ZyXEL

TOTAL INTERNET ACCESS SOLUTION

Prestige 641

ADSL Internet Access Router

User's Guide

Version 2.40

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Prestige 641

ADSL Internet Access Router

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Preface

About Your ADSL Internet Access Router

Congratulations on your purchase of the Prestige 641 ADSL Internet Access Router.

The Prestige 641 (P641) is an ADSL router used for Internet/LAN access via an ADSL line. The Prestige 641 supports multi-protocol routing for TCP/IP and Novell IPX, as well as transparent bridging for other protocols. We will refer to the Prestige 641 as the P641 or simply the Prestige from now on.

The P641 can run upstream maximum transmission rates of 640Kbps and downstream maximum transmission rates of 8Mbps. The actual rate depends on the copper category of your telephone wire, distance from the central office and the type of ADSL service subscribed. See the sections below for more background information on DSL and ADSL.

The P641's 10/100M auto-negotiating LAN interface enables fast data transfer of either 10Mbps or 100Mbps in either half-duplex or full-duplex mode depending on your Ethernet network.

Your Prestige is easy to install and to configure. All functions of the Prestige are software configurable via the SMT (System Management Terminal) Interface.

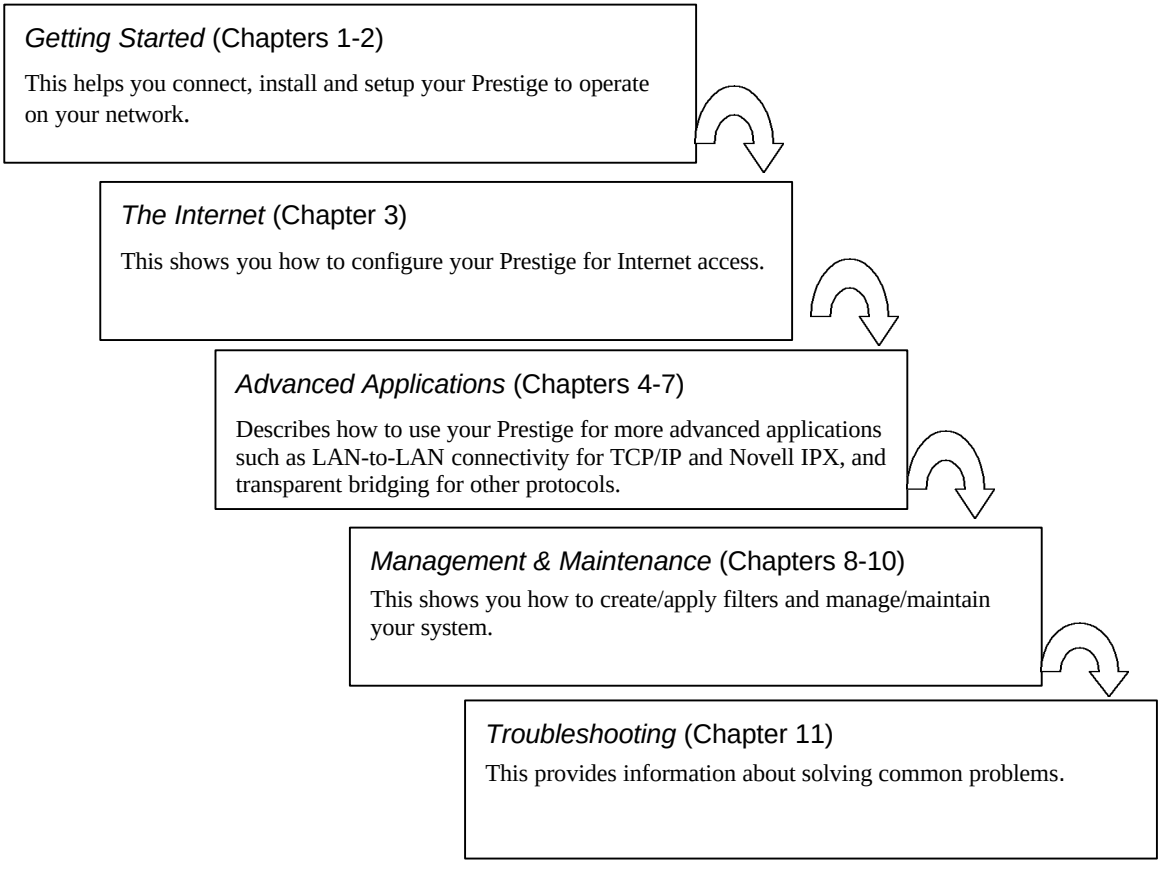
About This User's Guide

This user's guide covers all aspects of the Prestige 641 operations and shows you how to get the best out of the multiple advanced features of your ADSL Internet Access Router. This manual is designed to guide you through the correct configuration of your Prestige 641 for various applications.

Syntax Conventions

- "Enter" means for you to type one or more characters and press the carriage return. "Select" or "Choose" means for you to select one from the predefined choices.
- The SMT menu titles and labels are in **Bold Times** font. The choices of a menu item are in **Bold Arial** font. A single keystroke is in Arial font and enclosed in square brackets, for instance, [ENTER] means the Enter, or carriage return, key; [ESC] means the Escape key.
- For brevity's sake, we will use "e.g." as a shorthand for "for instance", and "i.e." as a shorthand for "that is" or "in other words" throughout this manual

Structure of this Manual



The following section offers some background information on ADSL. Skip to Chapter 1 if you wish to begin working with your router right away.

What is DSL?

DSL (Digital Subscriber Line) enhances the data capacity of the existing twisted-pair wire that runs between the local telephone company switching offices and most homes and offices. While the wire itself can handle higher frequencies, the telephone switching equipment is designed to cut off signals above 4,000 Hz to filter noise off the voice line, but now everybody is searching for ways to get more bandwidth to improve access to the Web - hence DSL technologies!

There are actually seven types of DSL service, ranging in speeds from 16 Kbits/sec to 52 Mbits/sec. The services are either symmetrical (traffic flows at the same speed in both directions), or asymmetrical (the downstream capacity is higher than the upstream capacity). Asymmetrical services (ADSL) are suitable for Internet users because more information is usually downloaded than uploaded. For example, a simple button click in a web browser can start an extended download that includes graphics and text.

As data rates increase, the carrying distance decreases. That means that users who are beyond a certain distance from the telephone company's central office may not be able to obtain the higher speeds. A DSL connection is a point-to-point dedicated circuit, meaning that the link is always up and there is no dialing required.

What is ADSL?

It is an asymmetrical technology, meaning that the downstream data rate is much higher than the upstream data rate. As mentioned, this works well for a typical Internet session in which more information is downloaded, e.g., from Web servers, than is uploaded. ADSL operates in a frequency range that is above the frequency range of voice services, so the two systems can operate over the same cable.

Chapter 1
Getting to Know Your ADSL Internet Access Router

This chapter describes the key features and applications of the Prestige 641.

1.1 Prestige 641 ADSL Internet Access Router

Your Prestige integrates a high-speed 10/100Mbps auto-negotiating LAN interface and one high-speed ADSL port into a single package. The Prestige is ideal for high-speed Internet browsing and making LAN-to-LAN connections to remote networks.

1.2 Features of the Prestige 641

Your Prestige is packed with a number of features that give it the flexibility to provide a complete networking solution for almost any user.

- **Ease of Installation**

Your Prestige is designed for quick, intuitive and easy installation. Physically, its compact size and lightweight make it easy to position anywhere in your busy office.

- **High Speed Internet Access**

The P641 ADSL router can support downstream transmission rates of up to 8Mbps and upstream transmission rates of 640Kbps. The P641 also supports rate management. Rate management allows ADSL subscribers to select an Internet access speed that best suit their needs and budget.

- **10/100M Fast Ethernet LAN Interface**

The P641's 10/100M auto-negotiating LAN interface enables fast data transfer of either 10Mbps or 100Mbps in either half-duplex or full-duplex mode depending on your Ethernet network.

- **Protocols Supported**
  - TCP/IP (Transmission Control Protocol/Internet Protocol) network layer protocol.
  - PPP (Point-to-Point Protocol) link layer protocol.

- SUA™ (Single User Account) and NAT (Network Address Translation).

- **Multiple Protocol Support**
  - Novel IPX (Internetwork Packet eXchange) network layer protocol.
  - Transparently bridging for unsupported network layer protocols.

- **DHCP Support**

DHCP (Dynamic Host Configuration Protocol) allows you to automatically assign TCP/IP settings to workstations on your network.

- **Networking Compatibility**

Your Prestige is compatible with the major ADSL DSLAM (Digital Subscriber Line Access Multiplexer) providers, making configuration as simple as possible for you.

- **Multiplexing**

The Prestige 641 supports VC-based and LLC-based multiplexing.

- **Encapsulation**

The Prestige 641 supports PPP (RFC 2364 - PPP over ATM Adaptation Layer 5), RFC 1483 encapsulation over ATM, MAC encapsulated routing as well as PPP over Ethernet (RFC 2516).

- **NAT/SUA for single-IP-address Internet Access**

The Prestige's SUA (Single User Account) feature allows multiple user Internet access for the cost of a single IP account. SUA supports popular Internet application, such as MS traceroute, CuSeeMe, IRC, RealAudio, VDOLive, Quake, and PPTP. No configuration is needed to support these applications.

- **Full Network Management**
  - SNMP (Simple Network Management Protocol) support.
  - Accessing SMT (System Management Terminal) through a telnet connection
  - Windows based PNC (Prestige Network Commander)

- **PAP and CHAP Security**

The Prestige supports PAP (Password Authentication Protocol) and CHAP (Challenge Handshake Authentication Protocol). CHAP is more secure since the password is scrambled prior to transmission. However, PAP is readily available on more platforms.

- **Filters**

The Prestige's packet filtering functions allows added network security and management.

1.3 Applications for the Prestige 641

1.3.1 Internet Access

The Prestige is the ideal high-speed Internet access solution. Your Prestige supports the TCP/IP protocol, which the Internet uses exclusively. It is compatible with all major ADSL DSLAM (Digital Subscriber Line Access Multiplexer) providers. A DSLAM is a rack of ADSL line cards with data multiplexed into a backbone network interface/connection (e.g., T1, OC3, DS3, ATM or Frame Relay). Think of it as the equivalent of a modem rack for ADSL. A typical Internet Access application is shown below.

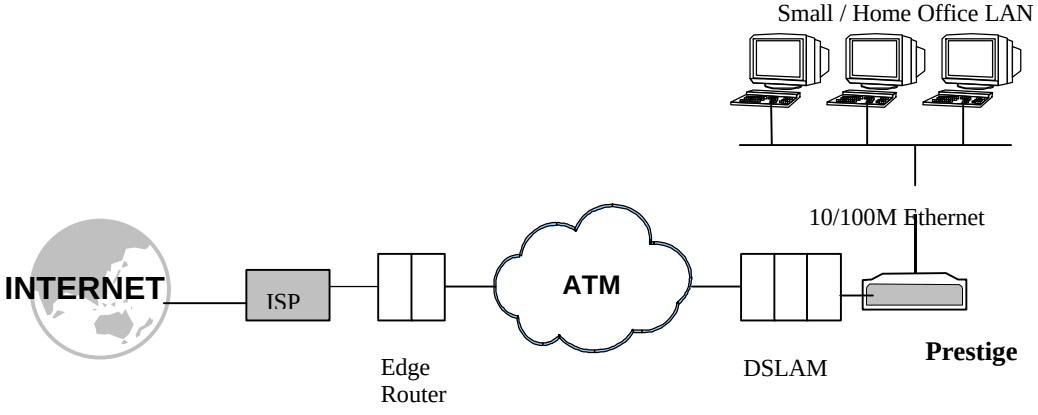


Figure 1-1 Internet Access Application

Internet Single User Account

For a SOHO (Small Office/Home Office) environment, your Prestige offers the Single User Account (SUA) feature that allows multiple users on the LAN (Local Area Network) to access the Internet concurrently for the cost of a single user.

1.3.2 LAN to LAN Application

You can use the Prestige to connect two geographically dispersed networks over the ADSL line. A typical LAN-to-LAN application for your Prestige is shown as follows.

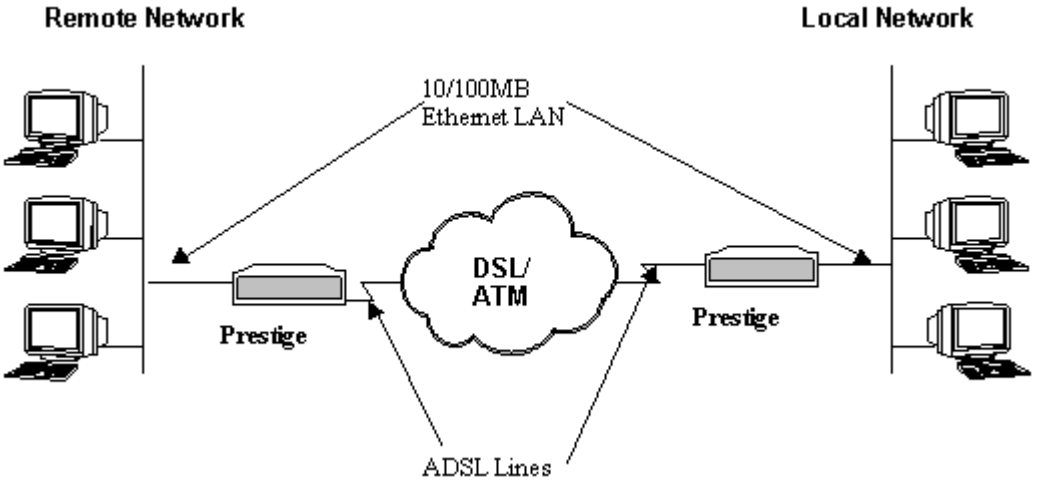


Figure 1-2 LAN-to-LAN Application

Chapter 2
Hardware Installation & Initial Setup

This chapter describes the physical features of the Prestige and how to make the cable connections.

2.1 Front Panel LEDs OF P641

The LED indicators on the front panel indicate the operational status of the Prestige 641. The table below the diagram describes the LED functions:

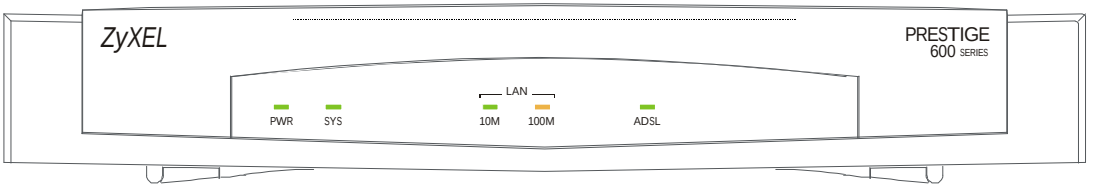


Figure 2-1 Prestige 641 Front Panel.

Table 2-1 Front Panel LED Description

PWR	The PWR (power) LED is on when power is applied to the Prestige.
SYS	A steady on SYS (system) LED indicates the Prestige is on and functioning properly while an off SYS LED indicates the system is not ready or a malfunction. The system is rebooting when the SYS LED is blinking.
LAN 10M	A steady *green* light indicates a 10Mb Ethernet connection. The LED blinks when data is being sent/received.
LAN 100M	A steady *orange* light indicates a 100Mb Ethernet connection. The LED will blink when data is being sent/received.
ADSL	The ADSL LED is on when the Prestige is connected successfully to a DSLAM. The LED blinks when data is being sent/received. The LED is off when the link is down.

2.2 Prestige 641 Rear Panel and Connections

The following figure shows the rear panel connectors of your Prestige.

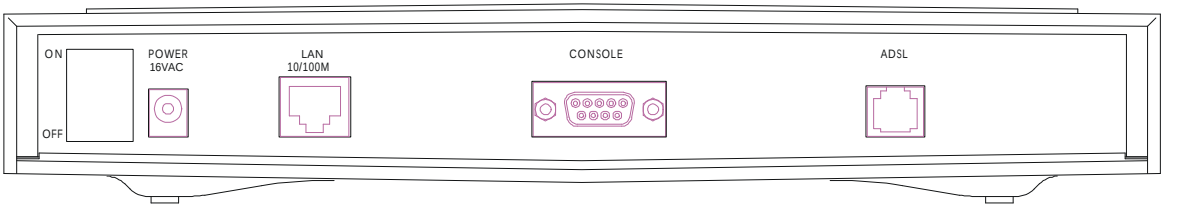


Figure 2-2 Prestige 641 Rear Panel

Step 1. *Connecting the ADSL Line*

Connect the Prestige directly to the wall jack using the included ADSL cable. Connect the micro filter(s) (supplied – see Figure 2-4 Connecting the Microfilter) between the wall jack and your telephone(s). The micro filters act as low pass filters (voice transmission takes place in the 0 to 4KHz bandwidth).

Step 2. *Connecting a Workstation to the Prestige 10/100M LAN port*

Ethernet 10Base-T networks use Shielded Twisted Pair (STP) cable with RJ-45 connectors that look like a bigger telephone plug with 8 pins. Use the crossover cable (red tag) to connect your Prestige 641 to a computer directly. Use straight through Ethernet cable (white tag) to connect to an external hub and then connect one end of a straight through Ethernet cable (white tag) from the hub to the NIC on the workstation.

Step 3. *Connecting the Power Adapter to your Prestige*

Connect the power adapter to the port labeled **POWER** on the rear panel of your Prestige.

Step 4. *Connecting the Console Port*

For the initial configuration of your Prestige, you need to use terminal emulator software on a workstation and connect it to the Prestige through the console port. Connect the 9-pin end of the console cable (9-pin to 25-pin console cable supplied) to the console port of the Prestige and the 25-pin end to a serial port (COM1, COM2 or other COM port) of your workstation. You can use an extension RS-232 cable if the enclosed one is too short.

2.3 Additional Installation Requirements

In addition to the contents of your package, there are other hardware and software requirements you need before you can install and use your Prestige. These requirements include:

- A computer with Ethernet 10Base-T/100Base-T NIC (Network Interface Card).
- A computer equipped with communications software (for example, Hyper Terminal in Win95) configured to the following parameters:
  - VT100 terminal emulation.

- 9600 Baud rate.
- No parity, 8 Data bits, 1 Stop bit.

After the Prestige has been successfully connected to your network, you can make future changes to the configuration through telnet application.

2.4 Housing

Your Prestige's ventilated housing has clip-out legs that fit snugly into grooves, enabling compact, sturdy stacking with airflow between routers. You should not stack more than 4 routers for maximum stability.

2.5 Telephone Microfilters

Telephone voice transmissions take place in the lower frequency range, 0 - 4KHz, while ADSL transmissions take place in the higher bandwidth range, above 4KHz. ZyXEL provides a microfilter that acts as a low-pass filter for your telephone to ensure that ADSL transmissions do not interfere with your telephone voice transmissions. Connect a phone cable from the wall jack to the wall side of the microfilter, and then connect the phone side of the microfilter to your telephone as shown.

