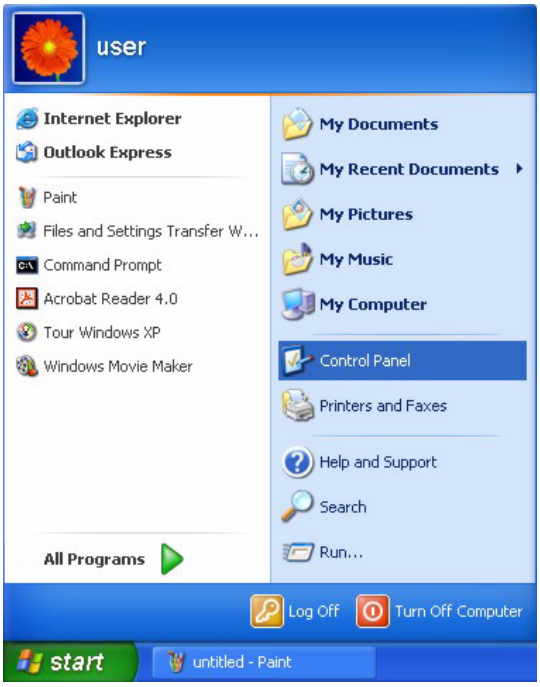
2 In the **Run** window, type winipcfg and click **OK** to open the **IP Configuration** window.

3 Select your network adapter. Your computer IP address, subnet mask, and default gateway will be displayed.

Windows 2000/NT/XP

1 For Windows XP, click **Start**, **Control Panel**. In Windows 2000/NT, click **Start**, **Settings**, **Control Panel**.

Figure 123 Windows XP: Start menu

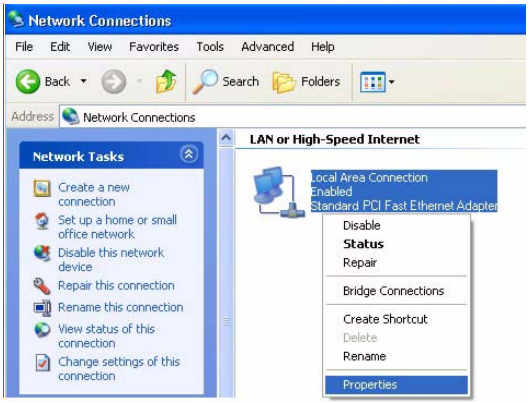


2 For Windows XP, click **Network Connections**. For Windows 2000/NT, click **Network and Dial-up Connections**.

Figure 124 Windows XP: Control Panel

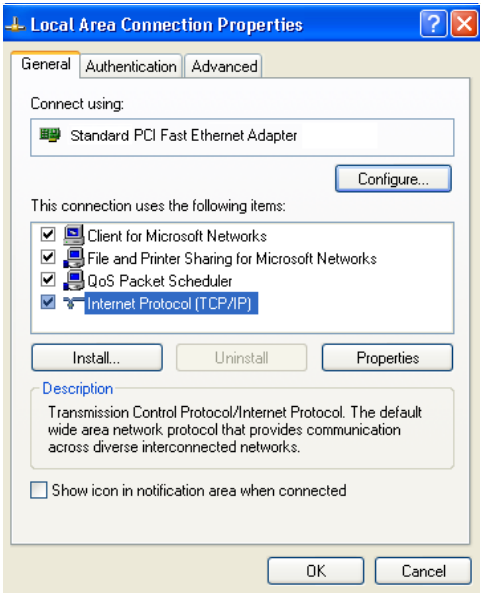
3 Right-click **Local Area Connection** and then click **Properties**.

Figure 125 Windows XP: Control Panel: Network Connections: Properties



4 Select **Internet Protocol (TCP/IP)** (under the **General** tab in Win XP) and click **Properties**.

Figure 126 Windows XP: Local Area Connection Properties

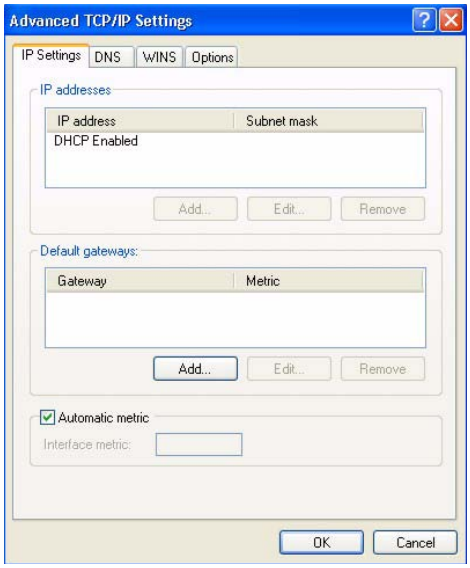


5 The **Internet Protocol TCP/IP Properties** window appears (the **General tab** in Windows XP).

— If you have a dynamic IP address, click **Obtain an IP address automatically**.

— If you have a static IP address, click **Use the following IP Address** and fill in the **IP address**, **Subnet mask**, and **Default gateway** fields. Click **Advanced**.

Figure 127 Windows XP: Advanced TCP/IP settings



6 If you do not know your gateway IP address, remove any previously installed gateways in the **IP Setting**s tab and click **OK**.

Ë Do one or more of the following if you want to configure additional IP addresses:

— In the **IP Settings** tab, in IP addresses, click **Add**.

— In **TCP/IP Address**, type an IP address in **IP address** and a subnet mask in **Subnet mask**, and then click **Add**.

— Repeat the above two steps for each IP address you want to add.

— Configure additional default gateways in the **IP Settings** tab by clicking **Add** in **Default gateways**.

— In **TCP/IP Gateway Address**, type the IP address of the default gateway in **Gateway**. To manually configure a default metric (the number of transmission hops), clear the **Automatic metric** check box and type a metric in **Metric**.

— Click **Add**.

— Repeat the previous three steps for each default gateway you want to add.

— Click **OK** when finished.

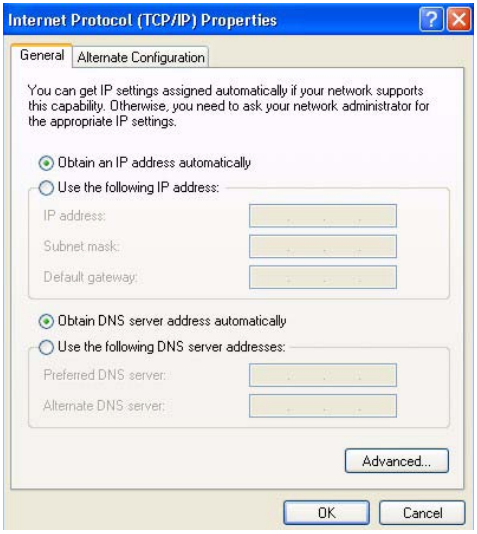
7 In the **Internet Protocol TCP/IP Properties** window (the **General tab** in Windows XP):

— Click **Obtain DNS server address automatically** if you do not know your DNS server IP addresses.

— If you know your DNS server IP addresses, click **Use the following DNS server addresses**, and type them in the **Preferred DNS server** and **Alternate DNS server** fields.

If you have previously configured DNS servers, click **Advanced** and then the **DNS** tab to order them.

Figure 128 Windows XP: Internet Protocol (TCP/IP) properties



8 Click **OK** to close the **Internet Protocol (TCP/IP) Properties** window.

9 Click **OK** to close the **Local Area Connection Properties** window.

10 Turn on your Business Secure Router and restart your computer (if prompted).

Verifying Settings

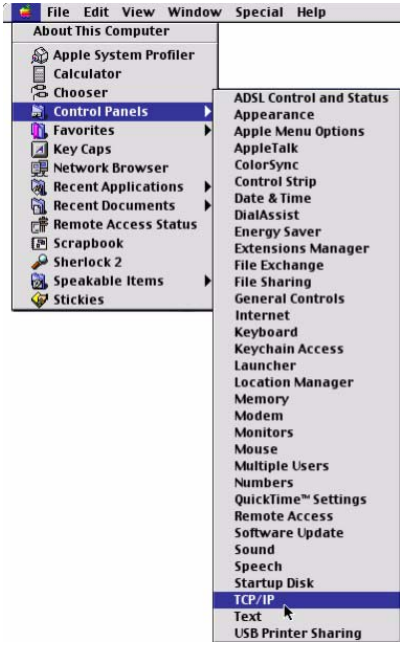
1 Click **Start**, **All Programs**, **Accessories** and then **Command Prompt**.

2 In the **Command Prompt** window, type ipconfig and press [ENTER]. You can also open **Network Connections**, right-click a network connection, click **Status** and then click the **Support** tab.

Macintosh OS 8/9

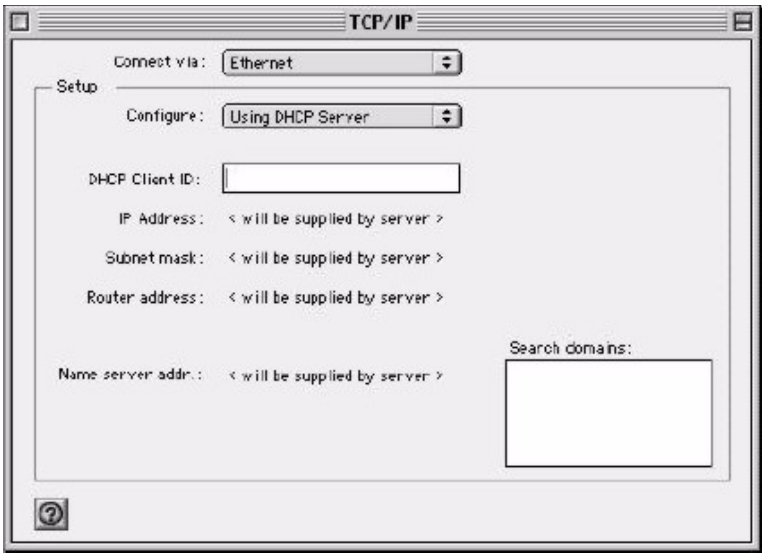
1 Click the **Apple** menu, **Control Panel** and double-click **TCP/IP** to open the **TCP/IP Control Panel**.

Figure 129 Macintosh OS 8/9: Apple Menu



2 Select **Ethernet built-in** from the **Connect via** list.

Figure 130 Macintosh OS 8/9: TCP/IP



3 For dynamically assigned settings, select **Using DHCP Server** from the **Configure:** list.

4 For statically assigned settings, do the following:

— From the **Configure** box, select **Manually**.

— Type your IP address in the **IP Address** box.

— Type your subnet mask in the **Subnet mask** box.

— Type the IP address of your Business Secure Router in the **Router address** box.

5 Close the **TCP/IP Control Panel**.

6 Click **Save** if prompted, to save changes to your configuration.

7 Turn on your Business Secure Router and restart your computer (if prompted).

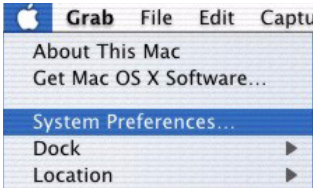
Verifying Settings

Check your TCP/IP properties in the **TCP/IP Control Panel** window.

Macintosh OS X

1 Click the **Apple** menu, and click **System Preferences** to open the **System Preferences** window.

Figure 131 Macintosh OS X: Apple menu



2 Click **Network** in the icon bar.

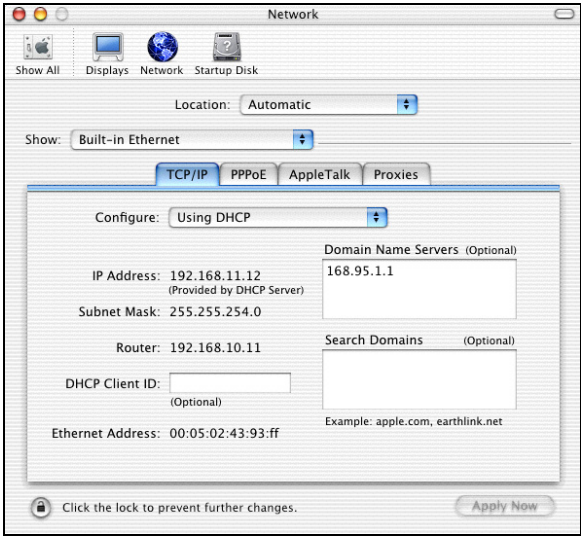
— Select **Automatic** from the **Location** list.

— Select **Built-in Ethernet** from the **Show** list.

— Click the **TCP/IP** tab.

3 For dynamically assigned settings, select **Using DHCP** from the **Configure** list.

Figure 132 Macintosh OS X: Network



4. For statically assigned settings, do the following:
   - From the **Configure** box, select **Manually**.
   - Type your IP address in the **IP Address** box.
   - Type your subnet mask in the **Subnet mask** box.
   - Type the IP address of your Business Secure Router in the **Router address** box.
5. Click **Apply Now** and close the window.
6. Turn on your Business Secure Router and restart your computer (if prompted).

Verifying settings

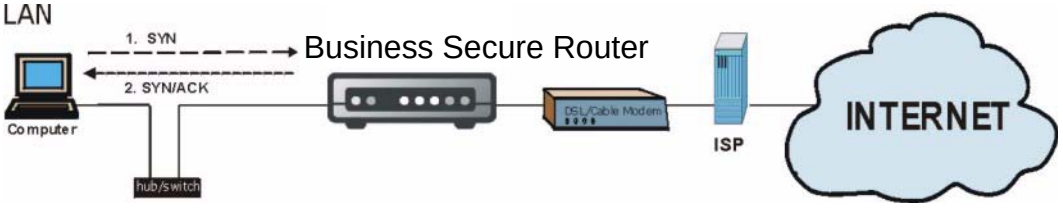
Check your TCP/IP properties in the **Network** window.

Appendix B
Triangle Route

The Ideal Setup

When the firewall is on, your Business Secure Router acts as a secure gateway between your LAN and the Internet. In an ideal network topology, all incoming and outgoing network traffic passes through the Business Secure Router to protect your LAN against attacks.

Figure 133 Ideal Setup



The Triangle Route Problem

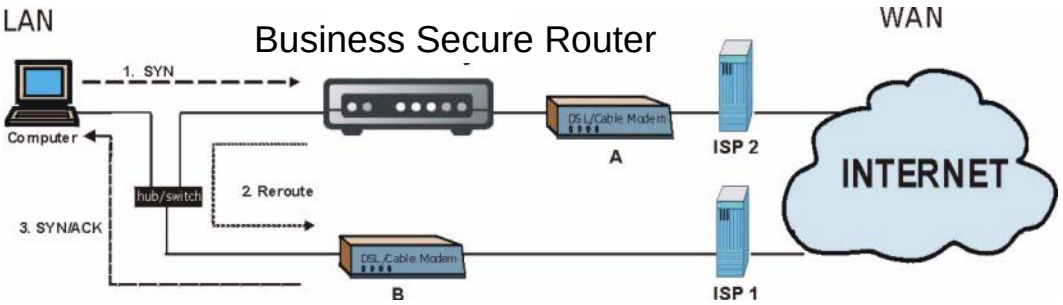
You can have more than one connection to the Internet (through one or more ISPs). If an alternate gateway is on the LAN (and its IP address is in the same subnet as the Business Secure Router LAN IP address), the triangle route (also called asymmetrical route) problem can occur. The steps below describe the triangle route problem.

A traffic route is a path for sending or receiving data packets between two Ethernet devices. Some companies have more than one alternate route to one or more ISPs. If the LAN and ISP are in the same subnet, the triangle route problem can occur. The steps below describe the triangle route problem.

1. A computer on the LAN initiates a connection by sending out a SYN packet to a receiving server on the WAN.
2. The Business Secure Router reroutes the SYN packet through Gateway **B** on the LAN to the WAN.
3. The reply from the WAN goes directly to the computer on the LAN without going through the Business Secure Router.

As a result, the Business Secure Router resets the connection, as the connection is not acknowledged.

Figure 134 Triangle Route Problem



The Triangle Route Solutions

IP aliasing

Using IP alias, you can partition your network into logical sections over the same Ethernet interface. Your Business Secure Router supports up to three logical LAN interfaces with the Business Secure Router being the gateway for each logical network. By putting your LAN and Gateway **B** in different subnets, all returning network traffic must pass through the Business Secure Router to your LAN. The following steps describe such a scenario.

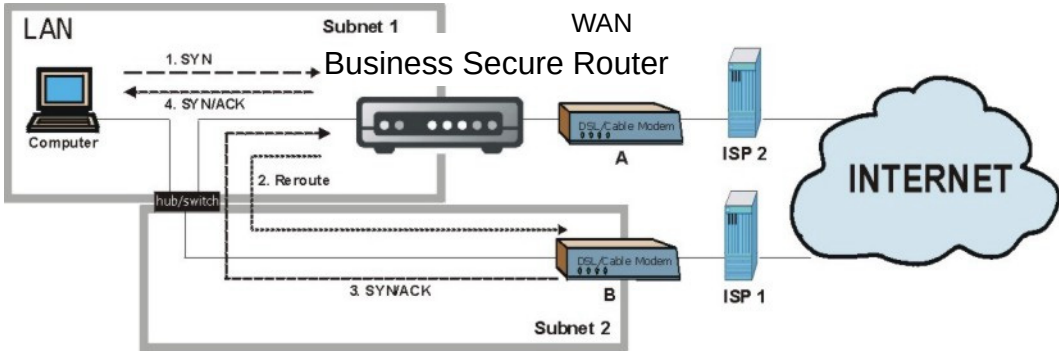
1. A computer on the LAN initiates a connection by sending a SYN packet to a receiving server on the WAN.

2 The Business Secure Router reroutes the packet to Gateway B, which is in Subnet 2.

3 The reply from WAN goes to the Business Secure Router.

4 The Business Secure Router ends the response to the computer in Subnet 1.

Figure 135 IP Alias



Appendix C
Importing certificates

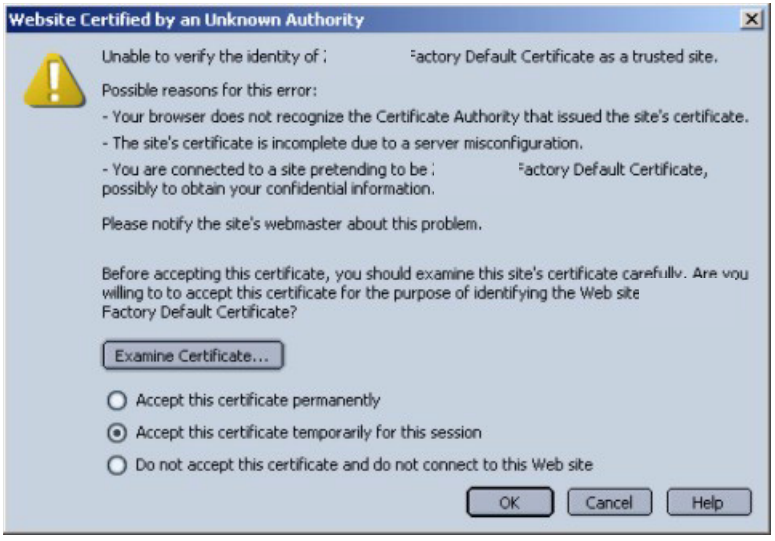
This appendix shows examples for importing certificates.

Import Business Secure Router certificates into Netscape Navigator

In Netscape Navigator, you can permanently trust the Business Secure Router server certificate by importing it into your operating system as a trusted certification authority.

Select **Accept This Certificate Permanently** in Figure 136 to do this.

