Prestige 128

User's Manual

Version 2.0

ZyXEL

ACCESSING INTERNET & INTRANET

ZyXEL Limited Warranty

ZyXEL warrants to the original end user (purchaser) that this product is free from any defects in materials or workmanship for a period of up to two (2) years from the date of purchase. During the warranty period, and upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, ZyXEL will, at its discretion, repair or replace the defective products or components without charge for either parts or labor, and to whatever extent it shall deem necessary to restore the product or components to proper operating condition. Any replacement will consist of a new or re-manufactured functionally equivalent product of equal value, and will be solely at the discretion of ZyXEL. This warranty shall not apply if the product is modified, misused, tampered with, damaged by an act of God, or subjected to abnormal working conditions.

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To obtain the services of this warranty, contact ZyXEL's Service Center, refer to the separate Warranty Card for your Return Material Authorization number (RMA). Products must be returned Postage Prepaid. It is recommended that the unit be insured when shipped. Any returned products without proof of purchase or those with an out-dated warranty will be repaired or replaced (at the discretion of ZyXEL) and the customer will be billed for parts and labor. All repaired or replaced products will be shipped by ZyXEL to the corresponding return address, Postage Paid (USA and territories only). If the customer desires some other return destination beyond the U.S. borders, the customer shall bear the cost of the return shipment. This warranty gives you specific legal

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FCC Part 15 Information

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operations.

This equipment has been tested and found to comply with the limits for a CLASS B digital device pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

If this equipment does cause harmful interference to radio/television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and the receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Shielded RS-232 cables are required to be used to ensure compliance with FCC Part 15, and it is the responsibility of the user to provide and use shielded RS-232 cables.

Information for Canadian Users

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operation, and safety requirements. The Industry Canada does not guarantee that the equipment will operate to a user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly. The customer should be aware that the compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

For their own protection, users should ensure that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electrical inspection authority, or electrician, as appropriate.

This digital apparatus does not exceed the class A limits for radio noise emissions from digital apparatus set out in the radio interference regulations of Industry Canada. The declarations of CE marking:

C E

The Prestige 128 has been approved for connection to the Public Switched Telecommunication Network using interfaces compatible

with ITU-TSS recommendation I.420 (Basic Rate ISDN user access). The Prestige 128 complies with the following directives:

1. The Council Directive 89/336/EEC of 3 May 1992 on the approximation of the laws of the member states relation to Electro Magnetic Compatibility. (EMC Directive)

2. Council Directive 91/263/EEC of 29 April 1991 on the approximation of the laws of the Member States concerning telecommunication terminal equipment. (The Telecom Terminal Equipment Directive)

3. 93/68/EEC of 22 July 1993 amending the Directives 89/336/EEC, 91/263 /EEC and 92/31/EEC.(Marking Directive)

4. The Council Directive 92/31/EEC of 28 April 1992 amending directive on the approximation of the laws of the member states relating to EletoMagnetic Compatibility.

Contacting ZyXEL

If you have questions about your ZyXEL product or desire assistance, contact ZyXEL Communications Corporation in one of the following ways:

- **Phone**: In North America call between 8:00 AM and 5:00 PM PST at (714) 693-0808

  Outside North America, you can dial +886-3-5783942 EXT 252 between 8:00AM and 5:00PM Taiwan time (GMT +8:00).

- **Fax**: ZyXEL in North America: (714) 693-8811 or Taiwan: +886-3-5782439

- **E-mail**:

    - **Sales inquiries**: sales@zyxel.com in North America. sales@zyxel.hinet.net outside North America.

- **Technical support**: support@zyxel.com in North America. support@zyxel.hinet.net outside North America.

- **Product information**: Visit our site on the World Wide Web: http://www.zyxel.com.

- **FTP**: Information , such as ZyXEL software and ROM updates for North America can be found at this FTP address: ftp.zyxel.com

  For European and Asian versions and related files, use the address: ftp.zyxel.co.at

- **Postal Service**: You can send written communications at the following address:

  ZyXEL Communications Corporation

  6, Innovation Road II, Science-Based Industrial Park

  Hsinchu, Taiwan 300, R.O.C.

  or

  ZyXEL Communications Inc.

  4920 E. La Palma Avenue

  Anaheim, CA92807, U.S.A.

Contents

1 **Introduction**

Congratulations on your purchase of the ZyXEL Prestige 128 Remote Access Router. The Prestige is the first device to integrate a Router and Bridge into a single package. In a modem-sized box, the Prestige offers inexpensive yet complete telecommunications and internetworking solutions for your home or branch office. The Prestige is ideal for everything from Internet browsing to receiving calls from Remote Dial-in Users to making LAN-to-LAN connections to Remote Nodes.

Distinguishing features of the Prestige include support for a full range of networking protocols such as TCP/IP (Transmission Control Protocol/Internet Protocol), Novell IPX (Internet Packet Exchange), and Transparent Bridging. The complete solution also includes Remote Dial-in User support, an Internet Single User Account (Network Address Translation), POTS line support (Plain Old Telephone Service; also called A/B Adapter in Europe), extensive Network Management, and solid security features.

Features

The 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

The Prestige is a self-contained unit that is quick and easy to install. Physically, it resembles an external modem except for the fact that it is a router and uses an Ethernet cable to connect to the host network.

ISDN Basic Rate Interface (BRI)

Using either a standard S/T or U Interface (128 uses the S/T interface and 128U uses the U interface) the Prestige supports a full range of switch types. The switch type depends on the CO (Central Office) switch your ISDN line is connected to. See Chapter 16 for more information on North American, European, and Asian ISDN firmware and switch types supported by the Prestige.

The two B-channels can be used independently for two destinations. Or they can be bundled for one connection to support bandwidth-on-demand.

Multiple Networking Protocol Support

The Prestige is a multi-protocol router. It supports TCP/IP, Novell IPX, and Transparent Bridging.

Standard Phone Jack

The Prestige is equipped with two standard phone jacks to connect to telephones, FAX machines, or modems. This allows the ISDN line to be used for voice calls as well as data calls.

Dial On Demand

The Dial On Demand feature allows the Prestige to automatically place a call to a Remote Node whenever there is traffic coming from any workstation on the LAN to that remote site.

Bandwidth On Demand

The Prestige supports bandwidth up to 128Kbps over a single ISDN BRI line. It incorporates PPP/MP (Point-to-Point Protocol/Multilink Protocol) to bundle two B channels over a BRI line. In addition, the Prestige dynamically allocates bandwidth between the two B channels, increasing or decreasing speeds as

needed to allow for greater efficiency in data transfer. It supports BAP (Bandwidth Allocation Protocol) and BACP (Bandwidth Allocation Control Protocol) to manage the number of links in multilink bundle.

Full Network Management

The Prestige incorporates SNMP (Simple Network Management Protocol) support and menu-driven network management via an RS-232 or Telnet connection. The Prestige is also equipped with a Call Detail Record (CDR) to help analyze and manage your telephone bill.

RADIUS (Remote Authentication Dial In User Service)

The RADIUS feature allows you to use an external, central, Unix based server to support thousands of users.

PPP Security

The Prestige supports PAP (Password Authentication Protocol) and CHAP (Challenge Handshake Authentication Protocol).

DHCP Support (Dynamic Host Configuration Protocol)

DHCP (Dynamic Host Configuration Protocol) allows you to dynamically and automatically assign IP address settings to hosts on your network.

Call Control

The Prestige provides budget management for outgoing calls and maintains a blacklist for unreachable phone numbers in order to save you the expense of unnecessary charges.

Data Compression

The Prestige incorporates Stac data compression and CCP (Compression Control Protocol).

Networking Compatibility

The Prestige is compatible with remote access products from other companies such as Ascend, Cisco, and 3Com. Furthermore, it supports Microsoft Windows 95 and Windows NT remote access capability.

Applications For Your Prestige

Some applications for the Prestige include:

Internet Access

The Prestige supports the TCP/IP protocol, which is the language used for the Internet. It is also compatible with access servers manufactured by major vendors such as Cisco and Ascend.

Internet Single User Account (SUA)

For a small office environment, the Prestige offers a Single User Internet Account from an ISP (Internet Service Provider). This allows multiple users on the LAN (Local Area Network) to access the Internet concurrently for the cost of a single user.

Single User Account address mapping can also be used for LAN to LAN connection.

Multiprotocol LAN-to-LAN Connection

The Prestige can dial to or answer calls from another remote access router connected to a different network. The Prestige supports TCP/IP, Novell IPX, and has the capability to bridge any Ethernet protocol.

Telecommuting Server

The Prestige allows Remote Dial-in Users to dial-in and gain access to your LAN. This feature enables users that have workstations with remote access capabilities, e.g., Windows 95, to dial in using an ISDN terminal adapter (TA) to access the network resources without physically being in the office.

What This Manual Covers

This manual is divided into five parts.

1. Part One - **Getting Started** (Chapters 1-3) - is structured as a step-by-step guide to help you connect, install, and setup your Prestige to operate on your LAN.

2. Part Two - **The Internet** (Chapter 4) **-** describes how to configure the Prestige to connect to the Internet.

3. Part Three - **Setting Up Advanced Applications** (Chapters 5-10) **-** describes how to use the Prestige for more advanced applications, such as TCP/IP routing and Bridging.

4. Part Four - **Advanced Management** (Chapters 11-14) **-** provides information on advanced management features for network managers.

5. Part Five - **System Maintenance** (Chapters 15-16) **-** describes maintenance features for checking system status and logging errors.

Regardless of the application, it is important that you follow the steps outlined in Part One (Chapters 1-3) to correctly connect your Prestige to your LAN. You can then refer to other chapters of the manual depending on which applications you wish to use.

What This Manual Doesn't Cover

This manual assumes that you know how to use your computer and are familiar with your communications software. If you have questions about using either one, refer to the manual for the product.

Other Resources

For more information about the Prestige 128 check the following sources:

- Quick Start Guide.

- Prestige Support disk.

- Release notes for firmware upgrades and other information can be accessed through a ZyXEL FTP server site.

For ZyXEL contact information see page vi.

Packing List

Before you proceed further, check all items you received with your Prestige against this list to make sure nothing is missing. The complete package should include:

- One Prestige 128.

- One power adapter.

- One RJ-45 phone cable.

- One RJ-11 phone cable.

- One 25 pin female - 9 pin male adapter.

- One LAN crossover cable (red tag).

- One LAN straight cable (white tag).

- One Prestige Support Disk.

- One Prestige 128/100 Quick Start Guide.

- This Prestige 128 User's Manual.

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:

- An ISDN telephone line.

- An Ethernet connection to your computer.

- A computer equipped with communications software 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 by using a Telnet application.

2 **Before You Begin**

To ensure successful installation of your Prestige, we strongly recommend that you carefully follow the steps outlined in Chapters 2 and 3. These chapters are designed as a guide for you to collect the necessary information about your ISDN phone line, and the LAN which you will be connected to. Once this information has been collected, it will be used to configure your Prestige.

After you have successfully configured your Prestige, see the appropriate chapters to setup your application. For Internet Access, see Chapter 4.

Road Map and Flow

The chart below is provided as a step by step guide to successfully installing your Prestige.
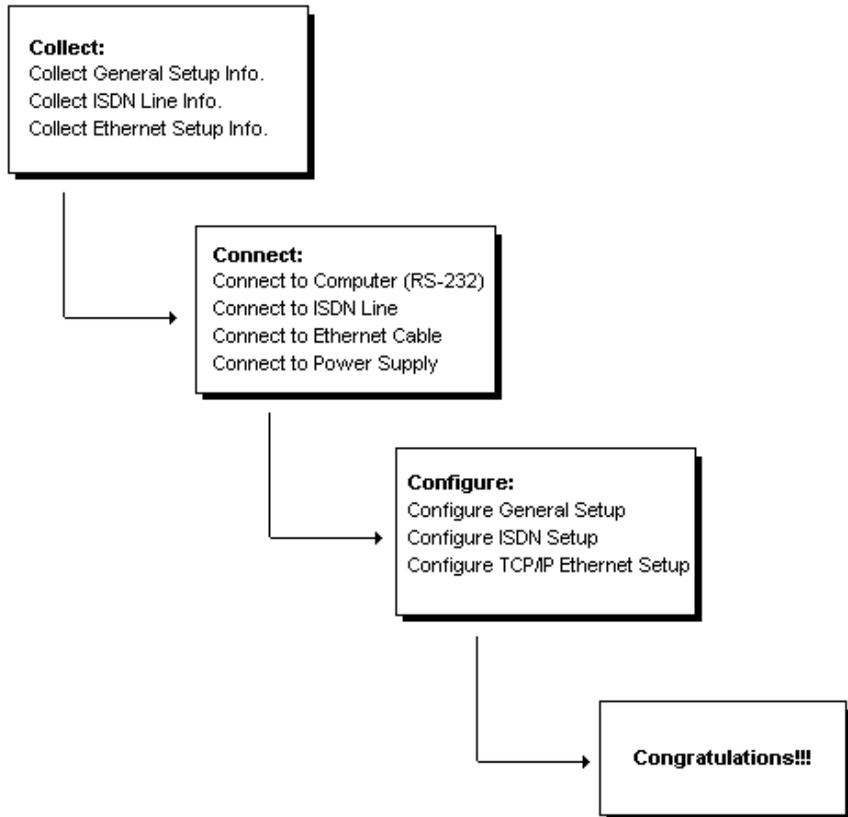
Figure 2-1 Installation Guide

Completing the Worksheet

Before you continue locate the worksheet at the end of this chapter. This information worksheet has been provided to help you get through setup and installation of your Prestige as easily as possible.

Ordering Your ISDN Line

If you do not have the ISDN line installed already, we suggest that you order it from your telephone company as soon as possible to avoid the long waits common when ordering a new line. Use the information in this section to place the order (see Chapter 16 for information on provisioning your ISDN line). If you have already installed your ISDN line, you can check the following section to make sure that you can use all the features of your Prestige.

1. Contact your local telephone company's ISDN Ordering Center.

2. Find out what type of ISDN service is available. Refer to Chapter 16 to find out the provisioning information for the appropriate switch type and ISDN service. For the U.S., the Prestige (both U and S/T Interface) have been approved by Bellcore and have IOC (ISDN Ordering Code) "S" Capability, EZ-ISDN 1.

3. Provide your telephone company with the proper provisioning information.

4. When the telephone company installs your ISDN line, be sure to obtain the following information:

   - ISDN switch type.
   - ISDN telephone number(s).
   - ISDN Service Profile Identifiers (SPID) number(s) (only for North America).

Collecting General Setup Information

The Prestige requires the following system information. You can obtain all the pertinent information from your network administrator. Record this information into the worksheet as it becomes available. This worksheet will later be referred to as you configure your Prestige.

- **System Name** - This is the name given to the Prestige for identification purposes. This name should be no more than 8 alphanumeric characters. Spaces are not allowed, but "-" and "_" are accepted. This name can be obtained remotely via the SNMP management protocol and will be displayed as the prompt when the user enters the Command Mode.

- **Route IP Field** - For Internet access, you will need to enable the Route IP Field. See Chapter 4 for more details on configuring your Prestige for Internet access. To support Novell IPX, or Bridging, enable the appropriate protocol and reference the related chapters for detailed information.

You have now collected all of the general setup information you need. Make sure that you have entered all the values onto the worksheet before proceeding to the next section.

Collecting ISDN Phone Line Information

After you have successfully installed the ISDN phone line or if you already have one installed, you need to use the ISDN line information to complete the worksheet and configure your Prestige. Your telephone company can give you the following information to configure the Prestige:

Switch Type	Geography	No of Phone #s	No of SPIDs
AT&T 5ESS NI-1	North America	2	2
AT&T 5ESS Point to Point	North America	1	0
AT&T 5ESS Multipoint	North America	2	2
Northern Telecom NI-1	North America	2	2
Northern Telecom Custom	North America	2	2
DSS1	Europe, Asia	2	N/A
1TR6	Germany	2	N/A

- **Switch Type -** This is the type of switch used by your telephone company. Check with your telephone company and choose the appropriate option on the worksheet. For North

America, select your ISDN switch type. For DSS1 and 1TR6, verify this field to make sure that you have the proper firmware loaded.

- **B Channel Usage -** Determine which connection is appropriate for your B channel and check the corresponding option on the worksheet.

  If your Prestige is the only device using the ISDN line, then configure B Channel Usage to **Switch/Switch** so that your device will use both B channels to communicate. If your Prestige is sharing the ISDN line with other devices, then configure B Channel Usage to **Switch/Unused**.

- **Telephone Number(s)** - Record on the worksheet the telephone number(s) given to you by your ISDN provider. Some switch types only have one telephone number. These phone numbers should be in a standard digit format (for example, 5551212). Note that these fields will only accept digits, so - and spaces will not be accepted.

- **Analog Call** - Check the appropriate Analog Call option on the worksheet for each telephone number. This information is later used to configure the Prestige in routing an incoming analog call. Set to Phone1 or Phone2 if you wish to route the incoming analog call for this telephone number to PHONE port number 1 or 2.

- **SPID Number(s) -** (For North America only) The SPID (Service Profile Identifier) is a number used by a central office switch for identification purposes. With the switch information, see the previous table for the number of SPIDs you must enter.

You have now collected all of the necessary information about your ISDN phone line. Make sure that these values are entered into

your worksheet before you continue to the next section. For DSS1 and 1TR6 ISDN, refer to Chapter 3.

Collecting Ethernet Setup Information

This section assumes that you are setting up your Prestige for a TCP/IP connection. If you want to configure the Prestige for other protocols (e.g., IPX), refer to the appropriate chapters.

- **Ethernet Interface** - The first step is to determine the type of Ethernet interface you will be using on the Prestige. There are two options: AUI or UTP. Record the interface type onto the worksheet. If you have a 10Base2 (BNC), you should choose AUI.

- **IP Address -** An IP Address is required for TCP/IP protocol. The IP Address is the unique 32-bit number assigned to your Prestige. This address is written in dotted decimal notation (four 8-bit numbers, between 0 and 255, separated by periods), e.g., 192.68.203.5.

    Record the IP Address into the worksheet as assigned by your network administrator. Note that every machine on an internet must have a unique IP address - do not assign an arbitrary address to any machine.

- **IP Sub-net Mask -** This field is required for TCP/IP protocol. An IP address consists of two parts, the network ID and the host ID. The IP Subnet Mask is used to specify the network ID portion of the address, expressed in dotted decimal notation. The Prestige will automatically calculate this mask based on the IP address that you assign. Unless you have special need for subnetting, use the default mask as calculated by the Prestige.

The table below lists some examples of IP subnet masks and the number of hosts that are allowed. Consult your network administrator if you are unsure of this value.

IP Subnet Mask	Number of Host IDs	Number of Bits
255.255.255.0	254	24
255.255.255.128	126	25
255.255.255.192	62	26
255.255.255.224	30	27
255.255.255.255	1	32

Prestige Setup and Installation Worksheet

General Setup Information

- **System Name (for identification purposes):**

  _____

- **Protocol Routing:**

  ___TCP/IP

  ___IPX

  ___Bridging

ISDN Setup Information

- **Switch Type (check one):**

  ___AT&T 5ESS NI-1

  ___AT&T Point to Point

  ___AT&T 5ESS Multipoint

  ___Northern Telecom NI-1

  ___Northern Telecom Custom

  ___DSS1

  ___1TR6

- **B-Channel Usage (check one):**

  ___Switch/Switch

  ___Switch/Unused

North America ISDN

- **1st Telephone Number:**

  _____

- **Analog Call (check one):**

  ___Phone1

  ___Phone2

  ___DOVBS

- **1st SPID Number:**

  _____

- **2nd Telephone Number:**

  _____

- **Analog Call (check one):**

  ___Phone1

  ___Phone2

  ___DOVBS

- **2nd SPID Number:**

  _____

DSS1 ISDN

- **ISDN Data Number & Subaddress:**

  _____

- **A/B Adapter 1 Number & Subaddress:**

  _____

- **A/B Adapter 2 Number & Subaddress:**

  _____

- **Outside Line Prefix Number:**

  _____

- **PBX Number (S/T Bus Number):**

  _____

- **Incoming Number Matching:**

  ___MSN

  ___CDSA

  ___Don't Care

- **Analog Call Routing:**

  ___A/B #1

  ___A/B #2

  ___Ignore

- **Global Analog Call:**

  ___Accept

  ___Ignore

1TR6 ISDN:

- **ISDN Data Number:**

  _____

- **A/B Adapter 1 Number:**

  _____

- **A/B Adapter 2 Number:**

  _____

- **Outside Line Prefix Number:**

  _____

- **PBX Number (S/T Bus Number):**

  _____

- **Incoming Number Matching:**

  ___EAZ

  ___Don't Care

- **Analog Call Routing:**

  ___A/B #1

  ___A/B #2

  ___Ignore

Ethernet Setup Information

- **Ethernet Interface (check one):**

  ___AUI

  ___UTP

- **IP Address:**

  _____._____._____._____

- **IP Subnet Mask:**

  _____._____._____._____

Notes:

3 Installation

This chapter outlines how to connect your Prestige to the LAN and ISDN line. Refer to the diagram below to identify all of the ports on your device when you attempt to make the various connections.
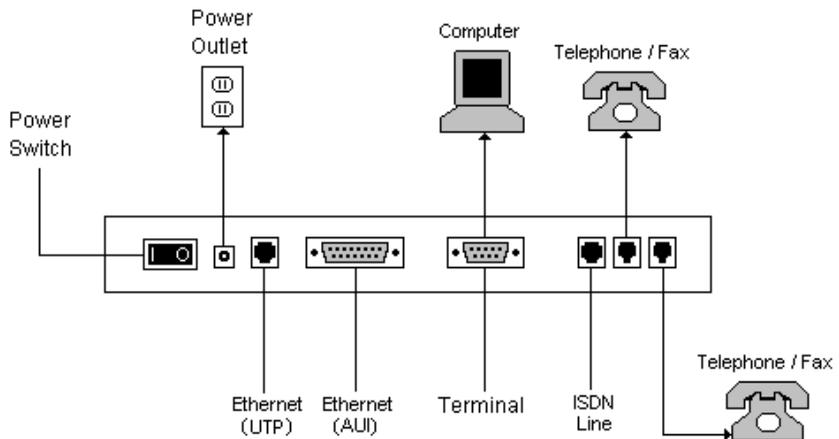
Figure 3-1 Rear Panel Diagram

A Warning On Connection Cables

The RS-232, ISDN line, and Ethernet cable, are very similar to each other. It is important that you use the correct cable for each connection; otherwise, your Prestige could be damaged.