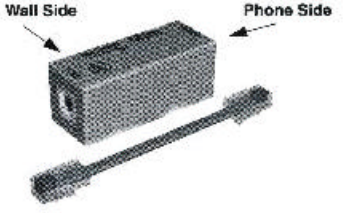


Figure 2-3 Microfilter

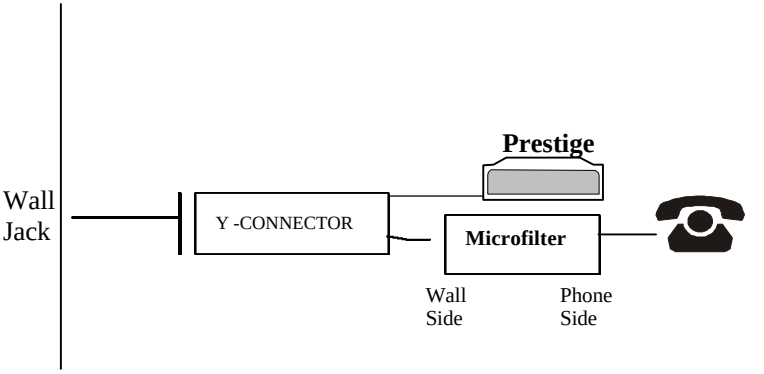


Figure 2-4 Connecting the Microfilter

2.6 Power On Your Prestige

At this point, you should have connected the console port, the ADSL line, the Ethernet port and the power port to the appropriate devices or lines. You can now apply power to the Prestige by turning the switch on.

Step 1. Initial Screen

When you power on your Prestige, it performs several internal tests as well as line initialization. After the initialization, the Prestige asks you to press **Enter** to continue, as shown.

```
Copyright (c) 1994 - 1999 ZyXEL Communications Corp.
initialize ch =0, ethernet address: 00:a0:c5:01:23:45
WAN Channel init.....................done
Download ADSL modem SW
.
……
……..
Press ENTER to continue...
```

Figure 2-5 Power-On Display

Step 2. Entering Password

The login screen appears after you press Enter, prompting you to enter the password, as shown below.

For your first login, enter the default password **1234**. As you type the password, the screen displays a (X) for each character you type.

Please note that if there is no activity for longer than 5 minutes after you log in, your Prestige will automatically log you out and will display a blank screen. If you see a blank screen, press [Enter] to bring up the login screen again.

```
Enter Password : XXXX
```

Figure 2-6 Login Screen

2.7 Navigating the SMT Interface

The SMT (System Management Terminal) is the interface that you use to configure your Prestige.

Several operations that you should be familiar with before you attempt to modify the configuration are listed in the table below.

Table 2-2 Main Menu Commands

Operation	Press/<read>	Description
Move forward to another menu	[Enter]	To move forward to a sub-menu, type in the number of the desired sub-menu and press [Enter].
Move backward to a previous menu	[Esc]	Press the [Esc] key to move back to the previous menu.
Move to a submenu	Press the [Space bar] to change **No** to **Yes** then press [ENTER]**.**	Fields beginning with “Edit” have a default setting of **No**. Press the [Space bar] to change **No** to **Yes**, then press [ENTER] to go to a submenu.
Move the cursor	[Enter] or [Up]/[Down] arrow keys	Within a menu, press [Enter] to move to the next field. You can also use the [Up]/[Down] arrow keys to move to the previous and the next field, respectively.
Enter information	Fill in, or Press the [Space bar] to toggle	You need to fill in 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 the [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.
Exit the SMT	Type 99, then press [Enter].	Type 99 at the Main Menu prompt and press [Enter] to exit the SMT interface.

After you enter the password, the SMT displays the **Main Menu**, as shown below.

```
            Copyright (c) 1994 - 1999 ZyXEL Communications Corp.
                          Prestige 641 Main Menu

Getting Started                         Advanced Management
1. General Setup                        21. Filter Set Configuration
3. Ethernet Setup                       22. SNMP Configuration
4. Internet Access Setup                23. System Password
                                        24. System Maintenance
Advanced Applications
11. Remote Node Setup
12. Static Routing Setup
15. SUA Server Setup
                                        99. Exit



                        Enter Menu Selection Number:
```

Figure 2-7 SMT Main Menu

2.7.1 System Management Terminal Interface Summary

Table 2-3 Main Menu Summary

#	Menu Title	Description
1	General Setup	Use this menu to set up general information.
3	Ethernet Setup	Use this menu to set up your LAN connection.
4	Internet Access Setup	A quick and easy way to set up an Internet connection.
11	Remote Node Setup	Use this menu to set up the Remote Node for LAN-to-LAN connection, including Internet connection.
12	Static Routing Setup	Use this menu to set up static routes.
15	SUA Server Setup	Use this menu to specify inside servers when SUA is enabled.
21	Filter Set Configuration	Use this menu to set up filters to provide security, etc.
22	SNMP Configuration	Use this menu to set up SNMP related parameters.
23	System Password	Use this menu to change your password.
24	System Maintenance	This menu provides system status, diagnostics, software upload, etc.
99	Exit	To exit from SMT and return to a blank screen.

2.8 Changing the System Password

The first thing your should do before anything else is to change the default system password by following the steps below.

Step 1. Enter 23 in the Main Menu to open **Menu 23 - System Password** as shown below.

When the Submenu 23 System Password appears, type in your existing system password, i.e., 1234, and press [Enter].

```
                        Menu 23 – System Password

              Old Password= ****
              New Password= ****
         Retype to confirm= ****



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

Figure 2-8 Menu 23.1 - System Password

Step 2. Enter your new system password (up to 30 characters), and press [Enter].

Step 3. Re-type your new system password for confirmation and press [Enter].

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

2.9 Resetting the Prestige

If you have forgotten your password or for some reason cannot access the SMT menu you will need to reinstall the configuration file. Uploading the configuration file replaces the current configuration file with the default configuration file, you will lose all configurations that you had before and the speed of the console port will be reset to the default of 9600 bps with 8 data bit, no parity and 1 stop bit (8n1). The password will be reset to the default of 1234, also.

Turn off the Prestige and begin a Telnet session with the default console port settings. Turn on the Prestige again. When you see the message " Press Any key to enter Debug Mode within 3 seconds", press any key to enter debug mode. You should already have downloaded the "romfile.zip" file from the Internet and unzipped it. See section 10.5 Restore Configuration on page 10-10 for more information.

2.9.1 Filename conventions

The configuration filename is the router model name with a rom extension, e.g., p641.rom. The ZyNOS firmware filename is the router model name with a bin extension, e.g., p641.bin. Rename the latter filename to “ras” when uploading to the Prestige. See section 10.6 Firmware Update on page 10-11 for more information.

2.10 General Setup

Menu 1 - General Setup contains administrative and system-related information.

To enter Menu 1 and fill in the required information, follow these steps:

Step 1. Enter 1 in the Main Menu to open **Menu 1 – General Setup**.

Step 2. The **Menu 1 - General Setup** screen appears, as shown below. Fill in the required fields marked [?] and turn on the individual protocols for your applications, as explained in the following table.

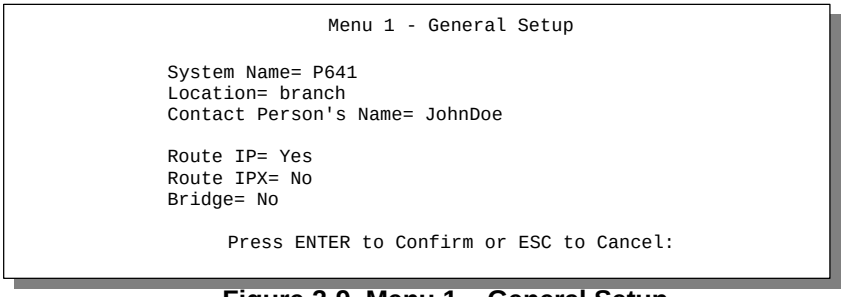


Figure 2-9 Menu 1 – General Setup

Table 2-4 General Setup Menu Fields

Field	Description	Example
System Name	Choose a descriptive name for identification purposes. This name can be up to 30 alphanumeric characters long. Spaces are not allowed, but dashes “-” and underscores "_" are accepted.	P641
Location (optional)	Enter the geographic location (up to 31 characters) of your Prestige.	MyHouse
Contact Person's Name (optional)	Enter the name (up to 30 characters) of the person in charge of this Prestige.	JohnDoe
Protocols:	Turn on or off routing for the individual protocols.	Press space-bar to toggle
Route IP	Set this field to **Yes** to enable IP routing. You must enable IP routing for Internet access.	**Yes/No**
Route IPX	Set this field **Yes** to enable IPX routing.	**Yes/No**
Bridge	Turn on/off bridging for protocols not supported (e.g., SNA) or not turned on in the previous Route fields.	**Yes/No**

2.10.1 Note on Bridging

When bridging is enabled, your Prestige forwards any packet that it does not route. Without bridging, the packets that the Prestige does not route are simply discarded. Compared to routing, bridging generates far more traffic for the same network protocol and consumes more CPU cycles and memory.

2.11 Ethernet Setup

This section describes how to configure the Ethernet using **Menu 3 – Ethernet Setup**. From the Main Menu, enter 3 to open Menu 3.