Figure 136 Security Certificate



Importing the Business Secure Router Certificate into Internet Explorer

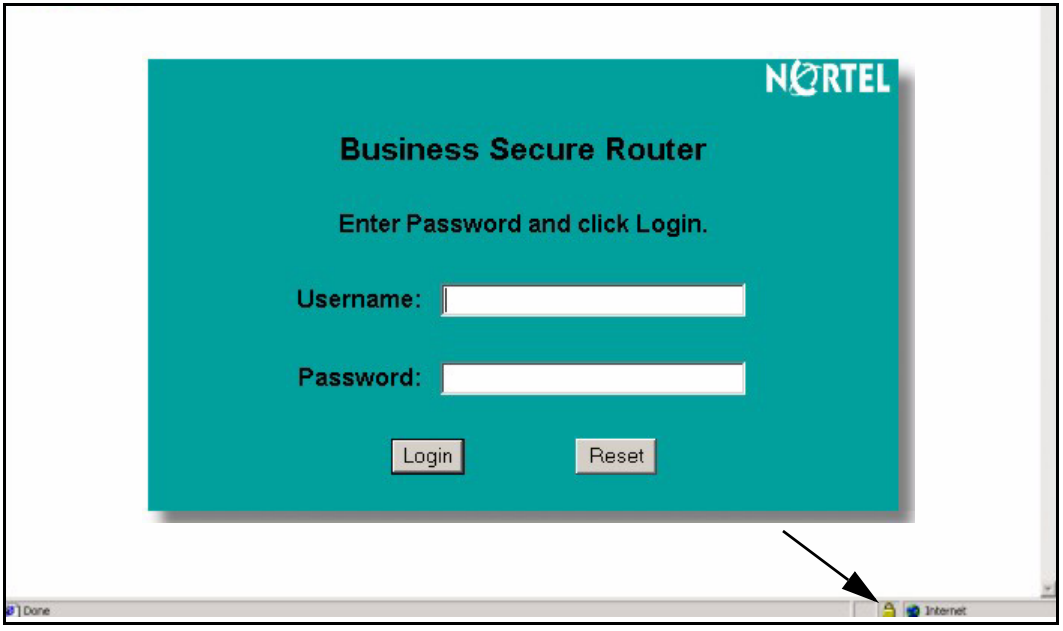
For Internet Explorer to trust a self-signed certificate from the Business Secure Router, simply import the self-signed certificate into your operating system as a trusted certification authority.

To have Internet Explorer trust a Business Secure Router certificate issued by a certificate authority, import the certificate authority's certificate into your operating system as a trusted certification authority.

The following example procedure shows how to import the Business Secure Router's (self-signed) server certificate into your operating system as a trusted certification authority.

1 In Internet Explorer, double click the lock shown in Figure 137.

Figure 137 Login Screen



2 Click **Install Certificate** to open the **Install Certificate** wizard.

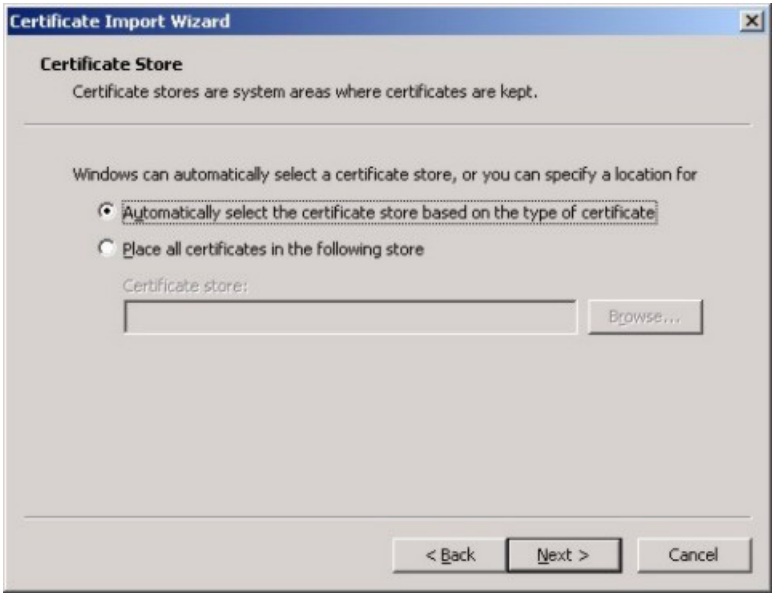
Figure 138 Certificate General Information before Import

3 Click **Next** to begin the **Install Certificate** wizard.

Figure 139 Certificate Import Wizard 1

4 Select where you want to store the certificate and click **Next**.

Figure 140 Certificate Import Wizard 2



5 Click **Finish** to complete the **Import Certificate** wizard.

Figure 141 Certificate Import Wizard 3

6 Click **Yes** to add the Business Secure Router certificate to the root store.

Figure 142 Root Certificate Store

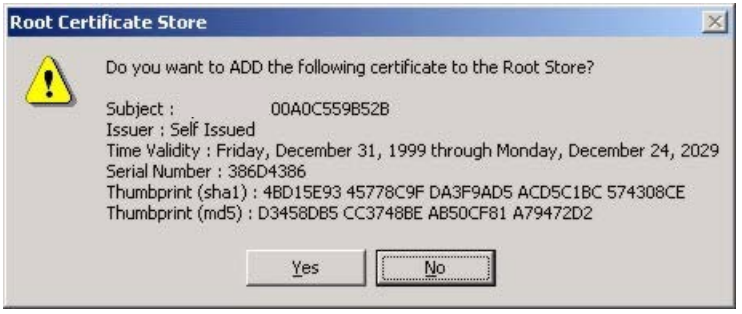
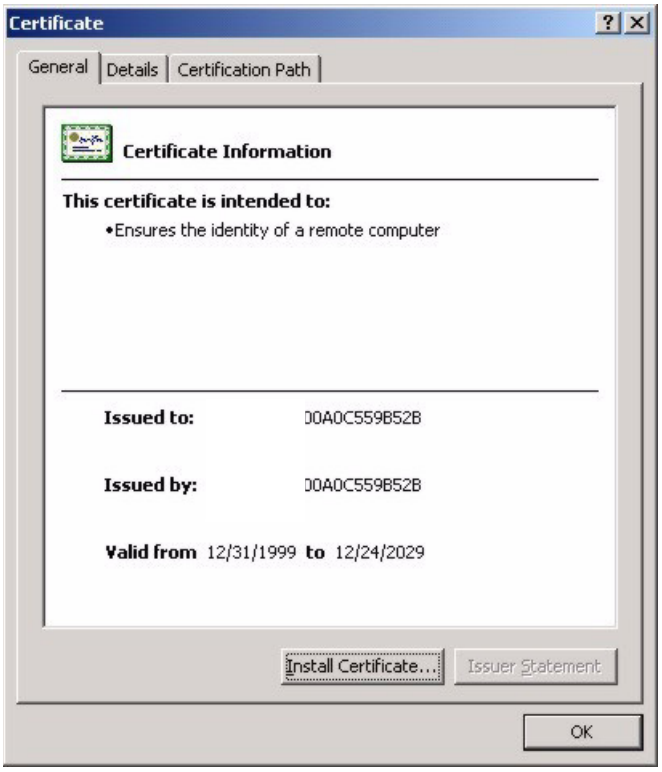


Figure 143 Certificate General Information after Import



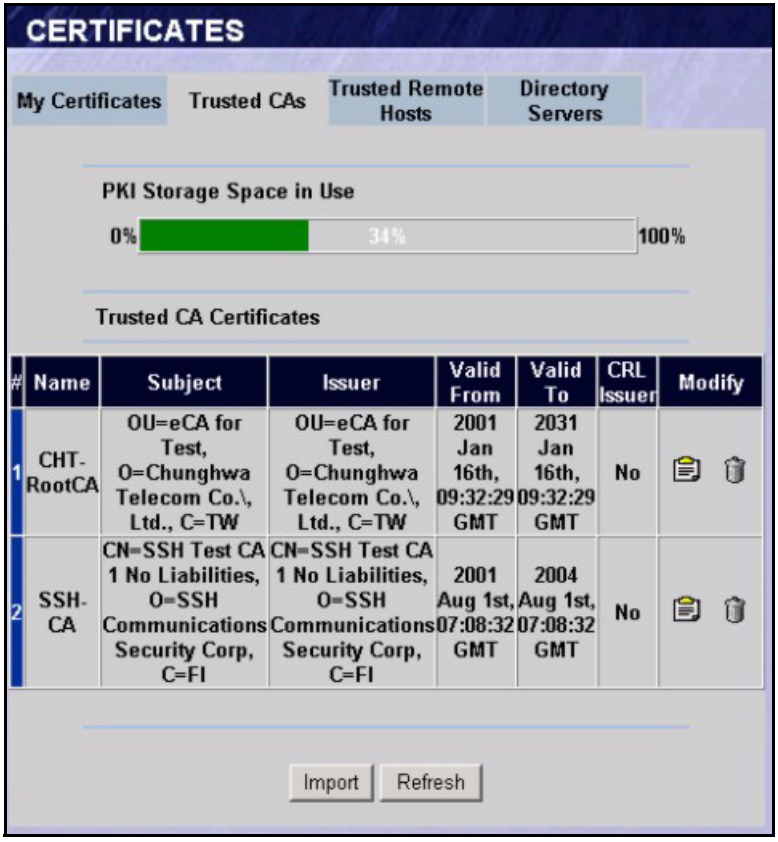
Enrolling and Importing SSL Client Certificates

The SSL client needs a certificate if **Authenticate Client Certificates** is selected on the Business Secure Router.

You must have imported at least one trusted CA to the Business Secure Router in order for the **Authenticate Client Certificates** to be active (see “Certificates” in *Nortel Business Secure Router 222 Configuration — Basics* (NN47922-500) for details).

Apply for a certificate from a Certification Authority (CA) that is trusted by the Business Secure Router (see the Business Secure Router’s **Trusted CA** WebGUI screen—Figure 144).

Figure 144 Business Secure Router Trusted CA screen

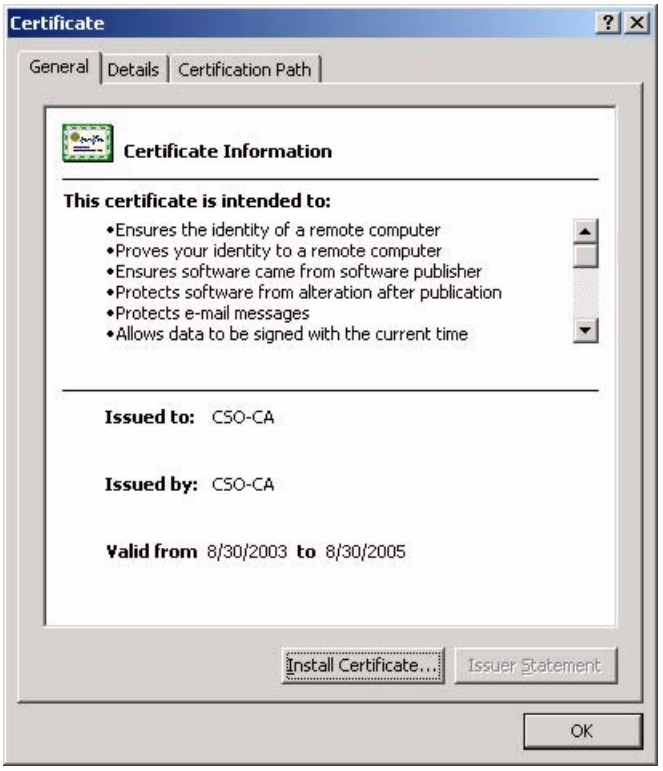


The CA sends you a package containing the CA's trusted certificate, your personal certificates and a password to install the personal certificates.

Installing the CA's certificate

1 Double click the CA's trusted certificate to produce a screen similar to the one shown in Figure 145.

Figure 145 CA certificate example



2 Click **Install Certificate** and follow the wizard as shown earlier in this appendix.

Installing your personal certificates

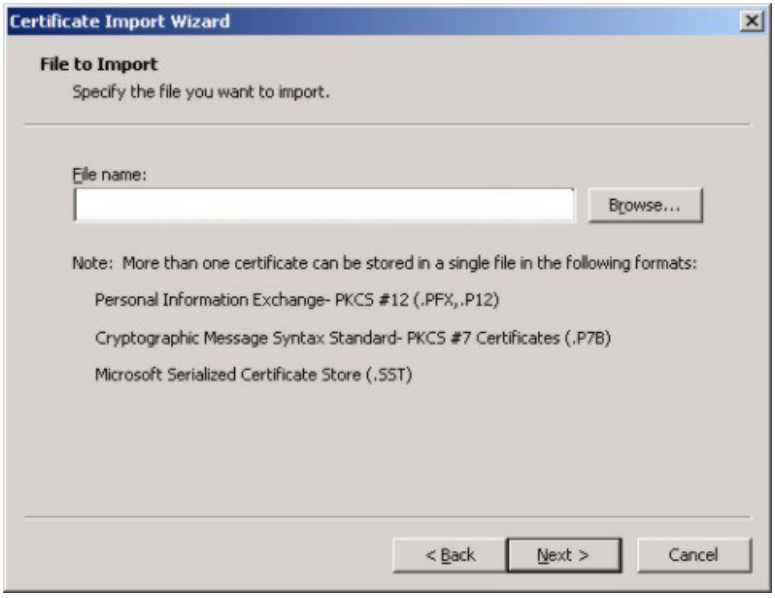
You need a password in advance. The CA can issue the password or you can specify it during the enrollment. Double-click the personal certificate given to you by the CA to produce a screen similar to Figure 146

1 Click **Next** to begin the wizard.

Figure 146 Personal certificate import wizard 1

2 The file name and path of the certificate you double-clicked automatically appears in the **File name** text box. Click **Browse** if you wish to import a different certificate.

Figure 147 Personal certificate import wizard 2

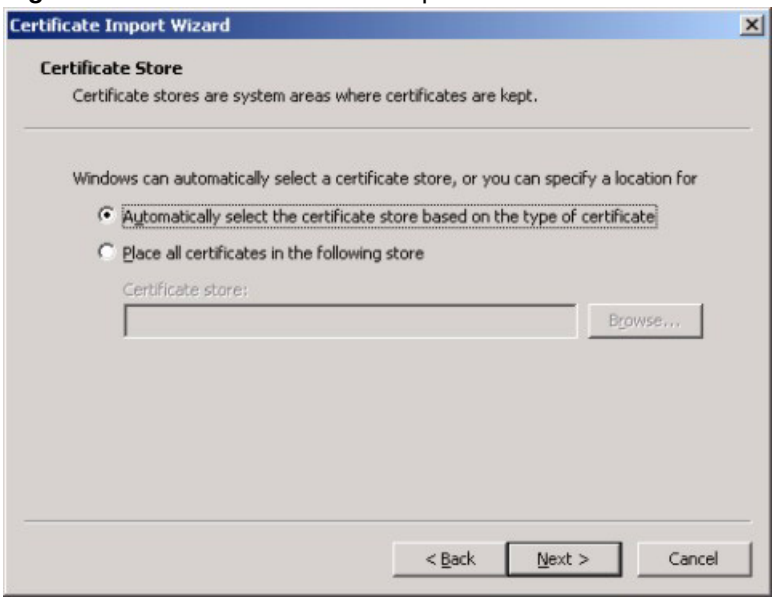


3 Enter the password given to you by the CA.

Figure 148 Personal certificate import wizard 3

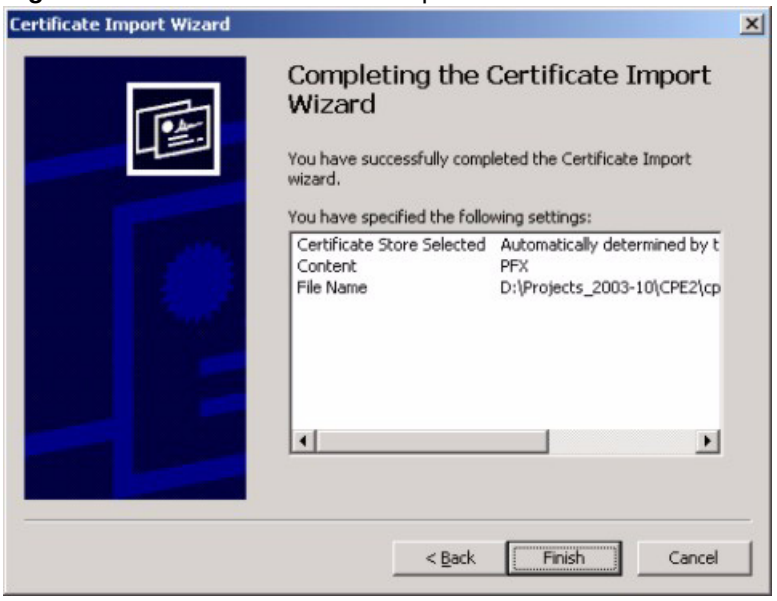
4 Have the wizard determine where the certificate should be saved on your computer or select **Place all certificates in the following store** and choose a different location.

Figure 149 Personal certificate import wizard 4



5 Click **Finish** to complete the wizard and begin the import process.

Figure 150 Personal certificate import wizard 5



6 Figure 151 shows the screen that appears when the certificate is correctly installed on your computer.

Figure 151 Personal certificate import wizard 6

Using a certificate when accessing the Business Secure Router example

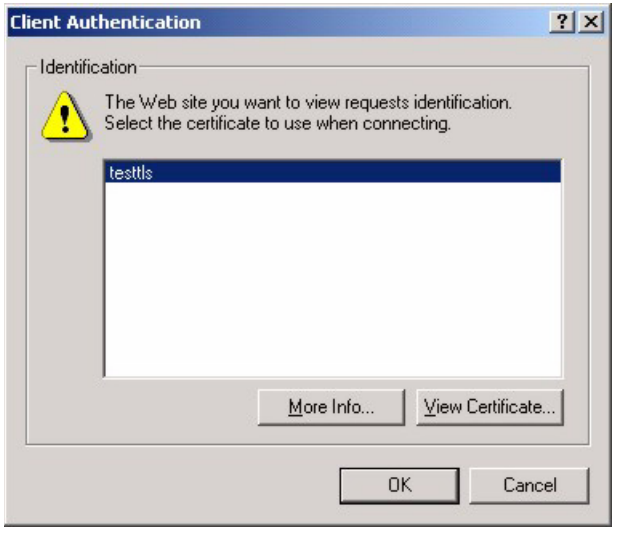
Use the following procedure to access the Business Secure Router via HTTPS.

1 Enter https://Business Secure Router IP Address/ in your browser's web address field.

Figure 152 Access the Business Secure Router via HTTPS

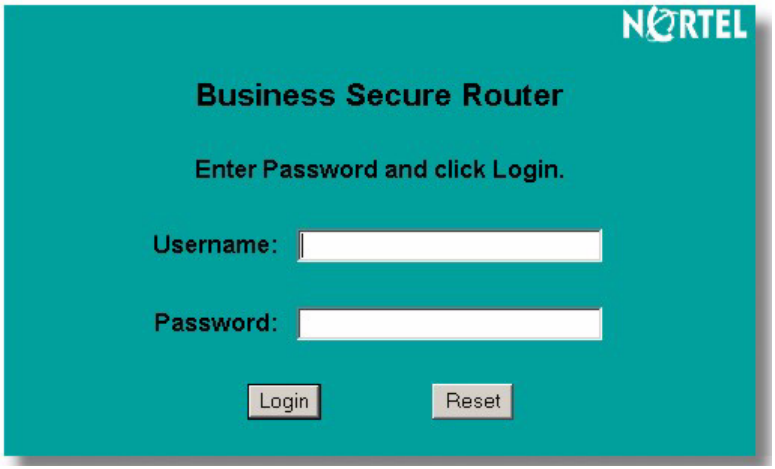
2 When **Authenticate Client Certificates** is selected on the Business Secure Router, you are asked to select a personal certificate to send to the Business Secure Router. This screen displays even if you only have a single certificate, as shown in Figure 153.

Figure 153 SSL client authentication



3 The Business Secure Router login screen appears.

Figure 154 Business Secure Router secure login screen



Appendix D
PPPoE

PPPoE in action

An ADSL modem bridges a PPP session over Ethernet (PPP over Ethernet, RFC 2516) from your PC to an ATM PVC (Permanent Virtual Circuit), which connects to a DSL Access Concentrator where the PPP session terminates (see Figure 155). One PVC can support any number of PPP sessions from your LAN. PPPoE provides access control and billing functionality in a manner similar to dial-up services using PPP.

