

Exhibit E - User's Manual

RH348

User's Manual

Version 0.1

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:



The Prestige 100IH 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 100IH 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)
- The Council Directive 92/31/EEC of 28 April 1992 amending directive on the approximation of the laws of the member states relating to Eletro Magnetic 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.com.tw outside North America.

- **Technical support:** support@zyxel.com in North America
support@zyxel.com.tw 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 to 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

ZyXEL Limited Warranty ii
FCC Part 15 Information iii
Information for Canadian Users iv
Contacting ZyXEL vi

1 Introduction 1

Features 1

Ease of Installation 1
ISDN Basic Rate Interface (BRI) 2
Networking Protocol Support 2
Standard Phone Jack 2
Built-in 4-Port Ethernet Hub 2
Dial On Demand 2
Bandwidth On Demand 3
Network Management 3
DHCP Support (Dynamic Host Configuration Protocol) 3
Security 4

Call Control 4

Data Compression 4

Networking Compatibility 4

Applications For Your Prestige 4

Internet Access 4

Internet Single User Account (SUA) 4

Telecommuting Server 5

What This Manual Covers 5

What This Manual Doesn't Cover 6

Other Resources 6

Packing List 6

Additional Installation Requirements 7

2 Before You Begin 9

Road Map and Flow 9

Completing the Worksheet 10

Ordering Your ISDN Line 10

Collecting General Setup Information 11

Collecting ISDN Phone Line Information 12

Collecting Ethernet Setup Information 14

3 Installation 21

A Warning On Connection Cables 21

Connecting Your Computer and Your Prestige 22

Connecting the RS-232 Cable to your Prestige 22

Connecting an ISDN Line to your Prestige 22

Connecting a Telephone/Fax to your Prestige 23

Connecting an Ethernet Cable to your Prestige 23

Connecting a Power Adapter to your Prestige 24

Prestige Front Panel 24

Powering On Your Prestige 25

Navigating Through the SMT 26

SMT Summary 28

General Setup 29

ISDN Setup 30

North American ISDN 30

DSS1 & ITR6 ISDN 32

TCP/IP Ethernet Setup and DHCP 35

4 Configuring for Internet Access 39

IP Addresses and the Internet 40

Internet Access Configuration 41

Single User Account 44

Configuration for Single User Account 46

Configuring Backup ISP Accounts 46

5 Remote Node Configuration 49

Bandwidth on Demand 55
Editing PPP Options 56

6 Dial-In Configuration 59
Telecommuting 59
Dial-In Server Application 60
Default Dial-In Setup 61
Dial-In Users Setup 65
More on CLID 68

7 TCP/IP Configuration 69
IP Subnet Mask 69
LAN-to-LAN Application 70
Remote Node Setup 71
Static Route Setup 74

8 Filter Configuration 77
About Filtering 77
Prestige's Filter Structure 78
Configuring a Filter Set 79
Configuring a Filter Rule 82
TCP/IP Filter Rule 82
Generic Filter Rule 85

9 System Security 89
About System Security For the Prestige 89
Configuring the SMT Password 89

10 Telnet Configuration and Capabilities 91
About Telnet Configuration 91
Telnet Capabilities 92
Single Administrator 92
System Timeout 92

11 System Maintenance 93

System Status 93
Terminal Baud Rate 96
Log and Trace 97
View Error Log 98
Syslog And Accounting 98
Diagnostic 99
Backup Configuration 102
Restore Configuration 103
Software Update 103
Command Interpreter Mode 104
Call Control 104
Call Control Parameters 105
Blacklist 106
Budget Management 107

12 Troubleshooting 109

Problems Starting Up the Prestige 109

None of the LED's are on when you power up the Prestige 109
Connecting the RS-232 cable, cannot access the SMT 109
Problems With the ISDN Line 110
The ISDN initialization failed 110
The ISDN loopback test failed 110

Problems with the LAN Interface 111

Can't PING any station on the LAN 111
Problems Connecting to a Remote Node or ISP 111
Problems Connecting to a Remote User 112

13 ISDN Switch Types 113

Provisioning For U.S. Switches 113

Provisioning For the AT&T 5ESS Switches 114
Provisioning For the Northern Telecom Switch 115

14 Index 117

1

Introduction

Congratulations on your purchase of a ZyXEL Prestige 100IH Remote Access Router. 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 surfing the Internet to receiving calls from Remote Dial-in Users to making LAN-to-LAN connections to Remote Nodes.

Distinguishing features of the Prestige 100IH include 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, built-in 4-port Ethernet hub, and the latest security features.

Features

The Prestige 100IH 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 Ethernet cables to connect to the host network.

ISDN Basic Rate Interface (BRI)

Using either a standard S/T Interface or a U Interface (The Prestige 100IH uses the S/T interface and Prestige 100IHU 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. Please see Chapter 13 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.

Networking Protocol Support

The Prestige offers support for TCP/IP.

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.

Built-in 4-Port Ethernet Hub

The Prestige 100IH is equipped with a built-in 4-port Ethernet hub. The built-in hub eliminates the need to purchase a separate hub when building a one to four port network, and is fully expandable by linking to other hubs via a 10BaseT uplink port.