```
                    Menu 3 - Ethernet Setup


              1. General Setup
              2. TCP/IP and DHCP Setup
              3. Novell IPX Setup
              4. Bridge Setup
```

Figure 2-10 Menu 3 - Ethernet Setup

2.11.1 General Ethernet Setup

This menu allows you to specify filter set(s) that you wish to apply to the Ethernet traffic. You seldom need to filter Ethernet traffic; however, the filter sets may be useful to block certain packets, reduce traffic and prevent security breaches.

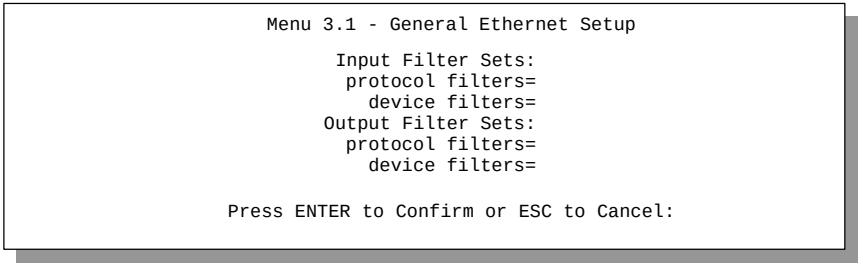


Figure 2-11 Menu 3.1 - General Ethernet Setup

If you need to define filters, please read the *Filter Set Configuration* chapter first, then return to this menu to define the filter sets.

2.12 Protocol Dependent Ethernet Setup

Depending on the protocols for your applications, you need to configure the respective Ethernet Setup, as outlined below.

- For TCP/IP Ethernet setup refer to *Chapter 3 - Internet Access Application*.
- For Novell IPX Ethernet setup refer to Section 6.3 - IPX Ethernet Setup in *Chapter 6 - IPX Configuration*.
- For bridging Ethernet setup refer to *Chapter 7 - Bridging Setup.*

Chapter 3
Internet Access

This chapter shows you how to configure the LAN as well as the WAN of your Prestige for Internet access.

3.1 Factory Ethernet Defaults

The Ethernet parameters of the Prestige are preset in the factory with the following values:

1. IP address of 192.168.1.1 with subnet mask of 255.255.255.0 (24 bits).
2. DHCP server enabled with 32 client IP addresses starting from 192.168.1.33.

These parameters should work for the majority of installations. If the parameters are satisfactory, you can skip to section 3.4 **TCP/IP Ethernet Setup and DHCP** to enter the DNS server address(es) if your ISP gives you explicit DNS server address(es). If you wish to change the factory defaults or to learn more about TCP/IP, please read on.

3.2 TCP/IP Parameters

3.2.1 IP Address and Subnet Mask

Similar to the houses on a street that share a common street name, the machines on a LAN share one common network number, also.

Where you obtain your network number depends on your particular situation. If the ISP or your network administrator assigns you a block of registered IP addresses, follow their instructions in selecting the IP addresses and the subnet mask.

If the ISP did not explicitly give you an IP network number, then most likely you have a single user account and the ISP will assign you a dynamic IP address when the connection is established. If this is the case, it is recommended that you select a network number from 192.168.0.0 to 192.168.255.0 (ignoring the trailing zero) and you must enable the Single User Account feature of the Prestige. The Internet Assigned Number Authority (IANA) reserved this block of addresses specifically for private use; please do *not* use any other number unless you are told otherwise. Let's say you select 192.168.1.0 as the network number; which covers 254 individual addresses, from 192.168.1.1 to 192.168.1.254 (zero and 255 are reserved). In other words, the first 3 numbers specify the network number while the last number identifies an individual workstation on that network.

Once you have decided on the network number, pick an IP address that is easy to remember, e.g., 192.168.1.1, for your Prestige.

The subnet mask specifies the network number portion of an IP address. Your Prestige will compute the subnet mask automatically based on the IP address that you entered. You don't need to change the subnet mask computed by the Prestige unless you are instructed to do otherwise.

3.2.2 RIP Setup

RIP (Routing Information Protocol) allows a router to exchange routing information with other routers. The **RIP Direction** field controls the sending and receiving of RIP packets. When set to both, the Prestige will broadcast its routing table periodically and incorporate the RIP information that it receives; when set to none, it will not send any RIP packets and will ignore any RIP packets received.

The **Version** field controls the format and the broadcasting method of the RIP packets that the Prestige sends (it recognizes both formats when receiving). **RIP-1** is universally supported; but RIP-2 carries more information. RIP-1 is probably adequate for most networks, unless you have a unusual network topology.

Both **RIP-2B** and **RIP-2M** sends the routing data in RIP-2 format; the difference being that **RIP-2B** uses subnet broadcasting while **RIP-2M** uses multicasting. Multicasting can reduce the load on non-router machines since they generally do not listen to the RIP multicast address and so will not receive the RIP packets. However, if one router uses multicasting, then all routers on your network must use multicasting, also.

By default, **RIP direction** is set to **Both** and the **Version** set to **RIP-1**.

3.2.3 DHCP Configuration

DHCP (Dynamic Host Configuration Protocol) allows the individual clients (workstations) to obtain the TCP/IP configuration at start-up from a centralized DHCP server. The Prestige has built-in DHCP server capability, enabled by default, which means it can assign IP addresses, an IP default gateway and DNS servers to Windows 95, Windows NT and other systems that support the DHCP client. The Prestige can also act as a surrogate DHCP server where it relays IP address assignment from the actual DHCP server to the clients.

IP Pool Setup

The Prestige is pre-configured with a pool of 32 IP addresses starting from 192.168.1.33 to 192.168.1.64 for the client machines. This leaves 31 IP addresses, 192.168.1.2 to 192.168.1.32 (excluding the Prestige itself which has a default IP of 192.168.1.1) for other server machines, e.g., server for mail, FTP, telnet, web, etc., that you may have.

DNS Server Address

DNS (Domain Name System) is for mapping a domain name to its corresponding IP address and vice versa, e.g., the IP address of *www.zyxel.com* is 204.217.0.2. The DNS server is extremely important because without it, you must know the IP address of a machine before you can access it. The DNS server addresses

that you enter in the DHCP setup are passed to the client machines along with the assigned IP address and subnet mask.

There are two ways that an ISP disseminates the DNS server addresses. The first is for an ISP to tell a customer the DNS server addresses, usually in the form of an information sheet, when s/he signs up. If your ISP does give you the DNS server addresses, enter them in the **DNS Server** fields in **DHCP Setup**, otherwise, leave them blank.

Some ISP's choose to pass the DNS servers using the DNS server extensions of PPP IPCP (IP Control Protocol) after the connection is up. If your ISP did not give you explicit DNS servers, chances are the DNS servers are conveyed through IPCP negotiation. The Prestige supports the IPCP DNS server extensions through the DNS proxy feature.

If the **Primary** and **Secondary DNS Server** fields in **DHCP Setup** are not specified, i.e., left as 0.0.0.0, the Prestige tells the DHCP clients that it itself is the DNS server. When a workstation sends a DNS query to the Prestige, the Prestige forwards the query to the real DNS server learned through IPCP and relays the response back to the workstation.

Please note that DNS proxy works only when the ISP uses the IPCP DNS server extensions. It does not mean you can leave the DNS servers out of the DHCP setup under all circumstances. If your ISP gives you explicit DNS servers, make sure that you enter their IP addresses in the **DHCP Setup** menu. This way, the Prestige can pass the DNS servers to the workstations and the workstations can query the DNS server directly without the Prestige's intervention.

3.3 Route IP Setup

The first step is to enable the IP routing in **Menu 1 - General Setup**.

To edit Menu 1, enter 1 in the Main Menu to select **General Setup** and press [Enter]. Set the **Route IP** field to **Yes** by pressing the space bar.

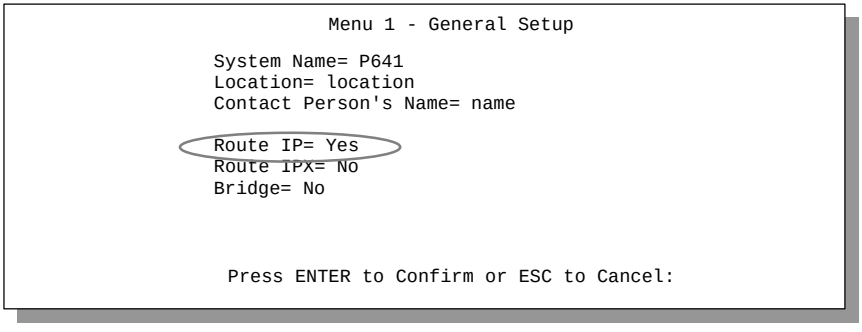


Figure 3-1 Menu 1 – General Setup

3.4 TCP/IP Ethernet Setup and DHCP

You will now use Menu 3.2 to configure your Prestige for TCP/IP.

To edit Menu 3.2, enter 3 to open the **Menu 3 - Ethernet Setup** from the Main Menu. When Menu 3 appears, 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 next**.**

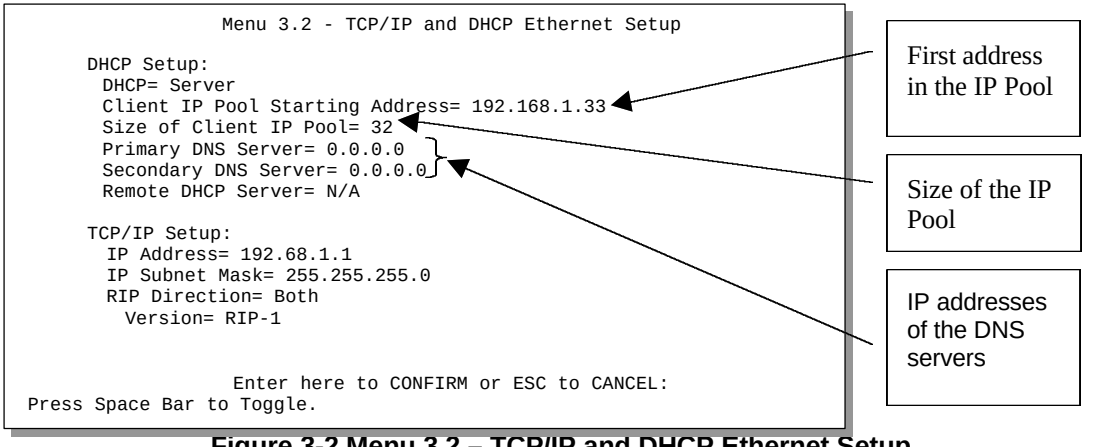


Figure 3-2 Menu 3.2 – TCP/IP and DHCP Ethernet Setup

Follow the instructions in the following table on how to configure the DHCP fields.

Table 3-1 DHCP Ethernet Setup Menu Fields

Field	Description	Example
DHCP Setup		
DHCP=	This field enables/disables the DHCP server/relay. If it is set to **Server**, your Prestige will act as a DHCP server. If set to **None**, the DHCP server will be disabled. If set to **Relay,** the Prestige acts as a surrogate DHCP server and relays DHCP requests and responses between the remote server and the clients.	**None** **Server** (default) **Relay**
	When DHCP is used, the following items need to be set:	
Client IP Pool Starting Address	This field specifies the first of the contiguous addresses in the IP address pool.	192.168.1.33
Size of Client IP Pool	This field specifies the size, or count, of the IP address pool.	32
Primary DNS Server Secondary DNS Server	Enter the IP addresses of the DNS servers. The DNS servers are passed to the DHCP clients along with the IP address and the subnet mask.	
Remote DHCP Server	If **Relay** is selected in the **DHCP=** field above, then enter the IP address of the actual, remote DHCP server here.	

Follow the instructions in the following table to configure TCP/IP parameters for the Ethernet port.

Table 3-2 TCP/IP Ethernet Setup Menu Fields

Field	Description	Example
TCP/IP Setup		
IP Address	Enter the (LAN) IP address of your Prestige in dotted decimal notation	192.168.1.1 (default)
IP Subnet Mask	Your Prestige will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the Prestige	255.255.255.0
RIP Direction	Press the space bar to select the RIP direction from **Both/In Only/Out Only** or **None.**	**Both** (default)
Version	Press the space bar to select the RIP version from **RIP-1/RIP-2B/RIP-2M.**	**RIP-1** (default)
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.		

3.5 LANs & WANs

A LAN (Local Area Network) is a computer network limited to the immediate area, usually the same building or floor of a building. A WAN (Wide Area Network), on the other hand is an outside connection to another network or the Internet.

3.5.1 LANs, WANs and the Prestige

The actual physical connection determines whether the Prestige ports are LAN or WAN ports. There are two separate IP networks, one inside, the LAN network; the other outside, the WAN network as shown next.

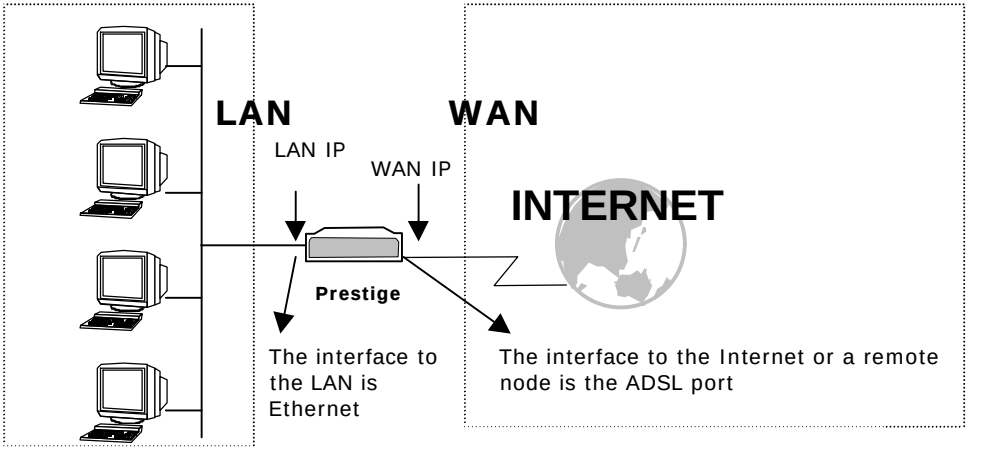


Figure 3-3 LAN & WAN IPs

3.6 VPI & VCI

Be sure to use the correct Virtual Path Identifier (VPI) and Virtual Channel Identifier (VCI) numbers supplied by the Telephone Company. The valid range for the VPI is 1 to 255 and for the VCI is 32 to 65535 (1 to 32 is reserved for local management of ATM traffic). Please see VPI & VCI in Appendix B for more information.

3.7 Multiplexing

There are two conventions to identify what protocols the virtual circuit (VC) is carrying. Be sure to use the multiplexing method required by your ISP.

3.7.1 VC-based multiplexing

In this case, by prior mutual agreement, each protocol is assigned to a specific virtual circuit, e.g., VC1 carries IP, VC2 carries IPX, etc. VC-based multiplexing may be dominant in environments where dynamic creation of large numbers of ATM VCs is fast and economical.

3.7.2 LLC-based multiplexing

In this case one VC carries multiple protocols with protocol identifying information being contained in each packet header. Despite the extra bandwidth and processing overhead, this method may be advantageous if it is not practical to have a separate VC for each carried protocol, e.g., if charging heavily depends on the number of simultaneous VCs.

3.8 Encapsulation

Be sure to use the encapsulation method required by your ISP. The Prestige supports the following methods.

3.8.1 ENET ENCAP

The MAC Encapsulated Routing Link Protocol (**ENET ENCAP**) is only implemented with the IP network protocol. IP packets are routed between the Ethernet interface and the WAN interface and then formatted so that they can be understood in a bridged environment i.e., it encapsulates routed Ethernet frames into bridged ATM cells. **ENET ENCAP** requires that you specify a gateway IP address in the **Ethernet Encapsulation Gateway** field in Menu 4 and in the **Rem IP Addr** field in Menu 11.1. You can get this information from your ISP.

3.8.2 PPP over Ethernet

The Prestige 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 xDSL Access Concentrator where the PPP session terminates. 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.

For more information on PPPoE, see PPP over Ethernet in Appendix A.

3.8.3 PPP

Please refer to RFC 2364 for more information on PPP over ATM Adaptation Layer 5 (AAL5). Refer to RFC 1661 for more information on PPP.

3.8.4 RFC 1483

RFC 1483 describes two methods for Multiprotocol Encapsulation over ATM Adaptation Layer 5 (AAL5). The first method allows multiplexing of multiple protocols over a single ATM virtual circuit (LLC-based multiplexing) and the second method assumes that each protocol is carried over a separate ATM virtual circuit (VC-based multiplexing). Please refer to the RFC for more detailed information.

3.9 IP Address Assignment

The Single User Account feature can be enabled or disabled no matter whether you have a dynamic or static IP. However the encapsulation method assigned influences your choices for IP Address and ENET ENCAP Gateway.

3.9.1 Using PPP or PPPoE Encapsulation

If you have a dynamic IP, then the IP Address and ENET ENCAP Gateway fields are not applicable (N/A). If you have a static IP, then you *only* need to fill in the IP Address field and *not* the ENET ENCAP Gateway field.

3.9.2 Using RFC 1483 Encapsulation

In this case the IP Address Assignment *must* be static with the same requirements for the IP Address and ENET ENCAP Gateway fields as stated above (in 3.9.1).

3.9.3 Using ENET ENCAP Encapsulation

In this case you can have either a static or dynamic IP. For a static IP you must fill in all the IP Address and ENET ENCAP Gateway fields as supplied by your ISP. However for a dynamic IP, the Prestige acts as a DHCP client on the WAN port and so the IP Address and ENET ENCAP Gateway fields are not applicable (N/A) as they are assigned to the Prestige by the DHCP server.

3.10 Internet Access Configuration

Menu 4 allows you to enter the Internet Access information in one screen. Menu 4 is actually a simplified setup for one of the remote nodes that you can access in Menu 11. Before you configure your Prestige for Internet access, you need to collect your Internet account information from your ISP and telephone company.

Use the following table to record your Internet Account Information. Note that if you are using PPP or PPPoE encapsulation, then the only ISP information you need is a login name and password. You only need to know the Ethernet Encapsulation Gateway IP address if you are using ENET ENCAP encapsulation.

Table 3-3 Internet Account Information

Internet Account Information	Write your account information here
Telephone Company Information	
VPI (Virtual Path Identifier)	—
VCI (Virtual Channel Identifier)	—
ISP Information	
IP Address of the ISP's Gateway (Optional)	—
Login Name	—
Password for ISP authentication	—
Type of Multiplexing	—
Type of Encapsulation	—
Ethernet Encapsulation Gateway	—

From the Main Menu, enter 4 to go to **Menu 4 - Internet Access Setup**, as displayed below. The following table contains instructions on how to configure your Prestige for Internet access.

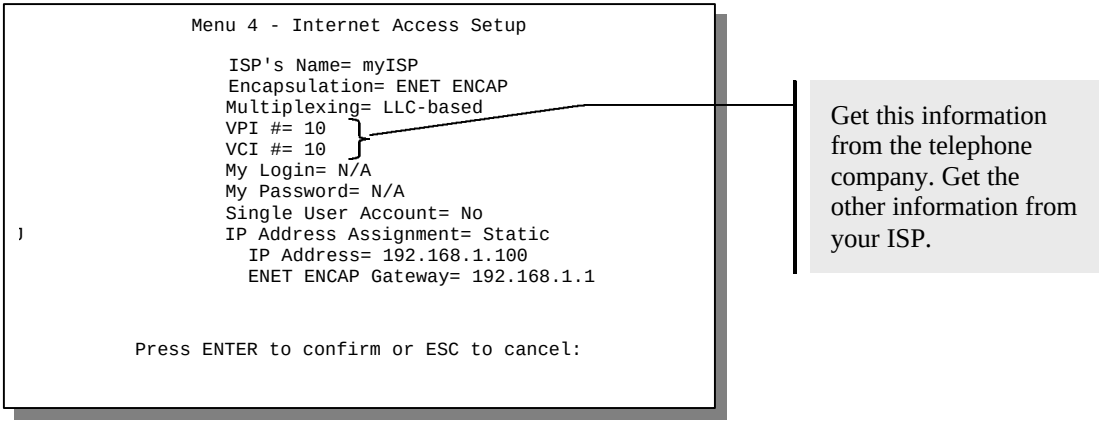


Figure 3-4 Internet Access Setup

Table 3-4 Internet Access Setup Menu Fields

Field	Description	Options/E.G.
ISP's Name	Enter the name of your Internet Service Provider, e.g., myISP. This information is for identification purposes only.	**e.g., MyISP**
Encapsulation	Press the spacebar to select the method of encapsulation used by your ISP. Please see section 3.9 for related information.	**PPPoE**(default)**, PPP, RFC 1483 or ENET ENCAP.**
Multiplexing	Press the [Space Bar] to select the method of multiplexing used by your ISP - either **VC-based** or **LLC-based**.	**VC-based LLC-based**
VPI #	Enter the Virtual Path Identifier (VPI) that the telephone company gives you.	**e.g., 10**
VCI #	Enter the Virtual Channel Identifier (VCI) that the telephone company gives you.	**e.g., 10**
My Login	Enter the login name that your ISP gives you. If you are using **PPPoE** encapsulation**,** then this field must be of the form user@domain where domain identifies your ISP.	**e.g., tarbuck**
My Password	Enter the password associated with the login name above.	*******
Single User Account	Press the spacebar to enable or disable SUA. Please see	**Yes/No**

Field	Description	Options/E.G.
	the following section for a more detailed discussion on the Single User Account feature.	
IP Address Assignment	Press the [Space Bar] to select **Static** or **Dynamic** address assignment. Please see section 3.9 for related information.	**Static / Dynamic**
IP Address	Enter the IP address supplied by your ISP if applicable.	**e.g., 192.168.1.100**
ENET ENCAP Gateway	Enter the gateway IP address supplied by your ISP if applicable.	**e.g., 192.168.1.1**

At this point, if all your settings are correct your Prestige should connect automatically to the Internet. If the connection fails, note the error message that you receive on the screen and take the appropriate troubleshooting steps.

3.11 Single User Account

Typically, if there are multiple users on the LAN wanting to concurrently access the Internet, you will have to lease a block of legal, or globally unique, IP addresses from the ISP.

The Single User Account (SUA) feature allows you to have the same benefits as having multiple legal addresses, but only pay for one IP address, thus saving significantly on the subscription fees. (Check with your ISP before you enable this feature). SUA supports popular Internet applications such as MS traceroute, CuSeeMe, IRC, RealAudio, VDOLive, Quake and PPTP with no extra configuration needed.

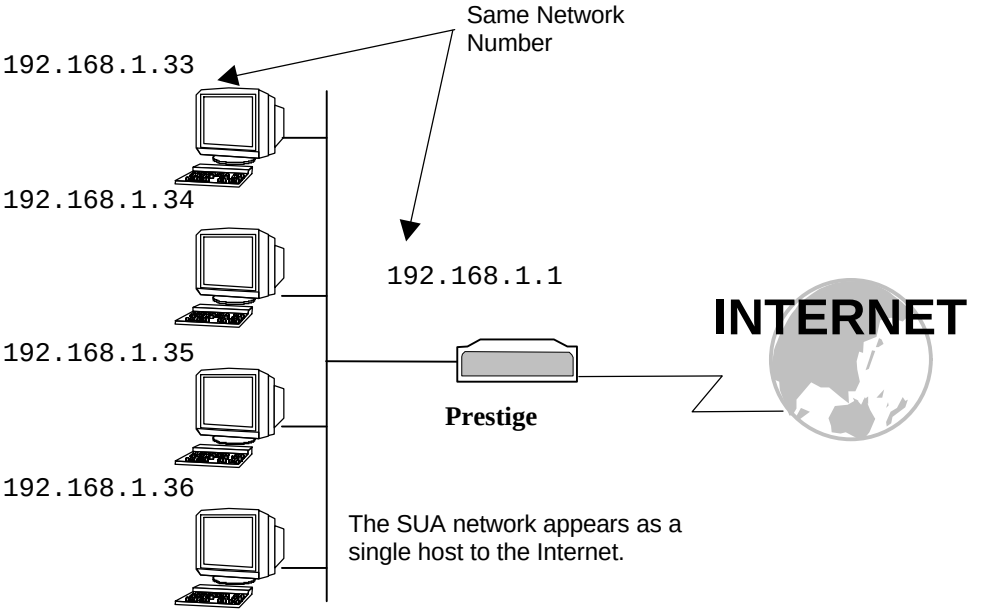


Figure 3-5 Single User Account Topology

The IP address for the SUA can be either fixed or dynamically assigned by the ISP. In addition, you can designate servers, e.g., a web server and a telnet server, on your local network and make them accessible to the outside world. If you do not define any server, SUA offers the additional benefit of firewall protection. If no server is defined, all incoming inquiries will be filtered out by your Prestige, thus preventing intruders from probing your network. Your Prestige accomplishes this address sharing by translating the internal LAN IP addresses to a single address that is globally unique on the Internet. For more information on IP address translation, refer to RFC 1631, *The IP Network Address Translator (NAT).*

3.11.1 Advantages of SUA

In summary:

- SUA is a cost-effective solution for small offices to access the Internet or other remote TCP/IP networks.
- SUA supports servers to be accessible to the outside world.
- SUA can provide firewall protection if you do not specify a server. All incoming inquiries will be filtered out by your Prestige.
- UDP and TCP packets can be routed. In addition, partial ICMP, including echo and traceroute, is supported.

3.11.2 Single User Account Configuration

The steps for configuring your Prestige for Single User Account are identical to the conventional Internet access with the exception that you need to fill in two extra fields in **Menu 4 - Internet Access Setup**, as shown below.

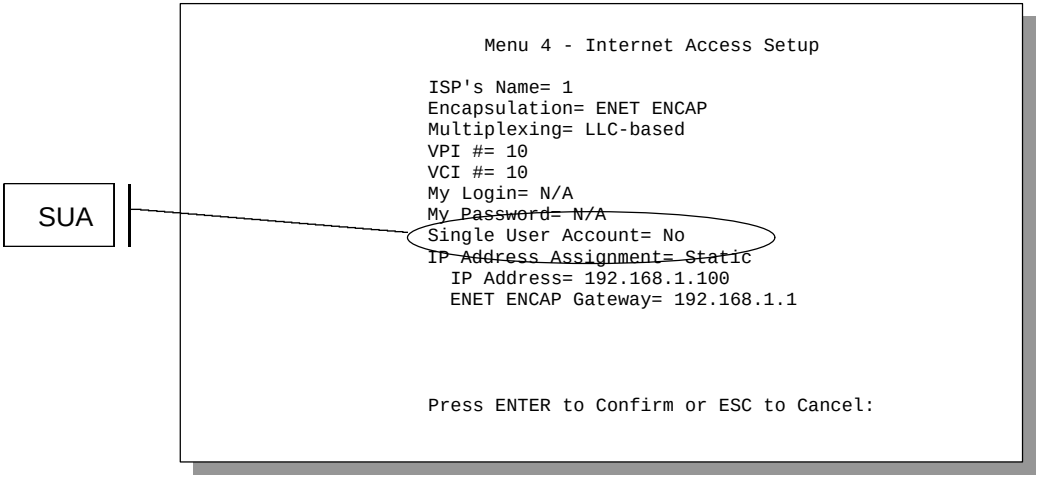


Figure 3-6 Menu 4 – Internet Access Setup for Single User Account

To enable the SUA feature in Menu 4, move the cursor to the **Single User Account** field and select **Yes** (or **No** to disable SUA). Then follow the instructions on how to configure the SUA fields.

Table 3-5 Single User Account Menu Fields

Field	Description
Single User Account	Select **Yes** to enable SUA.
IP Addr.	If your ISP did *not* assign you a static IP address, enter [0.0.0.0] here; otherwise, enter that IP address here.
Press [Enter] at the message [Press ENTER to Confirm ...] to save your configuration, or press [Esc] at any time to cancel.	

3.12 Multiple Servers behind SUA

If you wish, you can make inside servers for different services, e.g., web or FTP, visible to the outside users, even though SUA makes your whole inside network appear as a single machine to the outside world. A service is identified by the port number, e.g., web service is on port 80 and FTP on port 21.

As an example, if you have a web server at 192.168.1.2 and an FTP server 192.168.1.3, then you need to specify for port 80 (web) the server at IP address 192.168.1.2 and for port 21 (FTP) another at IP address 192.168.1.3.

Please note that a server can support more than one service, e.g., a server can provide both FTP and DNS service, while another provides only web service. Also, since you need to specify the IP address of a server in the Prestige, a server must have a fixed IP address and not be a DHCP client whose IP address potentially changes each time it is powered on.

In addition to the servers for specific services, SUA supports a default server. A service request that does not have a server explicitly designated for it is forwarded to the default server. If the default server is not defined, the service request is simply discarded.

To make a server visible to the outside world, specify the port number of the service and the inside IP address of the server in **Menu 15 - Multiple Server Configuration**.

3.12.1 Configuring a Server behind SUA

Follow the steps below to configure a server behind SUA:

1. Enter 15 in the main menu to go to **Menu 15 - Multiple Server Configuration**.
2. Enter an index number in menu 15 to go to **Menu 15.1 - SUA Server Configuration**.
3. Enter the service port number in the Port # field and the inside IP address of the server in the IP Address field.
4. 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.

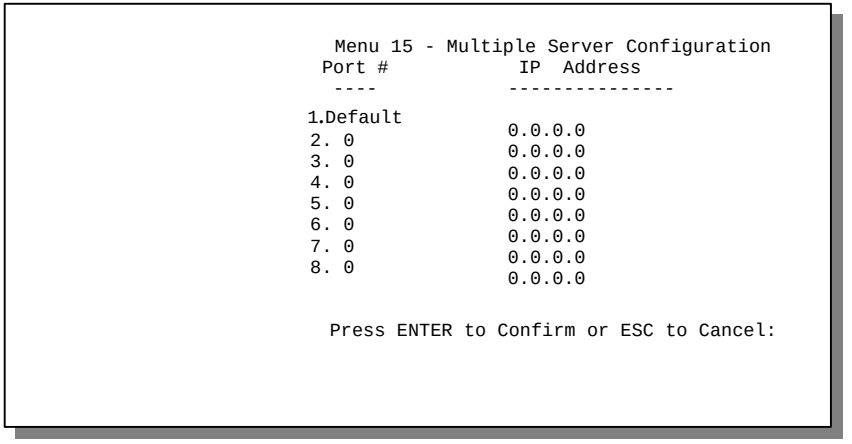


Figure 3-7 Multiple Server Configuration

The most often used port numbers are:

Table 3-6 Services vs. Port number

Services	Port Number
FTP (File Transfer Protocol)	21
Telnet	23
SMTP (Simple Mail Transfer Protocol)	25
DNS(Domain Name System)	53
HTTP (Hyper Text Transfer protocol or WWW, Web)	80
PPTP (Point-to-Point Tunneling Protocol)	1723

Chapter 4
Remote Node Configuration

In this chapter, we discuss the parameters that are protocol independent. The protocol-dependent configuration will be covered in subsequent chapters. For TCP/IP, see Chapter 5, for IPX, see Chapter 6 and for Bridging, see Chapter 7.

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 one of the remote nodes.

4.1 Remote Node Setup

This section describes the protocol-independent parameters for a remote node.

4.1.1 Remote Node Profile

To configure a remote node, follow these steps:

Step 1. From the Main Menu, select menu option **1. Remote Node Setup**

Step 2. When Menu 11 appears, as shown below, enter the number of the remote node that you wish to configure.