Benefits of PPPoE

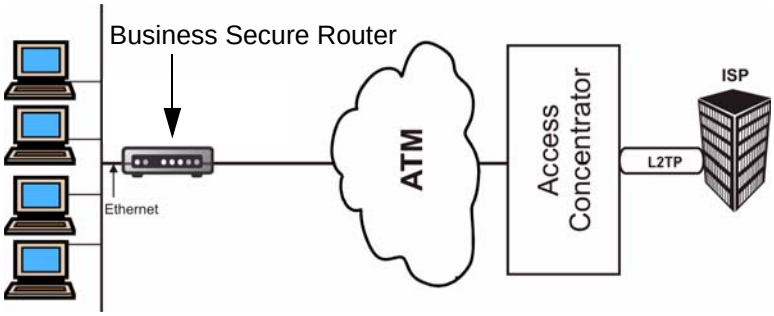
PPPoE offers the following benefits:

- It provides you with a familiar dial-up networking (DUN) user interface.
- It lessens the burden on the carriers of provisioning virtual circuits all the way to the ISP on multiple switches for thousands of users. For GSTN (PSTN and ISDN), the switching fabric is already in place.
- It allows the ISP to use the existing dial-up model to authenticate and (optionally) to provide differentiated services.

Traditional dial-up scenario

Figure 155 depicts a typical hardware configuration where the PCs use traditional dial-up networking.

Figure 155 Single-PC per Router Hardware Configuration



How PPPoE works

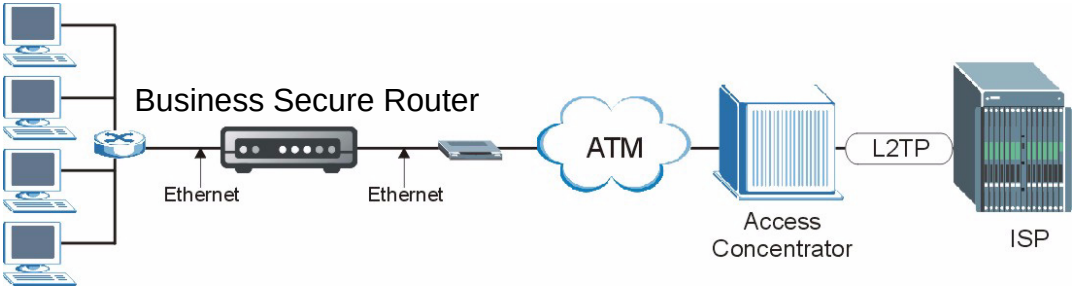
The PPPoE driver makes the Ethernet appear as a serial link to the PC and the PC runs PPP over it, while the modem bridges the Ethernet frames to the Access Concentrator (AC). Between the AC and an ISP, the AC acts as an L2TP (Layer 2 Tunneling Protocol) LAC (L2TP Access Concentrator) and tunnels the PPP frames to the ISP. The L2TP tunnel is capable of carrying multiple PPP sessions.

With PPPoE, the VC (Virtual Circuit) is equivalent to the dial-up connection and is between the modem and the AC, as opposed to all the way to the ISP. However, the PPP negotiation is between the PC and the ISP.

Business Secure Router as a PPPoE client

When using the Business Secure Router as a PPPoE client, the PCs on the LAN see only Ethernet and are not aware of PPPoE. This alleviates the administrator from having to manage the PPPoE clients on the individual PCs.

Figure 156 Business Secure Router as a PPPoE Client



Appendix E
PPTP

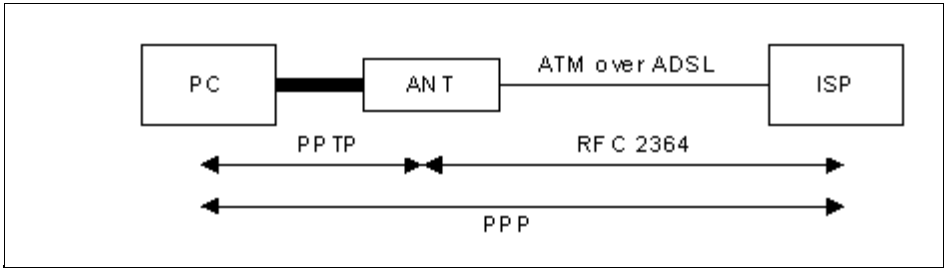
What is PPTP?

PPTP (Point-to-Point Tunneling Protocol) is a Microsoft proprietary protocol (RFC 2637 for PPTP is informational only) to tunnel PPP frames.

How can we transport PPP frames from a PC to a broadband modem over Ethernet?

A solution is to build PPTP into the ANT (ADSL Network Termination) where PPTP is used only over the short haul between the PC and the modem over Ethernet. For the rest of the connection, the PPP frames are transported with PPP over AAL5 (RFC 2364) The PPP connection, however, is still between the PC and the ISP. The various connections in this setup are depicted in the following diagram. The drawback of this solution is that it requires one separate ATM VC per destination.

Figure 157 Transport PPP frames over Ethernet

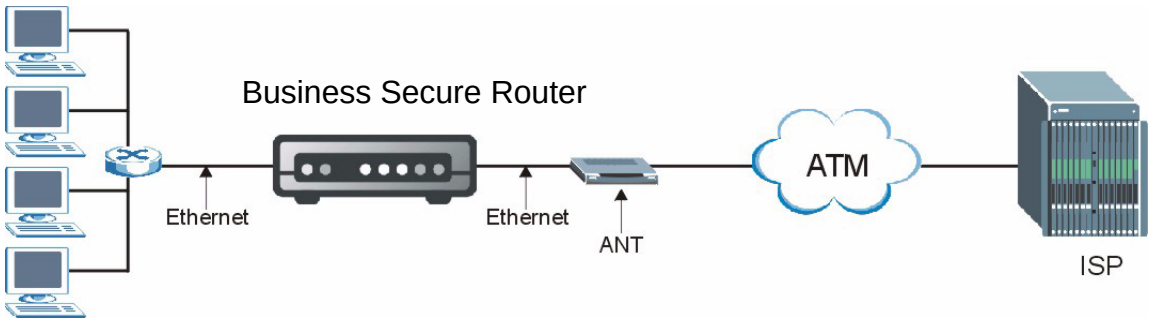


PPTP and the Business Secure Router

When the Business Secure Router is deployed in such a setup, it appears as a PC to the ANT.

In Windows VPN or PPTP Pass-Through feature, the PPTP tunneling is created from Windows 95, 98, and NT clients to an NT server in a remote location. Using the pass-through feature, users on the network can access a different remote server using the Business Secure Router's Internet connection. In SUA/NAT mode, the Business Secure Router is able to pass the PPTP packets to the internal PPTP server (for example, NT server) behind the NAT. You must configure port forwarding for port 1723 to have the Business Secure Router forward PPTP packets to the server. In the case above as the remote PPTP Client initializes the PPTP connection, the user must configure the PPTP clients. The Business Secure Router initializes the PPTP connection hence; there is no need to configure the remote PPTP clients.

Figure 158 Business Secure Router as a PPTP client

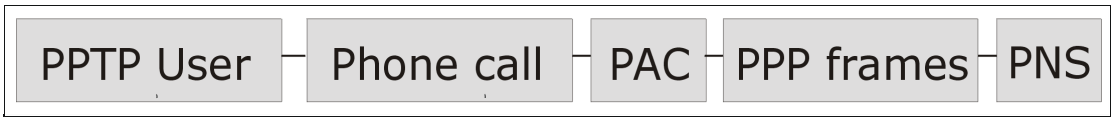


PPTP protocol overview

PPTP is very similar to L2TP, since L2TP is based on both PPTP and L2F (Cisco’s Layer 2 Forwarding). Conceptually, there are three parties in PPTP, namely the PNS (PPTP Network Server), the PAC (PPTP Access Concentrator) and the PPTP user. The PNS is the box that hosts both the PPP and the PPTP stacks and forms one end of the PPTP tunnel. The PAC is the box that dials or answers the phone calls and relays the PPP frames to the PNS. The PPTP user is not necessarily a PPP client, it can also be a PPP server. Both the PNS and the

PAC must have IP connectivity; however, the PAC must also have dial-up capability. The phone call is between the user and the PAC and the PAC tunnels the PPP frames to the PNS. The PPTP user is unaware of the tunnel between the PAC and the PNS.

Figure 159 PPTP protocol overview



Microsoft includes PPTP as a part of the Windows OS. In Microsoft's implementation, the PC, and hence the Business Secure Router, is the PNS that requests the PAC (the ANT) to place an outgoing call over AAL5 to an RFC 2364 server.

Control and PPP connections

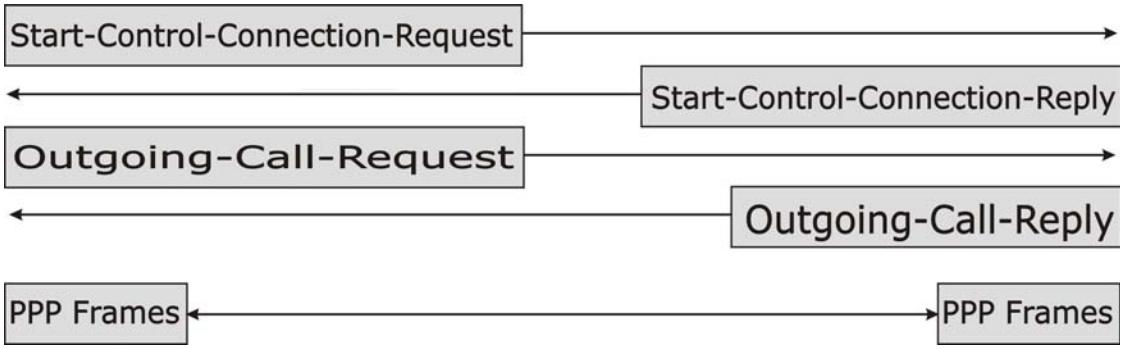
Each PPTP session has distinct control connection and PPP data connection.

Call connection

The control connection runs over TCP. Similar to L2TP, a tunnel control connection is first established before call control messages can be exchanged. Note that a tunnel control connection supports multiple call sessions.

Figure 160 depicts the message exchange of a successful call setup between a PC and an ANT.

Figure 160 Example message exchange between PC and an ANT



PPP data connection

The PPP frames are tunneled between the PNS and PAC over GRE (General Routing Encapsulation, RFC 1701, 1702). The individual calls within a tunnel are distinguished using the Call ID field in the GRE header.

Appendix F
Hardware specifications

Cable pin assignments

Table 54 General specifications

Power Specification	I/P AC 120V / 60Hz; O/P DC 12V 1200 mA
MTBF	416 107 hrs (Mean Time Between Failures)
Operation Temperature	0º C ~ 40º C
Ethernet Specification for WAN	10/100Mb/s Half / Full autonegotiation
Ethernet Specification for LAN/ VPN Ports	10/100Mb/s Half / Full autonegotiation, autosensing

In a serial communications connection, generally a computer is DTE (DataTerminal Equipment) and a modem is DCE (Data Circuit-terminating Equipment). The Business Secure Router is DCE when you connect a computer to the console port. The Business Secure Router is DTE when you connect a modem to the dial backup port.

Figure 161 Console or dial backup port pin layouts [1]

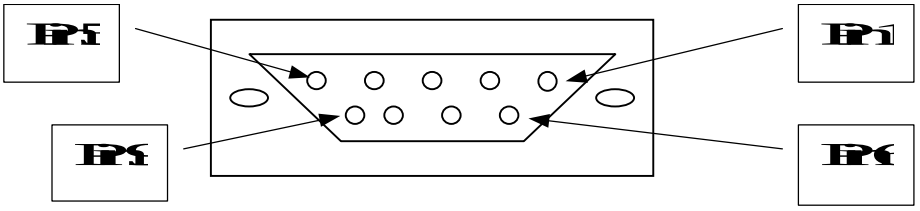
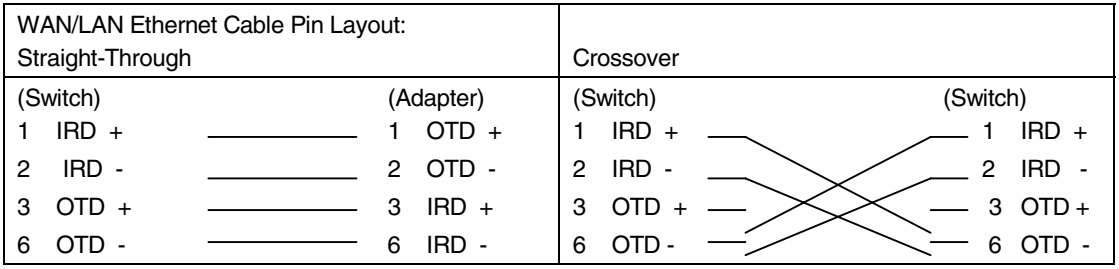


Table 55 Console or dial backup port pin assignments

CONSOLE Port RS – 232 (Female) DB-9F	DIAL BACKUP RS – 232 (Male) DB-9M
Pin 1 = NON Pin 2 = DCE-TXD Pin 3 = DCE –RXD Pin 4 = DCE –DSR Pin 5 = GND Pin 6 = DCE –DTR Pin 7 = DCE –CTS Pin 8 = DCE –RTS PIN 9 = NON	Pin 1 = NON Pin 2 = DTE-RXD Pin 3 = DTE-TXD Pin 4 = DTE-DTR Pin 5 = GND Pin 6 = DTE-DSR Pin 7 = DTE-RTS Pin 8 = DTE-CTS PIN 9 = NON.
The CON/AUX port also has these pin assignments. The CON/AUX switch changes the setting in the firmware only and does not change the CON/AUX port's pin assignments.	Business Secure Routers with a CON/AUX port also have a 9-pin adapter for the console cable with these pin assignments on the male end.

[1] Products without flow control only use pins 2, 3, and 5.

Figure 162 Ethernet cable pin assignments



AC Power Adapter Specifications

Use only power supplies listed in the user instructions.

Phihong, Model PSA21R-180

Note: Not to remove the plug and plug into a wall outlet by itself; always attach the plug to the power supply first before insert into the wall.

Leader, Model MU18-2180100-XX (XX can be A1, A2, A3, B2 or C5 for the different plugs used)

Appendix G
IP subnetting

IP addressing

Routers route based on the network number. The router that delivers the data packet to the correct destination host uses the host ID.

IP classes

An IP address is made up of four octets (eight bits), written in dotted decimal notation, for example, 192.168.1.1. IP addresses are categorized into different classes. The class of an address depends on the value of its first octet.

- Class A addresses have a 0 in the left-most bit. In a class A address, the first octet is the network number and the remaining three octets make up the host ID.
- Class B addresses have a 1 in the left-most bit and a 0 in the next left most bit. In a class B address, the first two octets make up the network number and the two remaining octets make up the host ID.
- Class C addresses begin (starting from the left) with 1 1 0. In a class C address, the first three octets make up the network number and the last octet is the host ID.
- Class D addresses begin with 1 1 1 0. Class D addresses are used for multicasting. (There is also a class “E” address, which is reserved for future use.)

Table 56 Classes of IP addresses

IP Address:		Octet 1	Octet 2	Octet 3	Octet 4
Class A	0	Network number	Host ID	Host ID	Host ID
Class B	10	Network number	Network number	Host ID	Host ID
Class C	110	Network number	Network number	Network number	Host ID

Note: Host IDs of all zeros or all ones are not allowed.

Therefore:

A class C network (8 host bits) can have 2^8 –2 or 254 hosts.

A class B address (16 host bits) can have 2^{16} –2 or 65 534 hosts.

A class A address (24 host bits) can have 2^{24} –2 hosts (approximately 16 million hosts).

Since the first octet of a class A IP address must contain a 0, the first octet of a class A address can have a value of 0 to 127.

Similarly the first octet of a class B must begin with 10, therefore the first octet of a class B address has a valid range of 128 to 191. The first octet of a class C address begins with 110, and therefore has a range of 192 to 223.

Table 57 Allowed IP address range By class

Class	Allowed Range of First Octet (Binary)	Allowed Range of First Octet (decimal)
Class A	**0**0000000 to **0**1111111	0 to 127
Class B	**10**000000 to **10**111111	128 to 191
Class C	**110**00000 to **110**11111	192 to 223
Class D	**1110**0000 to **1110**1111	224 to 239

Subnet masks

A subnet mask is used to determine which bits are part of the network number, and which bits are part of the host ID (using a logical AND operation). A subnet mask contains 32 bits. If there is a 1 in the bit, then the corresponding bit of the IP address is part of the network number. If a bit in the subnet mask is 0 then the corresponding bit in the IP address is part of the host ID.

Subnet masks are expressed in dotted decimal notation just as IP addresses are. The natural masks for class A, B, and C IP addresses are as follows.

Table 58 Natural Masks

Class	Natural mask
A	255.0.0.0
B	255.255.0.0
C	255.255.255.0

Subnetting

With subnetting, the class arrangement of an IP address is ignored. For example, a class C address no longer has to have 24 bits of network number and 8 bits of host ID. With subnetting, some of the host ID bits are converted into network number bits. By convention, subnet masks always consist of a continuous sequence of ones beginning from the left most bit of the mask, followed by a continuous sequence of zeros, for a total number of 32 bits.

Since the mask is always a continuous number of ones beginning from the left, followed by a continuous number of zeros for the remainder of the 32-bit mask, you can simply specify the number of ones instead of writing the value of each octet. This is usually specified by writing a / followed by the number of bits in the mask after the address.

For example, 192.1.1.0 /25 is equivalent to saying 192.1.1.0 with mask 255.255.255.128.

Table 59 shows all possible subnet masks for a class C address using both notations.

Table 59 Alternative Subnet Mask Notation

Subnet mask IP address	Subnet mask 1 Bits	Last octet bit value
255.255.255.0	/24	0000 0000
255.255.255.128	/25	1000 0000
255.255.255.192	/26	1100 0000
255.255.255.224	/27	1110 0000
255.255.255.240	/28	1111 0000
255.255.255.248	/29	1111 1000
255.255.255.252	/30	1111 1100

The first mask shown is the class C natural mask. Normally, if no mask is specified, it is understood that the natural mask is being used.

Example: two subnets

As an example, you have a class C address 192.168.1.0 with subnet mask of 255.255.255.0.

	Network number	Host ID
IP Address	192.168.1.	0
IP Address (Binary)	11000000.10101000.00000001.	00000000
Subnet Mask	255.255.255.	0
Subnet Mask (Binary)	11111111.11111111.11111111.	00000000

The first three octets of the address make up the network number (class C). You want to have two separate networks.

Divide the network 192.168.1.0 into two separate subnets by converting one of the host ID bits of the IP address to a network number bit. The borrowed host ID bit can be either 0 or 1, thus giving two subnets; 192.168.1.0 with mask 255.255.255.128 and 192.168.1.128 with mask 255.255.255.128.

Note: In the following charts, shaded or bolded last-octet bit values indicate host ID bits borrowed to form network ID bits. The number of borrowed host ID bits determines the number of subnets you can have. The remaining number of host ID bits (after borrowing) determines the number of hosts you can have on each subnet.

Table 60 Subnet 1

	Network number	**Last Octet bit value**
IP Address	192.168.1.	0
IP Address (Binary)	11000000.10101000.00000001.	**0**0000000
Subnet Mask	255.255.255.	128
Subnet Mask (Binary)	11111111.11111111.11111111.	**1**0000000
Subnet Address: 192.168.1.0	Lowest Host ID: 192.168.1.1	
Broadcast Address: 192.168.1.127	Highest Host ID: 192.168.1.126	

Table 61 Subnet 2

	Network number	**Last octet bit value**
IP Address	192.168.1.	128
IP Address (Binary)	11000000.10101000.00000001.	**1**0000000
Subnet Mask	255.255.255.	128
Subnet Mask (Binary)	11111111.11111111.11111111.	**1**0000000
Subnet Address: 192.168.1.128	Lowest Host ID: 192.168.1.129	
Broadcast Address: 192.168.1.255	Highest Host ID: 192.168.1.254	

The remaining 7 bits determine the number of hosts each subnet can have. Host IDs of all zeros represent the subnet itself and host IDs of all ones are the broadcast address for that subnet, so the actual number of hosts available on each subnet in the example above is $2^7 – 2$ or 126 hosts for each subnet.