Connecting Your Computer and Your Prestige

For the initial setup of your Prestige, you must use RS-232 and communications software to configure the Prestige.

After the Prestige has been successfully installed, you can modify the configuration through a remote Telnet connection. See Chapter 13 for detailed instructions on using Telnet to configure your Prestige.

Connecting the RS-232 Cable to your Prestige

One 9-25 pin adapter is included in your package. To connect a RS-232 cable, connect the 9-pin end of the cable to the DTE port on the back panel of the Prestige. Connect the other end to the RS-232 cable connected to the serial port (COM1, COM2, or any other COM port) of your computer.

Connecting an ISDN Line to your Prestige

Plug one end of your ISDN phone line which is included in your package into the socket on the rear panel of the Prestige labeled ISDN and the other end into the ISDN wall jack.

- **S/T interface -** This can only connect to your NT-1 (Network Termination) device.

NOTE: DO NOT UNDER ANY CIRCUMSTANCES CONNECT DIRECTLY TO THE ISDN WALL JACK.

- **U interface -** This allows you to connect directly to your ISDN wall jack.

NOTE: THE ISDN JACK IS FOR ISDN LINE CONNECTION ONLY. CONNECTION OF A PHONE LINE MAY RESULT IN DAMAGE TO YOUR PRESTIGE.

ATTENTION: LA FICHE ISDN EST DESTINÉE UNIQUEMENT POUR LA CONNEXION SUR UNE LIGNE RNIS. LA CONNEXION SUR UNE LIGNE TÉLÉPHONIQUE PEUT ENDOMMAGER VOTRE ADAPTATEUR DE TERMINAL.

Connecting a Telephone/Fax to your Prestige

If you wish, you can connect a regular telephone, fax machine, or a modem to your Prestige to be used for analog calls just like a

normal phone line. It should be noted that this is optional and is not required for you to run other applications using your Prestige.

Plug one end of the telephone cord from a phone, fax, or modem into the socket on the rear panel of the Prestige labeled PHONE 1 or PHONE 2.

In order to receive incoming calls using a device connected to PHONE ports, you need to enter Phone1 or Phone2 in the **Analog Call** field under the desired telephone number (e.g., **1st phone #**) in SMT Menu 2 - ISDN Setup. See Collecting ISDN Phone Line Information in Chapter 2 for more details.

Connecting an Ethernet Cable to your Prestige

The Prestige supports two types of Ethernet connections. The connection procedure differs for each one; follow the one that is appropriate for your installation.

- **UTP**

The UTP port is used to connect to a 10Base-T network. 10Base-T networks use Unshielded Twisted Pair (UTP) cable and RJ-45 connectors that look like a bigger telephone plug with 8 pins. Two types of gray Ethernet cables come with the package:

- Straight through cable (white tag): Connect your Prestige to a 10Base-T hub.
- Crossover cable (red tag): Connect your Prestige to your computer directly without a hub.

NOTE: IF THIS CABLE IS USED TO CONNECT ISDN, IT MAY DAMAGE YOUR PRESTIGE.

- **AUI**

The AUI port (the connector with 15 pins) is used to connect the Prestige to a 10Base5 (thicknet) network.

If you have a 10Base2 network using BNC connectors and thin coaxial cables, you will need a transceiver between the AUI port and the 10Base2 cabling.

Connecting a Power Adapter to your Prestige

Plug a 16VAC 1200mA power adapter into the outlet on the rear panel of the Prestige labeled POWER

At this point, you should have connected the RS-232 cable, the ISDN phone line, the Ethernet cable, and the power supply. You can now power on your Prestige.

Prestige Front Panel

Names and descriptions of the Prestige front panel LEDs are listed below:
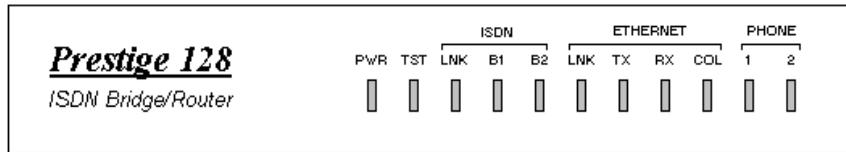
Figure 3-2 Front Panel

PWR - Comes on as soon as you connect you Prestige to the power supply and switch it to the I (on) position.

TST - Should be blinking if the Prestige is functioning properly.

ISDN: LNK - Indicates that the Prestige has an ISDN line connected to the WAN interface and it has been successfully initialized.

ISDN: B1 and **B2** - On if there is an active WAN session on that channel or if that channel is making or receiving a call.

ETHERNET: LNK - Indicates that the Prestige has been successfully connected to the LAN via the UTP Ethernet interface.

ETHERNET: TX and RX - Transmit and Receive LEDs will blink to indicate when there is traffic on the LAN.

ETHERNET: COL - Indicates that there is transmission collision over the LAN.

PHONE: 1 - Indicates the functionality of the POTS port 1 on the Prestige. If there is a device plugged into this port, and the device is in use, this LED should be on.

PHONE: 2 - Indicates the functionality of the POTS port 2 on the Prestige. If there is a device plugged into this port, and the device is in use, this LED should be on.

Powering On Your Prestige

When you power on your Prestige, the Prestige will perform several internal tests and will also do an ISDN line initialization. After this initialization, the Prestige will ask you to press **ENTER** to continue as shown below:

```
Copyright (c) 1994 - 1996 ZyXEL Communications Corp.
RAS Version: V1.10a ! 9/4/96
ethernet address: 00:a0:c5:40:00:03
Resetting ISDN firmware ..........
Switch Type is DSS1 - ISDN Firmware Version: V Prestige_4.05

Init ISDN line. (This may take up to 20 seconds.)
Press ENTER to continue...
```

Figure 3-3 Power on Messages

If you press **ENTER**, the Prestige will display a login screen and ask you to enter the password as shown below:

```
                        Enter Password :
```

Figure 3-4 Login Screen

Enter the default password, **1234** to get into the Main Menu of
System Management Terminal (SMT). Note that once you are in
the SMT and if there is no activity for longer than 5 minutes, the
Prestige will automatically log you out and will display a blank
screen. If you see a blank screen, press **ENTER** to bring up the
password screen.

Navigating Through the System Management Terminal Interface

The SMT 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 of your Prestige are listed
below:

• **Moving Forward to Another Menu.** To move forward to a
   sub-menu below the current one, type in the number of the sub-
   menu and press **ENTER**.

• **Moving Backward to a Previous Menu.** Press the **Escape** key
   to move back to the previous menu. The only exception is the

Main Menu, where typing **99** is the only method to exit the SMT.

- **Moving the Cursor.** Within a menu, press **ENTER** (carriage return) to move to the next field. You can also use the **Up** and **Down** keys to move to the previous and the next field, respectively.

- **Entering Information.** There are two types of fields that you will need to fill in. The first requires you to type in the appropriate information. The second gives you choices to choose from. In the second case, press the **space bar** to cycle through the available choices.

- **Required Fields.** Some of the fields in the SMT are essential in order to configure the Prestige. These fields will initially show a ? indicating that the information must be filled in before that menu can be saved.

- **N/A Fields.** Some of the fields in the SMT will show a N/A. This symbol refers to an option that is not available.

- **Saving Your Configuration.** You can 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.

The SMT main menu is shown below:
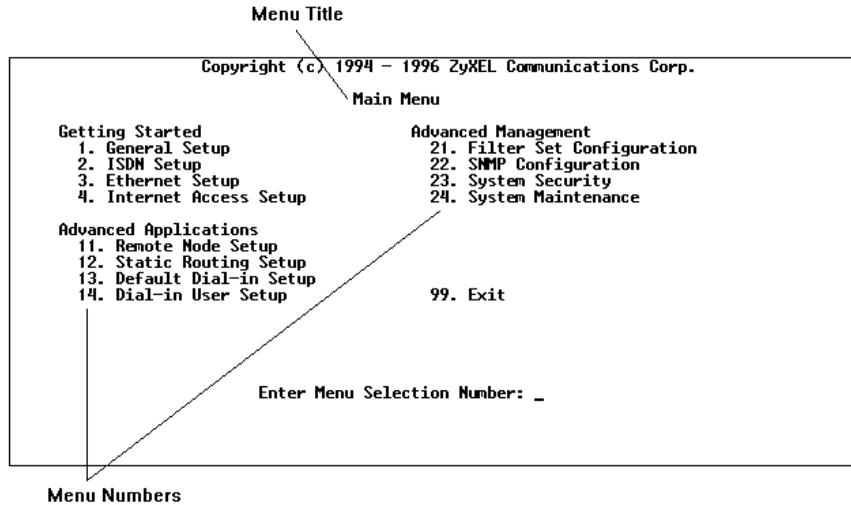
Figure 3-5 SMT Main Menu

System Management Terminal Interface Summary

This section summarizes all major SMT Menus:

#	Menu Title	Description
1	General Setup	Setup general information and enable routing or bridging of specific protocols
2	ISDN Setup	Setup ISDN configuration
3	Ethernet Setup	Setup Ethernet configuration
4	Internet Access Setup	A quick and easy way to setup Internet connection
11	Remote Node Setup	Setup Remote Node for LAN-to-LAN connection including Internet connection. Prestige has four Remote Nodes.
12	Static Routing Setup	Setup static route for different protocols. There are four static routes for each protocol.
13	Default Dial-in Setup	Setup default dial-in parameters such that your Prestige can be a dial-in server for the Remote Node and Remote Dial-in User.
14	Dial-in User Setup	Setup Remote Dial-in User. Prestige has eight Remote Dial-in Users.
21	Filter Set Configuration	Setup filters to be used in Menu 3 and Menu

#	Menu Title	Description
		11 to provide security, call control, etc.
22	SNMP Configuration	Setup SNMP related parameters
23	System Security	Setup security related parameters
24	System Maintenance	Provide system status, diagnostics, firmware upload, etc.
99	Exit	To exit from SMT and return to the blank screen

General Setup

This menu contains administrative and system-related information. Enter **1** in the main menu to go to Menu 1 - General Setup.

```
                    Menu 1 - General Setup

        System Name= 306V
        Location= San Jose
        Contact Person's Name= CC


        Route IP= Yes
        Route IPX= Yes
        Bridge= No






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

Figure 3-6 Menu 1 - General Setup

1. **System Name -** Choose a descriptive name for the Prestige for identification purposes, e.g., p128. This name should be no more than 8 alphanumeric characters. Spaces are not allowed, but "-" and "_" are accepted. This name can be retrieved remotely via SNMP, used for CHAP authentication, and will be displayed as the prompt in the Command Mode. See Chapter 6 for more information on CHAP; see Chapter 14 for more information on Command Mode.

2. **Location -** Enter the geographic location (up to 31 characters) of your Prestige, e.g., San Jose.

3. **Contact Person's Name -** Enter the name (up to 8 characters) of the person in charge of this Prestige, e.g., Brent Harper. The Location and the Contact Person fields are optional.

4. **Protocols -** Turn on or off the individual protocols for your particular application. Unsupported protocols will have a N/A in their fields.

ISDN Setup

Menu 2 is for entering information about your ISDN line. Different telephone companies deploy different types of switches for ISDN service. Depending on the switch for your particular installation, you will have a different number of telephone numbers, and if you are in North America, you may also have SPIDs. Make sure that you have correct and complete telephone numbers and SPIDs. You need to pass the ISDN setup before your system can make an outgoing call or answer an incoming call.

North American ISDN

```
                    Menu 2 — ISDN Setup

             Switch Type= Northern Tel Custom

             B Channel Usage= Switch/Switch
             1st Phone #= 5552000
               SPID #= 0555200001
               Analog Call= Phone 1
             2nd Phone #= 5554000
               SPID #= 0555400001
               Analog Call= Phone 2







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

Figure 3-7 Menu 2 - ISDN Setup for North America

1. **Switch Type** - Verify the switch type information with your telephone company. For North America, select the type of switch used by your telephone company. If your switch type is not currently shown, press the **space bar** to change to the next switch; repeat until you see the correct switch type. The Prestige will not be able to place or to receive calls if the wrong switch type is specified. If you are not sure, contact your telephone company to confirm the exact switch type.

2. **B Channel Usage -** If you are using one B channel of your Prestige with another device on the S/T bus, then select **Switch/Unused**. If not choose **Switch/Switch**.

3. **Telephone Number(s) -** Enter the telephone number(s) assigned to your ISDN line by your telephone company. Some switch types only have one telephone number. For North America, these phone numbers should be in a standard seven digit format (for example, 5551212). Note that the Prestige only accepts digits; do not include - and spaces in this field. This field should be no longer than 19 digits.

4. **Analog Call -** This tells the Prestige how to route an incoming analog call. Set to Phone1 if you wish to route the incoming analog call for this telephone number to the PHONE port 1 (a.k.a., POTS port in North America and A/B Adapter in Europe). Set to Phone2 if you wish to route the incoming analog call for this telephone number to PHONE port 2. Set to DOVBS if you wish to receive incoming Data Over Voice Bearer Service call.

5. **SPID Number(s) -** SPIDs are numbers used by a switch for identification purposes. Depending on your switch type, you may have zero, one, or two SPIDs assigned to your line. For example, if your switch type is Northern Telecom Custom, you will have to enter two SPID numbers.

DSS1 & 1TR6 ISDN

```
                    Menu 2 - ISDN Setup

   Switch Type: DSS-1
   B Channel Usage= Switch/Switch

   ISDN Data    = 40101               Subaddress=
   A/B Adapter 1= 40102               Subaddress=
   A/B Adapter 2= 40103               Subaddress=

   Dial Prefix to Access Outside Line=
   PABX Number (Include S/T Bus Number)=
   Incoming Phone Number Matching= Multiple Subscriber Number (MSN)
     Analog Call Routing= N/A
     Global Analog Call= N/A



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

Figure 3-8 Menu 2 - ISDN Setup for DSS1

```
                    Menu 2 - ISDN Setup

   Switch Type: 1TR6
   B Channel Usage= Switch/Switch

   ISDN Data    = 40101
   A/B Adapter 1= 40102
   A/B Adapter 2= 40103

   Dial Prefix to Access Outside Line=
   PABX Number (Include S/T Bus Number)=
   Incoming Phone Number Matching= Endgeraete Auswahl Ziffer (EAZ)
     Analog Call Routing= N/A



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

Figure 3-9 Menu 2 - ISDN Setup for 1TR6

1. **Switch Type -** This field is fixed as DSS1 or 1TR6.

2. **B Channel Usage** - This field is fixed as Switch/Switch.

3. **ISDN Data & Subaddress -** Enter the telephone number and subaddress assigned to the ISDN data call for the Prestige. It will be used as the outgoing CGPN(Calling Party Number) setting for ISDN data calls. Note that the Prestige only accepts digits; do not include - and spaces in this field. This field should

be no longer than 19 digits for the number and 5 digits for the Subaddress. The Subaddress is only available for DSS1.

4. **A/B Adapter 1 & Subaddress -** Enter the telephone number and subaddress assigned to A/B Adapter 1 (POTS port 1) calls. It will be used as outgoing Calling Party Number setting for A/B Adapter 1 calls.

5. **A/B Adapter 2 & Subaddress -** Enter the telephone number and subaddress assigned to A/B Adapter 2 (POTS port 2) calls. It will be used as outgoing Calling Party Number setting for the A/B Adapter 2 calls.

6. **Dial Prefix to Access Outside Line -** Enter the prefix number if the Prestige is connected to an ISDN PBX. This number will be added to all outgoing calls and should be no longer than 3 digits. Otherwise, leave this field blank.

7. **PBX Number (with S/T Bus Number)** - Enter the S/T bus number if the Prestige is connected to an ISDN PBX. If this field is left as blank then the loopback test will be skipped.

8. **Incoming Phone Number Matching -** There are three options in this field:

   - **Multiple Subscriber Number (MSN)** - The digital call will only be answered when there is a match for the ISDN data number. The analog call will be answered as the A/B Adapter 1 call when there is a match for the A/B Adapter 1 number. Or it will be answered as A/B Adapter 2 call when there is a match for the A/B Adapter 2 number. If no A/B Adapter 1 or 2 number is specified, then the analog call will not be answered. This option will be available as EAZ (Endgeraete Auswahl Ziffer) for 1TR6.

   - **Called Party Sub-Address (CDSA)** - The digital call will be answered when there is a match for the ISDN Data subaddress. The analog call will be answered as the A/B Adapter 1 call when there is a match for the A/B Adapter 1

subaddress. Or it will be answered as A/B Adapter 2 call when there is a match for the A/B Adapter 2 subaddress. If A/B Adapter 1 or 2 subaddress is specified, then the analog call will not be answered. This option is only available for DSS1.

- **Don't care - all numbers accepted** - All digital calls, including global calls (without CDPN and CDSA in the call setup), to any Called Party Number will be answered. All analog calls will be routed to A/B Adapter 1, A/B Adapter 2, or not answered. This depends on the setting of Analog Call Routing. All global analog calls will either accept or not answer them depending on the setting of Global Analog Call.

9. **Analog Call Routing -** All analog calls will be routed to A/B Adapter 1 if the setting is A/B Adapter 1. Or they will be routed to the A/B Adapter 2 if the setting is A/B Adapter 2. Or they will not be answered if the setting is Ignore.

10. **Global Analog Call -** All global analog calls will be answered and routed to the A/B Adapter 1 or A/B Adapter 2 (the setting in the filed of Analog call routing) if the setting is Accept. Or they will not be answered if the setting is Ignore.

When you are finished, press **ENTER** at the message: Press ENTER to Confirm ... to save your selections, or press **ESC** to cancel. When you press ENTER, the Prestige will use the information that you entered to initialize the ISDN link to the telephone company switch. It should be noted that whenever the switch type is changed, the ISDN initialization will take slightly longer. In addition, if you are using the U-interface, the system will also take slightly longer to initialize.

At this point, the Prestige will ask if you wish to test to check if your ISDN line has been successfully connected to your Prestige. If you select Yes, the Prestige will perform a loop-back test to check

the ISDN line. If the loop-back test fails, note the error message that you receive and take the appropriate troubleshooting action.

```
Setup LoopBack Test...
Dialing to 40002 ...
Sending and Receiving Data...
Disconnecting...
** LoopBack Test completed. OK **
### Hit any key to continue.###

_
```

Figure 3-10 ISDN Loop-Back Test Screen

Ethernet Setup

Menu 3 is used to enter Ethernet related information. Depending on the protocols (TCP/IP or IPX) on your LAN, you will need to configure each protocol separately.