```
                    Menu 11 - Remote Node Setup

                1. nodename
                2. _________
                3. _________
                4. _________
                5. _________
                6. _________
                7. _________
                8. _________
                9. _________
                10. _________
                11. _________
                12. _________

                       Enter Node # to Edit:
```

Figure 4-1 Menu 11 – Remote Node Setup

When **Menu 11.1 - Remote Node Profile** appears fill in the fields as described in the table that follows to define this remote profile. The Remote Node Profile Menu Fields table shows how to configure the Remote Node Menu.

4.1.2 Encapsulation & Multiplexing Scenarios

For Internet Access you should use the encapsulation and multiplexing methods used by your ISP. For a LAN-to-LAN application, e.g., branch office and corporate headquarters, prior mutual agreement on methods used is necessary because there is no mechanism to automatically determine encapsulation/multiplexing. Selection of which encapsulation and multiplexing methods to use depends on how many VCs you have and how many different network protocols you need. The extra overhead that PPP over Ethernet (**PPPoE**) and **ENET ENCAP** encapsulation entail makes them a poor choice in a LAN-to-LAN application. Here are some examples of more suitable combinations in such an application.

Scene 1. One VC, Multiple Protocols

PPP (RFC 2364) encapsulation with **VC-based** multiplexing is the best combination because the extra protocol identifying headers that **LLC-based** multiplexing uses is unneeded. The **PPP** protocol already contains this information.

Scene 2. One VC, One Protocol (IP)

Select **RFC-1483** encapsulation with VC-based multiplexing requires the least amount of overhead (0 octets). However, if there is a potential need for multiple protocol support in the future, it may be safer to select **PPP** encapsulation instead of **RFC-1483**, so you don't need to reconfigure either machine when the time comes.

Scene 3. Multiple VCs

If you have an equal number (or more) of VCs than the number of protocols, then select **RFC-1483** encapsulation and **VC-based** multiplexing.

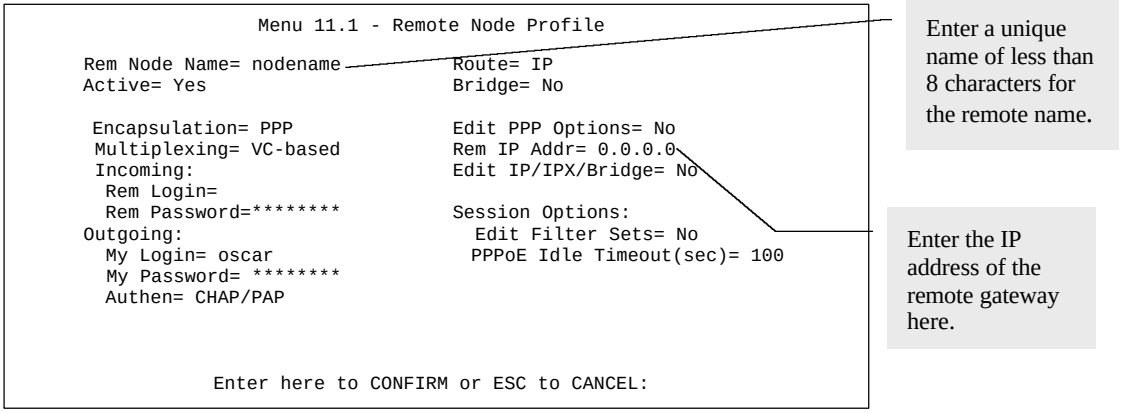


Figure 4-2 Menu 11.1 Remote Node Profile

Table 4-1 Remote Node Profile Menu Fields

Field	Description	Options
Rem Node Name	This is a required field [?]. Enter a descriptive name for the remote node, for example, Corp. This field can be up to eight characters. This name must be unique from any other remote node name.	
Active	Press the spacebar to toggle between **Yes** and **No**. Inactive nodes are displayed with a minus sign (-) at the beginning of the name in Menu 11.	**Yes/No**
Encapsulation=	**PPPoE** refers to RFC 2516 and **PPP** refers to RFC 2364, "PPP Encapsulation over ATM Adaptation Layer 5". If **RFC 1483** ("Multiprotocol Encapsulation over ATM Adaptation Layer 5") or **ENET ENCAP** are selected, then the **Rem Login, Rem Password, My Login, My Password, Edit PPP Options** and **Authen** fields will not be applicable (N/A). Moreover, **ENET ENCAP** encapsulation does not apply for IPX routing.	**PPPoE, PPP**, **RFC 1483** or **ENET ENCAP**
Multiplexing=	Press the spacebar to the select the multiplexing method.	**VC-based** **LLC-based**
Incoming: Rem Login Name	Enter the login name that this remote node will use when it calls your Prestige. The login name in this field combined with the Rem Node Password will be used to authenticate this node.	
Incoming: Rem Password	Enter the password used when this remote node calls your Prestige.	

Field	Description	Options
Outgoing: My Login	Enter the login name for your Prestige when it calls this remote node. If you are using **PPPoE** encapsulation**,** then this field must be of the form user@domain where domain identifies your ISP.	
Outgoing: My Password	Enter the password for your Prestige when it calls this remote node.	
Outgoing: Authen	This field sets the authentication protocol used for outgoing calls. Options for this field are: ● **CHAP/PAP** - Your Prestige will accept either CHAP or PAP when requested by this remote node. ● **CHAP** - accept CHAP only. ● **PAP** - accept PAP only.	**CHAP/PAP** **CHAP** **PAP**
Route	This field determines the protocols that your Prestige will route.	
Bridge	Bridging is used for protocols that the Prestige does not support, e.g., SNA, or not turned on in the previous Route field. When bridging is enabled, your Prestige will forward any packet that it does not route to this remote node; otherwise, the packets are discarded. .	Press space bar to toggle **Yes/No**
Edit PPP Options	To edit the PPP options for this remote node, move the cursor to this field, use the space bar to select **Yes** and press [Enter]. This will bring you to **Menu 11.2 - Remote Node PPP Options**. For more information on configuring PPP options, see the section *Editing PPP Options*.	Press space bar to toggle **Yes** then press [Enter]
Rem IP Addr	Enter the IP address of the remote gateway.	
Edit IP/IPX/Bridge	Press the space bar to select **Yes** and press **Enter** to go to **Menu 11.3 - Remote Node Network Layer Options** menu.	**Yes** or **No**
Session Option: Edit Filter Sets	Use the space bar to toggle this field to **Yes** and press [Enter] to open Menu 11.5 to edit the filter sets. See the Remote Node Filter section for more details.	Default= **No**
PPPoE Idle Timeout(sec)=	This value specifies the number of idle seconds that elapse before the Prestige automatically disconnects the PPPoE session.	**100** (default)
Once you have completed filling in Menu 11.1 – Remote Node Profile, press [Enter] at the message [Press ENTER to Confirm…] to save your configuration, or press [Esc] at any time to cancel.		

4.1.3 Outgoing Authentication Protocol

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

4.1.4 Editing PPP Options

To edit the remote node PPP Options, move the cursor to the **Edit PPP Options** field in **Menu 11.1 - Remote Node Profile**, and use the space bar to select **Yes**. Press **Enter** to open Menu 11.2, as shown next.

```
                    Menu 11.2 - Remote Node PPP Options

                Encapsulation= Standard PPP
                Compression= No


                 Press ENTER to CONFIRM or ESC to CANCEL:
Press Space Bar to Toggle.
```

Figure 4-3 Menu 11.2 - Remote Node PPP Options

The following table describes the Remote Node PPP Options Menu, and contains instructions on how to configure the PPP options fields.

Table 4-2 Remote Node PPP Options Menu Fields

Field	Description	Option
Encapsulation	Select the CISCO PPP only when this remote node is a Cisco machine; otherwise, select the Standard PPP.	**Standard PPP** **CISCO PPP**
Compression	Turn on/off Stac Compression. The default for this field is **Off**.	**On/Off** (Default = **Off**)
Once you have completed filling in Menu 11.2 – Remote Node PPP Options, press [Enter] at the message [Press ENTER to Confirm…] to save your configuration, or press [Esc] at any time to cancel.		

4.1.5 Remote Node Filter

Use **Menu 11.5 – Remote Node Filter** to specify the filterset(s) to apply to the incoming and outgoing traffic between this remote node and the Prestige. You can specify up to 4 filter sets separated by comma, e.g., 1, 5, 9, 12, in each filter field. The default is no filters.

Note that spaces are accepted in this field. For more information on defining the filters, see Chapter 8 on *Filter Configuration*.

```
                    Menu 11.5 - 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 4-4 Menu 11.5 – Remote Node Filter

Chapter 5
Remote Node TCP/IP Configuration

This chapter shows you how to configure the TCP/IP parameters of a remote node.

A typical LAN-to-LAN application is to use your Prestige to connect a branch office to the headquarters, as depicted in the following diagram.

5.1 LAN-to-LAN Application

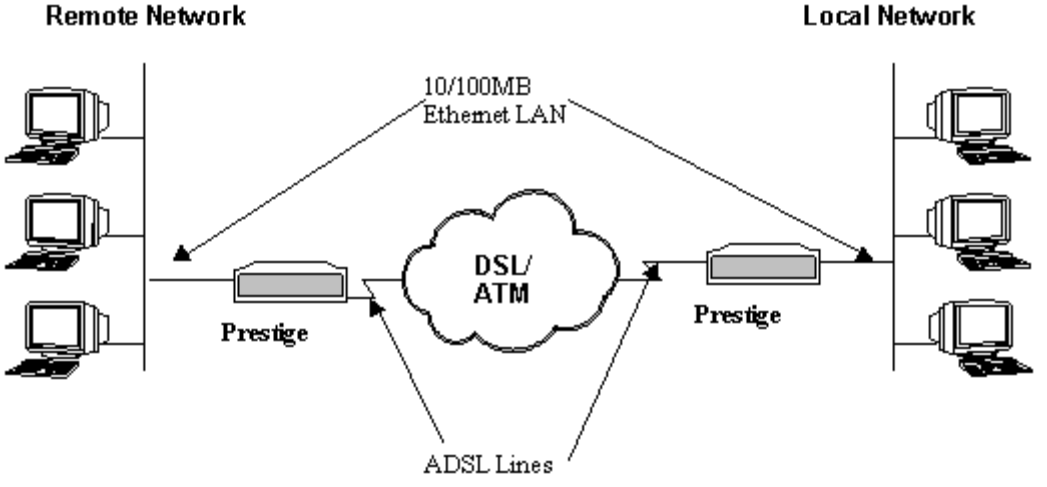


Figure 5-1 TCP/IP LAN-to-LAN Application

For the branch office, you need to configure a remote node in order to dial out to the headquarters. Additionally, you may also need to define static routes if some services reside beyond the immediate remote LAN.

5.1.1 Editing TCP/IP Options

Follow the steps below to edit **Menu 11.3 - Remote Node Network Layer Options** shown next.

In Menu 11.1, move the cursor to the **Edit IP/IPX/Bridge**, then press the space bar to toggle and set the value to **Yes**. Press [Enter] to open **Menu 11.3 - Network Layer Options**.

There are two versions of menu 11.3 for the P641, depending on whether you chose **VC-based** or **LLC-based Multiplexing** in menu 11.1.

VC-Based Multiplexing

Remember that for **VC-based** multiplexing, by prior mutual agreement, a protocol is assigned a specific virtual circuit, e.g., VC1 will carry IP, VC2 will carry IPX etc.

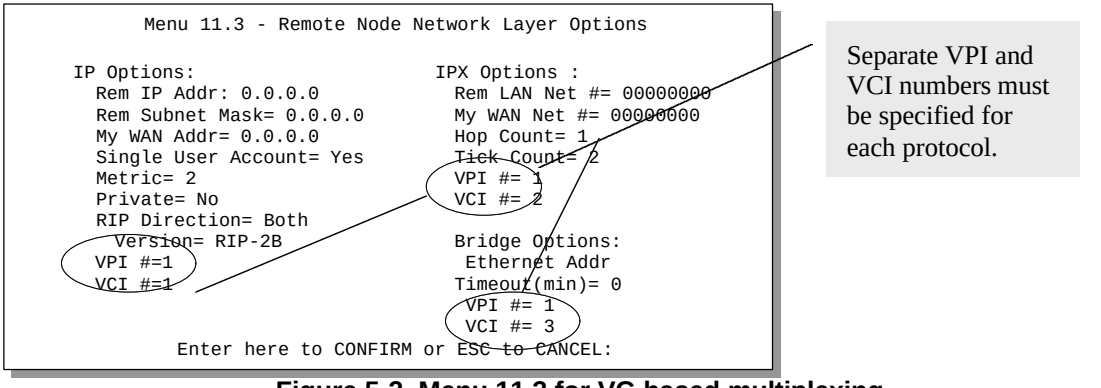


Figure 5-2 Menu 11.3 for VC-based multiplexing.

In this case, separate VPI and VCI numbers must be specified for each protocol.

LLC-based multiplexing

For **LLC-based** multiplexing, one VC carries multiple protocols with protocol identifying information being contained in each packet header.

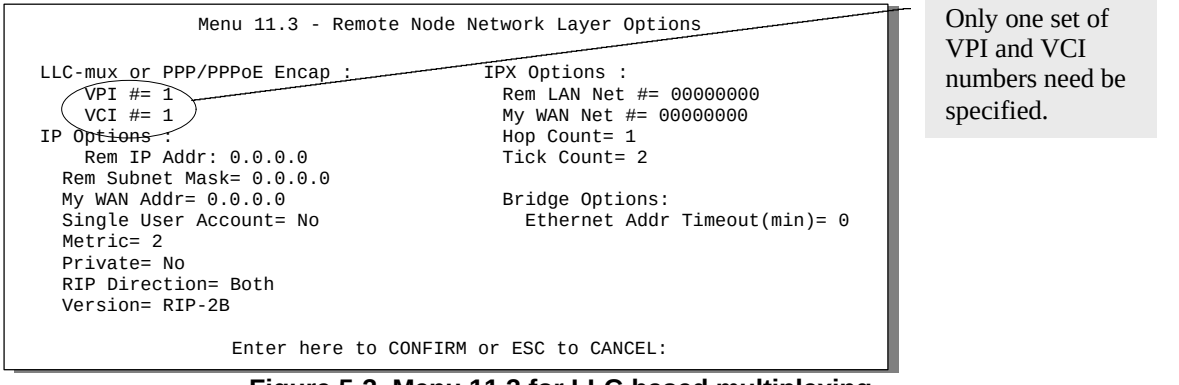


Figure 5-3 Menu 11.3 for LLC-based multiplexing

In this case, only one set of VPI and VCI numbers need be specified for all protocols. The valid range for the VPI is 1 to 255 and for the VCI is 32 to 65535 (1 to 32 is reserved for local management of ATM traffic).

The following diagram explains the Sample IP Addresses to help you to understand the field of **My Wan Addr** in Menu 11.3. Refer to Figure 3-3 LAN & WAN IPs for a brief review of what a WAN IP is. **My WAN Addr** indicates the local Prestige WAN IP while **Rem IP Address** indicates the peer WAN IP.