192.168.1.0 with mask 255.255.255.128 is the subnet itself, and 192.168.1.127 with mask 255.255.255.128 is the directed broadcast address for the first subnet. Therefore, the lowest IP address that can be assigned to an actual host for the first subnet is 192.168.1.1 and the highest is 192.168.1.126. Similarly the host ID range for the second subnet is 192.168.1.129 to 192.168.1.254.

Example: four subnets

The above example illustrated using a 25-bit subnet mask to divide a class C address space into two subnets. Similarly to divide a class C address into four subnets, you need to borrow two host ID bits to give four possible combinations of 00, 01, 10 and 11. The subnet mask is 26 bits (11111111.11111111.11111111.**11**000000) or 255.255.255.192. Each subnet contains 6 host ID bits, giving 2^6-2 or 62 hosts for each subnet (all 0s is the subnet itself, all 1s is the broadcast address on the subnet).

Table 62 Subnet 1

	Network number	**Last octet bit value**
IP Address	192.168.1.	0
IP Address (Binary)	11000000.10101000.00000001.	**00**000000
Subnet Mask (Binary)	11111111.11111111.11111111.	**11**000000
Subnet Address: 192.168.1.0	Lowest Host ID: 192.168.1.1	
Broadcast Address: 192.168.1.63	Highest Host ID: 192.168.1.62	

Table 63 Subnet 2

	Network number	**Last octet bit value**
IP Address	192.168.1.	64
IP Address (Binary)	11000000.10101000.00000001.	**01**000000
Subnet Mask (Binary)	11111111.11111111.11111111.	**11**000000
Subnet Address: 192.168.1.64	Lowest Host ID: 192.168.1.65	
Broadcast Address: 192.168.1.127	Highest Host ID: 192.168.1.126	

Table 64 Subnet 3

	Network number	Last Octet Bit Value
IP Address	192.168.1.	128
IP Address (Binary)	11000000.10101000.00000001.	**10**000000
Subnet Mask (Binary)	11111111.11111111.11111111.	**11**000000
Subnet Address: 192.168.1.128	Lowest Host ID: 192.168.1.129	
Broadcast Address: 192.168.1.191	Highest Host ID: 192.168.1.190	

Table 65 Subnet 4

	Network number	Last Octet Bit Value
IP Address	192.168.1.	192
IP Address (Binary)	11000000.10101000.00000001.	**11**000000
Subnet Mask (Binary)	11111111.11111111.11111111.	**11**000000
Subnet Address: 192.168.1.192	Lowest Host ID: 192.168.1.193	
Broadcast Address: 192.168.1.255	Highest Host ID: 192.168.1.254	

Example: eight subnets

Similarly, use a 27-bit mask to create 8 subnets (001, 010, 011, 100, 101, 110).

Table 66 shows class C IP address last-octet values for each subnet.

Table 66 Eight subnets

Subnet	Subnet Address	First Address	Last Address	Broadcast Address
1	0	1	30	31
2	32	33	62	63
3	64	65	94	95
4	96	97	126	127
5	128	129	158	159
6	160	161	190	191

Table 66 Eight subnets

Subnet	Subnet Address	First Address	Last Address	Broadcast Address
7	192	193	222	223
8	224	225	254	255

Table 67 is a summary for class C subnet planning.

Table 67 Class C subnet planning

No. Borrowed Host Bits	Subnet Mask	No. Subnets	No. Hosts per Subnet
1	255.255.255.128 (/25)	2	126
2	255.255.255.192 (/26)	4	62
3	255.255.255.224 (/27)	8	30
4	255.255.255.240 (/28)	16	14
5	255.255.255.248 (/29)	32	6
6	255.255.255.252 (/30)	64	2
7	255.255.255.254 (/31)	128	1

Subnetting with Class A and Class B networks.

For class A and class B addresses the subnet mask also determines which bits are part of the network number and which are part of the host ID.

A class B address has two host ID octets available for subnetting and a class A address has three host ID octets (see Table 56) available for subnetting.

Table 68 is a summary for class B subnet planning.

Table 68 Class B subnet planning

No. “Borrowed” Host Bits	Subnet Mask	No. Subnets	No. Hosts per Subnet
1	255.255.128.0 (/17)	2	32 766
2	255.255.192.0 (/18)	4	16 382
3	255.255.224.0 (/19)	8	8 190
4	255.255.240.0 (/20)	16	4 094

Table 68 Class B subnet planning

No. “Borrowed” Host Bits	Subnet Mask	No. Subnets	No. Hosts per Subnet
5	255.255.248.0 (/21)	32	2 046
6	255.255.252.0 (/22)	64	1 022
7	255.255.254.0 (/23)	128	510
8	255.255.255.0 (/24)	256	254
9	255.255.255.128 (/25)	512	126
10	255.255.255.192 (/26)	1 024	62
11	255.255.255.224 (/27)	2 048	30
12	255.255.255.240 (/28)	4 096	14
13	255.255.255.248 (/29)	8 192	6
14	255.255.255.252 (/30)	16 384	2
15	255.255.255.254 (/31)	32 768	1

Appendix H
Command Interpreter

The following describes how to use the command interpreter. Enter 24 in the main menu to bring up the system maintenance menu. Enter 8 to go to **Menu 24.8 - Command Interpreter Mode**. See the included disk or www.nortel.com for more detailed information on these commands.

Note: Use of undocumented commands or misconfiguration can damage the unit and possibly render it unusable.

Command Syntax

- The command keywords are in `Courier New` font.
- Enter the command keywords exactly as shown. Do not abbreviate.
- The required fields in a command are enclosed in angle brackets <>.
- The optional fields in a command are enclosed in square brackets `[]`.
- The `|`symbol means or.

  For example,

  ```
  sys filter netbios config <type> <on|off>
  ```

  means that you must specify the type of netbios filter and whether to turn it on or off.

Command usage

A list of valid commands can be found by typing `help` or `?` at the command prompt. Always type the full command. Type `exit` to return to the SMT main menu when you are finished.

Sys commands

Table 69 lists and describes the system commands. Each of these commands must be preceded by `sys`. For example, type `sys stdio 60` to set the management session inactivity timeout to 60 minutes.

Table 69 Sys commands

Command			Description
atsh			Displays the MRD field.
callhist			
	display		Displays the call history.
	remove	<index>	Removes an entry from the call history.
client			
	name	[name]	Sets or displays the client logon name.
	password	[password]	Sets or displays the client logon password.
countrycode		[countrycode]	Sets or displays the country code.
datetime			
	date	[year month date]	Sets or displays the system's current date.
	time	[hour [min [sec]]]	Sets or displays the system time.
	period	[day]	Sets how often the Business Secure Router gets the date and time from the time server.
	sync		Gets the date and time from the time server.
domainname			Displays the domain name that the device sends to the LAN DHCP clients.
edit		<filename>	Edits the system preset text files such as autoexec.net.
extraphnum			Maintains extra phone numbers for outgoing (dial backup) calls.
	add	<set 1-3> <1st phone num> [2nd phone num]	Adds extra phone numbers.
	display		Displays the extra phone numbers.
	node	<num>	Sets all extra phone numbers to remote node <num>.

Table 69 Sys commands

Command			Description
	remove	<set 1-3>	Removes extra phone numbers.
	reset		Resets node and mask.
feature			Displays a list of the device's major features.
firmware			Displays the ISDN firmware type.
firewall			See "Sys firewall commands" on page 297 for information about the system firewall commands.
hostname		[hostname]	Sets or displays the system name.
logs			
	category		
		8021x	Records logs for IEEE 802.1X.
		access [0:none/1:log/2:alert/3:both]	Records, sends alerts, or both for access control logs.
		attack [0:none/1:log/2:alert/3:both]	Records, sends alerts, or both for firewall attack logs.
		cdr [0:none/1:log]	Records Call Detail Record logs.
		display	Displays the category settings.
		error [0:none/1:log/2:alert/3:both]	Records, sends alerts, or both for system error logs.
		icmp [0:none/1:log]	Records ICMP logs.
		ike [0:none/1:log/2:alert/3:both]	Records, sends alerts or both for access control logs.
		ipsec [0:none/1:log/2:alert/3:both]	Records the access control logs
		javablocked [0:none/1:log]	Records the java blocked logs.
		mten [0:none/1:log]	Records the system maintenance logs.
		packetfilter [0:none/1:log]	Records the packet filter logs.
		ppp [0:none/1:log]	Records the PPP logs.
		remote [0:none/1:log]	Records the remote management logs.
		tcpreset [0:none/1:log]	Records the TCP reset logs.
		upnp [0:none/1:log]	Records the UPnP logs.

Table 69 Sys commands

Command			Description
		`urlblocked [0:none/1:log/2:alert/3:both]`	Records and/or sends alerts for web access blocked logs.
		`urlforward [0:none/1:log]`	Records web access forward logs.
	`clear`		Clears the log.
	`display`	`[access|attack|error|ike|ipsec|javablocked|mten|packetfilter|pki|tcpreset|tls|upnp|urlblocked|urlforward]`	Displays all logs or specifies a category of logs.
	`errlog`		
		`clear`	Clears the error log.
		`disp`	Displays the error log.
		`online`	Turns the error log online display on or off.
	`load`		Loads the log settings buffer. Use this command before you configure the log settings. Use `sys logs save` after you configure the log settings.
	`mail`		
		`alertAddr [mail address]`	Sends alerts to this e-mail address.
		`clearLog [0:no/1:yes]`	Enables the switch to clear the log after sending logs via e-mail.
		`display`	Displays the logs and alerts mail settings.
		`logAddr [mail address]`	Sends logs to this e-mail address.
		`schedule display`	Displays the mail schedule.
		`schedule hour [0-23]`	Sets the hour to send logs.
		`schedule minute [0-59]`	Sets the minute to send the logs.
		`schedule policy [0:full/1:hourly/2:daily/3:weekly/4:none]`	Sets the mail schedule policy.
		`schedule week [0:sun/1:mon/2:tue/3:wed/4:thu/5:fri/6:sat]`	Sets the day of the week to send weekly logs.
		`server [domainName/IP]`	Sets the domain name or IP address of the mail server to which the logs are sent.

Table 69 Sys commands

Command			**Description**
		`subject [mail subject]`	Sets the log e-mail's subject.
		`auth`	Enables or disables SMTP authentication.
		`user`	Sets the SMTP authentication username.
		`passwd`	Sets the SMTP authentication password.
	`save`		Saves the log settings from the buffer.
	`syslog`		
		`active [0:no/1:yes]`	Enables or disables syslog logging.
		`display`	Displays the syslog settings.
		`facility [Local ID(1-7)]`	Specifies the file to which the device logs the syslog messages.
		`server [domainName/IP]`	Specifies the IP address of the syslog server the syslogs are sent.
	`consolidate`		
		`switch <0:on|1:off>`	Turns log consolidation on or off.
		`period`	Sets the consolidation period (in seconds).
		`msglist`	Displays the consolidated messages.
	`updateSvrIP`	`<minute>`	Sets how often to resolve the mail and syslog server domain name to an IP address.
	`switch`		
		`bmlog <0:no|1:yes>`	Turns the broadcast or multicast log on or off.
		`display`	Displays switch settings.
		`trilog <0:no|1:yes>`	Turns triangle route logging on or off.
`reboot`		`[0:cold boot/1: immediate reboot/2: bootModule debug mode]`	Restarts the device.
`rn`			
	`load`	`<entry no.>`	Loads remote node information.
	`disp`	`<entry no.>(0:working buffer)`	Displays remote node information.

Table 69 Sys commands

Command			Description
	nat	<none|sua|full_feature>	Configures remote node NAT.
	nailup	<no|yes>	Configures a remote node connection to be nailed up (always on).
	mtu	<value>	Sets the remote node Maximum Transmission Unit.
	accessblock		Blocks access to a remote node.
	save	[entry no.]	Saves remote node information.
stdio		[minute]	Sets or displays the management terminal idle timeout value.
tos			
	display		Shows all runtime Temporarily Open Sessions.
	debug		Turns TOS debug message on or off.
	listPerHost		Displays all hosts session counts.
	sessPerHost		Sets the session per host limit.
	timeout		
		display	Displays all TOS (Temporarily Open Session) timeout information.
		icmp	Sets the ICMP session idle timeout value.
		igmp	Sets the IGMP session idle timeout value.
		tcpsyn	Sets the SYN TCP session idle timeout value.
		tcp	Sets the TCP session idle timeout value.
		tcpfin	Sets the TCP FIN session idle timeout value.
		udp	Sets the UDP-session idle-timeout value.
		gre	Sets the GRE-session idle-timeout value.
		esp	Sets the ESP-session idle-timeout value.
		ah	Sets the AH-session idle-timeout value.

Table 69 Sys commands

Command			**Description**
		others	Sets the idle-timeout value for other sessions.
trcdisp		parse, brief, disp	Sets the level of detail that should be displayed. “parse” displays the most detail and “disp” displays the least.
trclog			
	switch	[on|off]	Enables or disables the system trace log or displays the current setting.
	online	[on|off]	Enables or disables the trace log onscreen display (for example, in the Telnet management window).
	level	[level]	Sets the level (1-10) of trace logs (1 shows the least) to display.
	type	<bitmap>	Uses hexadecimal characters to set the type of trace logs to record.
	disp		Shows the trace log.
	clear		Erases the trace log.
	call		Shows call events.
	encapmask	[mask]	Shows which type of encapsulation the trace log records, or sets the encapsulation if you specify the encapsulation’s hexadecimal character.
trcpacket			Uses trace packets to capture parts of packets in order to see the packet flow from one interface to another.
	create	<entry> <size>	Creates a packet trace buffer.
	destroy		Removes the packet trace buffer.
	channel	<name> [none|incoming|outgoing|bothway]	Sets the packet trace direction for a given channel.
	string	[on|off]	Enables or disables the sending of a log to the trace packet buffer when configuration changes are made or displays the current setting if neither on/off is specified.
	switch	[on|off]	Enables or disables packet trace or displays the current setting if neither on nor off is specified.
	disp		Displays the trace packets.

Table 69 Sys commands

Command			Description
	udp		Sends the trace packets to another system using UDP.
	udp switch	[on|off]	Enables or disables the sending of the trace packets to another system using UDP or displays the current setting.
	udp addr	<addr>	Sets the target IP address for sending trace packets using UDP.
	udp port	<port>	Sets the UDP port (should match that of the target IP address) for sending trace packets using UDP.
	parse	[[start_idx], end_idx]	Displays detailed packet details of the packet range specified.
	brief		Displays a brief listing of packet contents.
version			Displays the RAS code and driver versions.
view		<filename>	Displays the specified text file.
wdog			
	switch	[on|off]	Turns the watchdog firmware protection feature on or off.
	cnt	[value]	Sets (0-34 463) or displays the current watchdog count (in 1.6 sec units).
romreset			Restores the factory default configuration file.
	server		Use these commands to configure remote server management.
		access <telnet|ftp|web|icmp|snmp|dns> <value>	Sets the server access type.
		load	Loads server information.
		disp	Displays server information.
		port <telnet|ftp|web|snmp> <port>	Sets the server port.
		save	Saves server information.
		secureip <telnet|ftp|web|icmp|snmp|dns> <ip>	Sets server secure IP address.

Table 69 Sys commands

Command			**Description**
pwderrtm		[minute]	Sets or displays the password error blocking timeout value.
upnp			
	active	[0:no/1:yes]	Activates or deactivates the saved UPnP settings.
	config	[0:deny/1:permit]	Allows users to make configuration changes through UPnP.
	display		Displays UPnP information
	firewall	[0:deny/1:pass]	Allows UPnP to pass through the firewall.
	load		Saves UPnP information.
	reserve	[0:deny/1:permit]	
	save		Saves UPnP information.
socket			Displays the system socket's ID #, type, control block address (PCB), IP address and port number of peer device connected to the socket (Remote Socket) and task control block (Owner).
filter			
	netbios		
		disp	Displays the current NetBIOS filter modes.
		config <0:Between LAN and WAN/ 3: IPSec Pass through/ 4: Trigger Dial> <on|off>	Sets NetBIOS filters.
roadrunner			
	debug	<level>	Enables or disables Road Runner service. 0: disable (default)1: enable
	display	<iface name>	Displays Road Runner information iface-name: enif0, wanif0
	restart	<iface name>	Restarts Road Runner.
ddns			
	debug	<level>	Enables or disables DDNS service.
	display	<iface name>	Displays DDNS information.

Table 69 Sys commands

Command			Description
	restart		Restarts DDNS.
	logout		This command has no effect.
cpu			
	display		Displays the CPU utilization.

Exit Command

Table 70 Exit Command

Command	Description
exit	Ends the command interpreter session.

Ethernet Commands

Table 71 lists and describes the Ethernet commands. Each of these commands must be preceded by `ether`. For example, type `ether config` to display information on the LAN configuration.

Table 71 Ether Commands

Command			Description
config			Displays LAN configuration information.
driver			
	cnt		
		disp <name>	Displays the Ethernet driver counters.
	status	<ch_name>	Shows the LAN status.
version			Displays the Ethernet device type.
edit			
	load	<1:LAN>	Loads Ethernet (1:LAN) data from the System Parameters Table.
	mtu	<value>	Sets the Ethernet data Maximum Transmission Unit.

Table 71 Ether Commands

Command			Description
	accessblock	<0:disable 1:enable>	Blocks Internet access.
	speed	<auto|10/half|10/full|100/half|100/full>	Sets the Ethernet data speed and duplex.
	save		Saves Ethernet data to the System Parameters Table.
dynamic Port			
	dump		Displays the relationship between physical port and channel.
	set	<port> <type>	Sets physical port to a specific channel.
	spt		Displays channel setting stored in SPT.

IP commands

Table 72 lists and describes the IP commands. Each of these commands must be preceded by `ip`. For example, type `ip address` to display the host IP address.

Table 72 IP commands

Command			Description
address		[addr]	Displays the host IP address.
alias		<iface>	Sets an alias for the specified interface.
aliasdis		<0|1>	Disables or enables the alias for the specified interface.
arp			
	status	<iface>	Displays an interface's IP Address Resolution Protocol status.
	attpret	<on|off>	Allows or disallows the device to receive ARP from a different network or not.
	force	<on|off>	Enables or disables the ARP timeout function.
dhcp		<iface>	
	client		
		release	Releases the DHCP client IP address.

Table 72 IP commands

Command			Description
		renew	Renews the DHCP client IP address.
	status	[option]	Displays the DHCP status.
dns			
	query	address <ip address>	Displays the domain name of an IP address.
		name <host name>	Displays the IP address of a domain name.
	system		Configures the system DNS server settings.
		display	Shows the system DNS server settings.
		edit <0: first|1: second|2: third> <0:from ISP|1:usr-def|2:none> [IP address if choosing 1]	Configures the system DNS server settings.
	lan	edit <0: first|1: second|2: third> <0:from ISP|1:usr-def|2:DNS Relay|3: none> [IP address if choosing 1]	Configures the LAN DNS server settings.
		display	Shows the LAN DNS server settings.
httpd		debug [on|off]	Enables or disables the HTTP debug flag. This command currently does not work.
icmp			
	status		Displays the ICMP statistics counter.
	discovery	<iface> [on|off]	Sets the ICMP router discovery flag.
ifconfig		[iface] [ipaddr] [broadcast <addr>|mtu <value>|dynamic]	Configures a network interface.
ping		<hostid>	Pings a remote host.
route			
	status	[if]	Displays the routing table.