General Ethernet Setup

This menu determines the type of Ethernet interface you are using as well as the filter sets you wish to implement to monitor your Ethernet traffic. From Menu 3 - Ethernet Setup, enter **1** to go to menu 3.1 -General Ethernet Setup.

```
                    Menu 3.1 - General Ethernet Setup

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



















            Press ENTER to Confirm or ESC to Cancel:

Press Space Bar to Toggle.
```
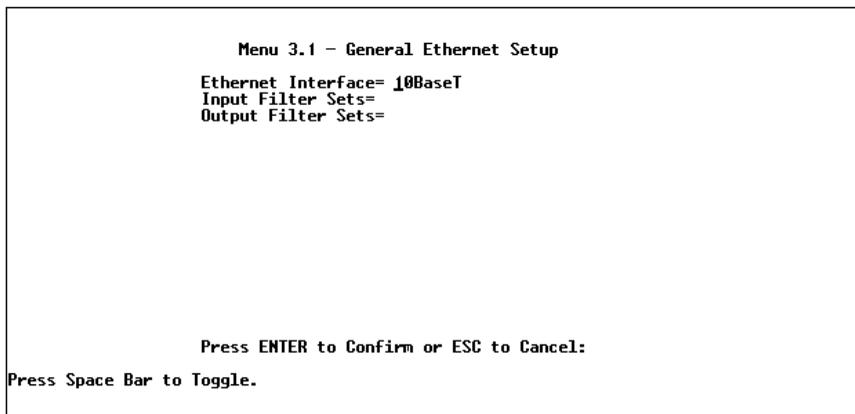
Figure 3-11 Menu 3.1 - General Ethernet Setup

1. **Ethernet Interface -** The Prestige supports two types of
   Ethernet connections, the AUI (15-pin) or the connection for
   the 10BaseT network (looks like a bigger telephone plug).
   Determine which type you are using and select the appropriate
   option in this field.

2. **Input and Output Filter Sets** - Filter sets are used to block
   certain packets to reduce traffic and to prevent a security
   breach. Filtering is a very involved subject, so leave these fields
   blank for the time being. After you have studied filtering in
   Chapter 10, come back and define the filter sets.

TCP/IP Ethernet Setup and DHCP

If you are setting up your network for the first time, read Chapter
4, Configuring for Internet Access, before proceeding. The chapter
contains important information on how to assign IP addresses for
your network.

From Menu 3 - Ethernet Setup, enter **2** to go to Menu 3.2 - TCP/IP
Ethernet Setup.

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

                DHCP Setup:
                  DHCP= None
                  Client IP Pool Starting Address= N/A
                  Size of Clent IP Pool= N/A
                  Primary DNS Server= N/A
                  Secondary DNS Server= N/A

                TCP/IP Setup:
                  IP Address= 192.68.0.1
                  IP Subnet Mask= 255.255.255.0
                  RIP Direction= Both




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

Figure 3-12 Menu 3.2 - TCP/IP Ethernet Setup

1. **DHCP** - This field determines what mode of DHCP (Dynamic Host Configuration Protocol) support the Prestige should use. If it is set to None, DHCP will not be used. If it is set to Server, the Prestige will act as a DHCP server, capable of automatically assigning IP addresses to Windows 95, Windows NT, and other systems that support the DHCP client. When DHCP is used, the following four items need to be set.

   Do not set this field to Server if there is already a DHCP server on your network.

2. **Client IP Pool Starting Address** - DHCP can assign IP addresses to hosts dynamically instead of requiring that each system have a fixed IP address. IP addresses are allocated from a block of addresses, usually assigned by your Internet provider. The Client IP Pool Starting Address gives the first address in the reserved block, which is also used as the LAN network address of the Prestige itself. This address will also serve as the default gateway for DHCP clients.

3. **Size of Client IP Pool** - Gives the size of the block of addresses reserved for DHCP address assignment. The Prestige

itself uses the first address in the block, and the remaining addresses in the pool are assigned to clients.

4. **Primary DNS Server/Secondary DNS Server** - These two fields are used by DHCP clients (such as Windows 95 and Windows NT systems) for Domain Name Servers. Usually your Internet provider will provide one or more name service hosts.

5. **IP Address -** Enter the IP address of the Prestige in dotted decimal notation (four 8-bit numbers, between 0 and 255, separated by periods), e.g., 192.68.135.5. Note that every machine on the TCP/IP network must have a unique IP address.

6. **IP Subnet Mask -** An IP address consists of two parts, the network ID and the host ID. The IP Subnet Mask is used to specify the network ID portion of the address, expressed in dotted decimal notation. The Prestige will automatically calculate this mask based on the IP address that you assign. Unless you have special need for subnetting, use the default subnet mask calculated by the Prestige.

7. **RIP Direction -** This parameter determines how the Prestige handles RIP (Routing Information Protocol). If set to Both (default), the Prestige will broadcast its routing table on the LAN, and incorporate RIP broadcasts by other routers into its routing table. If set to In Only**,** the Prestige will not broadcast its routing table on the LAN, if set to Out Only**,** the Prestige will broadcast its routing table but ignores any RIP broadcast packets that it receives. If set to None, the Prestige will not participate in any RIP exchange with other routers.

Usually, you should leave this parameter at its default of Both and let RIP propagate the routing information automatically.

When you are finished, press **ENTER** at the message: Press ENTER to Confirm... to save your selections, or press **ESC** at any time to cancel them.

Novell IPX Ethernet Setup

Refer to the chapter on Novell IPX configuration.

Bridge Ethernet Setup

Refer to the chapter on Bridging configuration.

4 Configuring for Internet Access

Menu 4 of the SMT allows you to configure Internet access on one screen. Before you configure the Prestige for Internet access, you need to collect the following information from your ISP (Internet Service Provider).

- IP address of the ISP's gateway (optional).

- Telephone number(s) of your ISP.

- Login name.

- Password for ISP authentication

For your Workstation:

- Domain Name Server (DNS)
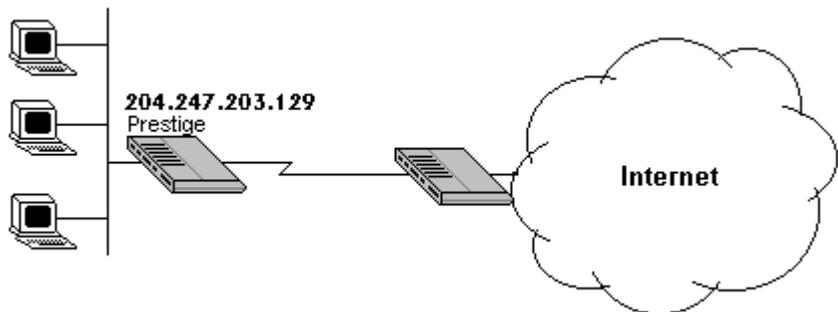
Figure 4-1 Internet Access

IP Addresses and the Internet

Conventionally, the Internet (with a capital I) refers the large-scale interconnected networks across the world that was originally developed by the US Department of Defense. The Internet uses exclusively the TCP/IP suite of protocols. The term "internet" (lower case i), however, refers to any interconnected networks using any protocol. An internet can be as simple as two hosts on a LAN, or it can be as complex as the Internet itself.

Every machine on the Internet must have a unique address within that internet. If your networks are isolated from the Internet, e.g., only between your two branch offices, you can assign any IP addresses to the hosts without problems. However, the Internet Assigned Numbers Authority (IANA) has reserved the following three blocks of IP addresses specifically for private networks:

```
10.0.0.0     -   10.255.255.255
172.16.0.0   -   172.31.255.255
192.168.0.0  -   192.168.255.255
```

For this reason, it is recommended that you choose your network number from the above list.

You can obtain your IP address from the IANA, from an ISP, or assigned from a private network. If you belong to a small organization and your Internet access is through an ISP, the ISP can provide you with the Internet addresses for your local networks. On the other hand, if you are part of a much larger organization, you should consult your network administrator for the appropriate IP addresses.

NOTE: REGARDLESS OF YOUR PARTICULAR SITUATION, **DO NOT** CREATE AN ARBITRARY IP ADDRESS; ALWAYS FOLLOW THE GUIDELINES ABOVE. FOR MORE INFORMATION ON ADDRESS ASSIGNMENT, REFER TO RFC 1597, *ADDRESS ALLOCATION FOR PRIVATE INTERNETS* AND RFC 1466, *GUIDELINES FOR MANAGEMENT OF IP ADDRESS SPACE*.

Once you have determined the IP address range for your local network, you may want to use DHCP (Dynamic Host Configuration Protocol) to assign addresses to individual hosts on the network, as an alternative to manually configuring each host's IP settings. See the TCP/IP Ethernet Setup and DHCP section on page 36 for more information about DHCP.

Internet Access Configuration

The following steps describe the set-up procedure to configure your Prestige for Internet access. The information you will need to provide will be indicated in **bold** type.

```
              Menu 4 - Internet Access Setup

        ISP's Name= myisp
        ISP IP Addr= 10.145.233.5
        Pri Phone #= 5551000
        Sec Phone #= 5552000
        My Login= surfer
        My Password= *******
        Single User Account= No
          IP Addr= N/A
          Server IP Addr= N/A
        Telco Option:
          Transfer Rate= 64K




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

Figure 4-2 Menu 4 - Internet Access Setup

1. From the Main Menu, enter 4 to go to Menu 4 - Internet Access Setup as seen above.

2. **ISP's Name -** Enter the name of your Internet Service Provider, e.g., myisp. This information is for identification purposes only.

3. **ISP IP Addr -** Enter the IP Address of the remote gateway at the ISP's site. If you do not have this data, just leave it blank.

4. **Pri(mary) Phone #** and **Sec(ondary) Phone Number -** Both the Primary and the Secondary Phone number refer to the number that the Prestige will dial to connect to the ISP. The Prestige will always call your ISP using the Primary Phone number first. If the Primary Phone number is busy or does not answer, the Prestige will call the Secondary Phone number if available. Once connected, the Prestige will use the BACP (Bandwidth Allocation Control Protocol) to establish the second B-channel if PPP/MP is enabled, and the ISP also supports MP and BACP.

5. **My Login Name -** Enter the login name given to you by your ISP.

6. **My Password -** Enter the password associated with the login name above. Note that this login name/password pair is only for the Prestige to connect to the ISP's gateway. When you use TCP/IP applications, e.g., FTP, to access the Internet from your workstation, you will need a separate login name and password for each server.

7. **Single User Account** - See the following section for a more detailed discussion on the Single User Account feature. The default is No.

8. **Telco Options: Transfer Rate -** This field (which only applies to outgoing calls) controls the rate at which the data is transferred between your Prestige and the Internet. The options for this field are:

   - **64K** - The Prestige will place 64Kbps (bits per second) digital data calls.

   - **56K -** (For the North America only) The Prestige will place 56Kbps digital data calls.

   - **DOVBS** - (For the North America only) The Prestige will place 56Kbps Data Over Voice Bearer Service (DOVBS)

call. Some phone companies in North America charge less
if calls are made using DOVBS.

9. Press **ENTER** at the message: Press ENTER to Confirm ... to
    confirm your selections, or press **ESC** at any time to cancel
    your selections.

10. At this point, the SMT will ask if you wish to test the Internet
    connection. If you select Yes, the Prestige will call the ISP to
    test the Internet connection. If the test fails, note the error
    message that you receive and take the appropriate
    troubleshooting steps.

Single User Account

Typically, if there are multiple users on the LAN wanting to
concurrently access the Internet, they will have to subscribe to
multiple IP addresses or a Class C subnetwork from the ISP. In
either case, these two approaches will cost more than a single user
account.

The Single User Account (SUA) feature allows customers to have
the same benefits as having a Class C address, but still only pay for
one IP address, thus saving significantly on subscription fees.
(Check with your ISP before you enable this feature).

This feature may also be used to connect to TCP/IP remote nodes
other than Internet Service Providers. For example this feature can
be used to simplify the allocation of IP addresses when connecting
branch offices to the corporate network.

The IP address for the Single User Account can be either fixed or
dynamically assigned by the ISP (or other remote node). In
addition, you can also configure a server, e.g., a Web server, on
your local network and make it accessible by outside users.

If you do not set a server IP address, SUA offers the additional
benefit of firewall protection. This is because if no server is

defined, all incoming inquiries will be filtered out by the Prestige even if you do have a server on your network. This can prevent intruders from probing your system.

The 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)*.

In summary:

1. SUA is an ideal, cost-effective solution for small offices with less than 20 hosts using a LAN to concurrently access the Internet or other remote TCP/IP network.

2. SUA can provide one server address to be accessed by Remote Dial-in Users, thus controlling the incoming packets.

3. SUA can provide firewall protection if you do not configure a server IP address. All incoming inquiries will be filtered out by the Prestige. Therefore, servers on your network are protected.

4. UDP and TCP datagrams can be routed. In addition, ICMP echo can also be routed.

The figure below shows an example of a small office connected to the Internet via a Single User Account using the Prestige. Note that if you enable the Single User Account feature, your local IP address **MUST** be selected from the list of IP addresses for private networks as defined by the IANA.
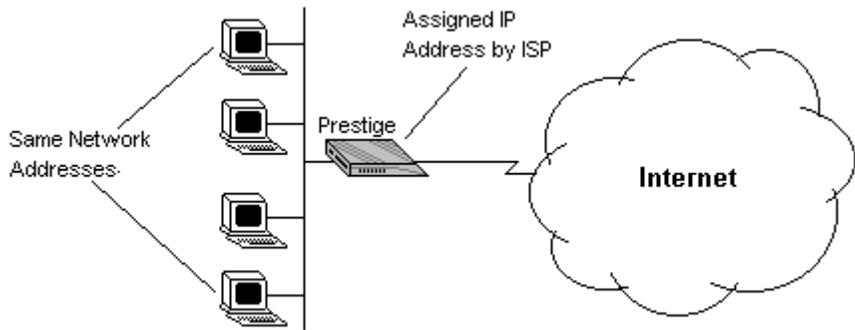
Figure 4-3 A Single User Account Using the Prestige

Configuration for Single User Account

The steps for configuring your Prestige for Single User Internet Access are identical to conventional Internet Access with the exception that you need to fill in three extra fields.

Follow steps 1-8 from the previous section, Internet Access Configuration.

1. **Single User Account -** Enter Yes to enable the Single User Account feature. Use the space bar to toggle between Yes and No.

2. **Single User Account: IP Addr -** If your ISP assigns you a dynamic IP address, enter 0.0.0.0 here. If your ISP assigns you a static IP address enter that IP address here.

3. **Single User Account: Server IP Addr -** If you want to make a single server, e.g., a Web server, accessible to outside users, enter that server's IP address here.

   Press **ENTER** at the message: Press ENTER to Confirm ... to confirm your selections or press **ESC** at any time to cancel your selections.

At this point, the Prestige will ask if you wish to test the Internet connection. If you select Yes, the Prestige will call the ISP to test the Internet connection. If the test fails, note the error message that you receive and take the appropriate troubleshooting steps.

Configuring Backup ISP Accounts

Sometimes it may be desirable to configure more than one ISP account for backup purposes. The Single User Account feature can be enabled for all of these accounts, making it convenient to switch Internet Service Providers in the event of a failure.

To configure a backup ISP,

1. Configure your primary ISP using Menu 4, as described earlier in this chapter.

2. Enter Menu 11, then select the number of an unused remote node.

3. In Menu 11.1, choose a name for your backup ISP account, set the Active field to No, and enter your outgoing login name, password, and phone number(s). The Remote IP Address field should be set to 1.1.1.1.

4. In Menu 11.3, set the remote node's subnet mask to 0.0.0.0, and set RIP to None.

5. Save the new configuration.

Once you have done this, if you need to change from your primary ISP to a backup ISP follow the steps below:

1. Enter Menu 11 and select your Primary ISP.

2. In Menu 11.1, set the Active field to No.

3. Enter Menu 11 again and select your backup ISP.

4. In Menu 11.1, set the Active field to Yes.

You will now be able to access the Internet through the backup ISP Remote Node.

5 Remote Node Configuration

A Remote Node represents both a remote gateway and the internet behind it, across an ISDN connection. A Remote Node is required for placing calls to or answering calls from a remote network. Note that when you use Menu 4 to configure the Internet, the Prestige will automatically add a Remote Node for you. Once a Remote Node is configured properly, traffic to the remote LAN will trigger the Prestige to make a call automatically (i.e., Dial On Demand). Similarly, calls from the remote LAN will be answered automatically and security will be checked.

In this chapter, we will discuss the parameters that are protocol independent. The protocol dependent configuration will be covered in subsequent chapters. For TCP/IP, see Chapter 7. For IPX, see Chapter 8. For bridging, see Chapter 9.

From the Main Menu, enter **11** to go to Menu 11 - Remote Node Setup. When in menu 11, enter the number of the Remote Nodes (1 to 4) that you wish to configure as shown below:

```
                    Menu 11 — Remote Node Setup

              1.  SJHQ
              2.  _____
              3.  _____
              4.  _____









                    Enter Node # to Edit:
```
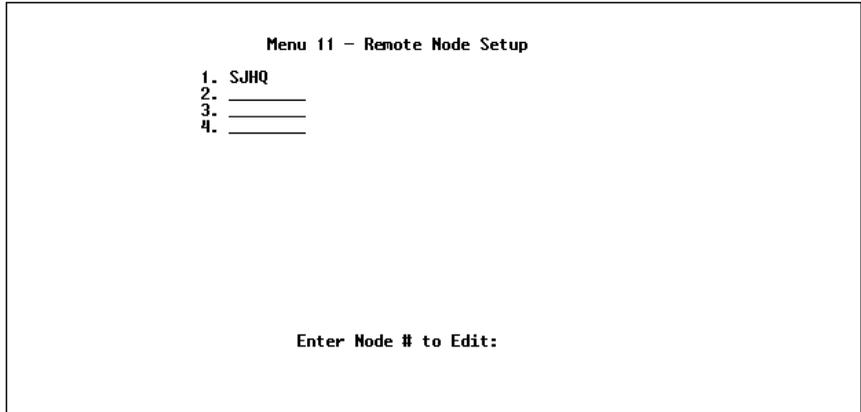
Figure 5-1 Menu 11 - Remote Node Setup

Enter the Remote Node number to edit and you will go to the next
submenu: 11.1 - Remote Node Profile as shown below:

```
                    Menu 11.1 — Remote Node Profile

    Rem Node Name= 3060              Route= IP
    Active= Yes                     Bridge= No
    Call Direction= Both
                                    Edit PPP Options= No
    Incoming:                       Rem IP Addr= 192.68.135.173
      Rem Login= 3060               Edit IP/IPX/AppleTalk/Bridge= No
      Rem Password= ********         Telco Option:
      Rem CLID=                        Transfer Type= 64K
      Call Back= No                    Allocated Budget(min)= 360
    Outgoing:                          Period(hr)= 24
      My Login= 306Y               Session Options:
      My Password= ********            Input Filter Sets=
      Authen= CHAP/PAP                 Output Filter Sets=
      Pri Phone #= 40001               Call Filter Sets=
      Sec Phone #=                     Idle Timeout(sec)= 300

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

Figure 5-2 Menu 11.1 - Remote Node Profile

1. **Rem Node Name -** This is a required field. Enter a descriptive
    name for the Remote Node, e.g., SJHQ. This field can support
    up to eight characters. This name must be unique from any
    other Remote Node name or Remote Dial-in User name.

2. **Active -** Press the space bar to toggle between Yes and No.
    When a Remote Node is deactivated, it has no effect on the

operation of the Prestige, even though it is still kept in the database, and can be activated in the future. Deactivated nodes are displayed with a – (minus sign) at the beginning of the name in Menu 11.

3. **Call Direction -** If this parameter is set to Both, the Prestige can both place and receive calls to/from this Remote Node. If set to Incoming, the Prestige will not place a call to this Remote Node. If set to Outgoing, the Prestige will drop any call from this Remote Node.

   Several other fields in this menu depend on this parameter. For example, in order to enable Call Back, the Call Direction must be Both.

4. **Incoming: Rem Node Login Name** - Enter the login name that this Remote Node will use when it calls into the Prestige. The login name in this field combined with the Rem Node Password will be used to authenticate the incoming calls from this node.

5. **Incoming: Rem Node Password** - Enter the password used when this Remote Node calls into the Prestige.

6. **Incoming: Rem CLID** - This field is active only if Call Direction is either Both or Incoming. Otherwise, an N/A appears in the field. This is the Calling Line ID (the telephone number of the calling party) of this Remote Node. If you enable the CLID Authen field in Menu 13 - Default Dial In, the Prestige will check this number against the CLID in the incoming call. If they do not match and the CLID Authen is Required, then the Prestige will reject the call.

7. **Incoming: Call Back** - This field will be valid only if Call Direction is Both. Otherwise, an N/A appears in the field. This field determines whether or not you wish the Prestige to call back after receiving a call from this Remote Node. If this option is enabled, the Prestige will disconnect the initial call

from this node and call it back at the Outgoing Primary Phone Number (see below).