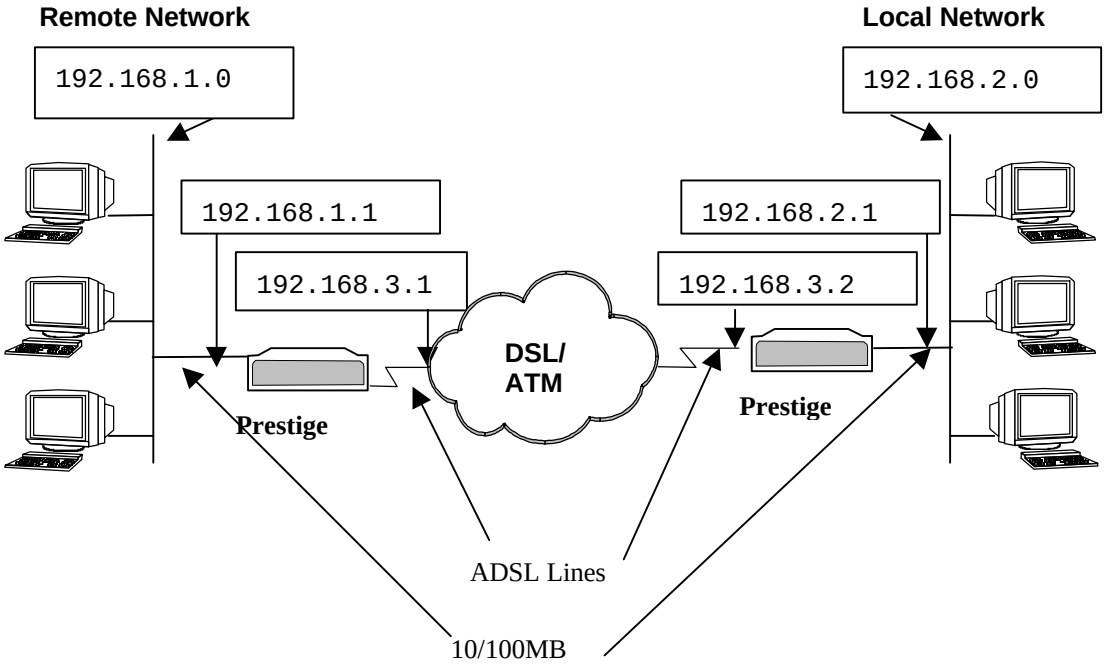


Figure 5-4 Sample IP Addresses for a TCPI/IP LAN-to-LAN Connection

To configure the TCP/IP parameters of a remote node, first configure the two fields in **Menu 11 – Remote Node Profile**, as shown in the table below. For more details on the IP Option fields, refer to Chapter 3.

Table 5-1 TCP/IP related fields in Remote Node Profile

Field	Description	Option
Rem IP Address	Enter the IP address of the remote gateway in Remote Node Profile.	
Edit IP	Press the space bar to select **Yes** and press **Enter** to go to Menu 11.3 - Remote Node Network Layer Options Menu.	**Yes** (**Yes/No**)

The following table shows the TCP/IP related fields in **Menu 11.3 - Remote Node Network Layer Options**.

Table 5-2 TCP/IP Remote Node Configuration

Field	Description	Option
Rem IP Address	This will show the IP address you entered for this remote node in the previous menu.	
Rem IP Subnet Mask	Enter the subnet mask for the remote network.	
My WAN Addr	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 Prestige. Note that this is the address assigned to your local Prestige, not the remote router.	
Single User Account	Set this field to **Yes** to enable the Single User Account feature for your Prestige. Use the space bar to toggle between **Yes** and **No**. *See Chapter 3 - Internet Access Application* for more information on the Single User Account feature.	**Yes/No**
Metric	The metric represents the “cost” of transmission for routing purposes. IP routing uses hop count as the measurement of cost, with a minimum of 1 for directly connected networks. Enter a number that approximates the cost for this link. The number need not be precise, but it must be between 1 and 15. In practice, 2 or 3 is usually a good number.	**1** to **15**
Private	This parameter determines if the Prestige will include 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 will be propagated to other hosts through RIP	**Yes/No**

Field	Description	Option
	broadcasts.	
RIP Direction	Press the space bar to select the **RIP direction** from **Both**/**In Only**/**Out Only** or **None**.	(Default= **Both**)
Version=	Press the space bar to select the RIP version from **RIP-1/RIP-2B/RIP-2M.**	**RIP-1** (default)
VPI	Enter the Virtual Path Identifier (VPI) number that your telephone company supplies.	
VCI	Enter the Virtual Channel Identifier (VCI) number that your telephone company supplies.	
Once you have completed filling in the Network Layer Options Menu, press [Enter] to return to Menu 11. Press [Enter] at the message [Press ENTER to Confirm...] to save your configuration, or press [Esc] at any time to cancel.		

5.1.2 Static Route Setup

Static routes tell the Prestige routing information that it cannot learn automatically through other means. This can arise in cases where RIP is disabled on the LAN or a remote network is beyond the one that is directly connected to a remote node.

Each remote node specifies only the network to which the gateway is directly connected, and the Prestige has no knowledge of the networks beyond. For instance, the Prestige knows about network N2 in the following diagram through remote node Router 1. However, the Prestige is unable to route a packet to network N3 because it doesn't know that there is a route through remote node Router 1 (via Router 2). The static routes are for you to tell the Prestige about the networks beyond the remote nodes.

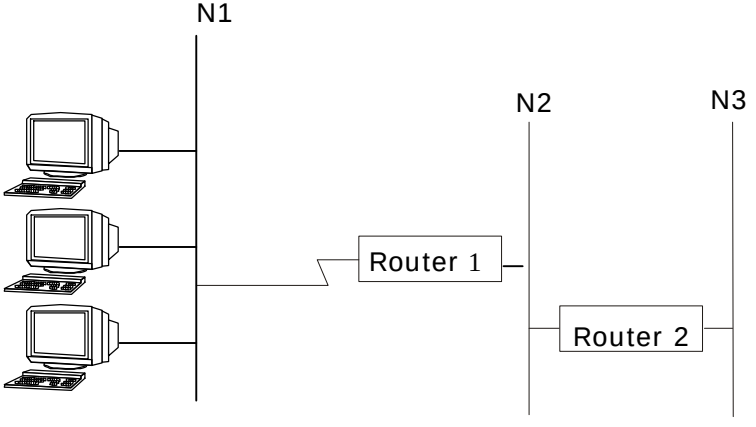


Figure 5-5 Example of Static Routing Topology

To configure an IP static route, use **Menu 12 - Static Route Setup**, as shown next.

```
                    Menu 12 - IP Static Route Setup


                    1. _________
                    2. _________
                    3. _________
                    4. _________
                    5. _________
                    6. _________
                    7. _________
                    8. _________


                    Enter selection number:
```

Figure 5-6 Menu 12 - IP Static Route Setup

From Menu 12, enter the index of the static route you wish to edit to open **Menu 12.1 -Edit IP Static Route.**

```
                     Menu 12.1 - Edit IP Static Route


                  Route #: 1
                  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:
```

Figure 5-7 Edit IP Static Route

The following table describes the fields for **Menu 12.1.1 – Edit IP Static Route Setup**.

Table 5-3 Edit IP Static Route Menu Fields

Field	Description
Route Name	Enter a descriptive name for this route. This is for identification purpose only.
Active	This field allows you to activate/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 subnet mask for this destination. Follow the discussion on IP subnet mask in this chapter.
Gateway IP Address	Enter the IP address of the gateway. The gateway is an immediate neighbor of your Prestige that will forward the packet to the destination. On the LAN, the gateway must be a router on the same segment as your Prestige; over WAN, the gateway must be the IP address of one of the remote nodes.
Metric	The metric represents the “cost” of transmission for routing purposes. IP routing uses hop count as the measurement of cost, with a minimum of 1 for directly connected networks. Enter a number that approximates the cost for this link. The number need not be precise, but it must be between 1 and 15. In practice, 2 or 3 is usually a good number.
Private	This parameter determines if the Prestige will include 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 will be propagated to other hosts through RIP broadcasts.

Chapter 6
IPX Configuration

This chapter shows you how to configure the IPX parameters of the Prestige 641.

6.1 IPX Network Environment

Novell bundles the protocol stack, the server software and routing functionality in their NetWare server products, so a NetWare server is not only a file or print server, it is also a router.

6.1.1 Network and Node Number

Every IPX machine has a network number and a node number, together they form the complete address of the machine. The IPX network number is a 32-bit quantity and is usually expressed in 8 hexadecimal digits, e.g., 0893A8CF. The host number is a 48-bit quantity and usually is taken from the MAC (Media Access Control) address of the Ethernet hardware, so you don't have to explicitly configure the node number.

An IPX client obtains its network number from a server that has the network numbers statically configured. If there are multiple servers on a network, only one server need to have the network numbers configured and all other stations (clients and servers) can obtain the network numbers from it. The server with configured network numbers is called a seed router.

If you have a NetWare server on the same LAN as the Prestige 641, we recommend that you set up a NetWare server as a seed router. Even though the Prestige 641 is capable as a seed router, a NetWare server offers a much more extensive facility for network management.

6.1.2 Frame Types

IPX can run on top of four different frame types on the Ethernet. These frame types are 802.2, 802.3, Ethernet II (DIX), and SNAP (Sub-Network Access Protocol). Each frame type is a separate logical network, even though they exist on one physical cable (see the following diagram).

Although there are four frame types available on the Ethernet, you should configure as few frame types as possible on your NetWare server and use automatic frame detection on the clients to simplify management and to reduce network overhead.

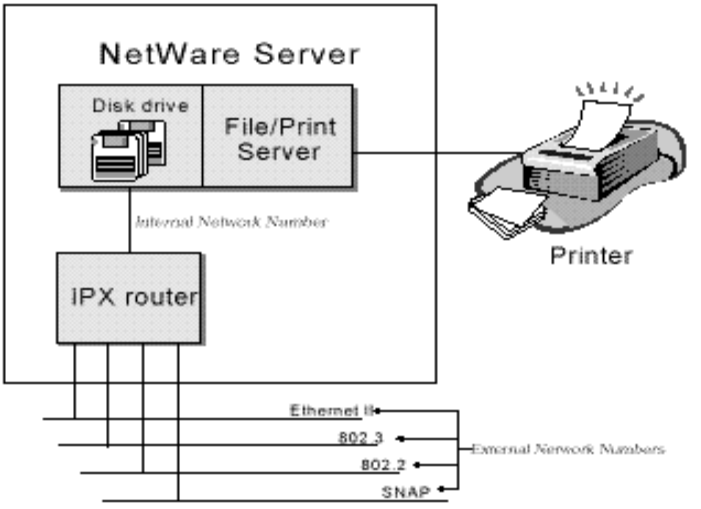


Figure 6-1 NetWare Server

6.1.3 External Network Number

Each of the four logical networks (based on frame type) has its own external network number.

6.1.4 Internal Network Number

In addition to the external network numbers, each NetWare server has its own internal network number that is a virtual network to which the server is attached. It is important to remember that every network number must be unique for that entire internetwork, either internal or external.

6.2 Prestige 641 in an IPX Environment

There are two scenarios in which your Prestige 641 is deployed, depending on whether there is a NetWare server on the LAN, as depicted in the following diagram.

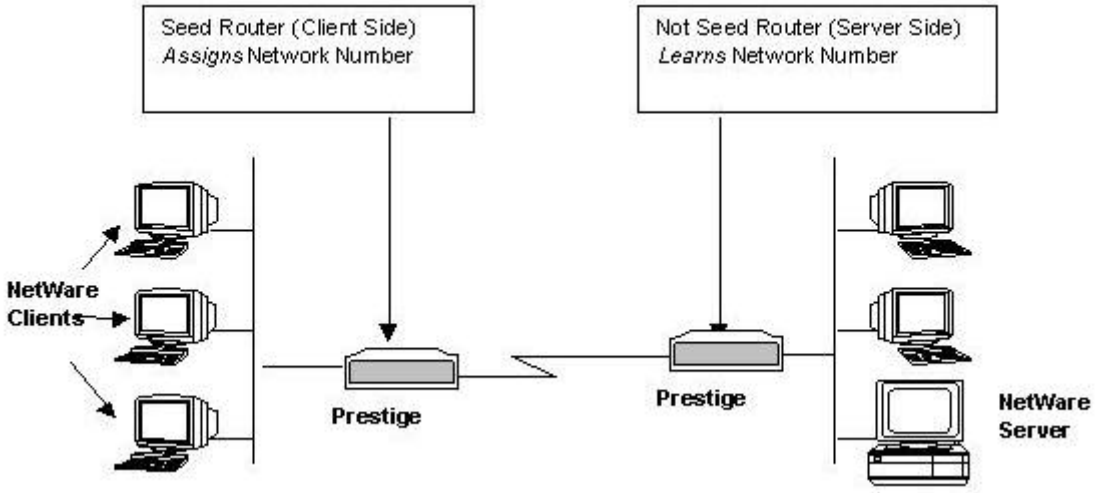


Figure 6-2 Prestige 641 in an IPX Environment

6.2.1 Prestige 641 on LAN with Server

If your Prestige 641 is on a LAN with a seed router, you do not need to configure the LAN network numbers. Your Prestige 641 will learn the network number from the seed router and add the routes to its routing table.

6.2.2 Prestige 641 on LAN without Server

Each IPX network must have a seed router. If you only have NetWare clients on your network, then you must configure the Prestige 641 as a seed router and set up unique network numbers for each frame type enabled using the Ethernet Setup Menu.

6.3 IPX Ethernet Setup

From **Menu 3 - Ethernet Setup**, enter 3 to go to **Menu 3.3 - Novell IPX Ethernet Setup** as shown in the figure below.

```
                    Menu 3.3 - Novell IPX Ethernet Setup

                  Seed Router= No

                  Frame Type 802.2= Yes
                    IPX Network #= N/A

                  Frame Type 802.3= No
                    IPX Network #= N/A

                  Frame Type Ethernet II= No
                    IPX Network #= N/A

                  Frame Type SNAP= No
                    IPX Network #= N/A


                    Enter here to CONFIRM or ESC to CANCEL:
Press Space Bar to Toggle.
```

Figure 6-3 Menu 3.3 - Novell IPX Ethernet Setup

The following table describes the Novell IPX Ethernet Setup Menu.

Table 6-1 Novell IPX Ethernet Setup Fields

Field	Description	Options
Seed Router	Determine if your Prestige 641 is to act as a seed router.	**Yes/No**
Frame Type	Enable/Disable the individual frame type. Remember to enable only the ones that are actually used on your network.	**802.2** **802.3** **Ethernet II** **SNAP**
IPX Network #	If your Prestige 641 is a seed router, enter a unique network number for each frame type enabled.	
Press [Enter] at the message [Press ENTER to Confirm ...] to save your configuration, or press [Esc] at any time to cancel.		

6.4 LAN-to-LAN Application with Novell IPX

A typical LAN-to-LAN application is to use your Prestige 641 to call from a branch office to the corporate headquarters to enable the stations in the branch office to access the NetWare servers at the headquarters, as depicted in the figure below.

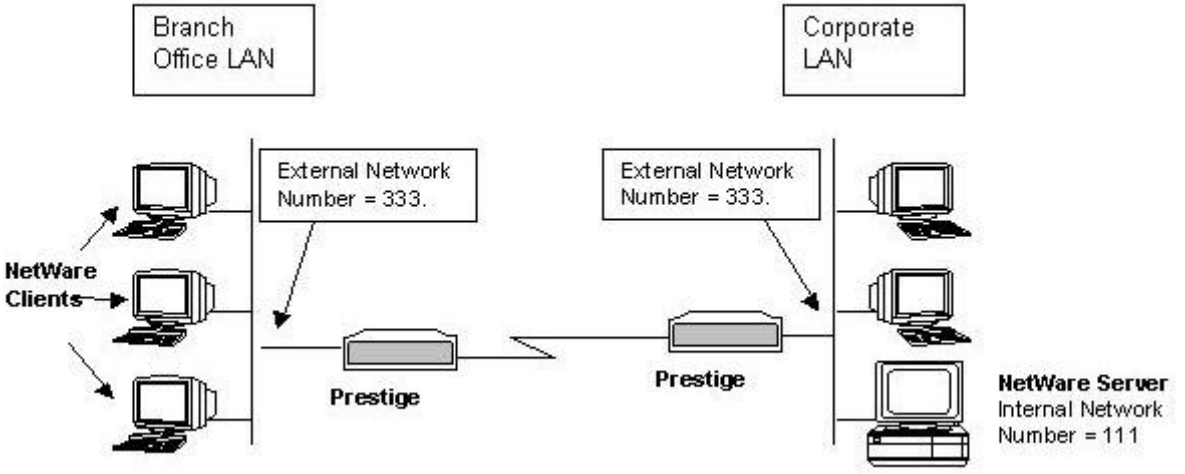


Figure 6-4 LAN-to-LAN Application with Novell IPX

6.4.1 IPX Remote Node Setup

Follow the procedure in *Chapter 5* to configure the protocol-independent parameters in **Menu 11.1 - Remote Node Profile**. For the IPX-specific parameters in **Menu 11.3 - Remote Node Network Layer Options** follow the instructions below.

Step 1. In Menu 11.1, make sure **IPX** is among the protocols in the **Route** field. (The **Route** field should display **Route** = IPX or **Route** = IP + IPX.)

Step 2. Move the cursor to the **Edit IP/IPX/Bridge** field, then press the space bar to select **Yes** and press [Enter] to open **Menu 11.3 - Network Layer Options**.

```
                Menu 11.3 - Remote Node Network Layer Options


LLC-mux or PPP/PPPoE Encap :          IPX Options:
    VPI #= 1                           Rem LAN Net #= 00000000
    VCI #= 1                           My WAN Net #= 00000000
IP Options:                            Hop Count= 1
  Rem IP Addr:                         Tick Count= 2
  Rem Subnet Mask= N/A
  My WAN Addr= N/A                   Bridge Options:
  Single User Account= N/A             Ethernet Addr Timeout(min)= N/A
  Metric= N/A
  Private= N/A
  RIP Direction= N/A
  Version= N/A



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

Figure 6-5 Menu 11.3 - Remote Node Novell IPX Options

The table below describes the IPX-specific parameters of the remote node setup.

Table 6-2 Remote Node Novell IPX Options

Field	Description	Option
Rem LAN Net #	In this field, enter the internal network number of the NetWare server on the remote LAN.	
My WAN Net #	In this field, enter the network number of the WAN link. If you leave this field as **00000000**, your Prestige will determine automatically the network number through negotiation with the PPP peer.	**00000000** (default)
Hop Count	This field indicates the number of intermediate networks that must be passed through to reach the remote node.	**1** (default)
Tick Count	This field indicates the time-ticks required to reach the remote node.	**2** (default)
Once you have completed filling in the Network Layer Options Menu, press [Enter] to return to Menu 11.1. Then press [Enter] at the message [Press ENTER to Confirm] to save your configuration, press [Esc] to cancel.		

6.4.2 IPX Static Route Setup

Similar to IP, IPX static routes tell the Prestige 641 how to reach servers beyond a remote node before a connection to that remote node is established.

From Menu 12, select two, then select one of the IPX Static Routes to open **Menu 12.2.1 - Edit IPX Static Route**, as shown next.