Table 72 IP commands

Command			Description
	add	<dest_addr|default>[/<bits>] <gateway> [<metric>]	Adds a route.
	addiface	<dest_addr|default>[/<bits>] <gateway> [<metric>]	Adds an entry to the routing table for the specified interface.
	addprivate	<dest_addr|default>[/<bits>] <gateway> [<metric>]	Adds a private route.
	drop	<host addr> [/<bits>]	Drops a route.
status			Displays IP statistic counters.
udp			
	status		Displays the UDP status.
rip			These are the Routing Information Protocol commands.
	accept	<gateway>	Drops an entry from the RIP refuse list.
	activate		Enables RIP.
	merge	[on|off]	Sets the RIP merge flag.
	refuse	<gateway>	Adds an entry to the RIP refuse list.
	request	<addr> [port]	Sends a RIP request to the specified address and port.
	reverse	[on|off]	RIP Poisoned Reverse.
	status		Displays RIP statistic counters.
	trace		Enables the RIP debug trace.
	mode		
		<iface> in [mode]	Sets the Business Secure Router to use the RIP information it receives.
		<iface> out [mode]	Sets the Business Secure Router to broadcast its routing table.
	dialin_user	[show|in|out|both|none]	Shows the dial-in user RIP direction.
tcp	status		Displays the TCP statistic counters.

Table 72 IP commands

Command			Description
telnet		<host> [port]	Creates a Telnet connection to the specified host.
tftp			
	support		Displays whether or not TFTP is supported.
	stats		Displays the TFTP statistics.
traceroute		<host> [ttl] [wait] [queries]	Sends ICMP packets to trace the route of a remote host.
xparent	join	<iface1> [<iface2>]	Add iface2 to the iface1's group.
	break	<iface>	Remove the specified interface from the ipxparent group.
urlfilter			
	enable	[0:no/1:yes]	Enables or disables content filtering.
	exemptZone		
		display	Displays content filtering exempt zone information.
		actionFlags [type(1-3)][enable/disable]	Enables or disables content filtering exempt zone action flags that determine to which IP addresses content filtering applies.
		add [ip1] [ip2]	Sets a range of IP addresses to be in the exempt zone.
		delete [ip1] [ip2]	Removes a range of IP addresses from the exempt zone.
		reset	Returns the exempt zone settings to the previous configuration.
	customize		Uses the customize commands to configure content filtering for trusted Web sites, forbidden Web sites and keyword blocking.
		display	Displays the content filtering customize action flags.
		actionFlags [act(1-7)] [enable/disable]	Sets the content filtering customize action flags.
		logFlags [type(1-3)][enable/disable]	Sets the content filtering customize log flags.

Table 72 IP commands

Command			**Description**
		`add [string] [trust/untrust/ keyword]`	Adds a trusted Web site, forbidden Web site or keyword blocking string.
		`delete [string] [trust/untrust/ keyword]`	Deletes a trusted Web site, forbidden Web site or keyword blocking string.
		`reset`	Returns to the default configuration.
`tredir`			
	`failcount`	`<count>`	Sets the number of times that the device can ping the target without a response before forwarding traffic to the backup gateway.
	`partner`	`<ipaddr>`	Sets the traffic redirect backup gateway IP address.
	`target`	`<ipaddr>`	Sets the IP address that the device uses to test WAN accessibility.
	`timeout`	`<timeout>`	Sets the number of seconds the device waits for a response from the target.
	`checktime`	`<period>`	Sets the number of seconds the device waits between attempts to connect to the target.
	`active`	`<on|off>`	Enables or disables traffic redirect.
	`save`		Saves traffic redirect configuration.
	`disp`		Displays the traffic redirect configuration.
	`debug`	`<value>`	Sets the traffic redirect debug value.
`rpt`			
	`active`	`[1:yes|0:no]`	Enables or disables the reports.
	`start`		Starts recording reports data.
	`stop`		Stops recording reports data.
	`url`		Records the most visited Web sites.
	`ip`		Records the LAN IP addresses that sent and received the most traffic.
	`srv`		Records the most heavily used protocols or service ports.
`stroute`			
	`display`	`[rule # | buf]`	Displays the list of static routes or detailed information on a specified rule.

Table 72 IP commands

Command			Description
	load	<rule #>	Loads the specified static route rule into the buffer.
	save		Saves a rule from the buffer to the System Parameters Table.
	config		
		name <site name>	Sets the name for a static route.
		destination <dest addr>[/<bits>] <gateway> [<metric>]	Sets a static route's destination IP address and gateway.
		mask <IP subnet mask>	Sets a static route's subnet mask.
		gateway <IP address>	Sets a static route's gateway IP address.
		metric <metric #>	Sets a static route's metric number.
		private <yes|no>	Turns private mode on or off.
		active <yes|no>	Enables or disables a static route rule.
dropIcmp		[0|1]	Sets whether or not the device allows ICMP fragment packets.
igmp			
	debug	[level]	Sets IGMP debug level.
	forwardall	[on|off]	Activates or deactivates IGMP forwarding to all interfaces flag.
	querier	[on|off]	Turns on or off IGMP stop query flag.
	iface		
		<iface> grouptm <timeout>	Sets IGMP group timeout for the specified interface.
		<iface> interval <interval>	Sets IGMP query interval for the specified interface.
		<iface> join <group>	Adds an interface to a group.
		<iface> leave <group>	Removes an interface from a group.
		<iface> query	Sends an IGMP query on the specified interface.

Table 72 IP commands

Command			**Description**
		`<iface> rsptime [time]`	Sets the IGMP response time.
		`<iface> start`	Turns on IGMP on the specified interface.
		`<iface> stop`	Turns off IGMP on the specified interface.
		`<iface> ttl <threshold>`	Sets the IGMP Time To Live threshold.
		`<iface> v1compat [on|off]`	Turns on or off IGMP version 1 compatibility on the specified interface.
	`robustness`	`<num>`	Sets the IGMP robustness variable.
	`status`		Displays the IGMP status.
`alg`			
	`display`		Shows whether the Application Layer Gateway is enabled or disabled.
	`siptimeout`	`<timeout in second> or 0 for no timeout`	Sets the SIP timeout period.
	`enable`	`<ALG_FTP|ALG_H323|ALG_SIP>`	Turns on the ALG.
	`disable`	`<ALG_FTP|ALG_H323|ALG_SIP>`	Turns off the ALG.

IPSec commands

Table 73 lists and describes the IP Sec commands. Each of these commands must be preceded by `ipsec`. For example, type `ipsec display 3` to display the third IPSec rule, if you have it configured.

Table 73 IPSec commands

Command			Description
`debug`	`type`	`<0:Disable | 1:Original on|off | 2:IKE on|off | 3: IPSec [SPI]|on|off | 4:XAUTHon|off | 5:CERT on|off | 6: All>`	Turns the trace for IPsec debug information on or off.
	`level`	`<0:None | 1:User | 2:Low | 3:High>`	Sets the debug level. The higher the number, the more detailed.
	`display`		Shows debugging information, including type and level.
`switch`	`<on|off>`		As long as there is one active IPSec rule, all packets go into the IPSec process to check against the SPD. When this switch is turned on, packets are not be put through the IPSec process, even if there are active IPSec rules.
`timer`			
	`chk_conn.`	`<0~255>`	Sets the idle timeout for IPSec connections. The system disconnects an IPSec connection with no traffic for the timeout period. The interval is in minutes (2 default) and 0 means the connection never times out.
	`dpdTime`	`<minutes>`	Sets the idle timeout for IPSec connections where the Business Secure Router is waiting for a response from the peer.
	`update_peer`	`<0~255>`	Sets the autotimer for updating IPSec rules that use a domain name as the secure gateway IP address. The interval is in minutes (30 default) and 0 means it never updates.

Table 73 IPSec commands

Command			**Description**
	chk_input	<0~255>	Adjusts autotimer to check if any inbound IPsec traffic has passed during the specified period. If not, the Business Secure Router disconnects the tunnel.
show_runtime	sa		Displays runtime phase 1 and phase 2 SA information.
	spd		When a dynamic rule accepts a request and a tunnel is established, a runtime SPD is created according to the peer's local IP address. This command displays these runtime SPDs.
updatePeerIp			Forces the system to immediately update IPSec rules that use a domain name as the secure gateway IP address.
display	<rule index>		Displays the specified IPSec rule.
policyDisplay	<rule index>		Displays the specified IPSec rule's IP policies.
dial	<rule index>	<policy index>	Triggers the specified phase two connection.
route	lan	<on|off>	After IPSec processes a packet and sends it to the LAN side, this switch controls whether or not IPSec can be applied to the packet again.
	wan	<on|off>	After IPSec processes a packet and sends it to the WAN side, this switch controls whether or not IPSec can be applied to the packet again.
load	<rule index>		Edit an IPSec branch office rule with the specified rule number.
save			Saves the IPSec branch office rule.
config			Uses these commands to configure the IPSec rule.
	name	<name>	Sets the name of the rule.
	active	<Yes|No>	Turns the rule on or off.
	negotiationMode	<0:Main | 1:Aggressive>	Sets the negotiation mode.
	natTraversal	<Yes|No>	Turns NAT traversal on or off.
	p1MultiPro	<Yes|No>	Turns phase 1 multiple proposal on or off.

Table 73 IPSec commands

Command			Description
	lcIdType	<0:IP | 1:DNS | 2:Email>	Sets the local ID type.
	lcIdContent	<content>	Sets the local ID content.
	myIpAddr	<IP address>	Sets the My IP Address.
	peerIdType	<0:IP | 1:DNS | 2:Email>	Sets the peer ID type.
	peerIdContent	<content>	Sets the peer ID content.
	secureGwAddr	<IP address | Domain name>	Sets the secure gateway address.
	authMethod	<0:PreSharedKey |1: RSASignature>	Sets the authentication method.
	certificate	<certificate name>	Specifies the certificate to use for authentication.
	preShareKey	<ASCII | 0xHEX>	Types 8 to 32 case-sensitive ASCII characters or 16 to 62 hexadecimal (0-9, A-F) characters (preceded by 0x (zero x), which is not counted as part of the 16 to 62 characters).
	p1EncryAlgo	<0:DES | 1:3DES | 2:AES>	Sets the phase 1 encryption algorithm.
	p1AuthAlgo	<0:MD5 | 1:SHA1>	Sets the phase 1 authentication algorithm.
	p1SaLifeTime	<seconds>	Sets the phase 1 SA lifetime.
	keyGroup	<0:DH1 | 1:DH2>	Sets the key group for phase 1 IKE setup.
	nailUp	<Yes|No>	Turns nailed up feature on or off.
	activeProtocol	<0:AH | 1:ESP>	Sets the protocol.
	p2MultiPro	<Yes|No>	Turns phase 2 multiple proposal on or off.
	p2EncryAlgo	<0:Null | 1:DES | 2:3DES | 3:AES>	Sets the phase 2 encryption algorithm.
	p2EncryKeyLen	<0:128 | 1:192 | 2:256>	Sets the phase 2 encryption key length (with AES encryption).
	p2AuthAlgo	<0:MD5 | 1:SHA1>	Sets the phase 2 authentication algorithm.
	p2SaLifeTime	<seconds>	Sets the phase 2 SA lifetime.

Table 73 IPSec commands

Command			Description
	encap	<0:Tunnel | 1:Transport>	Sets the encapsulation mode.
	pfs	<0:None | 1:DH1 | 2:DH2>	Sets Perfect Forward Secrecy.
	antiReplay	<Yes | No>	Turns replay detection on or off.
	connType	<0:Branch Office | 1:Contivity Client>	Specifies whether the rule is for a branch office or Contivity Client VPN connection.
	authOptions	<0:Username Password | 1:Group ID & Password	Sets the Business Secure Router to either send just the username and password to the remote Contivity VPN switch, or a group ID and password as well.
	onDemand	<on | off>	Sets whether or not outgoing packets can automatically trigger a VPN connection to the remote Contivity VPN switch.
	ODService	[netbios] [ntp] [none]...	Sets which specific services can automatically trigger a VPN connection to the remote Contivity VPN switch.
	groupID	<group ID>	Sets the Contivity Client tunnel's user's group ID.
	groupPasswd	<group password>	Sets the Contivity Client tunnel's user's group password.
	username	<name>	Sets the Contivity Client tunnel's user's username.
	password	<password>	Sets the Contivity Client tunnel's user's password.
	exUseMode	[enable|disable]	Turns the exclusive use mode for the Contivity Client tunnel on or off.
	exUseMac	[MAC address]	Specifies which MAC address is allowed to use the Contivity Client tunnel with exclusive use mode.
	clientFailOver	<IP address> <IP address> <IP address>	Sets the Contivity Client fail over IP addresses (of back up remote Contivity VPN switches).
	keepAlive	<Yes|No>	Turns the Keep Alive feature on or off.
ikeList			Displays a summary of the IKE (phase 1) rules.

Table 73 IPSec commands

Command			Description
ikeDelete	<rule index>		Deletes the specified IPSec rule.
policyEdit	<rule index>		Edits the specified IP policy.
policySave			Saves the IP policy.
ipsecList			Displays a summary of the IPSec (phase 2) rules.
policyList			Displays the IP policies.
policyDelete	<rule index>		Deletes the specified IP policy.
policyConfig			Uses these commands to configure an IP policy for an IPSec office tunnel rule.
	saIndex	<rule index>	Binds the IP policy to an IPSec rule.
	active	<Yes|No>	Turns the IP policy on or off.
	lcAddrStart	<IP>	Sets the local starting IP address.
	protocol	<1:ICMP | 6:TCP | 17:UDP>	Sets the IP policy's protocol.
	controlPing	<Yes|No>	Turns control ping on or off.
	controlPingAddr	<IP>	Sets the control ping IP address.
	lcAddrType	<0:single | 1:range | 2:subnet>	Sets the local address type.
	lcAddrEndMask	<IP>	Sets the local ending IP address or subnet mask.
	lcPortStart	<port>	Sets the local starting port number.
	lcPortEnd	<port>	Sets the local ending port number.
	rmAddrType	<0:single | 1:range | 2:subnet>	Sets the remote address type.
	rmAddrStart	<IP>	Sets the remote starting IP address.
	rmAddrEndMask	<IP>	Sets the remote ending IP address or subnet mask.
	rmPortStart	<port>	Sets the remote starting port number.
	rmPortEnd	<port>	Sets the remote ending port number.
	btNatActive	<Yes | No>	Turns branch tunnel NAT address mapping on or off.

Table 73 IPSec commands

Command			Description
	btNatType	<0:single | 1:range | 2:all>	Sets the type of NAT address mapping.
	btNatAddrStart	<IP address>	Sets the branch tunnel NAT starting IP address.
	btNatArEnd	<IP address>	Sets the branch tunnel NAT ending IP address or subnet mask.
swSkipOverlapIP	<on|off>		Turn this option on to have the device allow rules with overlapping source and destination IP addresses.
adjTcpMss	<off|auto|user defined value>		Sets the adjust TCP Maximum Segment Size.
contivityDial			Initiates the Contivity Client VPN connection.
contivityDrop			Ends the Contivity Client VPN connection.
contivityState			Displays information about the Contivity Client VPN connection.
contivitySplit			
contivityTimecnt	<0~65535>		Sets the Contivity Client keep-alive interval (in seconds).
exemptHost			Uses the exemptHost commands to configure specific IP addresses that are not to be part of a VPN tunnel.
	display		Displays the exempt host settings.
	load <index>		Loads an exempt host.
	active <Yes|No>		Enables or disables an exempt host.
	sourceStart		Sets the exempt host's source start IP address.
	sourceEnd		Sets the exempt host's source end IP address.
	destStart	<IP address>	Sets the exempt host's destination start IP address.
	destEnd	<IP address>	Sets the exempt host's destination end IP address.
	save		Saves an exempt host.
btNatList			Displays the branch tunnel NAT entries.

Table 73 IPSec commands

Command			Description
clientTerm			
	load		Loads client termination configuration from ROM to working buffer, you must execute this command before configuring client termination.
	active	<yes | no>	Enables or disables client termination.
	display	[user | cfg]	Displays configuration and/or remote user logon status of client termination, unless a parameter is specified, displays all.
	save		Saves any client termination configuration changes to ROM.
	auth	local <on | off>	Enables or disables Local User Database authentication method.
		local psk <on | off>	Enables or disables the Pre-Shared Key authentication method for the Local User Database.
		radius <on | off>	Enables or disables the RADIUS Server authentication method.
		radius groupId	Configures Group ID fields for RADIUS Server authentication method.
		radius groupPwd	Configures Group Password fields for RADIUS Server authentication method.
		radius psk <on | off>	Enables or disables Pre-Shared Key authentication type for RADIUS Server.
	encr	<128AES_SHA1 | 3DES_SHA1 | 3DES_MD5 | DES_SHA1 | DES_MD5 | AH_SHA1 | AH_MD5> <on | off>	Enables or disables the specified encryption algorithm.
	DHG	<DES_DH1 | 3DES_DH2 | 128AES_DH5 > <on | off>	Enables or disables the specified Diffie-Hellman encryption level.
	aci	static <on | off>	Enables or disables the Use Static Address option.

Table 73 IPSec commands

Command			Description
		`ipPool <index>`	Select which IP pool, index is based on 1, and inactive IP pool cannot be selected.
	`ipPool`	`load <index>`	Before you configure an IP pool for client termination, you must load the specified IP pool. Currently 3 IP pools are supported, so the valid index is: 1~3
		`save`	After changing the IP pool configuration, use the save command to save the modification to the ROM.
		`active`	Enables or disables the loaded IP pool.
		`poolName`	Sets the IP pool's name.
		`startAddr`	Sets the IP pool's starting IP address.
		`subnet`	Sets the IP pool's subnet.
		`size`	Sets the number of IP addresses in the IP pool.
		`status`	Displays the current runtime IP pool status of Client Termination.
	`natt`	`active <yes | no>`	Enables or disables NAT Traversal.
		`portSwitch <enable | disable>`	Enables or disables Client IKE Source Port Switching.
		`portNum`	Sets the NAT Traversal UDP port, valid UDP port: 1025 ~ 65535.
	`failover`	`<1 | 2 | 3> <IP>`	Sets the client failover IP address.
	`keepalive`	`active <yes | no>`	Enables or disables client failover tuning (keep-alive).
		`interval <hh:mm:ss>`	Sets the keep-alive interval, valid interval 00:00:10 ~ 23:59:59.
		`maxRetrans`	Sets the keep-alive max retransmissions, valid range 0~255
	`pfs`	`<enable | disable>`	Enables or disables Perfect Forward Secrecy.
	`idleTo`	`<hh:mm:ss>`	Sets the Idle Timeout, the valid value is: 00:00:00~23:59:59, 00:00:00 means no idle timeout.
	`aicp`	`<on | off>`	Enable or disables Accept Initial Contact Payload.

Table 73 IPSec commands

Command			Description
	rekeyTo	<hh:mm:ss>	Sets the lifetime of a single key used for data encryption.
	rekeyDc		Sets how much data you expect to transmit via the tunnel with a single key. A setting of 0 kb disables the Rekey Data Count, rekey data count must be more than 5.
	domain		Sets the domain name for client termination.
	dns	<primary | secondary> <IP>	Sets primary or secondary DNS server IP addresses to be assigned to remote users.
	wins	<primary | secondary> <IP>	Sets primary or secondary WINS server IP addresses to be assigned to remote users.
	banner	<on | off> [banner text]	Sets whether or not the banner appears when a remote user logs on to the gateway. Also sets the banner text if specified (up to 256 characters).
	password	clientStorage <on | off>	Sets whether or not the Contivity VPN clients can save their logon passwords instead of always having to manually enter them.
		manage <on | off>	Enables or disables the password management facilities, including maximum password age, minimum password length, and allow alpha-numeric passwords only.
		anpr <on | off>	Enables or disables the requirement of a alpha-numeric password.
		age <days>	Sets the maximum password age after which the login password expires, valid value: 0~180 days, and 0 means no expiration.
		minLen	Sets the minimum password length.

Sys firewall commands

Table 74 lists and describes the system firewall commands. Each of these commands must be preceded by `sys firewall`. For example, type `sys firewall active yes` to turn on the firewall.