8. **Outgoing: My Login Name** - This is a required field if Call Direction is either Both or Out. Enter the login name for the Prestige when it calls this Remote Node.

9. **Outgoing: My Password** - This is a required field if Call Direction is either Both or Out. Enter the password for the Prestige when it calls this Remote Node.

10. **Outgoing: Authen -** This field sets the authentication protocol used for outgoing calls.

    The Prestige supports two authentication protocols: PAP (Password Authentication Protocol) and CHAP (Challenge Handshake Authentication Protocol).

    - **PAP** sends the user name and password in plain text.
    - **CHAP** scrambles the password before it is sent over the wire.

    Generally speaking, CHAP is more secure than PAP; however, PAP is readily available on more platforms. The recommendation is to use CHAP whenever possible. Turning off the authentication is STRONGLY discouraged.

    Options for this field are:

    - **CHAP/PAP** - Prestige will try CHAP when CHAP is requested by the Remote Node or PAP when PAP is requested by the Remote Node.
    - **CHAP** - use CHAP only.
    - **PAP** - use PAP only.

11. **Outgoing: Pri(mary) Phone Sec(ondary) Phone Number** - Both the Primary Phone number and the Secondary Phone number refer to the number that the Prestige will dial to connect to the Remote Node. The Prestige will always call the

Remote Node using the Primary Phone number first. If the Primary Phone number is busy or does not answer, the Prestige will call the Secondary Phone number if available. Once connected, the Prestige will use the BACP (Bandwidth Allocation Control Protocol) to establish the second B-channel if Multilink PPP is enabled, and the Remote Node supports MP and BACP.

Some areas require dialing # before the phone number for local calls. A # symbol may be included at the beginning of the Primary Phone number or Secondary Phone number.

12. **Route** - This fields determines the protocols that the Prestige will route. The choices for this field are determined by the features enabled on your Prestige.

13. **Bridge** - Bridging is used for protocols that are not supported or not turned on in the previous Route field by the Prestige, e.g., SNA. When bridging is enabled, the Prestige will forward any packet that it does not recognize to this Remote Node; otherwise, the unrecognized packets are discarded. The disadvantage of bridging is that it usually generates large amounts of traffic. Press the space bar to select either Yes or No.

14. **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.

15. **IP Addr** - This is a required field if Route is set to IP. Enter the IP address of this Remote Node.

16. **Edit IP/IPX/Bridge Options** - To edit the parameters of the protocols, go to this field, select Yes and press ENTER. This will bring you to Menu 11.3 - Remote Node Network Layer

Options. For more information on filling out this screen, refer to the chapter pertaining to your specific protocol.

17. **Telco Options: Transfer Rate** - This field (which only applies to outgoing calls) controls the rate at which the data is transferred between your Prestige and the Remote Node. The options for this field are:

   - **64K** - The Prestige will place 64Kbps (bits per second) digital data calls.
   - **56K** - (For North America only) The Prestige will place 56Kbps digital data calls.
   - **DOVBS** - (For North America only) The Prestige will place 56Kbps Data Over Voice Bearer Service (DOVBS) call. Some phone companies in North America charge less if calls are made with DOVBS option.

18. **Telco Options: Allocated Budget (min) -** This field will set a budget outgoing call time for the Remote Node. The default for this field is 0 for no budget control.

19. **Telco Options: Period (hr) -** This field will set the time interval to reset the above outgoing call budget control.

20. **Session Option: Input Filter Sets, Output Filter Sets and Call Filter Sets** - In these fields, select which filter set(s) you would like to implement to filter the incoming and outgoing traffic between this Remote Node and the Prestige. You can choose from 12 different filter sets. In addition, you can link up to 4 filter sets together for further customization (e.g., 1, 5, 9, 12). Note that spaces and , are accepted in this field.

   For more information on customizing your filter sets, see Chapter 10. The default is blank, i.e., no filters defined.

21. **Session Option: Idle Timeout (sec) -** This value specifies the number of idle seconds that elapses before the Remote Node is automatically disconnected. Idle seconds is the period of time

where no data is passed between the Remote Node and your Prestige. Administrative packets such as RIP are not counted as data. The default is 300 seconds (5 minutes).

Once you have completed filling in Menu 11.1 - Remote Node Profile, press ENTER at the message: Press ENTER to Confirm ... to confirm your selections, or press ESC at any time to cancel your selections.

Bandwidth on Demand

The Bandwidth on Demand (BOD) feature allows you to bundle both B channels in one connection. The second channel is added and subtracted dynamically according to traffic demand. The Prestige uses the Bandwidth Allocation Control Protocol (BACP) and the Multilink Protocol (MP) to implement bandwidth on demand.

The configuration of bandwidth on demand focuses on the Base Transmission Rate (BTR) and the Maximum Transmission Rate (MTR). The relationship between BTR and MTR are shown below:

BTR & MTR Setting	No. of channel(s) used	Max No. of channel(s) used	Bandwidth on demand
BTR = 64, MTR = 64	1	1	Off
BTR = 64, MTR = 128	1	2	On
BTR = 128, MTR = 128	2	2	Off

When bandwidth on demand is enabled, a second channel will be brought up if traffic on the initial channel is higher than the high Target Utility number for longer than the specified Add Persist value. Similarly, the second channel will be dropped if the traffic level falls below the low Target Utility number for longer than the Subtract Persist value.

The Target Utility specifies the line utilization range at which you want the Prestige to add or subtract bandwidth. The range is 30 to

64 kbps (kilobits per second). The parameters are separated by a -.
For example, 30-60 means the add threshold is 60 kbps and
subtract threshold is 30 kbps. The Prestige will perform bandwidth
on demand only if it initiates the call. Addition and subtraction are
based on the value set in the BOD Calculation field. If this field is
set to Transmit or Receive, then traffic in either direction will be
calculated to determine if a link should be added or dropped.
Transmit will only use outgoing traffic to make this determination,
and Receive will only use incoming traffic to make this
determination.

If, after making the call to bring up a second channel, the second
channel does not succeed in joining the Multilink Protocol bundle
(because the remote device does not recognize the second call as
coming from the same device), the Prestige will hang up the second
channel and continue with the first channel alone.

Editing PPP Options

```
              Menu 11.2 - Remote Node PPP Options

      Encapsulation= Standard PPP
      Compression= Yes

      Multiple Link Options:
        BOD Calculation= Transmit or Receive
        Base Trans Rate(Kbps)= 64
        Max Trans Rate(Kbps)= 128
        Target Utility(Kbps)= 32-48
        Add Persist(sec)= 5
        Subtract Persist(sec)= 5




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

Figure 5-3 Remote Node PPP Options

1. **Encapsulation -** Select CCP (Compression Control Protocol)
   for the PPP or MP link. There are two options in this field.

   - **Standard PPP** - Standard PPP options will be used.

- **CISCO PPP -** Cisco PPP options will be used.

2. **Compression -** Turn on the Stac Compression. The default for this field is Off.

3. **Multiple Link Options: BOD Calculation** - Select the direction of the traffic you wish to calculate in order to determine when to add or subtract a link. The default for this field is Transmit or Receive.

4. **Multiple Link Options: Base Trans Rate** - Select the base data transfer rate for this Remote Node. This parameter is in kilobits per second (Kbps). There are two options for this field:

   - **64** - Only one channel will be used.
   - **128** - Two channels will be used when a packet triggers a call.

5. **Multiple Link Options: Max Trans Rate -** Enter the maximum data transfer rate allowed for this Remote Node. This parameter is in kilobits per second. There are two options for this field:

   - **64** - At most one channel can be used.
   - **128** - A maximum of two channels can be used.

6. **Multiple Link Options: Target Utility** - Enter the two thresholds separated by a - for subtracting and adding the second channel. The default is 32-48.

7. **Multiple Link Options: Add Persist** - This parameter specifies the number of seconds there traffic is above the adding threshold before the Prestige will bring up the second channel. The default is 5 seconds.

8. **Multiple Link Options: Subtract Persist** - This parameter specifies the number of seconds where traffic is below the subtraction threshold before the Prestige drops the second channel. The default is 5 seconds.

Once you have completed Menu 11.2 - Remote Node PPP Options, press **ENTER** at the message: Press ENTER to Confirm ... to confirm your selections, or press **ESC** to cancel your selections.

6 **Dial-In Configuration**

You can configure the Prestige to receive calls from Remote Dial-in Users (e.g. telecommuters) and Remote Nodes. There are several differences between R*emote Dial-in Users* and *Remote Nodes:*

1. The Prestige can make calls to or answer calls from the Remote Node. However, the Prestige will only answer calls from Remote Dial-in Users.

2. Each Remote Node can have its own set of parameters such as Bandwidth On Demand, Protocol, Security, etc.; while all Remote Dial-in Users share one common set, as defined in the Default Dial In Setup (Menu 13).

3. Generally, Remote Dial-in Users are individual users who dial in to the Prestige directly from their workstations, while Remote Nodes represent networks and are used for LAN-to-LAN connections.

This chapter discusses how to setup Default Dial-in parameters for both Remote Node and Remote Dial-in Users. The following sections give two examples of how the Prestige can be configured as a dial-in server for either or both.

By default, the Prestige allows information for up to eight users to be kept. If more than eight remote dial-in users can access the Prestige, you can use a separate RADIUS server to provide remote authentication services. For details on using a separate RADIUS server, see the Using RADIUS Authentication section in Chapter 12.

Telecommuting

Telecommuting enables people to work at remote sites and yet still have access to the resources in the business office. Typically, a telecommuter will uses a client workstation with TCP/IP or IPX and dial-out capabilities, e.g., a Windows 95 PC or a Macintosh and an ISDN Terminal Adapter (TA). For telecommuters to call in to your LAN, you need to configure a Dial-In User Profile for each telecommuter. Additionally, you need to configure the Default Dial-In Setup to set the operational parameters for all dial-in users. You can configure up to eight Remote Dial-in Users for the Prestige.

An example of Remote Dial-in User application, telecommuting, is shown below:
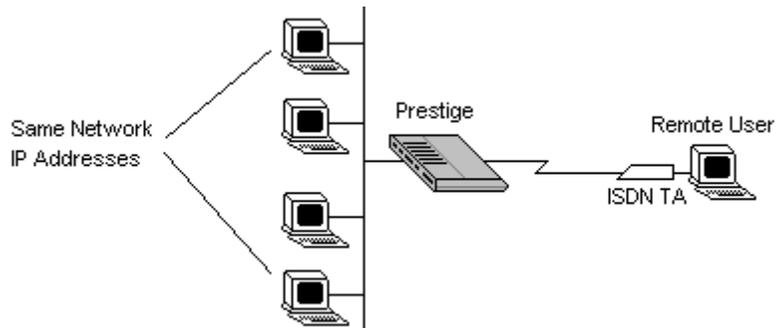
Figure 6-1 Example of Remote User: Telecommuter

Dial-In Server Application

The Prestige can also be used as a dial-in server. This application allows the Prestige to provide services for workstations on a remote network. For the Prestige to be set up as a dial-in server, you need to configure the Default Dial-In Setup to set the operational parameters for incoming call. Additionally, you will have to create a Remote Node for the

router on the remote network (see Chapter 5). An example of the Prestige being used as a dial-in server is shown below:
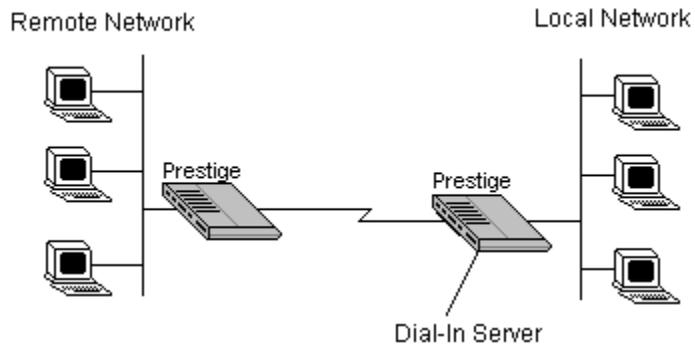
Figure 6-2 Example of a Dial-In Server Application

Default Dial-In Setup

This section covers the default dial-in parameters. The parameters in Menu 13 affect incoming calls from all Remote Dial-in Users and Remote Nodes before authentication is completed. Once authentication is completed, and if it matches a Remote Node, the Prestige will use parameters from that particular Remote Node.

```
                    Menu 13 - Default Dial-in Setup

    Telco Options:                    IP Address Supplied By:
      CLID Authen= None                 Dial-in User= Yes
                                        IP Pool= Yes
    PPP Options:                          IP Start Addr= 204.247.203.174
      Recv Authen= CHAP/PAP               IP Count(1,2)= 1
      Mutual Authen= No
        PAP Login= N/A                IPX Net Num. Supplied By:
        PAP Password= N/A               IPX Pool= No
                                          IPX Start Net Num.= N/A
    Multiple Link Options:                IPX Count(2,16)= N/A
      Max Trans Rate(Kbps)= 128
                                      Session Options:
    Callback Budget Management:         Input Filter Sets=
      Allocated Budget(min)= 240        Output Filter Sets=
      Period(hr)= 24                    Idle Timeout= 300

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

Figure 6-3 Menu 13 - Default Dial-in Setup

From the Main Menu, enter 13 to go to Menu 13 - Default Dial-in Setup. This section will describe how to configure the protocol-independent fields in this menu. For the protocol-dependent fields, refer to the appropriate chapters.

1. **Telco Options: CLID Authen.** - This field sets the CLID authentication parameter for all incoming calls. There are three options for this field:

   - **None** - No CLID is required.
   - **Required** - Must provide CLID, or call is disconnected.
   - **Preferred** - If the CLID is available then CLID will be used to do authentication. If the CLID is not available the call will continue.

2. **PPP Options: Recv. Authen. -** This field sets the authentication protocol used for incoming calls. User names and passwords are configured in the next section (Remote users/Dial-in Users Setup). Options for this field are:

   - **CHAP/PAP** - Prestige will try CHAP first, but PAP will be used if CHAP is not available.
   - **CHAP** - Use CHAP only.

- **None** - No authentication required.

3. **PPP Options: Mutual Authen.** - Some vendors, e.g. Cisco, implement a type of mutual authentication. That is, the node that initiates the call will request a user name and password from the far end that they are dialing to. If the Remote Node that is dialing in implements this type of authentication, set this field to Yes.

4. **PAP Login -** This field will only be enabled if the Mutual Authen. field is set to Yes. Enter in the login name to be used to respond to the far end's PAP authentication request. This field does not apply to CHAP authentication.

5. **PAP Password** - This field will only be enabled if the Mutual Authen. field is set to Yes. Enter in the PAP password to be used to respond to the far end's authentication request. This field does not apply to CHAP authentication.

6. **Multiple Link Options: Max Trans Rate -** Enter the maximum data transfer rate between your Prestige and the Remote Dial-in User. The unit is in bits per second. There are two options for this field:

   - **64 -** At most, one B channel will be used.
   - **128 -** A maximum of two channels can be used.

   When the Prestige calls back to the Remote Dial-in User the maximum data transfer rate is always 64.

7. **Callback Budget Management: Allocated Budget (min) -** This field will set a budget callback time for all the Remote Dial-in Users. The default for this field is 0 for no budget control.

8. **Callback Budget Management: Period (hr) -** This field will set the time interval to reset the above callback budget control.

9. **Dial-In IP Address Supplied By**: **Dial-in User** - If set to Yes, it tells the Prestige to allow a remote host to specify its own IP

address. This is to prevent the remote host from using an invalid IP address and potentially disrupting the whole network. If set to No, the remote host must use the IP address assigned by the Prestige from the IP pool, configured below. The default is Yes.

10. **Dial-In IP Address Supplied By: IP Pool -** This field tells the Prestige to provide the remote host with an IP address from the pool. This field is required if Dial-In IP Address Supplied By: Dial-in User is set to No. You can configure this field even if Dial-in User is set to Yes, in which case the Prestige will accept the IP address if the remote peer specifies one; otherwise, an IP address is assigned from the pool. The default is No.

11. **IP Pool: IP Start Addr -** This field is active only if you selected Yes in the Dial-In IP Address Supplied By: IP Pool field. The IP pool contains contiguous IP addresses and this field specifies the first one in the pool.

12. **IP Count (1,2)** - In this field, enter the number (1 or 2) of the addresses in the IP Pool. For example, if the starting address is 192.168.135.5 and the count is 2, then the pool will have 192.68.135.5 and 192.68.135.6

13. **Dial-In IPX Net. Num. Supplied By: IPX Pool -** This field tells the Prestige to provide the remote host with an IPX network number from the pool. Otherwise, the Prestige will generate a random IPX network number. The default is No.

14. **IPX Start Net. Num. -** This field is active only if you selected Yes in the Dial-In IPX Net. Num. Supplied By: IPX Pool field. The IPX pool contains contiguous IPX network numbers and this field specifies the first one in the pool.

15. **IPX Count (1,16)** - In this field, enter the number (1 - 16) of network numbers in the IPX Pool. For example, if the starting number is 12345678, and the count is 2, then the pool will have 12345678 and 12345679.

16. **Session Options: Input Filter Sets** and **Session Options: Output Filter Sets -** In these fields, you need to select the filter set(s) to filter the incoming and outgoing traffic between your Prestige and the Remote Dial-in User. Keep in mind that these filter set(s) will only apply to all Remote Dial-in Users but not the Remote Nodes.

You can choose from 12 different filter sets. In addition, you can link up to 4 filter sets together for further customization (e.g., 1, 5, 9, 12). Note that spaces and , are accepted in this field. For more information on customizing your filter sets, see Chapter 10 on Filter Configuration. The default is blank, i.e., no filters.

17. **Session Options: Idle Timeout -** This value is the number of idle seconds that elapses before the dial-in user is automatically disconnected. Idle Timeout is the period of time when there is no data traffic between the dial-in user or Remote Node and the Prestige. This field will only be used if the Recv. Authen is set to None and the call is not mapped to any Remote Node or Remote Dial-in User or the Prestige calls back to the Remote Dial-in User.

Once you have completed filling in Menu 13 - Default Dial-in Setup, press **ENTER** at the message: Press ENTER to Confirm ... to save your selections, or press **ESC** at any time to cancel your selections.