```
                Menu 12.2.1 - Edit IPX Static Route

              Route #= 11
              Server Name= ?
              Active= Yes
              Network #= ?
              Node #= 000000000001
              Socket #= 0451
              Type #= 0004
              Hop Count= 2
              Tick Count= 3
              Gateway Node= 1



            Press ENTER to CONFIRM or ESC to CANCEL:
```

Figure 6-6 Menu 12.2 - Edit IPX Static Route

The following table contains the instructions on how to configure the Edit IP Static Route Menu.

Table 6-3 Edit IPX Static Route Menu Fields

Field	Description
Server Name	In this field, enter the name of the server. This must be the *exact* name configured in the NetWare server**.**
Network #	This field contains the internal network number of the remote server that you wish to access. [00000000] or [FFFFFFFF] are reserved.
Node #	This field contains the address of the node on which the server resides. If you are using a Novell IPX implementation, this value is [000000000001].
Socket #	This field contains the socket number on which the server will receive service requests. The default for this field is hex [0451].
Type #	This field identifies the type of service the server provides. The default for this field is hex [0004].
Gateway Node	In this field, enter the number of the remote node that is the gateway for this static route.
Hop Count and Tick Count	These two fields have the same meaning as those in the Ethernet setup.
Once you have completed filling in the menu, press [Enter] at the message [Press ENTER to Confirm…] to save your configuration, or press [Esc] to cancel to cancel.	

Chapter 7
Bridging Setup

This chapter shows you how to configure the bridging parameters of your Prestige.

7.1 Bridging in General

Bridging bases the forwarding decision on the MAC (Media Access Control), or hardware address, while routing does it on the network layer (IP or IPX) address. Bridging allows the Prestige 641 to transport packets of network layer protocols that the Prestige 641 does not route, e.g., SNA, from one network to another. The caveat is that, compared to routing, bridging generates more traffic for the same network layer protocol and it also demands more CPU cycles and memory.

For efficiency reasons, do *not* turn on bridging unless you need to support protocols other than IP and IPX on your network. For IP and IPX, enable the respective routing if you need it; do not bridge what the Prestige 641 can route.

7.2 Bridge Ethernet Setup

Basically, all non-local packets are bridged to the WAN; however, your Prestige 641 applies special handling for certain IPX packets to reduce the number of calls, depending on the setting of the **Handle IPX** field.

From **Menu 3 - Ethernet Setup**, enter 4 to bring up **Menu 3.4 - Bridge Ethernet Setup** as shown next.

```
                    Menu 3.4 - Bridge Ethernet Setup


                  Handle IPX= None




                 Press ENTER to CONFIRM or ESC to CANCEL:
Press Space Bar to Toggle.
```

Figure 7-1 Menu 3.5 - Bridge Ethernet Setup

The following table describes how to configure the **Handle IPX** field in Menu 3.5.

Table 7-1 Bridge Ethernet Setup Menu - Handle IPX Field Configuration

Handle IPX Field Options (Menu 3.5)	Description
None	When there is no IPX traffic on the LAN or when you do not want to apply any special handling for IPX.
Client	When there are only client workstations on the LAN. RIP and SAP (Service Advertising Protocol) response packets will not trigger calls.
Server	When there are only IPX servers on the LAN. No RIP or SAP packets will trigger calls. In addition, during the time when the line is down, your Prestige 641 will reply to watchdog messages from the servers on behalf of remote clients. The period of time that your Prestige 641 will do this is linked to the Ethernet Address Timeout parameter in each remote node (see Remote Node Configuration). When a remote Ethernet address is aged out, there is no need to maintain its connection to the IPX server.

7.2.1 Remote Node Bridging Setup

Follow the procedure in *Chapter 5* to configure the protocol-independent parameters in **Menu 11.1 - Remote Node Profile**. For bridging-specific parameters, you need to configure **Menu 11.3 - Remote Node Network Layer Options**.

To set up **Menu 11.3 - Remote Node Network Layer Options** follow these steps:

Step 1. In Menu 11.1, make sure the **Bridge** field is set to **Yes**.

Step 2. Move the cursor to the **Edit IP/IPX/Bridge** field, then press the space bar to select **Yes** and press [Enter] to open Menu 11.3 - Network Layer Options.

```
              Menu 11.3 - Remote Node Network Layer Options

LLC-mux or PPP/PPPoE Encap :            IPX Options :
    VPI #= 1                              Rem LAN Net #= 00000000
    VCI #= 1                              My WAN Net #= 00000000
IP Options :                              Hop Count= 1
  Rem IP Addr: 0.0.0.0                    Tick Count= 2
  Rem Subnet Mask= 0.0.0.0
  My WAN Addr= 0.0.0.0                    Bridge Options:
  Single User Account= No                   Ethernet Addr Timeout(min)= 0
  Metric= 2
  Private= No
  RIP Direction= Both
  Version= RIP-2B

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

Figure 7-2 Menu 11.3 - Remote Node Bridging Options

The following table describes the bridging-specific parameters in the Remote Node Profile and Network Layers menus.

Table 7-2 P641 Remote Node Network Layers Menu Bridge Options

Field	Description
Bridge	Make sure this field is set to **Yes**.
Edit IP/IPX/Bridge	Press the space bar to change it to **Yes** and press Enter] to go to the Network Layer Options Menu.
Ethernet Addr Timeout (min)	In this field, enter the time (number of minutes) that you wish your Prestige 641 to retain the Ethernet Addr information in its internal tables while the line is down. If this information is retained, your Prestige 641 will not have to recompile the tables when the line is brought back up.
Once you have completed filling in the Network Layer Options Menu, press [Enter] to return to Menu 11.1. Then press [Enter] at the message [Press ENTER to Confirm…] to save your configuration, or press [Esc] to cancel.	

7.3 Bridge Static Route Setup

Similar to network layer static routes, a bridging static route tells the Prestige 641 about the route to a node before a connection is established. You configure bridge static routes in Menu 12.3.1, by pressing 3 in menu 12 and then selecting one of the bridge static routes as shown below.

```
                Menu 12.3 - Bridge Static Route Setup

              1. _________
              2. _________
              3. _________
              4. _________



                        Enter selection number:
```

Figure 7-3 Menu 12.3 - Bridge Static Route Setup

```
              Menu 12.3.1 - Edit Bridge Static Route



              Route #: 21
              Route Name=
              Active= No
              Ether Address= ?
              IP Address=
              Gateway Node= 1

            Press ENTER to CONFIRM or ESC to CANCEL:
```

Figure 7-4 Menu 12.3.1 - Edit Bridge Static Route

The following table describes the Bridge Static Route Menu.

Table 7-3 Bridge Static Route Menu Fields

Field	Description
Route Name	Enter a name for the bridge static route for identification purposes.
Active	Activate/deactivate the static route.
Ether Address	Enter the MAC address of the destination machine that you wish to bridge the packets to.
IP Address	If available, enter the IP address of the destination machine that you wish to bridge the packets to.
Gateway Node	Enter the number of the remote node that is the gateway of this static route.
Once you have completed filling in this menu, press [Enter] at the message [Press ENTER to Confirm…] to save your configuration, or press [Esc] to cancel.	

Chapter 8
Filter Configuration

This chapter shows you how to create and apply filter(s).

8.1 About Filtering

Your Prestige uses filters to decide whether or not to allow passage of a packet. Data filters are divided into incoming and outgoing filters, depending on the direction of the packet relative to a port. These filters are further subdivided into device and protocol filters, which are discussed later.

The following sections describe how to configure filter sets.

The Filter Structure of the Prestige

A filter set consists of one or more filter rules. Usually, you would group related rules, e.g., all the rules for NetBIOS, into a single set and give it a descriptive name. The Prestige allows you to 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.

Three sets of factory default filter rules have been configured in Menu 21 to prevent NetBIOS traffic from triggering calls and to prevent incoming telnetting. A summary of their filter rules is shown in the figures that follow and also see section 8.5 Applying a Filter and Factory Defaults.

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.

8.2 Configuring a Filter Set

To configure a filter sets, follow this procedure:

Step 1. Enter **21** from the Main Menu to open **Menu 21 - Filter Set Configuration**.

```
                    Menu 21 - Filter Set Configuration

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


                Enter Filter Set Number to Configure=
                Edit Comments= NetBIOS_WAN
               Press ENTER to CONFIRM or ESC to CANCEL:
```

Figure 8-1 Menu 21 - Filter Set Configuration

Step 2. Enter the index of the filter set you wish to configure (no. 1-12) and press [Enter].

Step 3. Enter a descriptive name or comment in the Edit Comments field and press Enter.

Step 4. Press [Enter] at the message: [Press ENTER to confirm] to open Menu 21.1 - Filter Rules Summary.

```
                    Menu 21.1 - 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=137                   N D N
2 Y IP   Pr=6, SA=0.0.0.0, DA=0.0.0.0, DP=138                   N D N
3 Y IP   Pr=6, SA=0.0.0.0, DA=0.0.0.0, DP=139                   N D N
4 Y IP   Pr=17, SA=0.0.0.0, DA=0.0.0.0, DP=137                  N D N
5 Y IP   Pr=17, SA=0.0.0.0, DA=0.0.0.0, DP=138                  N D N
6 Y IP   Pr=17, SA=0.0.0.0, DA=0.0.0.0, DP=139                  N D F


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

                 Edit Comments= NetBIOS_WAN

                   Press ENTER to Confirm or ESC to Cancel:
                 Enter Filter Rule Number (1-6) to Configure:
```

Figure 8-2 NetBIOS_WAN Filter Rules Summary

```
                    Menu 21.2 - Filter Rules Summary

  # A Type                        Filter Rules                       M m
  - - ---- ------------------------------------------- --------- - -
  1 Y IP   Pr=17, SA=0.0.0.0, SP=137, DA=0.0.0.0, DP=53            N D
  2 Y
  3 Y
  4 Y
  5 Y
  6 Y

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

Figure 8-3 NetBIOS _LAN Filter Rules Summary

```
                    Menu 21.3 - 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
```

Figure 8-4 Telnet Filter Rules Summary

8.2.1 Filter Rules Summary Menu

This screen shows a summary of the existing rules in an example filter set. The following tables contain a brief description of the abbreviations used in Menu 21.1.

Table 8-1 Abbreviations Used in the Filter Rules Summary Menu

Abbreviations	Description	Display
#	Refers to the filter rule number (1-6).	
A	Refers to Active.	[Y] means the filter rule is active. [N] means the filter rule is inactive.
Type	Refers to the type of filter rule. This shows GEN for generic, IP for TCP/IP	[GEN] for Generic [IP] for TCP/IP
Filter Rules	The filter rule parameters are displayed here (see below).	
M	Refers to More. [Y] means an action can not yet be taken as there are more rules to check, which are concatenated with the present rule to form a rule chain. When the rule chain is complete an action can be taken. [N] means you can now specify an action to be taken i.e., forward the packet, drop the packet or check the next rule. For the latter, the next rule is independent of the rule just checked. If More is **Yes**, then **Action Matched** and **Action Not Matched** will be **N/A**	[Y] [N]
m	Refers to **Action Matched**. [F] means to forward the packet immediately and skip checking the remaining rules.	[F] means to forward the packet. [D] means to drop the packet. [N] means check the next rule.
n	Refers to **Action Not Matched.** [F] means to forward the packet immediately and skip checking the remaining rules.	[F] means to forward the packet. [D] means to drop the packet. [N] means check the next rule.

The protocol dependent filter rules abbreviation are listed as follows:

- If the filter type is IP, the following abbreviations listed in the following table will be used.

Table 8-2 Abbreviations Used If Filter Type Is IP

Abbreviation	Description
Pr	Protocol
SA	Source Address
SP	Source Port number
DA	Destination Address
DP	Destination Port number

- Abbreviations Used If Filter Type Is IPX

Table 8-3 Abbreviations Used If Filter Type Is IPX

Abbreviation	Description
PT	IPX Packet Type
SS	Source Socket
DS	Destination Socket

- If the filter type is GEN (generic), the following abbreviations listed in the following table will be used.

Table 8-4 Abbreviations Used If Filter Type Is GEN

Abbreviation	Description
Off	Offset
Len	Length

Refer to the next section for information on configuring the filter rules.

8.3 Configuring a Filter Rule

To configure a filter rule, enter its number in **Menu 21.1 - Filter Rules Summary** and press Enter to open Menu 21.1.1 for the rule.

There are three types of filter rules: **TCP/IP**, **IPX** and **Generic**. Depending on the type of rule, the parameters below the type will be different. Use the space bar to select the type of rule that you wish to create in the **Filter Type** field and press Enter to open the respective menu.

To speed up filtering, all rules in a filter set must be of the same class, i.e., 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 filters field or vice versa, the Prestige will warn you and will not allow you to save.

8.4 Filter Types and SUA

There are two types of filter rules, **Device Filter** (Generic) rules and **Protocol Filter** (TCP/IP and IPX) rules. **Device Filter** rules act on the raw data from/to LAN and WAN. **Protocol Filter** rules act on the IP and IPX packets. Generic and TCP/IP filter rules are discussed in more detail in the next section. When NAT/SUA (Network Address Translation/Single User Account) 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 Prestige applies the **protocol filters** to the "native" IP address and port number before NAT/SUA for outgoing packets and after NAT/SUA 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 Prestige is receiving and sending the packets; i.e. the interface. The interface can be an Ethernet, or any other hardware port. The following diagram illustrates this.

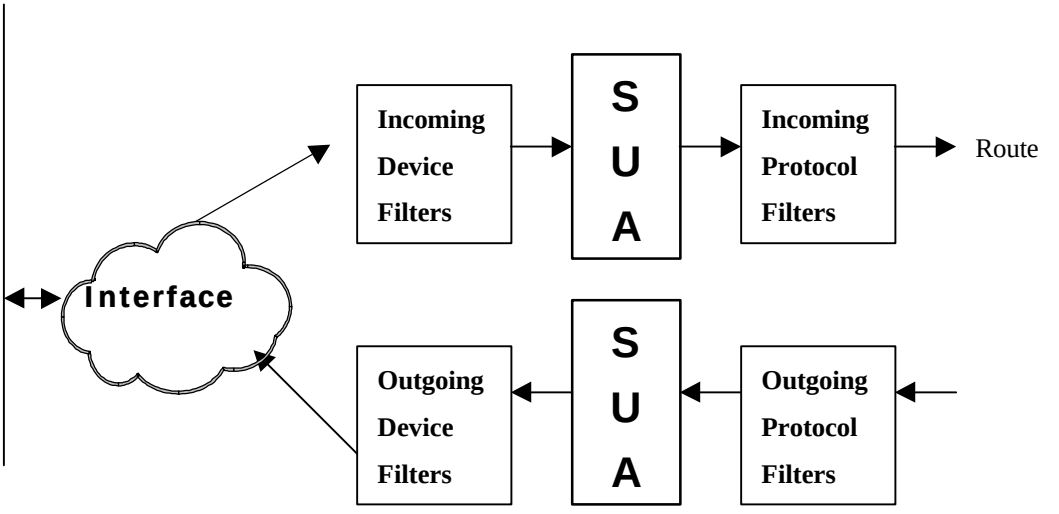


Figure 8-5 Protocol and Device Filter Sets

8.4.1 TCP/IP Filter Rule

This section shows you how to configure a TCP/IP filter rule. TCP/IP rules allow you to base the rule on the fields in the IP and the upper layer protocol, e.g., UDP and TCP, headers.

To configure a TCP/IP rules, select TCP/IP Filter Rule from the Filter Type field and press Enter to open **Menu 21.1.1 - TCP/IP Filter Rule**, as shown next.

```
                    Menu 21.1.1 - TCP/IP Filter Rule

                Filter #: 1,1
                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 #= 137
                             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= Check Next Rule
                Action Not Matched= Check Next Rule

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

Figure 8-6 Menu 21.1.1 - TCP/IP Filter Rule

The following table describes how to configure your TCP/IP filter rule.

Table 8-5 TCP/IP Filter Rule Menu Fields

Field	Description	Option
Active	This field activates/deactivates the filter rule.	**Yes/No**
IP Protocol	Protocol refers to the upper layer protocol, e.g., TCP is 6, UDP is 17 and ICMP is 1. This value must be between 0 and 255	0-255
IP Source Route	If **Yes**, the rule applies to packet with IP source route option; else the packet must not have source route option. The majority of IP packets do not have source route.	**Yes/No**
Destination: IP Addr	Enter the destination IP Address of the packet you wish to filter. This field is a don't-care if it is 0.0.0.0.	IP address
Destination: IP Mask	Enter the IP subnet mask to apply to the Destination: IP Addr.	Subnet mask
Destination: Port #	Enter the destination port of the packets that you wish to filter. The range of this field is 0 to 65535. This field is a don't-care if it is 0.	0-65535

Field	Description	Option
Destination: Port # Comp	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 Addr	Enter the source IP Address of the packet you wish to filter. This field is a don't-care if it is 0.0.0.0.	IP Address
Source: IP Mask	Enter the IP subnet mask to apply to the Source: IP Addr.	IP Mask
Source: Port #	Enter the source port of the packets that you wish to filter. The range of this field is 0 to 65535. This field is a don't-care if it is 0.	0-65535
Source: Port # Comp	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 IP Protocol field is 6, TCP. If yes, the rule matches only established TCP connections; else the rule matches all TCP packets.	**Yes/No**
More	If yes, a matching packet is passed to the next filter rule before an action is taken; else 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 / N/A**
Log	Select the logging option from the following: ● **None** – No packets will be logged. ● **Action Matched** - Only packets that match the rule parameters will be logged. ● **Action Not Matched** - Only packets that do not match the rule parameters will be logged. ● **Both** – All packets will be logged.	**None** **Action Matched** **Action Not Matched** **Both**
Action Matched	Select the action for a matching packet.	**Check Next Rule** **Forward** **Drop**
Action Not Matched	Select the action for a packet not matching the rule.	**Check Next Rule** **Forward** **Drop**
Once you have completed filling in Menu 21.1.1 - TCP/IP Filter Rule, press [Enter] at the message [Press Enter to Confirm] to save your configuration, or press [Esc] to cancel. This data will now be displayed on Menu 21.1 - Filter Rules Summary.		

8.4.2 Generic Filter Rule

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

For generic rules, the Prestige 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 Prestige applies the Mask (bit-wise ANDing) 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, e.g., FFFFFFFF.

To configure a generic rule, select Generic Filter Rule in the Filter Type field and press Enter to open **Menu 21.1.2 - Generic Filter Rule**, as shown next.

```
                Menu 21.1.2 - 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:
```

Figure 8-7 Menu 21.1.2 - Generic Filter Rule

The following table describes the fields in the Generic Filter Rule Menu.