Table 74 Sys firewall commands

Command		Description
`acl`		
	`disp`	Displays ACLs or a specific ACL set # and rule #.
`active`	`<yes|no>`	Activates or deactivates firewall Enables or disables the firewall.
`cnt`		
	`disp`	Displays the firewall log type and count.
	`clear`	Clears the firewall log count.
`dynamicrule`	`display`	Displays the firewall's dynamic rules.
`tcprst`		
	`rst`	Turns TCP reset sending on or off.
	`rst113`	Turns TCP reset sending for port 113 on or off.
	`display`	Displays the TCP reset sending settings.
`dos`		
	`smtp`	Enables or disables the SMTP DoS defender.
	`display`	Displays the SMTP DoS defender setting.
	`ignore`	Sets if the firewall ignores DoS attacks on the LAN or WAN.
`ignore`		
	`dos`	Sets if the firewall ignores DoS attacks on the LAN or WAN.
	`logBroadcast`	Displays the status of the broadcast log.
	`triangle`	Sets if the firewall ignores triangle route packets on the LAN or WAN.

Bandwidth management commands

Table 75 lists and describes the bandwidth management commands. Each of these commands must be preceded by `bm`. For example, type `bm show lan` to display the LAN port's bandwidth management settings.

Table 75 Bandwidth management commands

Command					Description
`interface`	`lan`	`enable`	`<bandwidth xxx>`		Enables bandwidth management (BWM) for traffic going out the LAN interface. You can also specify the b/s of bandwidth.
			`<wrr|prr>`		Sets the queueing mechanism to fairness-based (WRR) or priority-based (PRR).
			`<efficient>`		Turns on the work-conserving feature.
		`disable`			Disables bandwidth management for traffic going out the LAN interface.
	`wan`	`enable`	`<bandwidth xxx>`		Enables bandwidth management for traffic going out the WAN interface. You can also specify the b/s of bandwidth.
			`<wrr|prr>`		Sets the queueing mechanism to fairness-based (WRR) or priority-based (PRR).
			`<efficient>`		Turns on the work-conserving feature.
		`disable`			Disables bandwidth management for traffic going out the WAN interface.
`class`	`lan`	`add #`	`bandwidth xxx`	`<name xxx>`	Adds a class with bandwidth xxx b/s in LAN. The name is for your information.
				`<priority x>`	Sets the class priority. The range is between 0 (the lowest) to 7 (the highest).

Table 75 Bandwidth management commands

Command					Description
				<borrow on|off>	The class can borrow bandwidth from its parent class when borrowing is turned on, and vice versa.
		del #			Deletes the class # and its filter and all its children classes and their filters in LAN.
		mod #	<bandwidth xxx>		Modifies the parameters of the class in the LAN. A bandwidth value is optional.
			<name xxx>		Sets the class name.
			<priority x>		Sets the class priority. The range is between 0 (the lowest) to 7 (the highest). The priority is unchanged if you do not set a new value.
			<borrow on|off>		The class can borrow bandwidth from its parent class when borrowing is turned on, and vice versa.
	wan	add #	bandwidth xxx	<name xxx>	Adds a class with bandwidth xxx b/s in WAN. The name is for your information.
				<priority x>	Sets the class priority. The range is between 0 (the lowest) to 7 (the highest).
				<borrow on|off>	The class can borrow bandwidth from its parent class when borrowing is turned on, and vice versa.
		del #			Deletes the class # and its filter and all its children class and their filters in WAN.
		mod #	<bandwidth xxx>		Modifies the parameters of the class in the WAN. A bandwidth value is optional.
			<name xxx>		Sets the class name.
			<priority x>		Sets the class priority. The range is between 0 (the lowest) to 7 (the highest).

Table 75 Bandwidth management commands

Command					Description
			<borrow on|off>		The class can borrow bandwidth from its parent class when borrowing is turned on, and vice versa.
filter	lan	add #	Daddr <mask Dmask> Dport Saddr <mask Smask> Sport protocol		Adds a filter for class # in LAN. The filter contains destination address (netmask), destination port, source address (netmask), source port and protocol. Use 0 for items that you do not want the filter to include.
		del #			Deletes the LAN filter that belongs to the specified LAN class.
	wan	add #	Daddr <mask Dmask> Dport Saddr <mask Smask> Sport protocol		Adds a filter for class # in WAN. The filter contains destination address (netmask), destination port, source address (netmask), source port and protocol. Use 0 for items that you do not want the filter to include.
		del #			Deletes the LAN filter that belongs to the specified WAN class.
show	interface	lan			Displays the LAN interface settings.
		wan			Displays the WAN interface settings.
	class	lan			Displays the LAN classes.
		wan			Displays the WAN classes.
	filter	lan			Displays the LAN filter settings.
		wan			Displays the WAN filter settings.
	statistics	lan			Displays the statistics of the LAN classes.
		wan			Displays the statistics of the LAN classes.

Table 75 Bandwidth management commands

Command					Description
monitor	lan	<#>			Displays the bandwidth usage of the specified LAN class (or all of the LAN classes if you do not specify one). The first time you use the command turns it on; the second time turns it off, and so on.
	wan	<#>			Displays the bandwidth usage of the specified WAN class (or all of the WAN classes if you do not specify one). The first time you use the command turns it on; the second time turns it off, and so on.
moveFilter	< channName>	<from>	<to>		Changes the filter order. <channName>: LAN, WAN <from>: filter index number <to>: filter index number
config	save				Saves the BWM configuration.
	load				Loads the BWM configuration.
	clear				Clears the BWM configuration.

Certificates commands

Table 76 describes the certificate commands. Each of these commands must be preceded by `certificates` (or `cert` for short). For example, type `cert my_cert list` to display all of your certificate names and basic information.

All of these commands start with `certificates`.

Table 76 Certificates commands

Command		Description
my_cert		
	create	

Table 76 Certificates commands

Command			Description
	`create`	`selfsigned <name> <subject> [key size]`	Creates a self-signed local host certificate. <name> specifies a descriptive name for the generated certificate. <subject> specifies a subject name (required) and alternative name (required). The format is “subject-name-dn;{ip,dns,email}=value". If the name contains spaces, put it in quotes. [key size] specifies the key size. It has to be an integer from 512 to 2 048. The default is 1 024 bits.
	`create`	`request <name> <subject> [key size]`	Creates a certificate request and saves it to the router for later manual enrollment. <name> specifies a descriptive name for the generated certification request. <subject> specifies a subject name (required) and alternative name (required). The format is "subject-name-dn;{ip,dns,email}=value". If the name contains spaces, put it in quotes. [key size] specifies the key size. It has to be an integer from 512 to 2 048. The default is 1 024 bits.
	`create`	`scep_enroll <name> <CA addr> <CA cert> <auth key> <subject> [key size]`	Creates a certificate request and enrolls for a certificate immediately online using SCEP protocol. <name> specifies a descriptive name for the enrolled certificate. <CA addr> specifies the CA server address. <CA cert> specifies the name of the CA certificate. <auth key> specifies the key used for user authentication. If the key contains spaces, put it in quotes. To leave it blank, type "". <subject> specifies a subject name (required) and alternative name (required). The format is "subject-name-dn;{ip,dns,email}=value". If the name contains spaces, put it in quotes. [key size] specifies the key size. It has to be an integer from 512 to 2 048. The default is 1 024 bits.

Table 76 Certificates commands

Command			Description
	`create`	`cmp_enroll <name> <CA addr> <CA cert> <auth key> <subject> [key size]`	Creates a certificate request and enrolls for a certificate immediately online using CMP protocol. <name> specifies a descriptive name for the enrolled certificate. <CA addr> specifies the CA server address. <CA cert> specifies the name of the CA certificate. <auth key> specifies the id and key used for user authentication. The format is "id:key". To leave the id and key blank, type ":". <subject> specifies a subject name (required) and alternative name (required). The format is "subject-name-dn;{ip,dns,email}=value". If the name contains spaces, put it in quotes. [key size] specifies the key size. It has to be an integer from 512 to 2 048. The default is 1 024 bits.
	`import`	`[name]`	Imports the PEM-encoded certificate from stdin. [name] specifies the descriptive name (optional) the imported certificate is saved as. For my certificate importation to be successful, a certification request corresponding to the imported certificate must already exist on Business Secure Router. After the importation, the certification request is automatically deleted. If a descriptive name is not specified for the imported certificate, the certificate adopts the descriptive name of the certification request.
	`export`	`<name>`	Exports the PEM-encoded certificate to stdout for theuser to copy and paste. <name> specifies the name of the certificate to be exported.
	`view`	`<name>`	Views the information of the specified local host certificate. <name> specifies the name of the certificate to be viewed.
	`verify`	`<name> [timeout]`	Verifies the certification path of the specified local host certificate. <name> specifies the name of the certificate to be verified. [timeout] specifies the timeout value in seconds (optional). The default timeout value is 20 seconds.
	`delete`	`<name>`	Deletes the specified local host certificate. <name> specifies the name of the certificate to be deleted.
	`list`		Lists all my certificate names and basic information.

Table 76 Certificates commands

Command			Description
	rename	<old name> <new name>	Renames the specified certificate. <old name> specifies the name of the certificate to be renamed. <new name> specifies the new name the certificate is saved as.
	def_self_signed	[name]	Sets the specified self-signed certificate as the default self-signed certificate. [name] specifies the name of the certificate to be set as the default self-signed certificate. If [name] is not specified, the name of the current self-signed certificate is displayed.
	replace_factory		Creates a certificate using your device MAC address that is specific to this device. The factory default certificate is a common default certificate for all Business Secure Router models.
ca_trusted			
	import	<name>	Imports the PEM-encoded certificate from stdin. <name> specifies the name the imported CA certificate is saved as.
	export	<name>	Exports the PEM-encoded certificate to stdout for the user to copy and paste. <name> specifies the name of the certificate to be exported.
	view	<name>	Views the information of the specified trusted CA certificate. <name> specifies the name of the certificate to be viewed.
	verify	<name> [timeout]	Verifies the certification path of the specified trusted CA certificate. <name> specifies the name of the certificate to be verified. [timeout] specifies the timeout value in seconds (optional). The default timeout value is 20 seconds.
	delete	<name>	Deletes the specified trusted CA certificate. <name> specifies the name of the certificate to be deleted.
	list		Lists all trusted CA certificate names and basic information.
	rename	<old name> <new name>	Renames the specified trusted CA certificate. <old name> specifies the name of the certificate to be renamed. <new name> specifies the new name the certificate is saved as.

Table 76 Certificates commands

Command			Description
	`crl_issuer`	`<name> [on|off]`	Specifies whether or not the specified CA issues CRL. <name> specifies the name of the CA certificate. [on|off] specifies whether or not the CA issues CRL. If [on|off] is not specified, the current crl_issuer status of the CA is used.
`remote_trusted`			
	`import`	`<name>`	Imports the PEM-encoded certificate from stdin. <name> specifies the name the imported remote host certificate is saved as.
	`export`	`<name>`	Exports the PEM-encoded certificate to stdout for the user to copy and paste. <name> specifies the name of the certificate to be exported.
	`view`	`<name>`	Views the information of the specified trusted remote host certificate. <name> specifies the name of the certificate to be viewed.
	`verify`	`<name> [timeout]`	Verifies the certification path of the specified trusted remote host certificate. <name> specifies the name of the certificate to be verified. [timeout] specifies the timeout value in seconds (optional). The default timeout value is 20 seconds.
	`delete`	`<name>`	Deletes the specified trusted remote host certificate. <name> specifies the name of the certificate to be deleted.
	`list`		Lists all trusted remote host certificate names and basic information.
	`rename`	`<old name> <new name>`	Renames the specified trusted remote host certificate. <old name> specifies the name of the certificate to be renamed. <new name> specifies the new name the certificate is saved as.
`dir_server`			

Table 76 Certificates commands

Command			Description
	`add`	`<name> <addr[:port]> [login:pswd]`	Adds a new directory service. <name> specifies a descriptive name for the directory server. <addr[:port]> specifies the server address (required) and port (optional). The format is "server-address[:port]". The default port is 389. [login:pswd] specifies the logon name and password, if required. The format is "[login:password]".
	`delete`	`<name>`	Deletes the specified directory service. <name> specifies the name of the directory server to be deleted.
	`view`	`<name>`	Views the specified directory service. <name> specifies the name of the directory server to be viewed.
	`list`		Lists all directory service names and basic information.
	`rename`	`<old name> <new name>`	Renames the specified directory service. <old name> specifies the name of the directory server to be renamed. <new name> specifies the new name the directory server is saved as.
	`edit`	`<name> <addr[:port]> [login:pswd]`	Edits the specified directory service. <name> specifies the name of the directory server to be edited. <addr[:port]> specifies the server address (required) and port (optional). The format is "server-address[:port]". The default port is 389. [login:pswd] specifies the logon name and password, if required. The format is "[login:password]".

IEEE 802.1X commands

Table 77 lists and describes the IEEE 802.1x commands. Each of these commands must be preceded by `8021x`. For example, type `8021x debug level 1` to set the IEEE 802.1X debug messages to the first level.

Table 77 IEEE 802.1X commands

Command		Description
`debug`		
	`level <level>`	Sets the IEEE 802.1x debug message level
	`trace`	Displays all supplicants information in the supplicant table.
	`user <user>`	Displays all supplicants information related to the username.

RADIUS commands

Table 78 lists and describes the RADIUS commands. Each of these commands must be preceded by `radius`. For example, type `radius auth` to display the authentication server settings.

Table 78 RADIUS commands

Command	Description
`auth`	Displays the current RADIUS authentication server configuration.
`acct`	Displays the current RADIUS accounting server configuration.
`checkRadID`	Checks the RADIUS ID pool.
`debug`	Enables radius debug messages.

Appendix I
NetBIOS filter commands

The following describes the NetBIOS packet filter commands.

Introduction

NetBIOS (Network Basic Input/Output System) are TCP or UDP packets that enable a computer to connect to and communicate with a LAN.

For some dial-up services, such as PPPoE or PPTP, NetBIOS packets cause unwanted calls.

You can configure NetBIOS filters to do the following:

- Allow or disallow the sending of NetBIOS packets from the LAN to the WAN and from the WAN to the LAN.
- Allow or disallow the sending of NetBIOS packets through VPN connections.
- Allow or disallow NetBIOS packets to initiate calls.

Display NetBIOS filter settings

Figure 163 NetBIOS Display Filter Settings Command Example

```
============== NetBIOS Filter Status ===============
        Between LAN and WAN: Block
        IPSec Packets: Forward
        Trigger Dial: Disabled
```

Syntax:

```
sys filter netbios disp
```

This command gives a read-only list of the current NetBIOS filter modes.

The filter types and their default settings are as follows:

Table 79 NetBIOS filter default settings

Name	Description	Example
`Between LAN and WAN`	This field displays whether NetBIOS packets are blocked or forwarded from the LAN to the WAN or from the WAN to the LAN.	Forward
`IPSec Packets`	This field displays whether NetBIOS packets sent through a VPN connection are blocked or forwarded.	Forward
`Trigger dial`	This field displays whether NetBIOS packets are allowed to initiate calls. Disabled means that NetBIOS packets are blocked from initiating calls.	Disabled

NetBIOS filter configuration

Syntax:

```
sys filter netbios config <type> <on|off>
```

where

<type> identifies which NetBIOS filter (numbered 0-3) to configure.

- 0 = LAN to WAN and WAN to LAN
- 3 = IPSec packet pass through
- 4 = Trigger Dial

<on|off> is a switch to enable or disable the filter.

- For type 0, use on to enable the filter and block NetBIOS packets. Use off to disable the filter and forward NetBIOS packets.
- For type 3, use on to block NetBIOS packets from being sent through a VPN connection. Use off to allow NetBIOS packets to be sent through a VPN connection.
- For type 4, use on to allow NetBIOS packets to initiate dial backup calls. Use off to block NetBIOS packets from initiating dial backup calls.

Example commands

Command:

```
sys filter netbios config 0 on
```

This command blocks LAN to WAN and WAN to LAN NetBIOS packets

Command:

```
sys filter netbios config 1 off
```

This command forwards WAN to LAN and WAN to LAN NetBIOS packets

Command:

```
sys filter netbios config 3 on
```

This command blocks IPSec NetBIOS packets

Command:

```
sys filter netbios config 4 off
```

This command stops NetBIOS commands from initiating calls.

Appendix J
Boot Commands

The BootModule AT commands execute from within the router's bootup software, when debug mode is selected before the main router firmware is started. After you start up your Business Secure Router, you are given a choice to go into debug mode by pressing a key at the prompt shown in screen shown in Figure 164. In debug mode you have access to a series of boot module commands, for example ATUR (for uploading firmware) and ATLC (for uploading the configuration file). These are already discussed in Chapter 15, "Firmware and configuration file maintenance" on page 179.

Figure 164 Option to Enter Debug Mode

```
Bootbase Version: V1.02 | 08/08/2001 15:40:50
RAM: Size = 16384 Kbytes
DRAM Post: Testing:  16384K OK
FLASH: Intel 16M

RAS Version: V3.50(WB.0)b3 | 08/08/2001 16:21:27

Press any key to enter debug mode within 3 seconds.
.............................................
```

Enter ATHE to view all available Business Secure Router boot module commands, as shown in Figure 165. With ATBAx, you can change the console port speed. The x denotes the number preceding the colon to give the console port speed following the colon in the list of numbers that follows; for example ATBA3 will give a console port speed of 9.6 Kb/s. ATSE displays the seed that is used to generate a password to turn on the debug flag in the firmware. The ATSH

command shows product related information such as boot module version, vendor name, product model, RAS code revision, and more. With ATGO, you can continue booting the system. Most other commands aid in advanced troubleshooting and must only be used by qualified engineers.

Figure 165 Boot Module Commands

```
AT              just answer OK
ATHE            print help
ATBAx           change baudrate. 1:38.4k, 2:19.2k, 3:9.6k 4:57.6k 5:115.2k
ATENx,(y)       set BootExtension Debug Flag (y=password)
ATSE            show the seed of password generator
ATTI(h,m,s)     change system time to hour:min:sec or show current time
ATDA(y,m,d)     change system date to year/month/day or show current date
ATDS            dump RAS stack
ATDT            dump Boot Module Common Area
ATDUx,y         dump memory contents from address x for length y
ATRBx           display the  8-bit value of address x
ATRWx           display the 16-bit value of address x
ATRLx           display the 32-bit value of address x
ATGO(x)         run program at addr x or boot router
ATGR            boot router
ATGT            run Hardware Test Program
ATRTw,x,y(,z)   RAM test level w, from address x to y (z iterations)
ATSH            dump manufacturer related data in ROM
ATDOx,y         download from address x for length y to PC via XMODEM
ATTD            download router configuration to PC via XMODEM
ATUR            upload router firmware to flash ROM
ATLC            upload router configuration file to flash ROM
ATXSx           xmodem select: x=0: CRC mode(default); x=1: checksum mode
ATSR            system reboot
```

Appendix K
Log descriptions

This appendix provides descriptions of log messages.

Table 80 System error logs

Log Message	Description
`%s exceeds the max. number of session per host!`	This attempt to create a SUA/NAT session exceeds the maximum number of SUA/NAT session table entries allowed to be created per host.

Table 81 System maintenance logs

Log Message	Description
`Time calibration is successful`	The router has adjusted its time based on information from the time server.
`Time calibration failed`	The router failed to get information from the time server.
`DHCP client gets %s`	A DHCP client got a new IP address from the DHCP server.
`DHCP client IP expired`	A DHCP client's IP address has expired.
`DHCP server assigns %s`	The DHCP server assigned an IP address to a client.
`SMT Login Successfully`	Someone has logged on to the router's SMT interface.
`SMT Login Fail`	Someone has failed to log on to the router's SMT interface.
`WEB Login Successfully`	Someone has logged on to the router's WebGUI interface.
`WEB Login Fail`	Someone has failed to log on to the router's WebGUI interface.
`TELNET Login Successfully`	Someone has logged on to the router via Telnet.

Table 81 System maintenance logs

Log Message	Description
TELNET Login Fail	Someone has failed to log on to the router via Telnet.
FTP Login Successfully	Someone has logged on to the router via FTP.
FTP Login Fail	Someone has failed to log on to the router via FTP.
NAT Session Table is Full!	The maximum number of SUA/NAT session table entries has been exceeded and the table is full.

Table 82 UPnP logs

Log Message	Description
UPnP pass through Firewall	UPnP packets can pass through the firewall.