Dial-In Users Setup

The following steps describe the setup procedure for adding a Remote Dial-in User. From the Main Menu, enter 14 to go to 14. Dial-in User Setup is shown below:

```
                    Menu 14 - Dial-in User Setup
          1. joesmith
          2. _____
          3. _____
          4. _____
          5. _____
          6. _____
          7. _____
          8. _____




                    Enter Menu Selection Number:
```

Figure 6-4 Menu 14 - Dial-in User Setup

Select one of eight users by number, this will bring you to Figure 6-2Menu 14.1 - Edit Dial-in User.

```
                    Menu 14.1 - Edit Dial-in User

          User #: 1
          User Name= joesmith
          Active= Yes
          Passwd= ********
          Callback= No
          Callback Phone #= N/A
          Callback Override= N/A
          Rem CLID=
          Idle Timeout= 300




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

Figure 6-5 Menu 14.1 - Edit Dial-in User

1. **User Name** - This is a required field. This will be used as the login name for authentication. Choose a descriptive word for login, e.g., peterhousel.

2. **Active -** You can disallow dial-in access to this user by setting this field to Inactive. When set to inactive, the user record is still kept in the database for later activation. Deactivated users

are displayed with a – (minus sign) at the beginning of the name in Menu 14.

3. **Password -** Enter the password for the Remote Dial-in User.

4. **Callback -** This field determines if the Prestige will allow call back to the Remote Dial-in User upon dial-in. If this option is enabled, the Prestige will be able to call back to the Remote Dial-in User if they request it. In such a case, the Prestige will disconnect the initial call from this user and dial back to the specified call back number (see below). The default is no callback.

5. **Callback Phone # -** If Callback is Yes, then this is a required field. Otherwise, an N/A will appear in the field. Enter the telephone number to which the Prestige will call back.

6. **Callback Override -** If Callback is No, an N/A will appear in the field. The callback override allows the Remote Dial-in User to specify the call back telephone number on call-by-call basis. This is useful for when the Prestige returns a call back to a mobile user at different numbers, e.g., a sales rep in a hotel. Note that the default is No, i.e., the Prestige always calls back to the fixed callback number.

7. **Rem CLID -** If you have enabled the CLID Authen field in Menu 13, then you need to specify the telephone number from which this Remote Dial-in User calls. The Prestige will check this number against the CLID in the incoming call. If they do not match and the CLID Authen is Required, then the Prestige will reject the call.

8. **Idle Time-out -** Enter the idle time (in seconds). This time-out determines how long the dial-in user can be idle before the Prestige disconnects the call. Idle time is defined as the period of time where there is no data traffic between the dial-in user and the Prestige. The default is 300 seconds (5 minutes).

Once you have completed filling in Menu 14.1 - Edit Dial-in User , press **ENTER** at the message: Press ENTER to Confirm ... to save your selections, or press **ESC** at any time to cancel your selections.

More on CLID

CLID allows the Prestige to authenticate the caller before a call is answered, thus saving the cost of a connection. The Prestige uses the caller ID in the ISDN call setup message to match against the CLID in the database.

However, CLID may not be available due to your switch configuration.

Besides authentication, another application of CLID is to *combine* it with call back. For instance, your company pays for the connection charges for telecommuting employees, and you are using the Prestige as the dial in server. You can turn on both the CLID authentication and call back options for the dial-in users. By doing so, all usage are charged to the company instead of the employees, and your accounting department can avoid the hassles of accountability and reimbursement.

7 TCP/IP Configuration

This chapter shows you how to configure the Prestige for TCP/IP. Depending on your particular applications, you will need to configure different menus. For instance, Internet access is the most common application of TCP/IP. For this application, you should configure Menu 4. We will illustrate the configuration for other applications in the following sections.

IP Subnet Mask

A subnet mask is a 32-bit quantity that, when logically ANDed with an IP address, yields the network number. For instance, the subnet masks for class A, B and C without subnetting are 255.0.0.0, 255.255.0.0 and 255.255.255.0, respectively.

To create more network numbers, you shift some bits from the host ID to the network ID. For instance, to partition a class C network number 192.68.135.0 into two, you shift 1 bit from the host ID to the network ID. Thus the new subnet mask will be 255.255.255.128; the first subnet will have network number 192.68.135.0 with hosts 192.68.135.1 to 129.68.135.126 and the second subnet will have network number 192.68.135.128 with hosts 192.68.135.129 to 192.68.135.254.

It is recommended that you use the same subnet mask for all physical networks that share an IP network number. The table below lists the additional subnet mask bits in dot decimal notations. To use to following table, write down the original subnet mask and substitute the higher order 0s with the dot decimal of the additional subnet bits. For instance, to partition your class C network

204.247.203.0 with subnet mask 255.255.255.0 into 16 subnets (4 bits), the new subnet mask becomes 255.255.255.240.

Number of Bits	Dot Decimal
1	128
2	192
3	224
4	240
5	248
6	252
7	254
8	255

LAN-to-LAN Application

A typical LAN-to-LAN application is to use the Prestige to call from a branch office to the headquarters, as depicted in the following diagram.
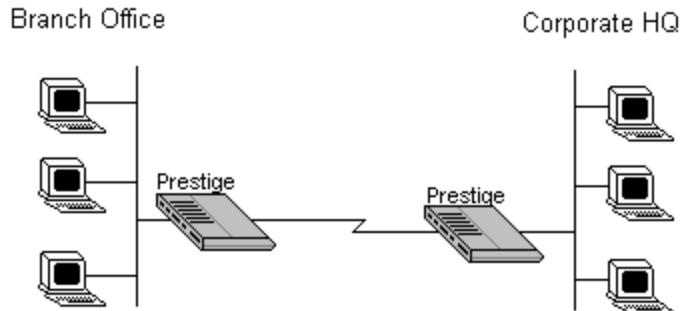
Figure 7-1 LAN-to-LAN Application

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 configure Static Routes if some services reside beyond the immediate remote LAN.

Remote Node Setup

Follow the procedure in Chapter 5 to fill the protocol-independent parameters in Menu 11, Remote Node Profile. For the protocol-dependent parameters, follow the instructions below. If you are configuring the Prestige to receive an incoming call, you also need to set the default dial-in parameters in menu 13 (see Chapter 6).

1. **Route** - Make sure IP is among the protocols in the Route field.

2. **IP Address** - Enter the IP address of the gateway at the remote site (in this case, headquarters). If the remote router is using a different IP address than the one entered here, the Prestige will drop the call.

3. **Edit IP/IPX/Bridge** - Press the space bar to change it to Yes and press Enter to go to the Menu 11.3 - Remote Node Network Layer Options menu shown below:

```
                Menu 11.3 - Remote Node Network Layer Options

IP Options:                          IPX Options:
  Rem IP Addr: 204.5.1.1               Dial-On-Query= N/A
  Rem Subnet Mask= 255.255.255.0       Rem LAN Net #= N/A
  My WAN Addr= 0.0.0.0                 My WAN Net #= N/A
  Single User Account= No              Hop Count= N/A
    Server IP Addr= N/A                Tick Count= N/A
  Metric= 2                            W/D Spoofing(min)= N/A
  Private= No                          SAP/RIP Timeout(min)= N/A
  RIP= None
                                     Bridge Options:
                                       Dial-On-Broadcast= N/A
                                       Ethernet Addr Timeout(min)= N/A




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

Figure 7-2 Menu 11.3 - Remote Node Network Layer Options

4. **Rem IP Address** - This will show the IP address you entered for this Remote Node in the previous menu.

5. **Rem IP Subnet Mask** - Enter the subnet mask for the remote network.

6. **My WAN Addr** - Some implementations, especially the UNIX derivatives, require hosts on both ends of the ISDN link to have separate addresses from the LAN, and that the addresses must have the same network number. If this is the case, enter the IP address assigned to the WAN port of the Prestige. Note that this is the address assigned to the local Prestige, not the remote router.
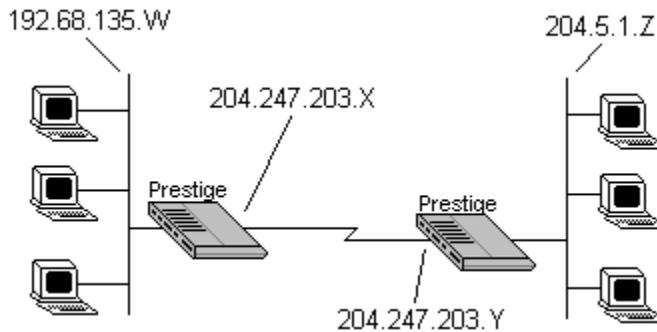
Figure 7-3 Sample IP Addresses

7. **Single User Account -** This field should be set to yes to enable the Single User Account (Network Address Translation) feature for this site. Use the space bar to toggle between yes and no. See page for more information on the Single User Account feature.

8. **Server IP address -** If you are using the Single User Account feature and you want to make a server accessible on your LAN, e.g., a web server, accessible to outside users, enter that servers IP address here.

9. **Metric** - The metric represents the "cost" of transmission for routing purpose. 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 16. In practice, 2 or 3 is usually a good number.

10. **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.

11. **RIP** - This parameter determines how the Prestige handles RIP (Routing Information Protocol), and the default is Both. If set to Both, the Prestige will broadcast its routing table on the WAN, and incorporate RIP broadcasts by the other router into its routing table. If set to In Only, the Prestige will not broadcast its routing table on the WAN; if set to Out Only, the Prestige will broadcast its routing table but ignores any RIP broadcast packets that it receives. If set to None, the Prestige will not participate in any RIP exchange with other routers. Usually, you should leave this parameter at its default of Both and let RIP propagate the routing information automatically.

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 selections, or press **ESC** at any time to cancel your selections.

Static Route Setup

On a directly connected internet, RIP usually handles the routing automatically. However, RIP cannot propagate across isolated networks, as in the case before a connection is made between the two subnetworks using one Class C IP address. Without a route, no packets can be forwarded to their destinations. A static route is used to resolve this problem by providing the Prestige with some static routing information. As a matter of fact, when you configure the Internet Access or a Remote Node, a static route is implicitly created by the Prestige. An example is given below. In the example, stations on the 204.5.1.0/24 subnetwork can access the remote stations using the static route. The route will have a

destination of 204.5.1.64/26 with the gateway address being that of the Remote Node (204.5.1.150).

204.5.1.0/24   204.5.1.64/26

204.5.1.1 204.5.1.150

204.5.1.151
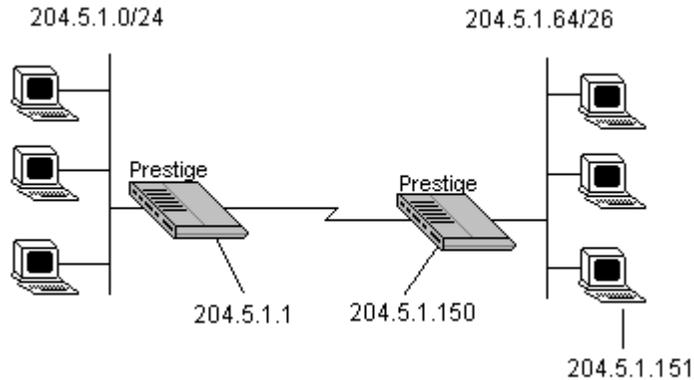
Figure 7-4 Static Routing Example

Note that in normal circumstances, the Prestige will have adequate routing information after you configure the Internet access and Remote Nodes; you do not need to configure additional static routes. You will need to configure static routes only for unusual cases, e.g., subnetting. To create an additional static routes for IP, use Menu 12, Static Route Setup as shown below:

```
                    Menu 12 - Static Route Setup

     IP Static Route                    Bridge Static Route
       1. AimNet (ISP)                    21. _____
       2. ISDN2_1                         22. _____
       3. _____                        23. _____
       4. ISDN2_2                         24. _____

     IPX Static Route
      11. _____
      12. _____
      13. _____
      14. _____




                    Enter Menu Selection Number:
```

Figure 7-5 Menu 12 - Static Route Setup - Main Menu

```
                 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 7-6 IP Static Route Setup

1. **Route Name** - Enter a descriptive name for this route. This is for identification purpose only.

2. **Active** - This fields allows you to activate/deactivate this static route.

3. **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.

4. **IP Subnet Mask** - Enter the subnet mask for this destination. Follow the discussion on IP subnet mask in this chapter.

5. **Gateway IP Address** - Enter the IP address of the gateway. The gateway is an *immediate* neighbor of the Prestige that will forward the packet to the destination. On the LAN, the gateway must be a router on the same segment as the Prestige; over ISDN, the gateway must be the IP address of one of the Remote Nodes.

6. The **Metric** and the **Private** parameters have the same meaning as those in the Remote Node Setup.

Once you have completed filling in the menu, press **ENTER** at the message: Press ENTER to Confirm ... to save your selections, or press **ESC** at any time to cancel your selections.

8   Novell IPX Configuration

This chapter shows you how to configure the Prestige for IPX.
Depending on your particular applications, you will need to
configure different menus. We will illustrate the configuration
for some applications in the following sections.

IPX Network Environment

Frame Type

The stations on an IPX network (both clients and servers) can run
on four different frame types existing on one physical Ethernet
cable. These frame types include 802.2, 802.3, Ethernet II (DIX),
and SNAP.

Network Numbers

Whenever you are setting up an IPX routing environment, it is
important to correctly configure the network numbers on the LAN.
On any IPX network, there is an external network number that is,
the number associated with the frame type on the Ethernet cable to
which the stations on the network are joined. In addition to this
external network number, each NetWare server has its own
internal network number. It is important to remember that every
network number has to be unique for that entire internetwork. So if
a server station had an internal network number of 00000011, there
is no other network number (internal or external) of 00000011
anywhere on the entire network.

There are two different scenarios in which you would connect your Prestige to a LAN: one with a server (server side), and one without a server (client side).
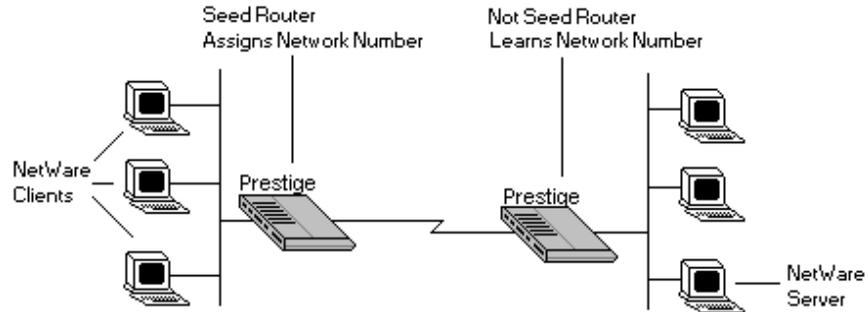
Figure 8-1 Prestige Operating in IPX Environment

Prestige on LAN with Server

When the Prestige is being connected to a LAN with an existing NetWare server station, you will not need to configure the Prestige as a seed router, and hence the network number parameter in the Ethernet Setup Menu for the Prestige. Rather, the Prestige will learn the network number of the network it is attached to through the regular RIP broadcasts sent by the server and add this route to its routing table.

Prestige on LAN without Server

If the Prestige is connected to a LAN without an existing NetWare server station, then it needs to create a unique external network number to apply to that frame on the LAN. This Prestige must then be configured as a Seed Router, and the network number can be configured in the Ethernet Setup Menu. The network number must be unique and not used anywhere else on the entire internetwork.

IPX Spoofing

The Prestige comes with several pre-defined call filters designed to prevent certain IPX packets from triggering a call to a Remote Node. These filters should inform your Prestige which packets should be ignored as traffic.

When you are routing IPX packets, the default call filters are defined as follows:

- Block periodical SAP and RIP response messages.

- Block NetWare serialization packets.

- Allow SAP and RIP inquiry packets.

These call filters prevent the Prestige from making a call to the Remote Node, thus preventing the expense of an unnecessary phone call.

IPX Ethernet Setup

The first step is to set up the Prestige on the LAN. From menu 3, select option 3 to go to Menu 3.3 - Novell IPX Ethernet Setup as seen below:

```
            Menu 3.3 - Novell IPX Ethernet Setup

       Seed Router= Yes

       Frame Type 802.2= Yes
          IPX Network #= 12345678

       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


       Press ENTER to Confirm or ESC to Cancel:
```
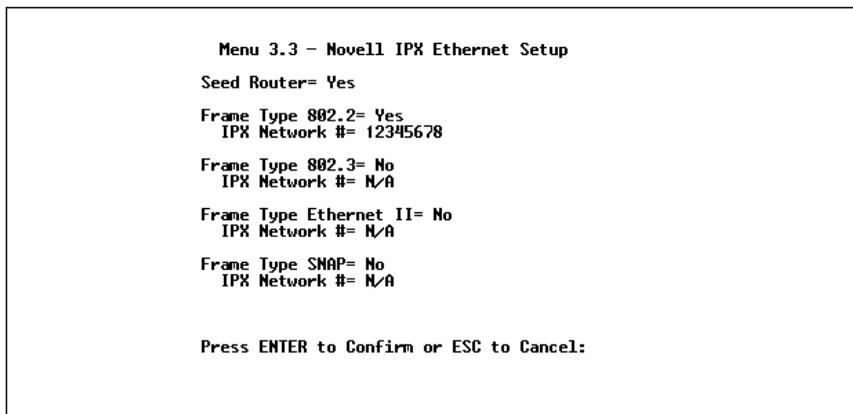
Figure 8-2 Menu 3.3 - Novell IPX Ethernet Setup

1. **Seed Router** - Determine if the Prestige is to act as a seed router. This value depends on the existing network. If there is a NetWare server providing the network number, select No. If there is no NetWare server providing the network number, select Yes.

2. **Frame Type** - For every frame type that the Prestige needs to support, you need to set the corresponding field to Yes. The frame type(s) selected here must be the same frame type(s) as the server or client stations on that network. Otherwise, the devices will not be able to communicate. You can select one or more of these four frame types:

   - 802.2
   - 802.3
   - Ethernet II
   - SNAP

3. **IPX Network #** - If you selected the Prestige to act as a seed router, you need to provide a unique network number to be associated with the network that the Prestige has joined. Keep in mind that this number must not be used anywhere else on the entire internetwork.

Once you have completed filling in the Menu 3.3, press **ENTER**
the save message to save your selections, or press **ESC** at any time
to cancel your selections.

LAN-to-LAN Application

A typical LAN-to-LAN application is to use the Prestige to call
from a branch office to headquarters such that all of the stations on
the branch office network have access to the server at the
headquarters, as depicted in the following diagram:
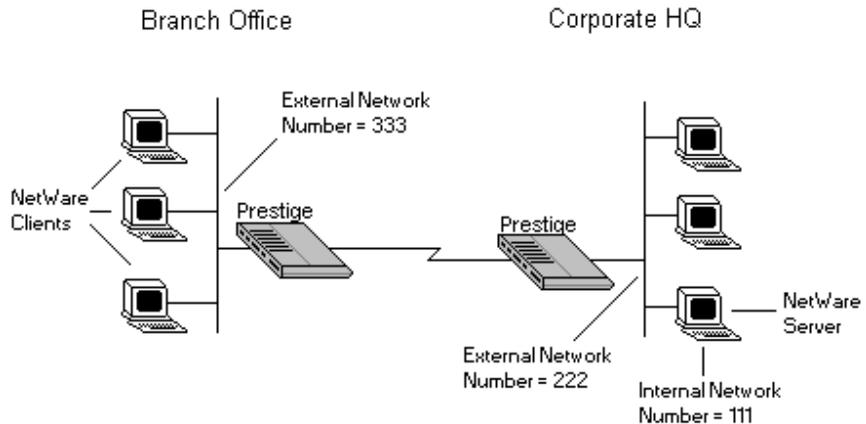
Figure 8-3 LAN-to-LAN application

For the branch office, you need to configure a Remote Node in
order to dial out to headquarters.

Remote Node Setup

Follow the procedure in Chapter 5 to fill the protocol-independent
parameters in Menu 11, Remote Node Profile. For the protocol-
dependent parameters, follow the ensuing instructions. If the
Prestige is configured to receive an incoming call, you can
configure the default dial-in parameters in menu 13 (see Chapter
6).

1. Route - Make sure IPX is among the protocols in the Route field.

2. Edit IP/IPX/Bridge - Press the space bar to change it to Yes and press Enter to go to the network layer options menu.

```
              Menu 11.3 - Remote Node Network Layer Options

IP Options:                          IPX Options:
  Rem IP Addr: 204.5.1.1               Dial-On-Query= N/A
  Rem Subnet Mask= 255.255.255.0       Rem LAN Net #= N/A
  My WAN Addr= 0.0.0.0                 My WAN Net #= N/A
  Single User Account= No             Hop Count= N/A
    Server IP Addr= N/A               Tick Count= N/A
  Metric= 2                           W/D Spoofing(min)= N/A
  Private= No                         SAP/RIP Timeout(min)= N/A
  RIP= None
                                     Bridge Options:
                                       Dial-On-Broadcast= N/A
                                       Ethernet Addr Timeout(min)= N/A



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

**Figure 8-4 Menu 14.1 - Edit Dial-in User**

3. **Dial-On-Query** - This field is necessary for the Prestige on the client side LAN. When set to Yes, any Get Service SAP or RIP broadcasts coming from the LAN will trigger the Prestige to make a call to that Remote Node. If it is set to No, the Prestige will not make the outgoing call.

4. **Rem LAN Net #** - In this field, enter the internal network number of the NetWare server on the remote side LAN. The Prestige will create a route to access this server.

5. **My WAN Net #** - In this field, you can enter in the WAN network number of the device that you are connecting to. This number will be used for negotiation between the Prestige and the remote device. If you leave this field as 00000000, the Prestige will select the greater WAN network number between the two devices.

6. **Hop Count** - This field indicates the number of intermediate networks that must be passed through to reach the Remote Node. The default is one (1).

7. **Tick Count** - This field indicates the time-ticks required to reach the Remote Node. The default is two (2).

8. **W/D Spoofing (min)** - This field is used for the Prestige on the server side LAN. The Prestige can spoof a response to a server's WatchDog request after the connection is dropped. In this field, enter in the time (number of minutes) that you want the Prestige to spoof the WatchDog response.

9. **SAP/RIP Timeout (min)** - This field indicates the amount of time that you want the Prestige to maintain the SAP and RIP entries learned from this Remote Node in its internal tables after the connection has been dropped. If this information is retained, then the Prestige will not have to get the SAP information when the line is brought back up. Enter the time (number of minutes) in this field.

Once you have completed filling in the Network Layer Options Menu, press **ENTER** to return to Menu 11.1. Press **ENTER** at the message: Press ENTER to Confirm ... to save your selections, or press **ESC** at any time to cancel your selections.