Table 8-6 Generic Filter Rule Menu Fields

Field	Description	Option
Filter #	This is the filter set, filter rule co-ordinates, i.e., 2,3 refers to the second filter set and the third filter rule of that set.	
Filter Type	Use the space bar to toggle between both types of rules. Parameters displayed below each type will be different.	**Generic Filter Rule/ TCP/IP Filter Rule**
Active	Select **Yes** to turn on the filter rule.	**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.	Default = 0
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.	Default = 0
Mask	Enter the mask (in Hexadecimal) to apply to the data portion before comparison.	
Value	Enter the value (in Hexadecimal) to compare with the data portion.	
More	If yes, a matching packet is passed to the next filter rule before an action is taken; else 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 / N/A**
Log	Select the logging option from the following: ● **None** – No packets will be logged. ● **Action Matched** - Only packets that match the rule parameters will be logged. ● **Action Not Matched** - Only packets that do not match the rule parameters will be logged. ● **Both** – All packets will be logged.	 **None** **Action Matched** **Action Not Matched** **Both**
Action Matched	Select the action for a matching packet.	**Check Next Rule** **Forward** **Drop**
Action Not Matched	Select the action for a packet not matching the rule.	**Check Next Rule** **Forward** **Drop**
Once you have completed filling in Menu 21.1.2 - generic Filter Rule, press [Enter] at the message [Press Enter to Confirm] to save your configuration, or press [Esc] to cancel. This data will now be displayed on Menu 21.1 - Filter Rules Summary.		

8.4.3 Novell IPX Filter Rule

This section shows you how to configure an IPX filter rule. IPX filters allow you to base the rules on the fields in the IPX headers.

To configure an IPX rules, select **IPX Filter Rule** from the **Filter Type** field and press Enter to open **Menu 21.1.3 IPX Filter Rule**, as shown in the figure below.

```
                    Menu 21.1.3 - IPX Filter Rule

               Filter #: 1,1
               Filter Type= IPX Filter Rule
               Active= No
               IPX Packet Type=
               Destination:  Network #=
                             Node #=
                             Socket #=
                             Socket # Comp= None
                    Source:  Network #=
                             Node #=
                             Socket #=
                             Socket # Comp= None
               Operation= 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.
```

Figure 8-8 Menu 21.1.3 - IPX Filter Rule

The table below describes the IPX Filter Rule.

Table 8-7 IPX Filter Rule Menu Fields

Field	Description
IPX Packet Type	Enter the IPX packet type (1-byte in hexadecimal) you wish to filter. **The popular types are (in hexadecimal):** 01 - RIP 04 - SAP 05 - SPX (Sequenced Packet eXchange) 11 - NCP (NetWare Core Protocol) 14 - Novell NetBIOS
Destination/Source Network #	Enter the destination/source network numbers (4-byte in hexadecimal) of the packet that you wish to filter.
Destination/Source Node #	Enter in the destination/source node number (6-byte in hexadecimal) of the packet you wish to filter.
Destination/Source Socket #	Enter the destination/source socket number (2-byte in hexadecimal) of the packets that you wish to filter.
Destination/Source Socket # Comp	Select the comparison you wish to apply to the destination/source socket in the packet against that specified above.
Operation	This field is applicable only if one of the Socket # fields is 0452 or 0453 indicating SAP and RIP packets. There are seven options for this field that specify the type of the packet. ● None. ● RIP Request. ● RIP Response. ● SAP Request. ● SAP Response. ● SAP Get Nearest Server Request. ● SAP Get Nearest Server Response
Once you have completed filling in **Menu 21.1.3 - IPX Filter Rule**, press [Enter] at the message [Press Enter to Confirm] to save your configuration, or press [Esc] to cancel. This data will now be displayed on **Menu 21.1 - Filter Rules Summary**.	

8.5 Applying a Filter and Factory Defaults

This section shows you where to apply the filter(s) after you design it (them). Three sets of factory default filter rules have been configured in Menu 21 to prevent NetBIOS traffic from triggering calls and to prevent incoming telnetting.

8.5.1 Ethernet traffic

You seldom need to filter Ethernet traffic; however, the filter sets may be useful to block certain packets, reduce traffic and prevent security breaches. Go to Menu 3.1 (shown below) and enter the number(s) of the filter set(s) that you want to apply as appropriate. You can choose up to four filter sets (from twelve) by entering their numbers separated by commas, e.g., 3, 4, 6, 11. The factory default filter set, NetBIOS_LAN, is inserted in the **protocol filters** field under **Input Filter Sets** in Menu 3.1 in order to prevent local NetBIOS messages from triggering calls to the DNS server

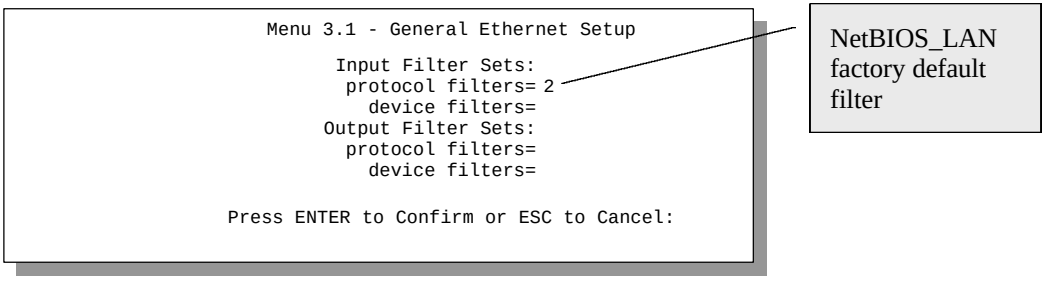


Figure 8-9 Filtering Ethernet traffic

8.5.2 Remote Node Filters

Go to Menu 11.5 (shown next) and enter the number(s) of the filter set(s) as appropriate. You can cascade up to four filter sets by entering their numbers separated by commas. The factory default filter set, NetBIOS_WAN, is inserted in **protocol filters** field under **Call Filter Sets** in Menu 11.5 to block local NetBIOS traffic from triggering calls to the ISP.

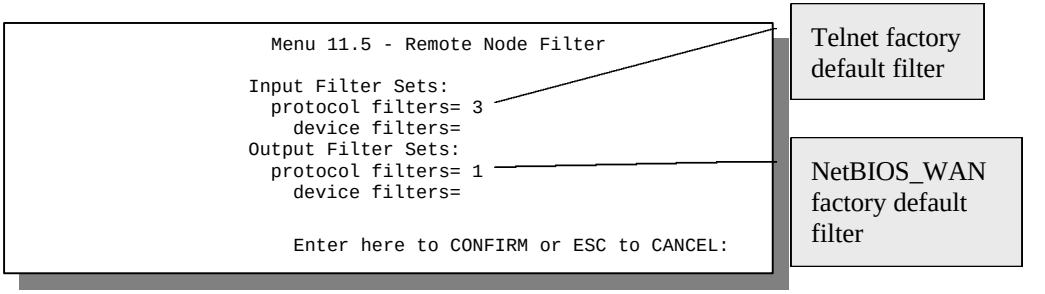


Figure 8-10 Filtering Remote Node traffic

Chapter 9
SNMP Configuration

This chapter discusses SNMP (Simple Network Management Protocol) for network management and monitoring.

9.1 About SNMP

Your Prestige 641 supports SNMP agent functionality, which allows a manager station to manage and monitor the Prestige through the network. Keep in mind that SNMP is only available if TCP/IP is configured on your Prestige.

9.2 Configuring SNMP

To configure SNMP, select **SNMP Configuration** (enter 22) from the Main Menu to open **Menu 22 - SNMP Configuration**, as shown in the figure below. The "community" for Get, Set and Trap fields is simply SNMP's terminology for password.

```
                Menu 22 - SNMP Configuration


          SNMP:
            Get Community= public
            Set Community= public
            Trusted Host= 0.0.0.0
            Trap:
              Community= public
             Destination= 0.0.0.0


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

Figure 9-1 Menu 22 - SNMP Configuration

The following table describes the SNMP configuration parameters.

Table 9-1 SNMP Configuration Menu Fields

Field	Description	Default
Get Community	Enter the get community, which is the password for the incoming Get- and GetNext- requests from the management station.	public
Set Community	Enter the set community, which is the password for incoming Set- requests from the management station.	public
Trusted Host	If you enter a trusted host, your Prestige will only respond to SNMP messages from this address. If you leave the field blank (default), your Prestige will respond to all SNMP messages it receives, regardless of source.	blank
Trap: Community	Enter the trap community, which is the password sent with each trap to the SNMP manager.	public
Trap: Destination	Enter the IP address of the station to send your SNMP traps to.	blank
Once you have completed filling in **Menu 22 - SNMP Configuration**, press [Enter] at the message [Press Enter to Confirm] to save your configuration, or press [Esc] to cancel.		

Chapter 10
System Maintenance

This chapter covers the diagnostic tools that help you to maintain your Prestige.

The diagnostic tools include updates on system status, port status, log and trace capabilities and upgrades for the system software. This chapter describes how to use these tools in detail.

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

```
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



Enter Menu Selection Number:
```

Figure 10-1 Menu 24 - System Maintenance

10.1 System Status

The first selection, System Status, gives you information on the status and statistics of the ports, as shown below. System Status is a tool that can be used to monitor your Prestige. Specifically, it gives you information on your ADSL line status, number of packets sent and received.

To get to the System Status, enter number **24** to go to **Menu 24 - System Maintenance.** From this menu, select number **1, System Status.** There are two commands in **Menu 24.1 - System Maintenance - Status**. Entering **1** resets the counters and **ESC** takes you back to the previous screen.

The table below describes the fields present in **Menu 24.1 - System Maintenance - Status**. It should be noted that these fields are READ-ONLY and are meant to be used for diagnostic purposes.

Please note that displaying this screen degrades system performance.

```
                    Menu 24.1 -- System Maintenance – Status

 Node-Lnk  Status     TxPkts     RxPkts     Errors      Tx  B/s      Rx B/s     Up Time
1-1483     Up          1462       1567          0          222         211     2:15:16
2          N/A            0          0          0            0           0     0:00:00
3          N/A            0          0          0            0           0     0:00:00
4          N/A            0          0          0            0           0     0:00:00
5          N/A            0          0          0            0           0     0:00:00
6          N/A            0          0          0            0           0     0:00:00
7          N/A            0          0          0            0           0     0:00:00
8          N/A            0          0          0            0           0     0:00:00
9          N/A            0          0          0            0           0     0:00:00
10         N/A            0          0          0            0           0     0:00:00
11         N/A            0          0          0            0           0     0:00:00
12         N/A            0          0          0            0           0     0:00:00

     Ethernet:                                    WAN:
       Status: 100M/Full Duplex  Tx Pkts: 1583      Line Status: Up
       Collisions: 0             Rx Pkts: 1521      Upstream Speed: 608 kbps
                                                    Downstream Speed: 4000 kbps
     CPU Load = 4.25%

                                  Press Command:
                          CMDS: 1-Reset Counters  ESC-Exit
```

Figure 10-2 Menu 24.1 - System Maintenance – Status

The following table describes the fields present in **Menu 24.1 - System Maintenance - Status**.

Table 10-1 System Maintenance - Status Menu Fields

Field	Description
Node-Lnk	This is the remote node index number and link type. Link types are : **PPP, ENET, 1483, PPPoE**
Status	Shows the status of the remote node.
TxPkts	The number of packets transmitted to this remote node.
RxPkts	The number of packets received from this remote node.
Errors	The number of error packets on this connection.
Tx B/s	Shows the transmission rate in bytes per second.
Rx B/s	Shows the receiving rate in bytes per second.
Up Time	Time this channel has been connected to the remote node.
Ethernet	
Status	Shows the current status of the LAN.
Tx Pkts	The number of transmitted packets to the LAN.
Rx Pkts	The number of received packets from the LAN.
Collision	Number of collisions.
WAN	
Line Status	Shows the current status of the ADSL line which can be **Up, Down, Wait for Init** or **Initializing**.
Upstream Speed	Shows the ADSL line upstream speed.
Downstream Speed	Shows the ADSL line downstream speed
CPU Load	Specifies the percentage of CPU utilization.
Press Command	
1 - Reset Counters	Press 1 to reset all the above statistics to 0.
ESC - Exit	Press ESC to go back to Menu 24.

Menu 24.2 System Information and Console Port Speed is as follows.

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

1. System Information
2. Console Port Speed
```

Figure 10-3 System Information and Console Port Speed

Press 1 to display the next screen, **Menu 24.2.1 - System Maintenance - Information.**

```
                Menu 24.2.1 – System Maintenance - Information

               Name:
               Routing: IP
               ZyNOS S/W Version: V2.21(C.10) | 1/16/99
               ADSL Chipset Vendor: Alcatel, Version 1.5.2
               ANSI Version: ANSI Issue 2

               LAN

                   Ethernet Address:00:a0:c5:02:34:56
                   IP Address: 192.168.1.1
                   IP Mask: 255.255.255.0
                   DHCP: Server

                  Press ESC or RETURN to Exit:
```

Figure 10-4 System Maintenance - Information

Table 10-2 Fields in System Maintenance - Information

Field	Description
Name	Displays the system name of your Prestige. This information can be modified in **Menu 1 - General Setup**.
Routing	Refers to the routing protocol used.
ZyNOS S/W Version	Refers to the ZyNOS (ZyXEL Network Operating System) software version. ZyNOS is a registered trademark of ZyXEL Communications Corporation.
ADSL Chipset Vendor	Displays the vendor of the ADSL chipset and ADSL modem software version.
ANSI Version	Refers to the ANSI Version.
Ethernet Address	Refers to the Ethernet MAC (Media Access Control) of your Prestige.
IP Address	This is the IP address of the Prestige in dotted decimal notation.
IP Mask	This shows the subnet mask of the Prestige.
DHCP	This field shows the DHCP setting (**None, Relay** or **Server**) of the Prestige.

10.1.1 Console Port Speed

You can change the speed of the console port through **Menu 24.2.2 – Console Port Speed**. Your Prestige supports 9600 (default), 19200, 38400, 57600, and 115200 bps for the console port. Use the space bar to select the desired speed in Menu 24.2.2, as shown in the following figure.

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

                 Console Port Speed: 115200

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

Figure 10-5 Menu 24.2.2 – System Maintenance – Console Port Speed

10.2 Log and Trace

There are two logging facilities in the Prestige. The first is the error logs and trace records that are stored locally. The second is the UNIX syslog facility for message logging.

10.2.1 Viewing Error Log

The first place you should look for clues when something goes wrong is the error log. Follow the procedure below to view the local error/trace log:

Step 1. Enter 24 from the Main Menu to open **Menu 24 - System Maintenance**.

Step 2. From Menu 24, enter 3 to open **Menu 24.3 - System Maintenance - Log and Trace**.

Step 3. Enter 1 in **Menu 24.3 - System Maintenance - Log and Trace** to display the error log in the system.

After the Prestige finishes displaying the error log, you will have the option to clear it.

Examples of typical error and information messages are presented in the following figure.

```
  45       7203 PINI  INFO  Channel 11 ok
  46       7204 PINI  INFO  Channel 10 ok
  47       7205 PINI  INFO  Channel 9 ok
  48       7206 PINI  INFO  Channel 8 ok
  49       7207 PINI  INFO  Channel 7 ok
  50       7208 PINI  INFO  Channel 6 ok
  51       7209 PINI  INFO  Channel 5 ok
  52       7210 PINI  INFO  Channel 4 ok
  53       7211 PINI  INFO  Channel 3 ok
  54       7212 PINI  INFO  Channel 2 ok
  55       7213 PINI  INFO  Channel 1 ok
Clear Error Log (y/n):
```

Figure 10-6 Examples of Error and Information Messages

10.2.2 Syslog And Accounting

The Prestige uses the UNIX 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 and Accounting**, as shown next.

```
       Menu 24.3.2 -- System Maintenance - UNIX Syslog and Accounting

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

                     Types:
                     CDR= No
                     Packet triggered= No
                     Filter log= No
                     PPP log= No
                  Press ENTER to Confirm or ESC to Cancel:
 Press Space Bar to Toggle.
```

Figure 10-7 Menu 24.3.2 - System Maintenance - Syslog and Accounting

You need to configure the UNIX syslog parameters described in the following table to activate syslog then choose what you want to log.

Table 10-3 System Maintenance Menu Syslog Parameters

Parameter	Description
UNIX Syslog:	
Active	Use the space bar to turn on or off syslog.
Syslog IP Address	Enter the IP Address of your syslog server.
Log Facility	Use the space bar to toggle between the 7 different Local options. The log facility allows you to log the message in different files in the server. Please refer to your UNIX manual for more detail.
Types:	
CDR	Call Detail Record (CDR) logs all data phone line activity if set to **Yes.**
Packet triggered	The first 48 bytes or octets and protocol type of the triggering packet is sent to the UNIX syslog server when this field is set to **Yes.**
Filter log	No filters are logged when this field is set to **No.** Filters with the individual filter **Log Filter** field set to **Yes** are logged when this field is set to **Yes.**
PPP log	PPP events are logged when this field is set to **Yes.**

Your Prestige sends four types of syslog messages. Please see Enhanced Syslog in Appendix C for the message format. Some examples of these syslog messages are shown next:

1. CDR

```
Jul 19 11:19:27 192.168.102.2 ZyXEL Communications Corp.: 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 ZyXEL Communications Corp.: board 0 line 0 channel 0, call
1, C02 OutCall Connected 64000 40002

Jul 19 11:20:06 192.168.102.2 ZyXEL Communications Corp.: board 0 line 0 channel 0, call
1, C02 Call Terminated
```

2. Packet triggered

```
Jul 19 11:28:39 192.168.102.2 ZyXEL Communications Corp.: Packet Trigger: Protocol=1,
Data=4500003c100100001f010004c0a86614ca849a7b08004a5c020001006162636465666768696a6b6c6d6e6
f7071727374

Jul 19 11:28:56 192.168.102.2 ZyXEL Communications Corp.: Packet Trigger: Protocol=1,
Data=4500002c1b0140001f06b50ec0a86614ca849a7b0427001700195b3e00000000600220008cd4000002040
5b4
```

```
Jul 19 11:29:06 192.168.102.2 ZyXEL Communications Corp.: Packet Trigger: Protocol=1,
Data=450000282401400001f06ac12c0a86614ca849a7b0427001700195b451d1430135004000077600000
```

3. Filter log

```
Jul 19 14:43:55 192.168.102.2 ZyXEL Communications Corp.: IP[Src=202.132.154.123
Dst=255.255.255.255 UDP spo=0208  dpo=0208]}S03>R01mF

Jul 19 14:44:00 192.168.102.2 ZyXEL Communications Corp.: IP[Src=192.168.102.20
Dst=202.132.154.1 UDP spo=05d4  dpo=0035]}S03>R01mF

Jul 19 14:44:04 192.168.102.2 ZyXEL Communications Corp.: IP[Src=192.168.102.20
Dst=202.132.154.1 UDP spo=05d4  dpo=0035]}S03>R01mF
```

4. PPP log

```
Jul 19 11:42:44 192.168.102.2 ZyXEL Communications Corp.: ppp:LCP Closing

Jul 19 11:42:49 192.168.102.2 ZyXEL Communications Corp.: ppp:IPCP Closing
```

Jul 19 11:42:54 192.168.102.2 ZyXEL Communications Corp.: ppp:CCP Closing

10.3 Diagnostic

The diagnostic facility allows you to test the different aspects of your Prestige to determine if it is working properly. Menu 24.4 allows you to choose among various types of diagnostic tests to evaluate your system, as shown.