Table 83 Content filtering logs

Category	Log Message	Description
URLFOR	IP/Domain Name	The Business Secure Router allows access to this IP address or domain name and forwards traffic to the IP address or domain name.
URLBLK	IP/Domain Name	The Business Secure Router blocked access to this IP address or domain name due to a forbidden keyword. All web traffic is disabled except for trusted domains, untrusted domains, or the cybernot list.
JAVBLK	IP/Domain Name	The Business Secure Router blocked access to this IP address or domain name because of a forbidden service, such as: ActiveX, a Java applet, a cookie, or a proxy.

Table 84 Attack logs

Log Message	Description
attack TCP	The firewall detected a TCP attack.
attack UDP	The firewall detected an UDP attack.
attack IGMP	The firewall detected an IGMP attack.
attack ESP	The firewall detected an ESP attack.
attack GRE	The firewall detected a GRE attack.
attack OSPF	The firewall detected an OSPF attack.
attack ICMP (type:%d, code:%d)	The firewall detected an ICMP attack; see the section on ICMP messages for type and code details.
land TCP	The firewall detected a TCP land attack.
land UDP	The firewall detected an UDP land attack.
land IGMP	The firewall detected an IGMP land attack.
land ESP	The firewall detected an ESP land attack.
land GRE	The firewall detected a GRE land attack.
land OSPF	The firewall detected an OSPF land attack.
land ICMP (type:%d, code:%d)	The firewall detected an ICMP land attack; see the section on ICMP messages for type and code details.
ip spoofing - WAN TCP	The firewall detected a TCP IP spoofing attack on the WAN port.
ip spoofing - WAN UDP	The firewall detected an UDP IP spoofing attack on the WAN port.
ip spoofing - WAN IGMP	The firewall detected an IGMP IP spoofing attack on the WAN port.
ip spoofing - WAN ESP	The firewall detected an ESP IP spoofing attack on the WAN port.
ip spoofing - WAN GRE	The firewall detected a GRE IP spoofing attack on the WAN port.
ip spoofing - WAN OSPF	The firewall detected an OSPF IP spoofing attack on the WAN port.
ip spoofing - WAN ICMP (type:%d, code:%d)	The firewall detected an ICMP IP spoofing attack on the WAN port.
icmp echo ICMP (type:%d, code:%d)	The firewall detected an ICMP echo attack.
syn flood TCP	The firewall detected a TCP syn flood attack.
ports scan TCP	The firewall detected a TCP port scan attack.

Table 84 Attack logs

Log Message	Description
`teardrop TCP`	The firewall detected a TCP teardrop attack.
`teardrop UDP`	The firewall detected an UDP teardrop attack.
`teardrop ICMP (type:%d, code:%d)`	The firewall detected an ICMP teardrop attack.
`illegal command TCP`	The firewall detected a TCP illegal command attack.
`NetBIOS TCP`	The firewall detected a TCP NetBIOS attack.
`ip spoofing - no routing entry TCP`	The firewall detected a TCP IP spoofing attack while the Business Secure Router did not have a default route.
`ip spoofing - no routing entry UDP`	The firewall detected an UDP IP spoofing attack while the Business Secure Router did not have a default route.
`ip spoofing - no routing entry IGMP`	The firewall detected an IGMP IP spoofing attack while the Business Secure Router did not have a default route.
`ip spoofing - no routing entry ESP`	The firewall detected an ESP IP spoofing attack while the Business Secure Router did not have a default route.
`ip spoofing - no routing entry GRE`	The firewall detected a GRE IP spoofing attack while the Business Secure Router did not have a default route.
`ip spoofing - no routing entry OSPF`	The firewall detected an OSPF IP spoofing attack while the Business Secure Router did not have a default route.
`ip spoofing - no routing entry ICMP (type:%d, code:%d)`	The firewall detected an ICMP IP spoofing attack while the Business Secure Router did not have a default route.
`vulnerability ICMP (type:%d, code:%d)`	The firewall detected an ICMP vulnerability attack.
`traceroute ICMP (type:%d, code:%d)`	The firewall detected an ICMP traceroute attack.

See Table 87 for type and code details.

Table 85 Access logs

Log Message	Description
`Firewall default policy: TCP (set:%d)`	TCP access matched the default policy of the listed ACL set and the Business Secure Router blocked or forwarded it according to the ACL set's configuration.
`Firewall default policy: UDP (set:%d)`	UDP access matched the default policy of the listed ACL set and the Business Secure Router blocked or forwarded it according to the ACL set's configuration.
`Firewall default policy: ICMP (set:%d, type:%d, code:%d)`	ICMP access matched the default policy of the listed ACL set and the Business Secure Router blocked or forwarded it according to the ACL set's configuration.
`Firewall default policy: IGMP (set:%d)`	IGMP access matched the default policy of the listed ACL set and the Business Secure Router blocked or forwarded it according to the ACL set's configuration.
`Firewall default policy: ESP (set:%d)`	ESP access matched the default policy of the listed ACL set and the Business Secure Router blocked or forwarded it according to the ACL set's configuration.
`Firewall default policy: GRE (set:%d)`	GRE access matched the default policy of the listed ACL set and the Business Secure Router blocked or forwarded it according to the ACL set's configuration.
`Firewall default policy: OSPF (set:%d)`	OSPF access matched the default policy of the listed ACL set and the Business Secure Router blocked or forwarded it according to the ACL set's configuration.
`Firewall default policy: (set:%d)`	Access matched the default policy of the listed ACL set and the Business Secure Router blocked or forwarded it according to the ACL set's configuration.
`Firewall rule match: TCP (set:%d, rule:%d)`	TCP access matched the listed firewall rule and the Business Secure Router blocked or forwarded it according to the rule's configuration.
`Firewall rule match: UDP (set:%d, rule:%d)`	UDP access matched the listed firewall rule and the Business Secure Router blocked or forwarded it according to the rule's configuration.
`Firewall rule match: ICMP (set:%d, rule:%d, type:%d, code:%d)`	ICMP access matched the listed firewall rule and the Business Secure Router blocked or forwarded it according to the rule's configuration.
`Firewall rule match: IGMP (set:%d, rule:%d)`	IGMP access matched the listed firewall rule and the Business Secure Router blocked or forwarded it according to the rule's configuration.
`Firewall rule match: ESP (set:%d, rule:%d)`	ESP access matched the listed firewall rule and the Business Secure Router blocked or forwarded it according to the rule's configuration.

Table 85 Access logs

Log Message	Description
`Firewall rule match: GRE (set:%d, rule:%d)`	GRE access matched the listed firewall rule and the Business Secure Router blocked or forwarded it according to the rule's configuration.
`Firewall rule match: OSPF (set:%d, rule:%d)`	OSPF access matched the listed a firewall rule and the Business Secure Router blocked or forwarded it according to the rule's configuration.
`Firewall rule match: (set:%d, rule:%d)`	Access matched the listed firewall rule and the Business Secure Router blocked or forwarded it according to the rule's configuration.
`Firewall rule NOT match: TCP (set:%d, rule:%d)`	TCP access did not match the listed firewall rule and the Business Secure Router logged it.
`Firewall rule NOT match: UDP (set:%d, rule:%d)`	UDP access did not match the listed firewall rule and the Business Secure Router logged it.
`Firewall rule NOT match: ICMP (set:%d, rule:%d, type:%d, code:%d)`	ICMP access did not match the listed firewall rule and the Business Secure Router logged it.
`Firewall rule NOT match: IGMP (set:%d, rule:%d)`	IGMP access did not match the listed firewall rule and the Business Secure Router logged it.
`Firewall rule NOT match: ESP (set:%d, rule:%d)`	ESP access did not match the listed firewall rule and the Business Secure Router logged it.
`Firewall rule NOT match: GRE (set:%d, rule:%d)`	GRE ac access did not match the listed firewall rule and the Business Secure Router logged it.
`Firewall rule NOT match: OSPF (set:%d, rule:%d)`	OSPF access did not match the listed firewall rule and the Business Secure Router logged it.
`Firewall rule NOT match: (set:%d, rule:%d)`	Access did not match the listed firewall rule and the Business Secure Router logged it.
`Filter default policy DROP!`	IP address or protocol matched a default filter policy and the Business Secure Router dropped the packet to block access.
`Filter default policy FORWARD!`	IP address or protocol matched a default filter policy. Access was allowed and the router forwarded the packet.
`Filter match DROP <set %d/rule %d>`	IP address or protocol matched the listed filter rule and the Business Secure Router dropped the packet to block access.
`Filter match FORWARD <set %d/rule %d>`	IP address or protocol matched the listed filter rule. Access was allowed and the router forwarded the packet.

Table 85 Access logs

Log Message	Description
`(set:%d)`	With firewall messages, this is the number of the ACL policy set and denotes the packet's direction (see Table 86). With filter messages, this is the number of the filter set.
`(rule:%d)`	With firewall messages, the firewall rule number denotes the number of a firewall rule within an ACL policy set.With filter messages, this is the number of an individual filter rule.
`Router sent blocked web site message`	
`Triangle route packet forwarded`	The firewall allowed a triangle route session to pass through.
`Firewall sent TCP packet in response to DoS attack`	The firewall detected a DoS attack and sent a TCP packet in response.
`Firewall sent TCP reset packets`	The firewall sent out TCP reset packets.
`Packet without a NAT table entry blocked`	The router blocked a packet that did not have a corresponding SUA/NAT table entry.
`Out of order TCP handshake packet blocked`	The router blocked a TCP handshake packet that came out of the proper order.
`Drop unsupported/ out-of-order ICMP`	The Business Secure Router generates this log after it drops an ICMP packet due to one of the following two reasons: 1. The Business Secure Router does not support the ICMP packet's protocol. 2. The ICMP packet is an echo reply for which there was no corresponding echo request.
`Router sent ICMP response packet (type:%d, code:%d)`	The router sent an ICMP response packet. This packet automatically bypasses the firewall.

See Table 87 for type and code details.

Table 86 ACL setting notes

ACL Set Number	Direction	Description
1	LAN to WAN	ACL set 1 for packets traveling from the LAN to the WAN.
2	WAN to LAN	ACL set 2 for packets traveling from the WAN to the LAN.
7	LAN to LAN/Business Secure Router	ACL set 7 for packets traveling from the LAN to the LAN or the Business Secure Router.
8	WAN to WAN/Business Secure Router	ACL set 8 for packets traveling from the WAN to the WAN or the Business Secure Router.

Table 87 ICMP notes

Type	Code	Description
0		Echo Reply
	0	Echo reply message
3		Destination Unreachable
	0	Net unreachable
	1	Host unreachable
	2	Protocol unreachable
	3	Port unreachable
	4	A packet that needed fragmentation was dropped because it was set to Don't Fragment (DF)
	5	Source route failed
4		Source Quench
	0	A gateway can discard internet datagrams if it does not have the buffer space needed to queue the datagrams for output to the next network on the route to the destination network.
5		Redirect
	0	Redirect datagrams for the Network
	1	Redirect datagrams for the Host
	2	Redirect datagrams for the Type of Service and Network
	3	Redirect datagrams for the Type of Service and Host
8		Echo

Table 87 ICMP notes

Type	Code	Description
	0	Echo message
11		Time Exceeded
	0	Time to live exceeded in transit
	1	Fragment reassembly time exceeded
12		Parameter Problem
	0	Pointer indicates the error
13		Timestamp
	0	Timestamp request message
14		Timestamp Reply
	0	Timestamp reply message
15		Information Request
	0	Information request message
16		Information Reply
	0	Information reply message

Table 88 Sys log

LOG MESSAGE	DESCRIPTION
Mon dd hr:mm:ss hostname src="<srcIP:srcPort>" dst="<dstIP:dstPort>" msg="<msg>" note="<note>	This message is sent by the "RAS" when this syslog is generated. The messages and notes are defined in this appendix's other charts.

VPN/IPSec logs

To view the IPSec and IKE connection log, type 3 in menu 27 and press [ENTER] to display the IPSec log as shown next. Figure 166 shows a typical log from the initiator of a VPN connection.

Figure 166 Example VPN initiator IPSec log

```
Index:    Date/Time:              Log:
-----------------------------------------------------------
 001    01 Jan 08:02:22    Send Main Mode request to <192.168.100.101>
 002    01 Jan 08:02:22    Send:<SA>
 003    01 Jan 08:02:22    Recv:<SA>
 004    01 Jan 08:02:24    Send:<KE><NONCE>
 005    01 Jan 08:02:24    Recv:<KE><NONCE>
 006    01 Jan 08:02:26    Send:<ID><HASH>
 007    01 Jan 08:02:26    Recv:<ID><HASH>
 008    01 Jan 08:02:26    Phase 1 IKE SA process done
 009    01 Jan 08:02:26    Start Phase 2: Quick Mode
 010    01 Jan 08:02:26    Send:<HASH><SA><NONCE><ID><ID>
 011    01 Jan 08:02:26    Recv:<HASH><SA><NONCE><ID><ID>
 012    01 Jan 08:02:26    Send:<HASH>
 Clear IPSec Log (y/n):
```

VPN responder IPSec log

Figure 167 shows a typical log from the VPN connection peer.

Figure 167 Example VPN responder IPSec log

```
Index:    Date/Time:              Log:
------------------------------------------------------------
 001    01 Jan 08:08:07    Recv Main Mode request from <192.168.100.100>
 002    01 Jan 08:08:07    Recv:<SA>
 003    01 Jan 08:08:08    Send:<SA>
 004    01 Jan 08:08:08    Recv:<KE><NONCE>
 005    01 Jan 08:08:10    Send:<KE><NONCE>
 006    01 Jan 08:08:10    Recv:<ID><HASH>
 007    01 Jan 08:08:10    Send:<ID><HASH>
 008    01 Jan 08:08:10    Phase 1 IKE SA process done
 009    01 Jan 08:08:10    Recv:<HASH><SA><NONCE><ID><ID>
 010    01 Jan 08:08:10    Start Phase 2: Quick Mode
 011    01 Jan 08:08:10    Send:<HASH><SA><NONCE><ID><ID>
 012    01 Jan 08:08:10    Recv:<HASH>
 Clear IPSec Log (y/n):
```

This menu is useful for troubleshooting. A log index number, the date and time the log was created, and a log message are displayed.

Note: Double exclamation marks (!!) denote an error or warning message.

Table 89 shows sample log messages during IKE key exchange.

Note: A PYLD_MALFORMED packet usually means that the two ends of the VPN tunnel are not using the same pre-shared key.

Table 89 Sample IKE key exchange logs

Log Message	Description
`Send <Symbol> Mode request to <IP>Send <Symbol> Mode request to <IP>`	The Business Secure Router has started negotiation with the peer.
`Recv <Symbol> Mode request from <IP>Recv <Symbol> Mode request from <IP>`	The Business Secure Router has received an IKE negotiation request from the peer.
`Recv:<Symbol>`	IKE uses the ISAKMP protocol (refer to RFC2408 – ISAKMP) to transmit data. Each ISAKMP packet contains payloads of different types that show in the log (see Table 91).
`Phase 1 IKE SA process done`	Phase 1 negotiation is finished.
`Start Phase 2: Quick Mode`	Phase 2 negotiation is beginning using Quick Mode.
`!! IKE Negotiation is in process`	The Business Secure Router has begun negotiation with the peer for the connection already, but the IKE key exchange is not finished yet.
`!! Duplicate requests with the same cookie`	The Business Secure Router has received multiple requests from the same peer but it is still processing the first IKE packet from that peer.
`!! No proposal chosen`	The parameters configured for Phase 1 or Phase 2 negotiations do not match. Check all protocols and settings for these phases. For example, one party is using 3DES encryption, but the other party is using DES encryption, so the connection fails.
`!! Verifying Local ID failed!! Verifying Remote ID failed`	During IKE Phase 2 negotiation, both parties exchange policy details, including local and remote IP address ranges. If these ranges differ, the connection fails.
`!! Local / remote IPs of incoming request conflict with rule <#d>`	If the security gateway is 0.0.0.0, the Business Secure Router uses the peer Local Addr as its Remote Addr. If this IP (range) conflicts with a previously configured rule then the connection is not allowed.
`!! Invalid IP <IP start>/<IP end>`	The Local IP Addr range for the peer is invalid.
`!! Remote IP <IP start> / <IP end> conflicts`	If the security gateway is 0.0.0.0, the Business Secure Router uses Local Addr for the peer as its Remote Addr. If a peer Local Addr range conflicts with other connections, the Business Secure Router does not accept VPN connection requests from this peer.

Table 89 Sample IKE key exchange logs

Log Message	Description
`!! Active connection allowed exceeded`	The Business Secure Router limits the number of simultaneous Phase 2 SA negotiations. The IKE key exchange process fails if this limit is exceeded.
`!! IKE Packet Retransmit`	The Business Secure Router did not receive a response from the peer and so retransmits the last packet sent.
`!! Failed to send IKE Packet`	The Business Secure Router cannot send IKE packets due to a network error.
`!! Too many errors! Deleting SA`	The Business Secure Router deletes an SA when too many errors occur.
`!! Phase 1 ID type mismatch`	The ID type of an incoming packet does not match the local's peer ID type.
`!! Phase 1 ID content mismatch`	The ID content of an incoming packet does not match the local's peer ID content.
`!! No known phase 1 ID type found`	The ID type of an incoming packet does not match any known ID type.
`Peer ID: IP address type <IP address>`	The IP address type or IP address of an incoming packet does not match the peer IP address type or IP address configured on the local router. The log displays the IP address type and IP address of the incoming packet.
`vs. My Remote <IP address>`	The IP address type or IP address of an incoming packet does not match the peer IP address type or IP address configured on the local router. The log displays this router's configured remote IP address type or IP address that the incoming packet did not match.
`vs. My Local <IP address>`	The IP address type or IP address of an incoming packet does not match the peer IP address type or IP address configured on the local router. The log displays the configured local IP address type of the router or IP address that the incoming packet did not match.
`-> <symbol>`	The router sent a payload type of IKE packet.
`Error ID Info`	The parameters configured for Phase 1 ID content do not match or the parameters configured for the Phase 2 ID (IP address of single, range or subnet) do not match. Check all protocols and settings for these phases.

Table 90 shows sample log messages during packet transmission.

Table 90 Sample IPSec logs during packet transmission

LOG MESSAGE	DESCRIPTION
`!! WAN IP changed to <IP>`	If the Business Secure Router's WAN IP changes, all configured "My IP Addr" are changed to "0.0.0.0". If this field is configured as 0.0.0.0, the Business Secure Router uses the current Business Secure Router WAN IP address (static or dynamic) to set up the VPN tunnel.
`!! Cannot find IPSec SA`	The Business Secure Router cannot find a phase 2 SA that corresponds with the SPI of an inbound packet (from the peer); the packet is dropped.
`!! Cannot find outbound SA for rule <%d>`	The packet matches the rule index number (#d), but Phase 1 or Phase 2 negotiation for outbound (from the VPN initiator) traffic is not finished yet.
`!! Discard REPLAY packet`	If the Business Secure Router receives a packet with the wrong sequence number it discards it.
`!! Inbound packet authentication failed`	The authentication configuration settings are incorrect. Check them.
`!! Inbound packet decryption failed`	The decryption configuration settings are incorrect. Check them.
`Rule <#d> idle time out, disconnect`	If an SA has no packets transmitted for a period of time (configurable via CI command), the Business Secure Router drops the connection.

Table 91 shows RFC-2408 ISAKMP payload types that the log displays. Refer to the RFC for detailed information on each type.