Static Route Setup

If your LAN-to-LAN application has NetWare servers on both sides of the link, then all NetWare client stations will have access to a server on their LAN as shown below:
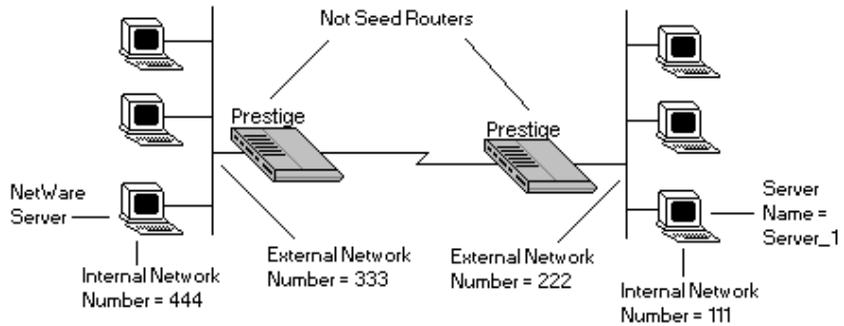
Figure 8-5 NetWare Servers on Both Sides of the Link

This may present a problem if you desire your client station to access a server at a remote site. For example, in the above diagram, suppose that a client station on the network on the left wishes to access the NetWare server on the right (internal network number = 111). However, the SAP broadcasts will receive a response from the server on the left (internal network number = 444). A static route is used to resolve this problem by providing the Prestige with some static routing information to access the remote server.

From Menu 12, select one of the four possible IPX Static Routes as shown below:

```
                   Menu 12.2 - Edit IPX Static Route

             Route #= 11
             Server Name= Server_1
             Active= Yes
             Network #= 00000222
             Node #= 000000000001
             Socket #= 0451
             Type #= 0004
             Hop Count= 2
             Tick Count= 3
             Gateway Node= 1




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

Figure 8-6 Menu 12.2 - Edit IPX Static Route

1. **Server Name** - In this field, enter in the name that has been configured for the server. This name must be the *exact* name configured in the NetWare server.

2. **Network #** - This field contains the internal network number of the remote server which you wish to access. Do not use 00000000 or FFFFFFFF for this field.

3. **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.

4. **Socket #** - This field contains the socket number on which the server will receive service requests. The default for this field is hex 0451.

5. **Type #** - This field identifies the type of service the server provides. The default for this field is hex 0004.

6. **Gateway Node** - In this field, enter the number (1-4) of the Remote Node that is linked to this static route. That is, the Remote Node that you wish to route the packet to.

The Hop Count and Tick Count fields have the same meaning as those in the Remote Node Setup.

Once you have completed filling in the menu, press **ENTER** at the message: Press ENTER to Confirm ... to save your selections, or press **ESC** at any time to cancel your selections.

9 **Bridging Configuration**

This chapter shows you how to configure the Bridging options for the Prestige. Depending on your particular applications, you will need to configure different menus. We will illustrate the configuration for some applications in the following sections.

IPX Spoofing

The Prestige comes with several pre-defined call filters designed to prevent certain IPX packets from triggering a call to a Remote Node. These filters should inform your Prestige which packets should be ignored as traffic.

When you are bridging IPX packets, the default call filters are defined as follows:

- Block periodical SAP and RIP response messages.

- Block SAP and RIP inquiry packets if set to Handle IPX as Server.

- Allow SAP and RIP inquiry packets if set to Handle IPX as Client or None.

These call filters prevent the Prestige from making a call to the Remote Node, thus preventing the expense of an unnecessary phone call.

Bridge Ethernet Setup

Bridging is used to forward packets of unsupported protocols whose destination is not on the local Ethernet to the WAN.

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

- If it is set to **None,** nothing is done to IPX traffic.

- If it is set to **Client,** all RIP and SAP (Service Advertising Protocol) periodical response packets will not trigger the call.

- If it is set to **Server,** no RIP or SAP packets will trigger the call. In addition, during the time when the ISDN line is down, the Prestige will reply to the servers watchdog messages on behalf of remote clients. The period of time that the Prestige will do this is linked to the *Ethernet Address Timeout* parameter in each Remote Node (see Chapter 5). When a remote Ethernet address is aged out, there is no need to maintain its connection to the IPX server.

From Menu 3 - Ethernet Setup, enter "5" to go to Menu 3.5 - Bridge Ethernet Setup shown below:

```
                    Menu 3.5 — Bridge Ethernet Setup
                    Handle IPX= Client




                    Press ENTER to Confirm or ESC to Cancel:
Press Space Bar to Toggle.
```
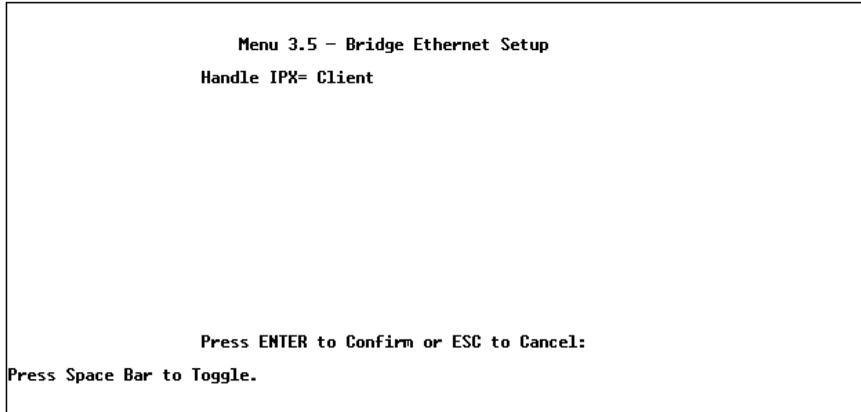
Figure 9-1 Bridge Ethernet Setup

- **Handle IPX** - Set this parameter to None if there is no IPX traffic on the LAN or if you do not want to apply any special handling for IPX. Set it to Client if there are only client workstations on the LAN. Set to Server if there are only IPX servers on the LAN.

  If there are both clients and servers on the LAN, then the setting depends on if the local clients will access the remote servers. If they do, set to **Client** and set Dial-On-Broadcast in menu 11.2 to **Yes** to allow the client queries to trigger the call. If they do not, set it to **Server**.

When you are finished, press **ENTER** at the message: Press ENTER to Confirm ... to save your selections, or press **ESC** at any time to cancel them.

LAN-to-LAN Application

A typical LAN-to-LAN application is to use the Prestige to call from one office to another office such that stations on one network have access to stations on the remote side and vice versa. You will

need to configure a Remote Node in order to dial out to another office.

Remote Node Setup

Follow the procedure in Chapter 5 to fill the protocol-independent parameters in Menu 11, Remote Node Profile. For the protocol-dependent parameters, follow the ensuing instructions:

1. **Bridge** - Make sure this field is set to Yes.

2. **Edit IP/IPX/Bridge** - Press the space bar to change it to Yes and press Enter to go to the network layer options menu as seen below:

```
                Menu 11.3 - Remote Node Network Layer Options

  IP Options:                            IPX Options:
    Rem IP Addr: 204.5.1.1                 Dial-On-Query= N/A
    Rem Subnet Mask= 255.255.255.0         Rem LAN Net #= N/A
    My WAN Addr= 0.0.0.0                   My WAN Net #= N/A
    Single User Account= No                Hop Count= N/A
      Server IP Addr= N/A                  Tick Count= N/A
    Metric= 2                              W/D Spoofing(min)= N/A
    Private= No                            SAP/RIP Timeout(min)= N/A
    RIP= None
                                         Bridge Options:
                                           Dial-On-Broadcast= N/A
                                           Ethernet Addr Timeout(min)= N/A



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

Figure 9-2 Remote Node Bridging Configuration

3. **Dial-On-Broadcast** - This field is necessary for the Prestige on the caller side LAN. When set to Yes, any broadcasts coming from the LAN will trigger the Prestige to make a call to that Remote Node. If it is set to No, the Prestige will not make the outgoing call.

4. **Ethernet Addr Timeout (min)** - In this field, enter the time (number of minutes) that you wish the Prestige to retain the Ethernet Addr information in its internal tables while the line is down. If this information is retained, then the Prestige will not

have to re-negotiate the protocol and 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. Press ENTER at the message: Press ENTER to Confirm ... to save your selections, or press **ESC** at any time to cancel your selections.

Default Dial-In Setup for Bridge

There is only one parameter you need to fill out for Bridging applications.

- **PPP Options: Recv. Authen.** - verify that this field is *not* set to None Bridging applications must have some sort of authentication turned on in order to match to a Remote Node.

Once you have completed filling in the menu, press ENTER at the message: Press **ENTER** to Confirm ... to save your selections, or press **ESC** at any time to cancel your selections.

Bridge Static Route Setup

You can configure Bridge static routes for your Bridging applications.

```
              Menu 12.4 - Edit Bridge Static Route

          Route #: 31
          Route Name= Remote
          Active= Yes
          Ether Address= ?
          IP Address=
          Gateway Node= 1









          Press ENTER to Confirm or ESC to Cancel:
```
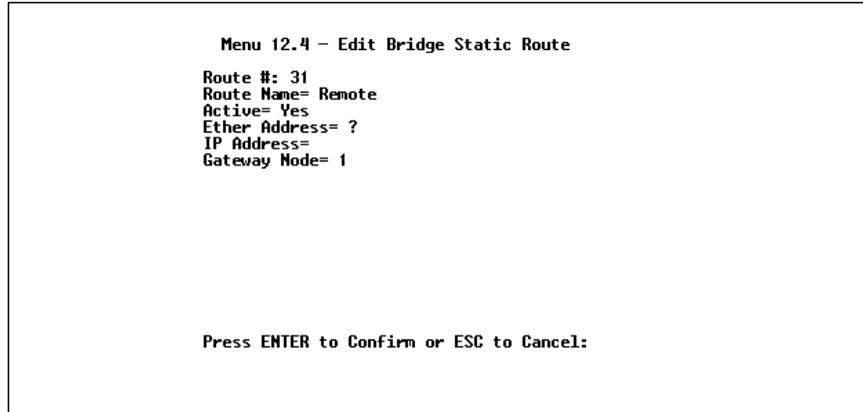
Figure 9-3 Menu 12.4 - Bridge Static Route

1. **Route Name** - For identification purposes enter a name for the
    bridge static route.

2. **Active** - Indicates whether the static route is active or not.

3. **Ether Address** -Enter the MAC address of the destination
    device that you wish to bridge your packets to.

4. **IP Address** - If available, enter the IP address of the
    destination device that you wish to bridge your packets to.

5. **Gateway Node** - Enter the number (1-4) of the Remote Node
    that is linked to this static route. When an incoming packet's
    destination Ether (MAC) address matches the value entered
    above, then it will trigger a call to this Remote Node.

Once you have completed filling in the menu, press **ENTER** at the
message: Press ENTER to Confirm ... to save your selections, or
press **ESC** at any time to cancel your selections.

10 **Filter Configuration**

About Filtering

The Prestige uses filters to decide whether or not to allow passage of a data packet and/or to make a call over the ISDN line. There are three types of filters involved: incoming data filters, outgoing data filters, and call filters. Data filters screen the data to determine if the packet should be allowed to pass. Call filters are used to determine if a call should be placed.

Outgoing packets must pass through the data filters before they encounter the call filters. Call filters are divided into two groups: default call filters and user-defined call filters. Prestige has default call filters that filter out administrative packets, e.g., RIP and SAP packets. The Prestige applies the default filters first and then the user-defined call filters if applicable as seen below:
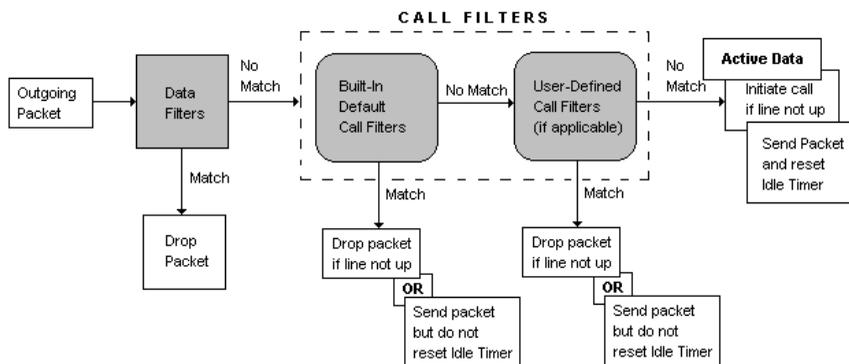

Figure 10-1 Outgoing packet filtering Process

For incoming packets, the Prestige applies data filters only. Packets are processed depending upon whether a match is made. The Prestige allows you to customize the filter sets that you wish to use. This following sections describe how to configure the Prestige's filter sets.

Prestige's Filter Structure

You can configure up to twelve filter sets with six rules in each set. Therefore, the Prestige allows you to customize up to 72 filter rules (12 x 6).

When implementing these filter sets, you can link up to four of the filter sets together to screen the data packet. Therefore, with each filter set having up to six rules, you can have a maximum of 24 rules active for a single filtering application.

Configuring a Filter Set

In order to distinguish between the 12 filter sets, each filter set should have a name or some comments. You can edit these comments in the following way.

1. From the Main Menu, select option 21. Filter Set Configuration. This will bring you to Menu 21 - Filter Set Configuration.

2. From this menu, you can choose from among the twelve filter sets. Select the filter set you wish to configure (1-12).

This will bring you to the **Edit Comments** field. Whatever the comments are for that filter set will be displayed in this field. You can edit the comments you wish to use to identify that filter set.

Once you have completed filling in **Edit Comments** field, press **ENTER** at the message: Press ENTER to Confirm ... to confirm your selections, or press **ESC** at any time to cancel your selections.

The new information will now be displayed in the read-only section of Menu 21 - Filter Set Configuration as shown below:

```
                    Menu 21 - Filter Set Configuration
    Filter                              Filter
    Set #         Comments              Set #         Comments
    ─────        ──────────            ─────        ──────────
      1          Filter Set #1            7          ──────────
      2          Filter Set #2            8          ──────────
      3          ──────────               9          ──────────
      4          ──────────              10          ──────────
      5          ──────────              11          ──────────
      6          ──────────              12          ──────────


              Enter Filter Set Number to Configure= 0

              Edit Comments=

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

Figure 10-2 Menu 21 - Filter Set Configuration

Once you press ENTER, you will be taken to Menu - 21.1 - Filter Rules Summary as seen below. The information displayed in this menu is read-only. From here, you can examine the parameters of each rule that you have configured for that set. The following is a brief description of the abbreviations used in this menu.

- **#** - Refers to the filter rule number (1-6).

- **A** - Refers to Active. Y means the filter rule is active and N means the filter rule is inactive.

- **Type** - Refers to the type of filter rule. This can display GEN for generic, IP for TCP/IP, or IPX for Novell IPX.

- **Filter Rules** - The filter rule parameters will be displayed here (see below).

- **M** - Refers to More. Y means there are more rules to check, N means there aren't.

- **m** - Refers to Action Matched. F means to forward the packet, D means to drop the packet, and N means check the next rule.

- **n** - Refers to Action Not Matched. F means to forward the packet, D means to drop the packet, and N means check the next rule.

```
                    Menu 21.1 - Filter Rules Summary

 # A Type                     Filter Rules                          M m n
 - - ----    ----------------------------------------------------   - - -
 1 Y IP      Pr=17, SA=204.247.203.2, SP=520, DA=192.68.135.1       N F D
 2 Y Gen     Off=4, Len=2, Mask=ffff, Value=0802                    N D N
 3 Y IPX     PT=ad, SS<2222, DS!=1111                               N F N
 4 Y APT     DT=244, DN=[32-64], DS!=200, SN=[100-450], SS>100      N D F
 5 N
 6 N




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

Figure 10-3 Menu 21.1 - Filter Rules Summary

If the filter type is IP (TCP/IP), the following abbreviations will be used:

- **Pr** - Protocol.
- **SA** - Source Address.
- **SP** - Source Port number.
- **DA** - Destination Address.
- **DP** - Destination Port number.

If the filter type is GEN (generic), the following abbreviations will be used:

- **Off** - Offset.
- **Len** - Length.

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If the filter type is IPX (Novell IPX), the following abbreviations will be used:

- **PT** - IPX Packet Type.
- **SS -** Source Socket.
- **DS** - Destination Socket.

For more information on configuring the filter rule parameters, refer to the next section.

To configure a specific filter rule, simply select the number of the filter rule (1-6) you wish to configure and press ENTER. This will take you to Menu 21.1.1 - TCP/IP Filter Rule (next section).

Configuring a Filter Rule

There are four types of filter rules that you can configure. Some of the parameters will differ depending on the type of rule. When you first enter the filter rule menu, you will be presented with Menu 21.1.1 - TCP/IP Filter Rule. If you wish to configure another type of filter rule, you need to select the appropriate type (by pressing SPACE bar) under the **Filter Type** field and press ENTER. This will bring you to the corresponding menu.

TCP/IP Filter Rule

This section will show you how to configure a TCP/IP filter rule for your Prestige. The fields in the menu are indicated in **bold** type.

```
                    Menu 21.1.1 - TCP/IP Filter Rule

            Filter #: 1,1
            Filter Type= ICP/IP Filter Rule
            Active= Yes
            IP Protocol= 17     IP Source Route= No
            Destination: IP Addr= 192.68.135.1
                         IP Mask= 255.255.255.255
                         Port #= 520
                         Port # Comp= None
                 Source: IP Addr= 204.247.203.2
                         IP Mask= 255.255.255.255
                         Port #= 520
                         Port # Comp= Equal
            TCP Estab= N/A
            More= No            Log= None
            Action Matched= Forward
            Action Not Matched= Drop

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

Figure 10-4 Menu 21.1.1 - TCP/IP Filter Rule

1. **Active** - In this field, you can make the filter rule active or inactive. There are two options:

    - Yes.
    - No.

2. **IP Protocol** - Protocol refers to the IP specific number of the protocol. The range for this value should be between 0 and 255. For example, 6 refers to the TCP protocol.

3. **IP Source Route -** Determine, Yes or No, whether to check the source route.

4. **Destination: IP Addr -** In this field, enter the destination IP Address of the packet you wish to filter. The address is usually written in dotted decimal notation such as a.b.c.d where a, b, c, and d are numbers between 0 and 255.

5. **Destination: IP Mask** - In this field, enter the IP mask that will be used to mask the bits of the IP Address given in **Destination: IP Addr**.

6. **Destination: Port # -** Enter the destination port of the packets that you wish to filter. The range of this field is 0 to 65535.

7. **Destination: Port # Comp -** In this field, you can select what comparison quantifier you wish to enable to compare to the value given in **Destination: Port #.** There are five options for this field:

- None.
- Less.
- Greater.
- Equal.
- Not Equal.

8. **Source: IP Addr -** In this field, enter the source IP Address of the packet you wish to filter. The address is usually written in dotted decimal notation such as a.b.c.d where a, b, c, and d are numbers between 0 and 255.

9. **Source: IP Mask -** In this field, enter the IP mask that will be used to mask the bits of the IP Address given in **Source: IP Addr**.

10. **Source: Port # -** Enter the source port of the packets that you wish to filter. The range of this field is 0 to 65535.

11. **Source: Port # Comp -** In this field, you can select what comparison quantifier you wish to use to compare to the value given in **Source: Port #.** There are five options for this field:

- None.
- Less.
- Greater.
- Equal.
- Not Equal.

12. **TCP Estab -** This field is dependent upon the IP Protocol field. This field will be inactive (N/A) unless the value in that field is 6 (TCP protocol). In this field you determine what type of TCP packets to filter. There are two options:

- Yes - filter match only established TCP connections.
- No - filter match both initial and established TCP connections.

13. **More** - In this field, you can determine if you want to pass the packet through the next filter rule before an action is taken. There are two options for this field:

- Yes.
- No.

If More is Yes, then Action Matched and Action Not Matched will be N/A.

14. **Log -** In this field, you can determine if you wish to log the results of packets attempting to pass the filter rule. These results will be displayed on the System Log (see Chapter 14). There are 4 options for this field:

- 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.

15. **Action Matched -** If the conditions for the filter rule are met, you can specify what to do with the packet. There are three options for this field:

- Check Next Rule.
- Forward.
- Drop.

16. **Action Not Matched -** If the conditions for the filter rule are not met, you can specify what to do with the packet. There are three options for this field:

- 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 confirm your selections, or press **ESC** at any time to cancel your selections. This data will now be displayed on Menu 21.1 - Filter Rules Summary.

Generic Filter Rule

This section will show you how to configure the protocol-independent parameters for a Generic filter rule for your Prestige. For information on the protocol-dependent fields, refer to the previous section, TCP/IP Filter Rule and the following section, Novell IPX Filter Rule. The fields in the menu are indicated in **bold** type.