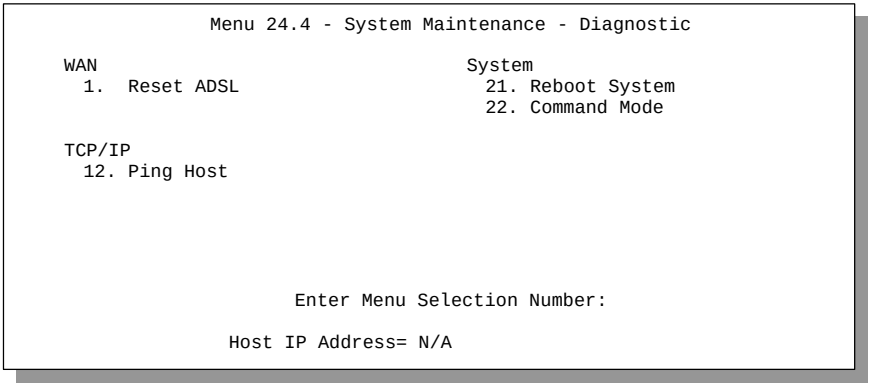


Figure 10-8 Menu 24.4 - System Maintenance - Diagnostic

Follow the procedure below to get to Diagnostic

Step 1. From the Main Menu, enter 24 to open **Menu 24 - System Maintenance**.

Step 2. From this menu, enter 4 to open **Menu 24.4 - System Maintenance - Diagnostic**.

The following table describes the diagnostic tests available in Menu 24.4 for your Prestige and the connections.

Table 10-4 System Maintenance Menu Diagnostic

Field	Description
Reset ADSL	This command re-initializes the ADSL link to the telephone company.
Ping Host	This diagnostic test pings the host, which determines the functionality of the TCP/IP protocol on both systems and the links in between.
Reboot System	This option reboots the Prestige.
Command Mode	This option allows you to enter the command mode. This mode allows you to diagnose and test your Prestige using a specified set of commands.

10.4 Backup Configuration

Option 5 in **Menu 24 - System Maintenance** allows you to backup the current Prestige configuration to your workstation. Backup is highly recommended once your Prestige is functioning properly.

You must perform the backup and restore through the console port. Any serial communications program should work fine; however, you must use XMODEM protocol to perform the download/upload.

Step 1. Go to Menu 24.5 (shown next).

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

Figure 10-9 Backup Configuration

Step 2. Press "Y" to indicate that you want to continue. The following procedure is for the HyperTerminal program. The procedure for other serial communications programs should be similar.

Step 3. Click "Transfer", then "Receive File" to display the following screen.

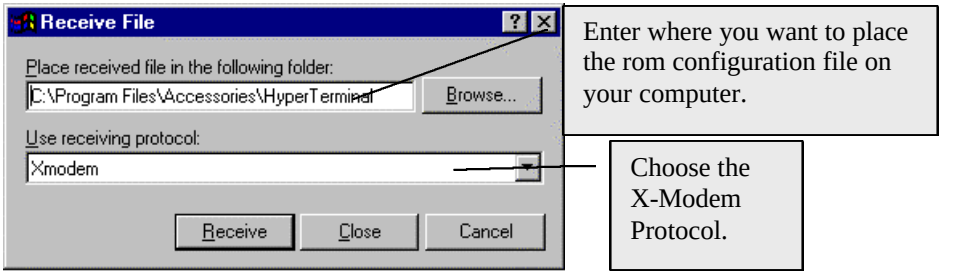


Figure 10-10 HyperTerminal Screen

Step 4. Enter where you want to place the rom configuration file on your computer, give it a suitable name, e.g., p641.rom (see section 2.9.1 Filename conventions) and make sure you choose the X-Modem Protocol. Then press "Receive".

Step 5. After a successful backup you will see the following screen. Press any key to return to the SMT menu.

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

Figure 10-11 Successful Backup

Please note that terms "download" and "upload" are relative to the workstation. Download means to transfer from another machine to the workstation, while upload means from your workstation to another machine.

10.5 Restore Configuration

Selecting option 6 from **Menu 24 - System Maintenance** to restore the configuration from your workstation to the Prestige. Again, you must use the console port and XMODEM protocol to restore the configuration.

Step 1. Go to Menu 24.6 (shown next).

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

Figure 10-12 Restore Configuration

Step 2. Press "Y" to indicate that you want to continue. The following procedure is for the HyperTerminal program. The procedure for other serial communications programs should be similar.

Step 3. Click "Transfer", then "Send File" to display the following screen.

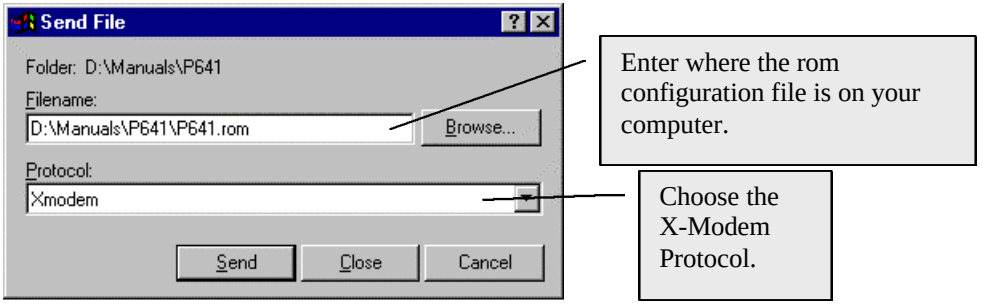


Figure 10-13 HyperTerminal Screen

Step 4. Enter where the rom configuration file is on your computer, and make sure you choose the X-Modem Protocol. Then press "Send".

Step 5. After a successful restoration you will see the following screen. Press any key to return to reboot the system.

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

Figure 10-14 Successful Backup

Keep in mind that the configuration is stored in the flash ROM in the Prestige, so even if power failure should occur, your configuration is safe.

10.6 Firmware Update

Menu 24.7 -- System Maintenance - Upload Firmware allows you to upgrade the firmware and the configuration file via the console port. Note that this function erases the old data before installing the new one; please do not attempt to update unless you have the new firmware at hand. There are 2 components in the system: the router firmware and the configuration file, as shown below.

```
Menu 24.7 -- System Maintenance - Upload Firmware
     1. Upload Router Firmware
     2. Upload Router Configuration File


          Enter Menu Selection Number:
```

Figure 10-15 Menu 24.7 - System Maintenance - Upload Firmware

10.6.1 Upload Router Firmware

The firmware is the program that controls the functions of the Prestige. Menu 24.7.1 shows you the instructions for uploading the firmware. If you answer yes to the prompt, the Prestige will go into debug mode. Follow the procedure below to upload the firmware:

1. Enter "`atur`" after the "`Enter Debug Mode`" message.
2. Wait for the "`Starting XMODEM upload`" message before activating Xmodem upload on your terminal.
3. After successful firmware upload, enter "`atgo`" to restart the Prestige.

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

To upload router 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
   router.

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




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

Figure 10-16 Menu 24.7.1 - Uploading Router Firmware

10.6.2 Uploading Router Configuration File

The configuration data, system-related data, the error log and the trace log are all stored in the configuration file. Please be aware that uploading the configuration file replaces everything contained within.

Menu 24.7.2 shows you the instructions for uploading the configuration file. If you answer yes to the prompt, the Prestige will go into debug mode. Follow the procedure below to upload the configuration file:

1. Enter "`atur3`" after the "`Enter Debug Mode`" message.
2. Wait for the "`Starting XMODEM upload`" message before activating Xmodem upload on your terminal.
3. After successful firmware upload, enter "`atgo`" to restart the Prestige.

If you replace the current configuration file with the default configuration file, i.e., P641.rom, you will lose all configurations that you had before and the speed of the console port will be reset to the default of 9600 bps with 8 data bit, no parity and 1 stop bit (8n1) . You will need to change your serial communications software to the default before you can connect to the Prestige again. The password will be reset to the default of 1234, also.

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

 To upload router configuration file:
 1. Enter "y" at the prompt below to go into debug mode.
 2. Enter "atur3" 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
    router.

 Warning:
 1. Proceeding with the upload will erase the current router
    configuration file.
 2. The router's console port speed (Menu 24.2.2) may change when
    it is restarted; Please adjust your terminal's speed accordingly. The
    password (menu 23) may change also.
 3. When uploading the DEFAULT configuration file, the console port speed
    will be reset to 9600 bps and the password to "1234".

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

Figure 10-17 Menu 24.7.2 - System Maintenance - Upload Router Configuration File

10.7 Command Interpreter Mode

This option allows you to enter the command interpreter mode. A list of valid commands can be found by typing [help] at the command prompt. For more detailed information, check the ZyXEL Web site or send e-mail to the ZyXEL Support Group.

```
                          Enter Menu Selection Number: 8

Copyright (c) 1994 - 1999 ZyXEL Communications Corp.
ras> ?
Valid commands are:
sys             exit            device          ether
wan             ip              ppp             bridge
ipx             hdap
```

Figure 10-18 Command mode

10.8 Boot module commands

Prestige boot module commands with accompanying explanations are shown in the following table. For ATBAx, x denotes the number preceding the colon to give the console port speed following the colon in the list of numbers that follows; e.g. ATBA3 will give a console port speed of 9.6 Kbps. 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, etc.

```
======= Debug Command Listing =======
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)
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(w,y,m,d) change system date to week 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 ZyNOS
ATGR            boot ZyNOS
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
ATUR            upload RAS code to flash ROM
ATUR3           upload RAS configuration file
```

Figure 10-19 Boot module commands

Chapter 11
Troubleshooting

This chapter covers the potential problems you may run into and the possible remedies. After each problem description, some instructions are provided to help you to diagnose and to solve the problem.

11.1 Problems Starting Up the Prestige

Table 11-1 Troubleshooting the Start-Up of your Prestige

Problem	Corrective Action	
None of the LEDs are on when you power on the Prestige	Check the connection between the AC adapter and the Prestige. If the error persists, you may have a hardware problem. In this case you should contact technical support**.**	
Cannot access the Prestige via the console port.	1.Check to see if the Prestige is connected to your computer's serial port.	
	2. Check to see if the communications program is configured correctly. The communications software should be configured as follows:	VT100 terminal emulation
		9600 bps
		No parity, 8 Data bits, 1 Stop bit.

11.2 Problems With the WAN Interface

Table 11-2 Troubleshooting the ADSL connection

Problem	Corrective Action
Initialization of the PVC connection failed.	Ensure that the cable is connected properly from the ADSL port to the wall jack. The ADSL LED on the front panel of the Prestige should be on. Check that your VPI, VCI, type of encapsulation and type of multiplexing settings are the sama as what you collected from your telephone company and ISP. Reboot the Prestige. If you still have problems, you may need to verify these variables with the telephone company and/or ISP.

11.3 Problems with the LAN Interface

Table 11-3 Troubleshooting the LAN Interface

Problem	Corrective Action
Can't ping any station on the LAN	Check the Ethernet LEDs on the front panel. The LED should be on for a port that has a station connected. If it is off, check the cables between your Prestige and the station.
	Verify that the IP address and the subnet mask are consistent between the Prestige and the workstations.

11.4 Problems Connecting to a Remote Node or ISP

Table 11-4 Troubleshooting a Connection to a Remote Node or ISP

Problem	Corrective Action
Can't connect to a remote node or ISP	Check Menu 24.1 to verify the line status. If it indicates [down], then refer to the section on the line problems.
	In Menu 11.1, verify your login name and password for the remote node.

Acronyms and Abbreviations

ADSL	Asymmetrical Digital Subscriber Line
CDR	Call Detail Record
CHAP	Challenge Handshake Authentication Protocol
CSU/DSU	Channel Service Unit/Data Service Unit
DCE	Data Communications Equipment
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
DSLAM	Digital Subscriber Line Access Multiplexer
DTE	Data Terminal Equipment
IANA	Internet Assigned Number Authority
IP	Internet protocol
IPCP (PPP)	IP Control Protocol
IPX	Internetwork Packet eXchange
ISDN	Integrated Service Digital Network
ISP	Internet Service Provider
LAN	Local Area Network
MAC	Media Access Control
NAT	Network Address Translation
PAP	Password Authentication Protocol
POTS	Plain Old Telephone Service
PPP	Point to Point Protocol
PSTN	Public Switched Telephone Network
RFC	Request For Comment
RIP	Routing Information Protocol
SAP	(IPX) Service Advertising Protocol
SNMP	System Network Management Protocol

STP	Shielded Twisted Pair (cable)
SUA	Single User Account
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
VCI	Virtual Channel Identifier
VPI	Virtual Path Identifier
WAN	Wide Area Network

Appendix A

PPP over Ethernet

PPPoE (PPP over Ethernet, RFC 2516) uses Ethernet as a point-to-point link to transport PPP frames.

PPPoE offers the following benefits:

1. It provides you with a familiar dial-up networking (DUN) user interface.
2. 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 & ISDN), the switching fabric is already in place.
3. It allows the ISP to use the existing dial-up model to authenticate and (optionally) to provide differentiated services.

Traditional Dial-up Scenario

The following diagram depicts a typical hardware configuration where the PCs use traditional dial-up networking.

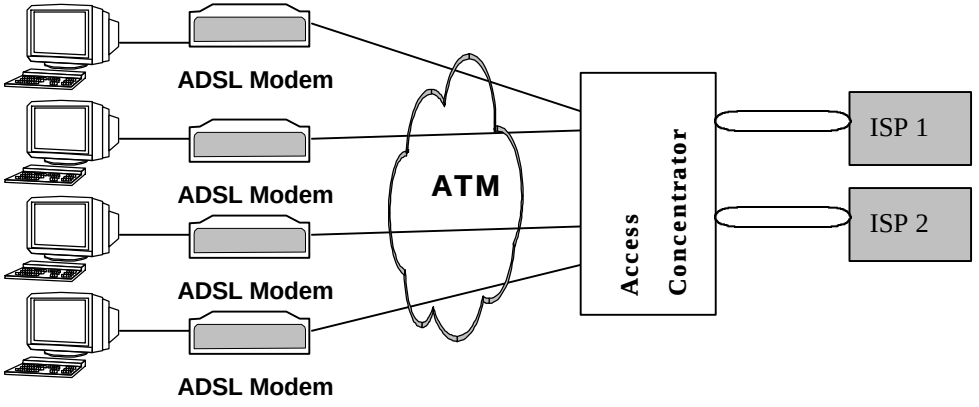


Diagram 1 Single-PC per Modem Hardware Configuration

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 is acting as a 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.

Prestige as a PPPoE Client

PPPoE is transparent to a broadband modem; the modem simply bridges the Ethernet frames from one port to another. However, when an ADSL Prestige is deployed in such a setup, it must appear as a single host to the AC.

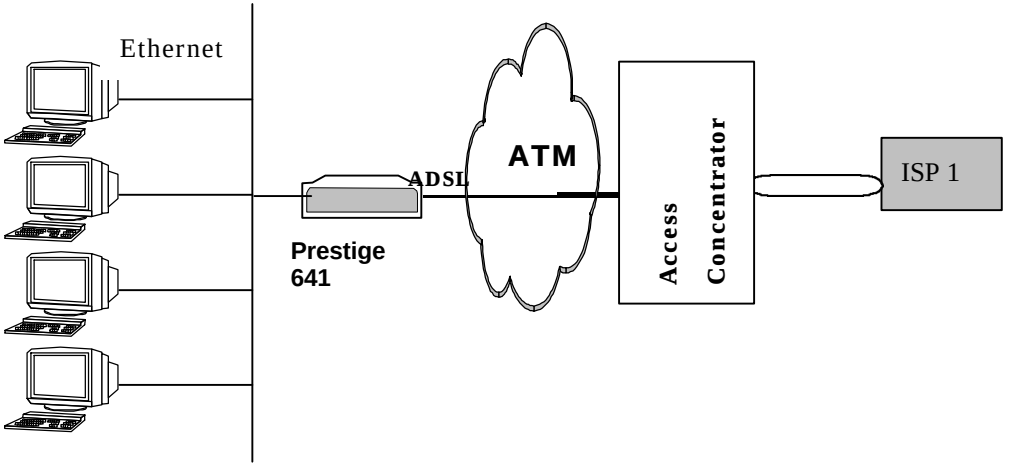


Diagram 2 Prestige as a PPPoE Client

Appendix B

VPI & VCI

ATM is a connection-oriented technology, meaning that it sets up virtual circuits over which end systems communicate. The terminology for virtual circuits is as follows:

- **VC (virtual channel)** Logical connections between end stations
- **VP (virtual path)** A bundle of VCs

Think of a VP as a cable that contains a bundle of wires. The cable connects two points, and wires within the cable provide individual circuits between the two points. In an ATM cell header, a **VPI** (Virtual Path Identifier) identifies a link formed by a virtual path and a **VCI** (Virtual Channel Identifier) identifies a channel within a virtual path. The **VPI** and **VCI** are identified and correspond to termination points at ATM switches as shown. Your telephone company should supply you with these numbers.

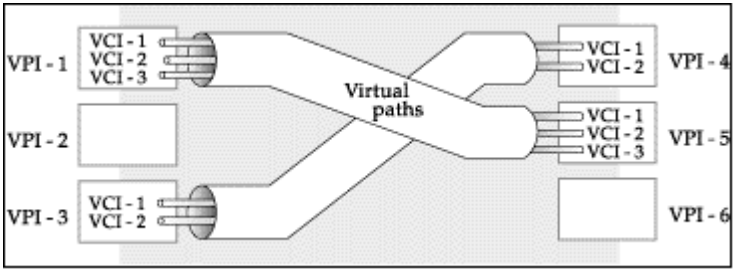


Diagram 3 VPI's & VCI's.

Appendix C

Enhanced Syslog

CDR
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
Packet triggered
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
Filter log
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
PPP Log
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

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