Table 91 RFC-2408 ISAKMP payload types

Log Display	Payload Type
SA	Security Association
PROP	Proposal
TRANS	Transform
KE	Key Exchange
ID	Identification
CER	Certificate

Table 91 RFC-2408 ISAKMP payload types

CER_REQ	Certificate Request
HASH	Hash
SIG	Signature
NONCE	Nonce
NOTFY	Notification
DEL	Delete
VID	Vendor ID

Table 92 PKI logs

Log Message	Description
`Enrollment successful`	The SCEP online certificate enrollment was successful. The Destination field records the certification authority server IP address and port.
`Enrollment failed`	The SCEP online certificate enrollment failed. The Destination field records the certification authority server's IP address and port.
`Failed to resolve <SCEP CA server url>`	The SCEP online certificate enrollment failed because the certification authority server's address cannot be resolved.
`Enrollment successful`	The CMP online certificate enrollment was successful. The Destination field records the certification authority server's IP address and port.
`Enrollment failed`	The CMP online certificate enrollment failed. The Destination field records the certification authority server's IP address and port.
`Failed to resolve <CMP CA server url>`	The CMP online certificate enrollment failed because the certification authority server's IP address cannot be resolved.
`Rcvd ca cert: <subject name>`	The router received a certification authority certificate, with subject name as recorded, from the LDAP server whose IP address and port are recorded in the Source field.
`Rcvd user cert: <subject name>`	The router received a user certificate, with subject name as recorded, from the LDAP server whose IP address and port are recorded in the Source field.
`Rcvd CRL <size>: <issuer name>`	The router received a CRL (Certificate Revocation List), with size and issuer name as recorded, from the LDAP server whose IP address and port are recorded in the Source field.
`Rcvd ARL <size>: <issuer name>`	The router received an ARL (Authority Revocation List), with size and issuer name as recorded, from the LDAP server whose address and port are recorded in the Source field.

Table 92 PKI logs

Log Message	Description
`Failed to decode the received ca cert`	The router received a corrupted certification authority certificate from the LDAP server whose address and port are recorded in the Source field.
`Failed to decode the received user cert`	The router received a corrupted user certificate from the LDAP server whose address and port are recorded in the Source field.
`Failed to decode the received CRL`	The router received a corrupted CRL (Certificate Revocation List) from the LDAP server whose address and port are recorded in the Source field.
`Failed to decode the received ARL`	The router received a corrupted ARL (Authority Revocation List) from the LDAP server whose address and port are recorded in the Source field.
`Rcvd data <size> too large! Max size allowed: <max size>`	The router received directory data that was too large (the size is listed) from the LDAP server whose address and port are recorded in the Source field. The maximum size of directory data that the router allows is also recorded.
`Cert trusted: <subject name>`	The router has verified the path of the certificate with the listed subject name.
`Due to <reason codes>, cert not trusted: <subject name>`	Due to the reasons listed, the certificate with the listed subject name has not passed the path verification. The recorded reason codes are only approximate reasons for not trusting the certificate. See Table 93 for the corresponding descriptions of the codes.

Table 93 Certificate path verification failure reason codes

Code	Description
1	Algorithm mismatch between the certificate and the search constraints.
2	Key usage mismatch between the certificate and the search constraints.
3	Certificate was not valid in the time interval.
4	(Not used)
5	Certificate is not valid.
6	Certificate signature was not verified correctly.
7	Certificate was revoked by a CRL.
8	Certificate was not added to the cache.
9	Certificate decoding failed.
10	Certificate was not found (anywhere).

Table 93 Certificate path verification failure reason codes

Code	Description
11	Certificate chain looped (did not find trusted root).
12	Certificate contains critical extension that was not handled.
13	Certificate issuer was not valid (CA specific information missing).
14	(Not used)
15	CRL is too old.
16	CRL is not valid.
17	CRL signature was not verified correctly.
18	CRL was not found (anywhere).
19	CRL was not added to the cache.
20	CRL decoding failed.
21	CRL is not currently valid, but in the future.
22	CRL contains duplicate serial numbers.
23	Time interval is not continuous.
24	Time information not available.
25	Database method failed due to timeout.
26	Database method failed.
27	Path was not verified.
28	Maximum path length reached.

Table 94 IEEE 802.1X logs

Log Message	Description
`Local User Database accepts user.`	A user was authenticated by the local user database.
`Local User Database reports user credential error.`	A user was not authenticated by the local user database because of an incorrect user password.
`Local User Database does not find user`s credential.`	A user was not authenticated by the local user database because the user is not listed in the local user database.
`RADIUS accepts user.`	A user was authenticated by the RADIUS Server.
`RADIUS rejects user. Pls check RADIUS Server.`	A user was not authenticated by the RADIUS Server. Check the RADIUS Server.

Table 94 IEEE 802.1X logs

Log Message	Description
`Local User Database does not support authentication method.`	The local user database only supports the EAP-MD5 method. A user tried to use another authentication method and was not authenticated.
`User logout because of session timeout expired.`	The router logged off a user whose session expired.
`User logout because of user deassociation.`	The router logged off a user who ended the session.
`User logout because of no authentication response from user.`	The router logged off a user from which there was no authentication response.
`User logout because of idle timeout expired.`	The router logged off a user whose idle timeout period expired.
`User logout because of user request.`	A user logged off.
`Local User Database does not support authentication mothed.`	A user tried to use an authentication method that the local user database does not support (it only supports EAP-MD5).
`No response from RADIUS. Pls check RADIUS Server.`	There is no response message from the RADIUS server, check the RADIUS server.
`Use Local User Database to authenticate user.`	The local user database is operating as the authentication server.
`Use RADIUS to authenticate user.`	The RADIUS server is operating as the authentication server.
`No Server to authenticate user.`	There is no authentication server to authenticate a user.
`Local User Database does not find user`s credential.`	A user was not authenticated by the local user database because the user is not listed in the local user database.

Log commands

Go to the command interpreter interface (see Appendix H, “Command Interpreter” on page 271 for information on how to access and use the commands).

Configuring what you want the Business Secure Router to log

Use the sys logs load command to load the log setting buffer that is used to configure which logs the Business Secure Router is to record.

Use sys logs category followed by a log category and a parameter to decide what to record.

Table 95 Log categories and available settings

Log Categories	Available Parameters
access	0, 1, 2, 3
attack	0, 1, 2, 3
error	0, 1, 2, 3
ike	0, 1, 2, 3
ipsec	0, 1, 2, 3
javablocked	0, 1, 2, 3
mten	0, 1
upnp	0, 1
urlblocked	0, 1, 2, 3
urlforward	0, 1
	Use 0 to not record logs for that category, 1 to record only logs for that category, 2 to record only alerts for that category, and 3 to record both logs and alerts for that category.

Use the sys logs save command to store the settings in the Business Secure Router (you must do this in order to record logs).

Displaying logs

Use the sys logs display command to show all of the logs in the Business Secure Router’s log.

Use the sys logs category display command to show the log settings for all of the log categories.

Use the sys logs display [log category] command to show the logs in an individual Business Secure Router log category.

Use the sys logs clear command to erase all of the Business Secure Router's logs.

Log command example

This example shows how to set the Business Secure Router to record the access logs and alerts and then view the results.

```
ras> sys logs load
ras> sys logs category access 3
ras> sys logs save
ras> sys logs display access

#  .time                 source                destination           notes
    message
  0|11/11/2002 15:10:12 |172.22.3.80:137       |172.22.255.255:137    |ACCESS BLOCK
    Firewall default policy: UDP(set:8)
  1|11/11/2002 15:10:12 |172.21.4.17:138       |172.21.255.255:138    |ACCESS BLOCK
    Firewall default policy: UDP(set:8)
  2|11/11/2002 15:10:11 |172.17.2.1            |224.0.1.60            |ACCESS BLOCK
    Firewall default policy: IGMP(set:8)
  3|11/11/2002 15:10:11 |172.22.3.80:137       |172.22.255.255:137    |ACCESS BLOCK
    Firewall default policy: UDP(set:8)
  4|11/11/2002 15:10:10 |192.168.10.1:520      |192.168.10.255:520    |ACCESS BLOCK
    Firewall default policy: UDP(set:8)
  5|11/11/2002 15:10:10 |172.21.4.67:137       |172.21.255.255:137    |ACCESS BLOCK
```

Appendix L
Brute force password guessing protection

Table 96 describes the commands for enabling, disabling and configuring the brute force password guessing protection mechanism for the password.

Table 96 Brute force password guessing protection commands

Command	Description
`sys pwderrtm`	This command displays the brute-force guessing password protection settings.
`sys pwderrtm 0`	This command turns off the password's protection from brute-force guessing. The brute-force password guessing protection is turned off by default.
`sys pwderrtm N`	This command sets the password protection to block all access attempts for N (a number from 1 to 60) minutes after the third time an incorrect password is entered.

Example

sys pwderrtm 5

This command sets the password protection to block all access attempts for five minutes after the third time an incorrect password is entered.

Appendix M
SIP

The Session Initiation Protocol (SIP) is an application-layer control (signaling) protocol that handles the setting up, altering, and tearing down of voice and multimedia sessions over the Internet. SIP is used in VoIP (Voice over IP), the sending of voice signals over the Internet Protocol.

SIP signaling is separate from the media for which it handles sessions. The media that is exchanged during the session can use a different path from that of the signaling. SIP handles telephone calls and can interface with traditional circuit-switched telephone networks.

SIP Identities

A SIP account uses an identity (sometimes referred to as a SIP address). A complete SIP identity is called a SIP URI (Uniform Resource Identifier). The URI of a SIP account identifies the SIP account in a way similar to the way an e-mail address identifies an e-mail account. The format of a SIP identity is SIP-Number@SIP-Service-Domain.

SIP Number

The SIP number is the part of the SIP URI that comes before the @ symbol. A SIP number can use letters like in an e-mail address (johndoe@your-ITSP.com, for example) or numbers like a telephone number (1122334455@VoIP-provider.com, for example).

SIP Service Domain

The SIP service domain of the VoIP service provider is the domain name in a SIP URI. For example, if the SIP address is 1122334455@VoIP-provider.com, then VoIP-provider.com is the SIP service domain.

SIP Call Progression

Table 97 displays the basic steps in the setup and tear down of a SIP call. A calls B.

Table 97 SIP Call Progression

A		B
1. INVITE		
		2. Ringing
		3. OK
4. ACK		
	5.Dialogue (voice traffic)	
6. BYE		
		7. OK

1. A sends a SIP INVITE request to B. This message is an invitation for B to participate in a SIP telephone call.
2. B sends a response indicating that the telephone is ringing.
3. B sends an OK response after the call is answered.
4. A then sends an ACK message to acknowledge that B has answered the call.
5. Now A and B exchange voice media (talk).
6. After talking, A hangs up and sends a BYE request.
7. B replies with an OK response confirming receipt of the BYE request and the call is terminated.

SIP Servers

SIP is a client-server protocol. A SIP client is an application program or device that sends SIP requests. A SIP server responds to the SIP requests.

When you use SIP to make a VoIP call, it originates at a client and terminates at a server. A SIP client could be a computer or a SIP phone. One device can act as both a SIP client and a SIP server.

SIP User Agent Server

A SIP user agent server can make and receive VoIP telephone calls. This means that SIP can be used for peer-to-peer communications even though it is a client-server protocol. In Figure 168, either A or B can act as a SIP user agent client to initiate a call. A and B can also both act as a SIP user agent server to receive the call.

Figure 168 SIP User Agent Server

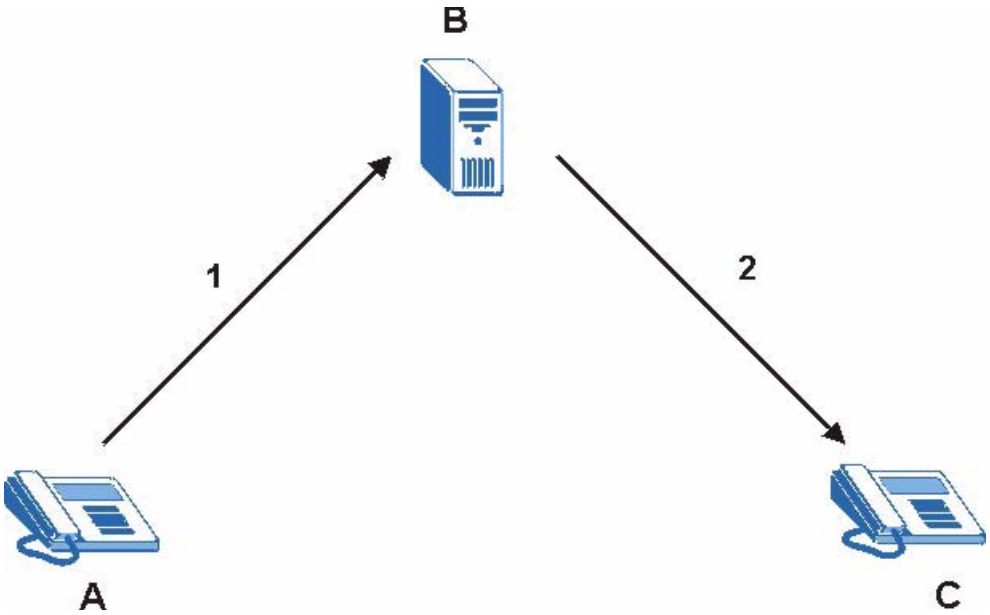
SIP Proxy Server

A SIP proxy server receives requests from clients and forwards them to another server.

In the following example, client device A calls someone who is using client device C.

1. The client device (A in the figure) sends a call invitation to the SIP proxy server (B).
2. The SIP proxy server forwards the call invitation to C.

Figure 169 SIP Proxy Server



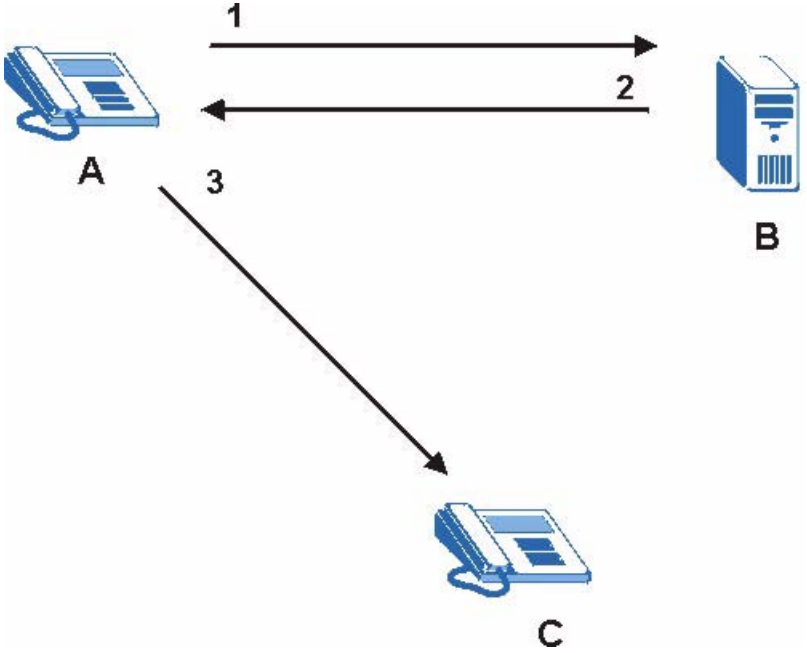
SIP Redirect Server

A SIP redirect server accepts SIP requests, translates the destination address to an IP address and sends the translated IP address back to the device that sent the request. Then the client device that originally sent the request can send requests to the IP address that it received back from the redirect server. Redirect servers do not initiate SIP requests.

In the following example, client device A calls someone who is using client device C.

1. Client device A sends a call invitation for C to the SIP redirect server (B).
2. The SIP redirect server sends the invitation back to A with C's IP address (or domain name).
3. Client device A then sends the call invitation to client device C.

Figure 170 SIP Redirect Server



SIP Register Server

A SIP register server maintains a database of SIP identity-to-IP address (or domain name) mapping. The register server checks your username and password when you register.

RTP

When you make a VoIP call using SIP, the RTP (Real time Transport Protocol) is used to handle voice data transfer. See RFC 1889 for details on RTP.

SIP ALG

Some NAT routers can include a SIP Application Layer Gateway (ALG). A SIP ALG allows VoIP calls to pass through NAT by examining and translating IP addresses embedded in the data stream. When a VoIP device (SIP client) behind the SIP ALG registers with the SIP register server, the SIP ALG translates the device's private IP address inside the SIP data stream to a public IP address. You do not need to use STUN if your VoIP device is behind the SIP ALG.

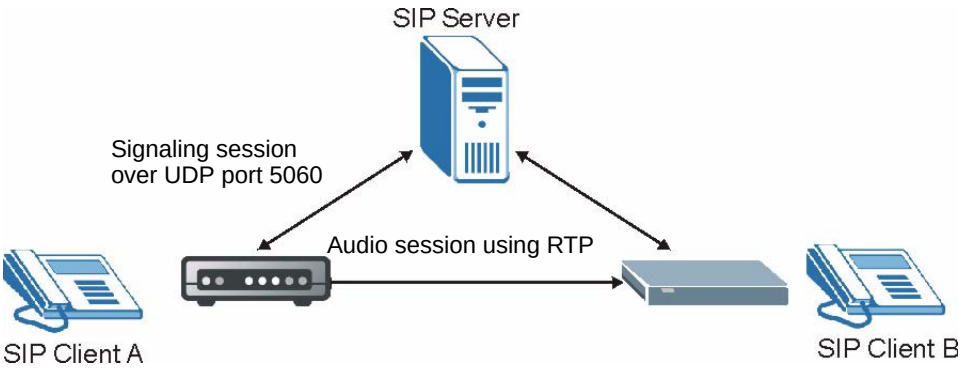
STUN

Using STUN (Simple Traversal of User Datagram Protocol (UDP) through Network Address Translators), the VoIP device can the presence and types of NAT routers, firewalls, or both between it and the public Internet. With STUN, the VoIP device can also find the public IP address that NAT assigned, so the VoIP device can embed it in the SIP data stream. See "*STUN - Simple Traversal of User Datagram Protocol (UDP) Through Network Address Translators (NATs)*" (RFC 3489) for details on STUN.

Business Secure Router SIP ALG

- SIP clients must be connected to the LAN. A SIP server must be on the WAN.
- You can make and receive calls between the LAN and the WAN. You cannot make a call between the LAN and the LAN.
- The SIP ALG forwards UDP packets with a port 5060 destination to pass through.
- The Business Secure Router forwards SIP audio connections.

Figure 171 Business Secure Router SIP ALG



SIP ALG and NAT

The Business Secure Router dynamically creates an implicit port forwarding rule for SIP traffic from the WAN to the LAN.

The SIP ALG on the Business Secure Router supports all NAT mapping types, including **One to One**, **Many to One**, **Many to Many Overload** and **Many One to One**.

SIP ALG and firewall

The Business Secure Router creates an implicit temporary firewall rule for the dynamic RTP port on the WAN to the SIP client device on the LAN. The firewall rule is created for both directions to allow voice packets. The firewall rule is deleted when the call is terminated.

SIP ALG and Multiple WAN

When the Business Secure Router has two WAN ports and uses the second highest priority WAN port as a back up, it drops SIP connections when the primary WAN port connection fails. The Business Secure Router does not automatically change the SIP connection to the secondary WAN port.

If the primary WAN connection fails, the SIP client needs to re-register with the SIP server through the secondary WAN port to have the SIP connection go through the secondary WAN port.

When the Business Secure Router uses both of the WAN ports at the same time, you can configure a routing policy to have the voice traffic from any IP address with UDP port 5060 and the RTP ports go over a specified WAN port.

Enabling or disabling the SIP ALG

The Business Secure Router SIP ALG is turned off by default to avoid retranslating the IP address of an existing SIP device that is using STUN. If you want to use a SIP client device (a SIP phone or IP phone for example) behind the Business Secure Router without STUN, use the `ip alg enable ALG_SIP` command to activate the SIP ALG.

Signaling session timeout

Most SIP clients have an expire mechanism indicating the lifetime of signaling sessions. The SIP UA sends registration packets to the SIP server periodically and keeps the session alive in the Business Secure Router.

If the SIP client does not have this mechanism and makes no call during the Business Secure Router SIP timeout default (60 minutes), the Business Secure Router SIP ALG drops any incoming calls after the timeout period. You can use the `ip alg siptimeout` command to change the timeout value.

Audio session timeout

If no voice packets go through the SIP ALG before the timeout period default (5 minutes) expires, the SIP ALG does not drop the call but blocks all voice traffic and deletes the audio session. You cannot hear anything and you must make a new call to continue your conversation.

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