```
                    Menu 21.1.2 - Generic Filter Rule

              Filter #: 1,2
              Filter Type= Generic Filter Rule
              Active= Yes
              Offset= 4
              Length= 2
              Mask= ffff
              Value= 0802
              More= No              Log= None
              Action Matched= Drop
              Action Not Matched= Check Next Rule




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

Figure 10-5 Menu 21.1.1 - Generic Filter Rule

1. **Offset -** Offset refers to the value of the byte that you want to use as your starting offset. That is, in the data packet, at what point do you want to begin the comparison. The range for this field is from 0 to 255. *Default = 0*

2. **Length -** This field refers to the length (in bytes) of the data in the packet that the Prestige should use for comparison and masking. The starting point of this data is determined by **Offset**. The range for this field is 0 to 8. *Default = 0*

3. **Mask -** In this field, specify (in Hexadecimal) the value that the Prestige should logically qualify [and] the data in the packet. Since **Length** is given in bytes, you need to enter in twice the length hexadecimal numbers for this field. For example, if **Length** were 4, then a valid **Mask** must have 8 hexadecimal numbers, like 1155ABF8.

4. **Value -** In this field, specify (in Hexadecimal) the value that the Prestige should use to compare with the masked packet. The value should align with **Offset**. Since **Length** is given in bytes, you need to enter in twice the length hexadecimal numbers for this field. For example, if **Length** were 4, then a valid **Value** must have 8 hexadecimal numbers, like 1155ABF8. If the result from the masked packet matches **Value**, then the packet is considered matched.

Once you have completed filling in Menu 21.1.1 - Generic Filter Rule, press **ENTER** at the message: Press ENTER to Confirm ... to confirm your selections, or press **ESC** at any time to cancel your selections. This data will now be displayed on Menu 21.1 - Filter Rules Summary.

Novell IPX Filter Rule

This section will show you how to configure the protocol-dependent parameters for an IPX filter. The fields in the menu are displayed in **bold** type.

```
                  Menu 21.1.3 - IPX Filter Rule

          Filter #: 1,3
          Filter Type= IPX Filter Rule
          Active= Yes
          IPX Packet Type= ad
          Destination: Network #= 12345678
                       Node #= abcdef123456
                       Socket #= 1111
                       Socket # Comp= Not Equal
               Source: Network #= 87654321
                       Node #= 654321fedcba
                       Socket #= 2222
                       Socket # Comp= Less
          Operation= N/A
          More= No            Log= None
          Action Matched= Forward
          Action Not Matched= Check Next Rule

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

Figure 10-6 Menu 21.1.3 - IPX Filter Rule

1. **IPX Packet Type** - Enter the IPX packet type value of the
    packet you wish to filter. This value should be two hex-bytes.

2. **Destination/Source Network #** - Enter the four hex-byte
    destination/source network numbers of the packet that you
    wish to filter.

3. **Destination/Source Node # -** Enter in the six hex-byte value
    for the destination/source node number of the packet you wish
    to filter.

4. **Destination/Source Socket #** - Enter the destination/source
    socket number of the packets that you wish to filter. This
    should be a 4-byte hex value.

5. **Destination/Source Socket # Comp -** You can select what
    comparison quantifier you wish to use to compare to the value
    given in Destination Socket # and Source Socket #.

6. **Operation** - This field is only active if one of the Socket #
    fields is 0452 or 0453 indicating SAP and RIP packets. There
    are seven options for this field which determines the operation
    for the IPX 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 confirm your selections, or press **ESC** at any time to cancel your selections. This data will now be displayed on Menu 21.1 - Filter Rules Summary.

11 SNMP

About SNMP

The Simple Network Management Protocol (SNMP) is a protocol governing network management and the monitoring of network devices and their functions. The Prestige supports the utilization of SNMP to regulate the communication that occurs between the manager station and the agent stations in a network. Basically, the Prestige, when connected to the LAN, acts as an agent station. In this way, the manager station on your LAN can monitor the Prestige as it would another station on the network. Keep in mind that SNMP is only available if TCP/IP is configured on your Prestige.

Configuring Your Prestige For SNMP Support

The following steps describe a simple setup procedure for configuring the SNMP management.

```
                Menu 22 - SNMP Configuration

       SNMP:
         Get Community= public
         Set Community= netman
         Trusted Host= 204.247.203.142
         Trap:
           Community= public
           Destination= 0.0.0.0




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

Figure 11-1 Menu 22 - SNMP Configuration

1. From the Main Menu, select option 22. SNMP Configuration.
    This will bring you to Figure 12.1 Menu 22 - SNMP
    Configuration.

2. You will then be prompted to enter the following information.
    Steps 3 -7 will describe the specific parameters involved in the
    configuration. The parameters you will have to fill in will be
    indicated in **bold** type.

3. **Get Community -** From this field, you can determine what the
    Get Community is for your Prestige. The value entered into this
    field will be used to authenticate the community field for the
    incoming Get- and GetNext- requests from the management
    station. The default is public.

4. **Set Community** - In this field, enter the Set Community for
    your Prestige. The value entered in this field will be used to
    authenticate the community field for the incoming Set- requests
    from the management station. The default is public.

5. **Trusted Host** - Enter the IP address of the trusted host SNMP
    management station. If this field is configured, then the Prestige
    will only respond to SNMP messages coming from this address.

If you leave the field blank (default), then the Prestige will respond to all SNMP messages it receives, regardless of origin.

6. **Trap: Community -** In this field, enter the community name that is sent with each trap to the SNMP manager. This should be treated like a password and match what the SNMP manager is expecting. The default is public.

7. **Trap: Destination -** This field contains the IP address of the station that you wish to send your SNMP traps to.

Once you have completed filling in Menu 22 - SNMP Configuration, press **ENTER** to confirm your selections or press **ESC** to cancel your selections.

If you are unsure how to configure the fields for the SNMP configuration, consult your network administrator.

12 **System Security**

The Prestige incorporates a number of security measures to prevent unauthorized access to your network. For example, the Prestige supports both PAP (Password Authentication Protocol) and CHAP (Challenge Handshake Authentication Protocol) in authenticating a Remote Node. More information on CHAP and PAP can be found in Chapter 6.

By default, the Prestige can store information about up to eight different users. If more dial-up users are necessary, an external RADIUS (Remote Authentication Dial In User Service) server can be used to provide centralized user security.

In addition, the Prestige also implements a user password to get into the SMT screen. You will have three attempts to enter the correct system password. If you do not do so, the SMT will kick you out. In addition, the Prestige will only support one user in the SMT at one time.

Using RADIUS Authentication

In addition to the Prestige router's built-in dial-up user list, which can hold up to eight users, it also supports an external authentication server which may provide password storage and usage accounting for thousands of users.

Installing a RADIUS Server

To use RADIUS authentication, you will need to have a UNIX-based machine on your network to act as a `radiusd` server, as well as a copy of the `radiusd` server program itself. You can

obtain a copy of the RADIUS software, along with documentation for the server, at

http://www.livingston.com/Tech/FTP/pub-le-radius.shtml

or at

ftp://ftp.livingston.com/pub/le/radius/

Follow the included instructions to install the server on your UNIX-based server.

Once you have installed the server, you will need to edit the dictionary file in the RADIUS configuration directory (which will usually be /etc/raddb). Using any text editor, add the following lines to the dictionary file:

Zyxel proprietary attributes

```
ATTRIBUTE Zyxel-Callback-Option    192 integer
VALUE      Zyxel-Callback-Option    None       0
VALUE      Zyxel-Callback-Option    Optional   1
VALUE      Zyxel-Callback-Option    Mandatory  2

#   Callback phone number source
ATTRIBUTE Zyxel-Callback-Phone-Source 193 integer

VALUE      Zyxel-Callback-Phone-Source Preconfigured  0
VALUE      Zyxel-Callback-Phone-Source User           1
```

These changes allow the RADIUS server to be used with ZyXEL CLID authentication, as described in the section below.

Configuring the Prestige for RADIUS Authentication

To configure the Prestige to use the RADIUS server set up in the previous section, select option 23, System Security, from the main menu. This will bring you to Menu 23 - System Security. Then from this menu, select option 2, External Server.

This will bring you to Menu 23.2 - System Security - External Server.

```
         Menu 23.2 - System Security - External Server

            Authentication Server:
              Active= Yes
              Type: RADIUS
              Server Address= 192.68.135.1
              Port #= 1645
              Key= ?





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

Figure 12-1 Menu 23.2 - System Security - External Server

The fields in the System Security - External Server menu are as follows:

1. **Active** - Determines whether the external security facility is enabled. If this field contains No, only the built-in dial-up user list will be used. If this field contains Yes, the built-in dial-up user list will be searched first, then the external authentication server.

2. **Type** - Determines the type of the external authentication server. At present only the RADIUS type is supported.

3. **Server Address** - The IP address of your network's UNIX-based RADIUS server.

4. **Port #** - The IP port address used by the authentication server. The default value of 1645 should be used.

5. **Key** - A "password" used to identify the Prestige as a valid client of the RADIUS authentication service.

The Key password should be stored in the `client` file in the RADIUS server's `/etc/raddb` directory. Lines of the form

```
# Client Name        Key
#----------------------------
192.168.0.1        1234
```

should be added to the `client` file. The Client Name field in the file gives the IP address of the Prestige router, and the Key field should be the same as the Key field in Menu 23.2.

After a RADIUS server has been configured, the Prestige will use it to authenticate all users that it cant find in its internal Dial-Up User List (Menu 14).

Adding Users to the RADIUS Database

The Prestige only uses the RADIUS database for user authentication; except for `Password`, `Dialback-No`, and the ZyXEL extensions `Zyxel-Callback-Option` and `Zyxel-Callback-Phone-Source` (described below), most standard RADIUS attribute fields are ignored by the Prestige.

To add a user to the RADIUS database, edit the `users` file in the RADIUS server's `/etc/raddb` directory, and add a line similar to the following:

joeuser   Password = "joepassword"

Each user should have a user name/password record in the `users` database.

Using RADIUS Authentication for CLID

To use RADIUS for CLID authentication, create a user record in the `users` file , where the user name (the first field) is the telephone number, and the password (the second field) is always `Zyxel-CLID` (case-sensitive). The regular user name is put in a User-Name field. The following is an example of a CLID user record:

5551212   Password = "Zyxel-CLID"

```
User-Name = "joeuser",
Zyxel-Callback-Option = Mandatory,
Zyxel-Callback-Phone-Source = Preconfigured
Dialback-No = "5551212"
```

Note that if CLID is turned off in the Prestige, you still need to have a separate user record for joeuser so the regular user name/password mechanism still works.

Configuring the SMT Password
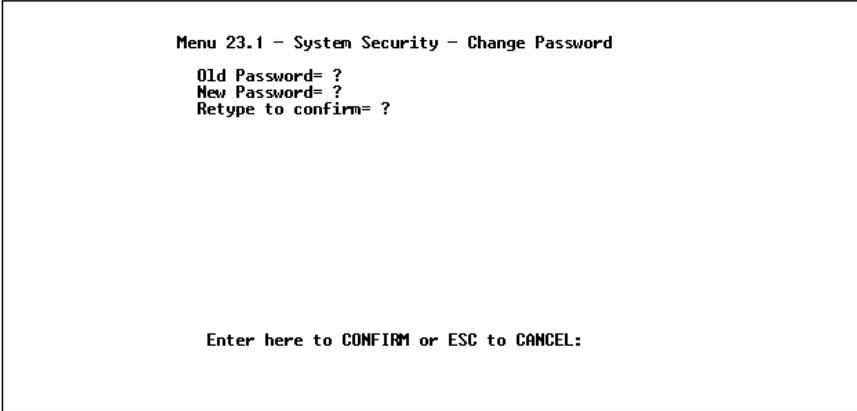
```
        Menu 23.1 - System Security - Change Password

        Old Password= ?
        New Password= ?
        Retype to confirm= ?

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

Figure 12-2 Menu 23.1 - System Security - Change Password

The following steps describe a simple setup procedure for configuring the SMT password.

1. From the Main Menu, select option 23. System Security. This will bring you to Menu 23 - System Security.

2. From this menu, you can select option 1. Change Password. This will bring you to Menu 23.1 - System Security - Change Password.

3. Type in your previous system password and press **ENTER**.

4. Type in your new system password and press **ENTER**.

5. Re-type your new system password for confirmation purposes and press **ENTER**.

You will now need to enter in this password when you try to get into the SMT. In addition, this password will also be used when a network administrator attempts to telnet to the Prestige.

13 Telnet Configuration and Capabilities

About Telnet Configuration

When you first configure your Prestige, it must be done via a computer connected to the RS-232 port. However, once the Prestige has been initially configured, you can use `telnet` to configure the device remotely as shown below:
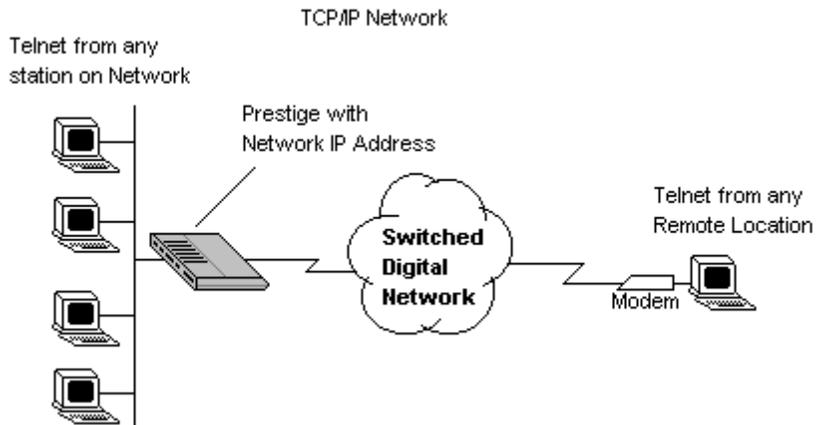
Figure 13-1 Telnet Configuration on a TCP/IP Network

In order to configure your Prestige in this way, you need to have assigned an IP Address to your device and have connected it to your network. See Chapter 3 for more information on assigning an IP Address. Once this is configured, any station on the LAN or remote network that has TCP/IP installed can use `telnet` remote management. If your Prestige is configured for IPX routing but not

IP in menu 1, `telnet` will still be available provided you assign the Prestige an IP address.

Telnet Capabilities

Single Administrator

To prevent confusion and discrepancy on the configuration, Prestige will only allow one terminal connection at any time. Prestige also gives priority to the RS-232 connection over `telnet`. If you have already connected to the Prestige via `telnet`, you will be logged out if another user is connecting to the Prestige via the RS-232 cable. Only after the other administrator has been disconnected will you be able to `telnet` to the Prestige again.

System Timeout

When you are connected to the Prestige via `telnet`, there is a system timeout of 5 minutes (300 seconds). If you are not configuring the device and leave it inactive for this timeout period, then the Prestige will automatically disconnect you.

14 System Maintenance

The Prestige provides diagnostic tools that you can use to maintain your device. Some of these tools include updates on system status, ISDN B channel status, log and trace capabilities and upgrades to the system software. This chapter will describe how to use these tools in greater detail.

System Status

System Status is a tool that can be used to monitor your Prestige. Specifically, it will give you information on the status of your system software version, ISDN telephone line, number of packets sent and number of packets received.

```
        Menu 24 - System Maintenance

        1.   System Status
        2.   Terminal Baud Rate
        3.   Log and Trace
        4.   Diagnostic
        5.   Backup Configuration
        6.   Restore Configuration
        7.   Software Update
        8.   Command Interpreter Mode
        9.   Call Control




        Enter Menu Selection Number: _
```

Figure 14-1 Menu 24 - System Maintenance

```
                Menu 24.1 — System Maintenance — Status
ISDN    Link     Type       TXPkt      RXPkt      Error  CLU  ALU    Up Time
 B1     Idle     0Kbps        0          0          0    0%   0%     0:00:00
 B2     306Y     64Kbps      96         72          0    0%   0%     0:01:00

     Total Outcall Time:      0:00:00

     Ethernet                         Name: 306Y
       Link: Up                       RAS S/W Version: V1.10 | 8/17/96
       TX Pkt: 1287                   ISDN F/W Version: V Prestige_4.06
       RX Pkt: 2553                   Ethernet Address: 00:a0:c5:10:00:72
       Collision: 0                   Country Code: 225

     LAN Packet Which Triggered Last Call: (Type: IP)
     45 00 00 3C 07 33 00 00 3B 01 31 49 00 00 00 00 C0 44 87 01 08 00 2D 84
     20 04 00 02 00 2A DE 74 C0 44 87 01 00 01 02 03 04 05 06 07 08 09 0A 0B

                           Press Command: _

     COMMANDS: 1-Discon. B1    2-Discon. B2    3-Reset Counters    ESC-Exit
```

Figure 14-2 Example of Menu 24.1 - System Maintenance - Status

1. To get to the System Status, select option 24. System Maintenance. This will bring you to Menu 24 - System Maintenance.

2. From this menu, select option 1. System Status.

3. There are four (4) possible commands in Menu 24.1 - System Maintenance - Status. Entering **1** will disconnect the current B1 channel call; **2** will disconnect the current B2 channel call, **3** will reset the counters; and **ESC** will exit this screen.

4. Items 5 - 26 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.

5. **ISDN** - shows statistics for **B1** and **B2** channels respectively. These are the information displayed for each channel:

6. **Link** - shows the Remote Node the channel is currently connected to or the status of the channel (Idle, Calling, or Answering).

7. **Type** - the current connecting speed (56K or 64K).

8. **TXPkt** - the number of transmitted packets on this channel.

9. **RXPkt** - the number of received packets on this channel.

10. **Error** - the number of error packets on this channel.

11. **CLU** - (Current Line Utilization) - percentage of current bandwidth used on this channel.

12. **ALU** - (Average Line Utilization) - average CLU for this channel.

13. **Up Time** - time this channel has been connected to the current Remote Node.

14. **Total Outgoing call Time** - shows the total outgoing call time for both **B1** and **B2** channels since the system has been powered up.

15. **Ethernet** - shows the current status of the LAN connection on your Prestige.

16. **Link** - shows the current status of the LAN (Up or Down if it is 10Base-T; otherwise, if it is configured as AUI, this will show AUI).

17. **TX Pkt** - the number of transmitted packets to LAN.

18. **RX Pkt** - the number of received packets from LAN.

19. **Collision** - number of collisions.

20. **Name** - displays the system name of your Prestige. This information can be modified in Menu 1 - General Setup.

21. **RAS S/W Version** - refers to the version of the current RAS software.

22. **ISDN F/W Version** - refers to the version of the current ISDN firmware.

23. **Ethernet Address** - refers to the Ethernet MAC address assigned to your Prestige.

24. **Country Code** - refers to the one byte country code value (in decimal notation), e.g., 225 indicates North America.

25. **LAN Packet Which Triggered Last Call** - shows the first 48 octets of the LAN packet that triggered the last outgoing call. There are three different types of packets: IP, IPX, and RAW. By viewing the packet information, you can determine which station has sent a packet to cause the Prestige to make an outgoing call.

Two example figures are shown below. the first of an ICMP Ping packet (Type: IP) triggering the call and the second with a SAP broadcast packet (Type: Raw) triggering the call. With this information, you can determine the source IP address of the packet or the source MAC address of the packet.
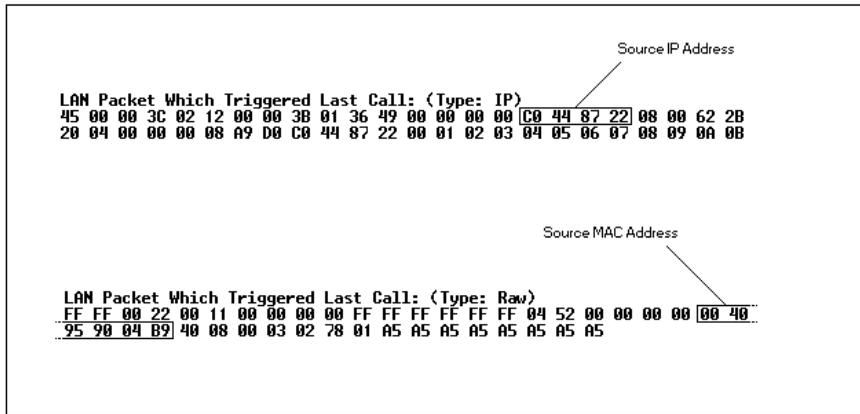
Figure 14-3 LAN Packet Which Triggered Last Call

Terminal Baud Rate

Users can set up different baud rates for the RS-232 connection through menu 24.2 Terminal Baud rate. The Prestige supports 9600 (default), 19200, and 38400bps for the RS-232 connection.

```
        Menu 24.2 — System Maintenance — Change Terminal Baud Rate
              Terminal Baud Rate: 38400




              Press ENTER to Confirm or ESC to Cancel:
Press Space Bar to Toggle.
```
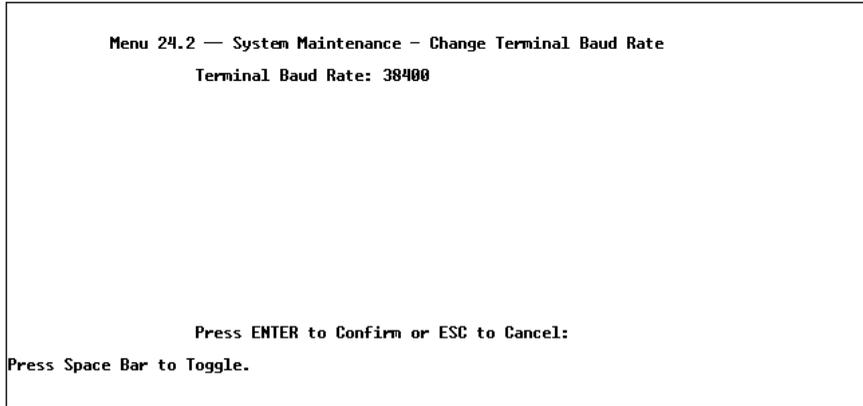
Figure 14-4 Menu 24.2 -System Maintenance - Change Terminal Baud Rate

Log and Trace

Log and trace tools allow users of the Prestige to view the error logs and trace records to troubleshoot any errors that may occur. The Prestige is also able to generate syslogs to send to other machines.

1. To get to the Log and Trace, select option 24. System Maintenance. This will bring you to Menu 24 - System Maintenance.

2. From this menu, select option 3. Log and Trace. This will bring you to Menu 24.3 - System Maintenance - Log and Trace.

3. You will be given two options.

   - View Error Log.
   - Syslog and Accounting.

The following list describes the fields involved in the trace and log options:

View Error Log

Selecting the first option from Menu 24.3 - System Maintenance - Log and Trace will display the Error Log in the system. The Error Log does not only provide the error messages but it is also a source of information about your Prestige.

You can also clear the Error Log on your Prestige. After each display, you are prompted with an option to do so. Enter the appropriate choice and press ENTER.

Syslog And Accounting

Syslog and Accounting can be configured in Menu 24.3.2 - System Maintenance - Syslog and Accounting. This menu configures the Prestige to send UNIX syslogs to another machine.

```
        Menu 24.3.2 — System Maintenance — Syslog and Accounting

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









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

Figure 14-5 Menu 24.3.2 - System Maintenance - Syslog and Accounting

The User needs to configure the following 3 parameters to activate syslog:

1. **Active** - Use the space bar to turn on of off the syslog option

2. **Syslog IP Address** - Input the IP Address that you wish to send your syslog to. The address is usually written in dotted

decimal notation such as a.b.c.d where a, b, c, and d are numbers between 0 and 255.

3. **Log Facility** - Use the space bar to toggle between the 7 different Local options. This feature is used for UNIX application.

The Prestige will send three different types of syslog messages: Call information messages (i.e. CDR), Error information messages, and Session information messages. Some examples of these messages are shown below:

Call Information Messages:

```
line 1 channel 1, call 41, C01, Incoming Call, 40001
line 1 channel 1, call 41, C01, ANSWER Connected, 64K 40001
line 1 channel 1, call 41, C01, Incoming Call, Call
Terminated
```

Error Information Messages:

```
line 1, channel 1, call 44, E01, CLID call refuse
line 1, channel 1, call 45, E02, IP address mismatch
```

Session Information Messages:

```
line 1, channel 1, call 41, I01, IPCP up, 306L
line 1, channel 1, call 41, I01, IPCP down, 306L
```

Diagnostic

The diagnostic functions on your Prestige allow you to test aspects of your device to determine if they are working properly. The following list provides a short description to the types of diagnostic tests available to your system.

```
              Menu 24.4 - System Maintenance - Diagnostic

ISDN                                   System
  1.  Hang Up B1 Call                    21. Reboot System
  2.  Hang Up B2 Call                    22. Command Mode
  3.  Reset ISDN
  4.  ISDN Connection Test
  5.  Manual Call

TCP/IP
  11. Internet Setup Test
  12. Ping Host


                    Enter Menu Selection Number:

               Manual Call Remote Node= N/A
               Host IP Address= N/A
```

Figure 14-6 Menu 24.4 - System Maintenance - Diagnostic

1. From the Main Menu, select option 24. System Maintenance. This will bring you to Menu 24 - System Maintenance.

2. From this menu, select option 4. Diagnostic. This will bring you to Figure 15.4 Menu 24.4 - System Maintenance - Diagnostic.

3. Items 4 - 12 will describes the nine (9) options to test your Prestige and its connections.

4. **Hang Up B1 Call** - This tool hangs up the B1 line. This will only be useful if the B1 line is currently connected to a Remote Node or a dial-in user.

5. **Hang Up B2 Call** - This tool hangs up the B2 line. This will only be useful if the B2 line is currently connected to a Remote Node or a dial-in user.

6. **Reset ISDN** - This command will re-initialize the ISDN link to the telephone company.

7. **ISDN Connection Test** - You can test to see if your ISDN line has been successfully connected to your Prestige by using this option. This command will trigger the Prestige to perform a loop-back test to check the functionality of the ISDN line. If your line is working properly, the test will succeed. Otherwise,

note the error message that you receive and consult your network administrator.

8. **Manual Call** - This provides a way for the users of the Prestige to place a manual call to a Remote Node. This tests the connectivity to that Remote Node. When you use this command, you will see traces displayed on the screen showing what is happening during the call setup and protocol negotiation. Below is an example of a successful connection.

```
Start dialing for node<1>
### Hit any key to continue.###
Dialing chan<2> phone(last 9-digit):40101
Call CONNECT speed<64000> chan<2> prot<1>
LCP up
CHAP send response
CHAP login to remote OK!
IPCP negotiation started
IPCP up
```

Figure 14-7 Trace Display for a Successful IPCP Connection via Manual Call

Below is an example of a failed Trace Display for a Successful IPCP Connection via Manual Call.

```
Start dialing for node<1>
### Hit any key to continue.###
Dialing chan<2> phone(last 9-digit):40101
Call CONNECT speed<64000> chan<2> prot<1>
LCP up
CHAP send response
***Login to remote failed. Check name/passwd.
Receive Terminate REQ
LCP down
Line Down chan<2>
```

Figure 14-8 Trace Display for a Failed IPCP Connection via Manual Call

1. **Internet Setup Test** - This test checks to see if your Internet access configuration has been done correctly. When this option is chosen, the Prestige will PING the Internet IP Address. If everything is working properly, you will receive an appropriate response. Otherwise, note the error message and consult your network administrator.

2. **Ping Host** - This diagnostic test pings the host which determines the functionality of the TCP/IP protocol on your system.

3. **Reboot System** - This option reboots the system. This serves to implement any changes that may have been recently added to your system.

4. **Command Mode** - This option allows the user to enter the command mode. This mode allows you to diagnose and test your Prestige using a specified set of commands.

Backup Configuration

Selecting option 5 from Menu 24 - Maintenance will allow you to backup your current Prestige configuration onto disk. Backup is

highly recommended once your Prestige configuration is functioning.

You need to download the configuration onto disk. Procedure for downloading varies depending on the type of software used to access the Prestige but you must use the XMODEM protocol to perform the download.

Restore Configuration

Selecting option 6 from Menu 24 - Maintenance will restore backup configuration from disk to the Prestige. You need to upload a backup file to the Prestige. Procedure for uploading varies depending on the type of software used to access the Prestige but you must use the XMODEM protocol to restore the configuration.

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

Software Update

Software updates are only possible through the RS-232 cable connection. You cannot use `telnet` to update the software version of your Prestige. Note that this function will delete the old software before installing the new software. Do not attempt to utilize this menu unless you have the new software version. There are two different software updates: RAS code and ISDN code.

- **RAS and ISDN code update** - Type atur and wait until the Prestige responds with an OK to begin uploading the new software (upload procedure varies depending on the type of software used to access the Prestige). You must use the XMODEM protocol to perform the upload. After uploading is successful, type atgo to start your Prestige. Below is an example of downloading RAS and ISDN using *PCPLUS*.

```
To update software, system needs to be rebooted.
After system is rebooted, 'Enter Debug Mode' will be displayed.
Please enter 'atur' to upload RAS code.
Or enter 'atrs', 'atis', then 'atupx' to upload ISDN code.
Do you want to continue (y/n):
Enter Debug Mode
atur
Now erase flash ROM for uploading RAS code...

Starting XMODEM upload.......
S
Programing successful....

OK
atgo
Initialing Driver...




 Alt-Z FOR HELP| ANSI    |  FDX  | 38400 N81 | LOG CLOSED | PRINT OFF | OFF-LINE
```

Figure 14-9 Example of uploading RAS using PCPLUS

Command Interpreter Mode

This option allows the user to enter the command interpreter mode. This mode allows you to diagnose, test, and configure your Prestige using a specified set of commands. 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 email to the ZyXEL Support Group.

Call Control

The Prestige provides two Call Control Management functions for the Remote Node and Remote Dial-in User. They are the Budget Management and Blacklist. The Budget Management function provides the budget control for the outgoing call and a way for users to set a limit on their ISDN utilization to prevent any accidental usage. It limits the total outgoing call time of the Prestige over a period of time for each Remote Node & Remote Dial-in User (callback only). If the total outgoing call time exceeds

the set limit, future outgoing calls will not be made and the current call will be dropped.

The Blacklist function prevents the Prestige from re-dialing to an unreachable phone number. It is a list of phone numbers, up to a maximum of 14, to which the Prestige will not make an outgoing call. If the Prestige tries to dial to a phone number and fails a certain number (configurable in the menu 24.9.1) times, then the phone number will be put onto the blacklist. The user has to enable the number manually again to be dialed.

Call Control Parameters

```
               Menu 24.9.1 - Call Control Parameters

         Dialer Timeout:
           Digital Call(sec)= 35


         Retry Counter= 0
         Retry Interval(sec)= N/A






         Press ENTER to Confirm or ESC to Cancel: _
```
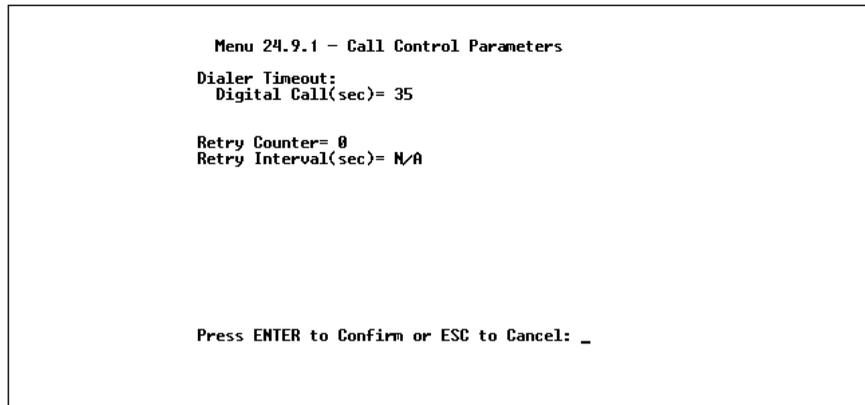
Figure 14-10 Menu 24.9.1 Call Control Parameters

- **Dialer Timeout: Digital Call (sec)** - The Prestige will timeout if it can not set up an outgoing digital call within the timeout value. The default is 30.

- **Retry Counter -** How many times a busy or no-answer phone number is retried before it is put on the blacklist. The default is 0 and the blacklist control is not enabled.

- **Retry Timer (sec) -** Elapse time after a call fails before another call may be retried. Applies before a phone number is blacklisted.

Blacklist

```
                    Menu 24.9.2 - Blacklist

            Phone Number
        1.  5551212
        2.  40001
        3.
        4.
        5.
        6.
        7.
        8.
        9.
        10.
        11.
        12.
        13.
        14.

            Remove Selection(1-14):
```

Figure 14-11 Blacklist

The phone numbers on this list cannot be entered directly, instead, they are numbers which have had problems connecting in the past. The user can take a number off the list by entering the index number of entry.

Budget Management

```
                    Menu 24.9.3 - Budget Management
        Remote Node   Connection Time/Total Budget   Elapsed Time/Total Period
  1. 3060                       0:00/6:00                    0:07/24:00
  2. ────────                      ──                            ──
  3. ────────                      ──                            ──
  4. ────────                      ──                            ──
  5. Dial-in User               0:00/4:00                    0:00/24:00



              Reset Node (0 to update screen):

```

Figure 14-12 Budget Management

The total budget is the time limit for an outgoing call to a Remote Node or Dial-in User. When this limit is reached, the call will be dropped and further outgoing calls to that Remote Node or Remote Dial-in User (callback) will fail. After each period, the total budget is reset. The defaults for the total budget is 0 minutes and the period is 0 hours. This means no budget control. The user can reset the total outgoing call time through this menu. The total outgoing call timer can be program need to reset itself periodically through the menu 11 and 13.

15 Troubleshooting

This chapter contains some problems you may run into when using
your Prestige. After each problem description, we have provided
some instructions to help you diagnose and solve the problem.

Problems Starting Up the Prestige

None of the LEDs are on when you power up the Prestige

- Check the power cord and the power supply and make sure it is
  properly connected to your Prestige. If the error persists you
  may have a hardware problem. In this case you should contact
  technical support.

Connecting the RS-232 cable, cannot access the SMT

- Check to see if the Prestige is connected to your computer's
  serial port.

- Check to see if the communications program is configured
  correctly. The communications software should be configured
  as follows:

  - VT100 terminal emulation.
  - 9600 Baud rate.
  - No parity, 8 Data bits, 1 Stop bit.

Problems With the ISDN Line

The ISDN initialization failed

This problem occurs when you attempt to save the parameters entered in menu 2, but receive the message, "Save successful, but Failed to initialize ISDN; Press ESC to exit".

1. Check the error log (in menu 24.3.1), you should see a log entry for the ISDN initialization failure in the format, "ISDN init failed. code<n>...". Note the code number, n.

2. If the code is 1, the ISDN link is not up. This problem could be either the ISDN line is not properly connected to the Prestige, or the ISDN line is not activated. Verify that the ISDN line is connected to the Prestige and also to the wall outlet (to the telephone company).

3. If the code is 2, this indicates an SPID error. Verify the SPID(s) that you have entered in menu 2. If these are correct, try to initialize again from menu 24.4.3.

4. If the code is 3, this indicates a general failure. Verify the SPID(s) in menu 2. If these are correct, you may also need to verify the provisioning information for your switch by contacting your telephone company.

The ISDN loopback test failed

If the ISDN initialization has passed, then the loopback test should also pass. Verify the phone numbers that have been entered in menu 2. The loopback test will dial the number entered in the 2nd Phone # field (except for switch types with only one phone number). If you need to dial a prefix (e.g., 9) to get an outside line, then you have to enter the phone number as 95551212 or 914085551212. If it is an internal line, you may only need to enter the last four or five digits (according to your internal dialing plan), e.g., 51212.

Problems with the LAN Interface

Can't PING any station on the LAN

1. Check the LAN LED on the front panel of your Prestige. If it is on, then the link is up. If it is off, then check the cables connecting your Prestige to your LAN.

2. The type of Ethernet interface that you have configured in menu 3.1. Verify that you are using the same (AUI or 10BaseT) as configured in this menu.

3. Verify with your network administrator that the IP address and the IP subnet mask configured in menu 3.2 are valid for that LAN.

4. Check the physical Ethernet cable, and make sure the connections on the Prestige and also to the hub are secure.

Problems Connecting to a Remote Node or ISP

1. Check menu 24.1 to verify the ISDN status. If it indicates down then refer to the section on the ISDN line problems.

2. In menu 24.4.5, do a manual call to that Remote Node. You will see some messages printed onto the screen. The messages will show you whether the call has been connected or not. If the call is not connected, verify the following parameters in menu 11: Pri(mary) Phone #, Sec(ondary) Phone #, and Transfer Rate.

3. If the call is connected, but the call still terminates, then there may be some kind of negotiation problem. Verify the following parameters in menu 11: My Login, My Password, Route, IP LAN Addr. Also verify your IP address in menu 3.2.

4. If you check the error log in menu 24.3.1, this will usually give you some logs regarding why the call was dropped. If there is

nothing in the log, the call may have been dropped by the remote device that you dialed in to. Make sure that the configuration parameters between these two devices are consistent.

Problems Connecting to a Remote User

1. First verify that you have configured the authentication parameters in menu 13. These would be CLID Authen, Recv. Authen, and Mutual Authen.

2. If the Remote Dial-in User is negotiating IP, verify that the IP address is supplied correctly in menu 13. Check that either the Remote Dial-in User is supplying a valid IP address, or that the Prestige is assigning a valid address from the IP pool.

3. If the Remote Dial-in User is negotiating IPX, verify that the IPX network number is valid from the IPX pool (if it is being used).

4. In menu 14, verify the user name and password for the Remote Dial-in User.

16 **ISDN Switch Types**

The following table summarizes the different type of switch types supported by the Prestige and some related information on the switch types (number of phone numbers and SPID numbers). It should be noted that the information in this table is for the common case and is recommended for those cases. Exceptions still exist to these figures. You can locate the provisioning information for the appropriate North American switch type in the next sections.

Switch Type	Geography	No. of Phone #s	No. of SPIDs
AT&T 5ESS NI-1	North American	2	2
AT&T 5ESS Point to Point	North American	1	0
AT&T 5ESS Multipoint	North American	2	2
Northern Telecom NI-1	North American	2	2
Northern Telecom Custom	North American	2	2
DSS1	Europe, Asia	2	N/A
1TR6	Germany	2	N/A

Provisioning For U.S. Switches

For the U.S., the Prestige (both the U and S/T interface) has been approved by Bellcore and has the IOC (ISDN Ordering Code) "S" Capability, EZ-ISDN 1. Provide this information to your telephone company when you order your ISDN line. If your telephone company is not familiar with this IOC, then ask them what kind of switch you will be connected to and use the information under each switch type to order your ISDN line.

Provisioning For the AT&T 5ESS Switches

The AT&T 5ESS switch type supports three types of ISDN service. These are: National ISDN-1 (NI-1), Multipoint, and Point-to-Point.

For AT&T 5ESS National ISDN-1

Provisioning Feature	Setting
Term Type	A
Circuit Switched Voice (CSV)	1
CSV Additional Call Offering (ACO)	Unrestricted
CSV limit	2
CSV Notification Busy (NB) limit	1
Circuit Switched Data (CSD)	1
CSD Additional Call Offering (ACO)	Unrestricted
CSD limit	2
CSD Notification Busy (NB) limit	1
MTERM	2

For AT&T 5ESS Multipoint

Provisioning Feature	Setting
Term Type	D
Call Appearances (CA)	1
CA Quantity	1
Circuit Switched Voice (CSV)	1
CSV Flexible Call Offering (FCO)	Unrestricted
CSV limit	2
CSV Notification Busy (NB) limit	1
Circuit Switched Data (CSD)	1
CSD Flexible Call Offering (FCO)	Unrestricted
CSD limit	2
CSD Notification Busy (NB) limit	1
MTERM	2

For AT&T 5ESS Point-to-Point

Provisioning Feature	Setting
Term Type	A
Call Appearances (CA)	1
CA Quantity	1
Circuit Switched Voice (CSV)	1
CSV Flexible Call Offering (FCO)	Unrestricted

Provisioning Feature	Setting
CSV limit	2
CSV Notification Busy (NB) limit	1
Circuit Switched Data (CSD)	1
CSD Flexible Call Offering (FCO)	Unrestricted
CSD limit	2
CSD Notification Busy (NB) limit	1
MTERM	2

Provisioning For the Northern Telecom Switch

The Northern Telecom switch type supports two types of ISDN service. These are: National ISDN-1 and Custom.

For Northern Telecom National ISDN-1

Provisioning Feature	Setting
Signaling	Functional
Protocol Version Control (PVC)	2 (National ISDN-1)
TEI assignment	Dynamic
Maximum number of keys (maxkeys)	3 (1 to 64 OK)
Release key	No
Ringing indicator	No
Electronic Key Telephone System (EKTS)	Yes or No (set to opposite of ACO)
Additional Call Offering (ACO)	Yes or No (set to opposite of
Number of call appearances	2
Notification Busy Limit	3

For Northern Telecom Custom

Provisioning Feature	Setting
Signaling	Functional
Protocol Version Control (PVC)	1 (Custom)
TEI assignment	Dynamic
Maximum number of keys (maxkeys)	3 (1 to 64 OK)
Release key	No
Ringing indicator	No
Electronic Key Telephone System (EKTS)	Yes or No (set to opposite of ACO)
Additional Call Offering (ACO)	Yes or No (set to opposite of

Provisioning Feature	Setting
	EKTS)

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