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.

Network Management

The Prestige supports two avenues for system management: The SMT interface and the Prestige Web Configurator.

SMT Interface

The SMT interface is a menu driven network management interface which can be accessed via an RS-232 interface or a Telnet connection.

Prestige Web Configurator

The Prestige Web Configurator is a JAVA based utility designed to allow users to access the Prestige's management settings via a Worldwide Web browser.

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.

Security

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

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 for unlimited 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 connection.

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, 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** (Chapter 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** (Chapter 5-10) - describes how to use the Prestige for more advanced applications such as TCP/IP.
4. **Part Four - Advanced Management** (Chapter 11-14) - provides information on advanced management features for network managers.
5. **Part Five - System Maintenance** (Chapter 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.

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.

This manual also does not cover how to configure your LAN workstations to access the Prestige, nor does it cover any aspects of the Prestige Web Configurator. Please refer to the "Prestige Quick Start Guide" for detail on both of these areas.

Resources

For more information about the Prestige 100IH check the following sources:

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

For ZyXEL contact information see page vi.

ing List

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

- One Prestige 100IH.
- One power adapter.
- One RJ-45 phone cable.
- One RJ-11 phone cable.
- One 25 pin female - 9 pin male RS-232 cable.
- One 9 pin female - 9 pin male RS-232 cable.
- One LAN crossover cable (red tag).
- One LAN straight cable (white tag).
- One Prestige Support CD.
- One Prestige Quick Start Guide.
- This Prestige 100IH 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 which has been installed by your telephone company.
- An Ethernet connection to your computer.
- **To Access the Prestige via the SMT port:** 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.

Please make sure that you have all of these components before you attempt to install your Prestige.

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, please see the appropriate chapters to setup your application. For Internet Access, please see Chapter 4.

Road Map and Flow

Below is a schematic flowchart. It is intended to guide you through a successful installation of your Prestige.

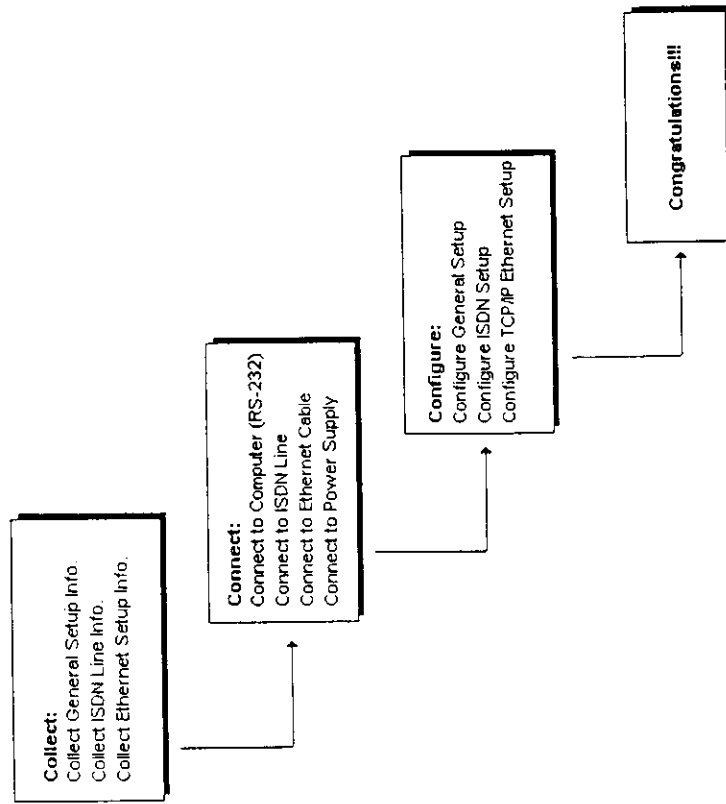


Figure 2-1 Installation Guide

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 13 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. Please refer to Chapter 13 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, please 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 certain 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.

- **Route IP Field** - For Internet access, you will need to enable the Route IP Field. Please see Chapter 4 for more details on configuring your Prestige for Internet access.

You have now collected all of the general setup information you need. Please 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
ITR6	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 ITR6,

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 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). Please 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, please 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 ITR6 ISDN, please refer to Chapter 3.

Collecting Ethernet Setup Information

- **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. Please note that every machine on an internet must have a unique IP address - do not assign an arbitrary address to any machine. If you are not sure as to which IP address to assign to the Prestige, contact your LAN administrator or refer to Chapter 4 of this guide for more details.

- **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 ID's	Number of Bits
255.255.255.0	254	24

IP Subnet Mask	Number of Host ID's	Number of Bits
255.255.255.128	126	25
255.255.255.192	62	26
255.255.255.224	30	27
255.255.255.255	1	32

Investigate Setup and Installation Worksheet

General Setup Information

- System Name (for identification purposes) : _____
- Protocol Routing: ☒ TCP/IP

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:

- PABX 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:

- PABX 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

- IP Address:

- IP Subnet Mask:

3

Installation

This chapter outlines how to connect your Prestige to the LAN and ISDN line. A diagram of the rear panel of the Prestige is shown below. Refer to this diagram to identify all of the ports on your device when you attempt to make the various connections.

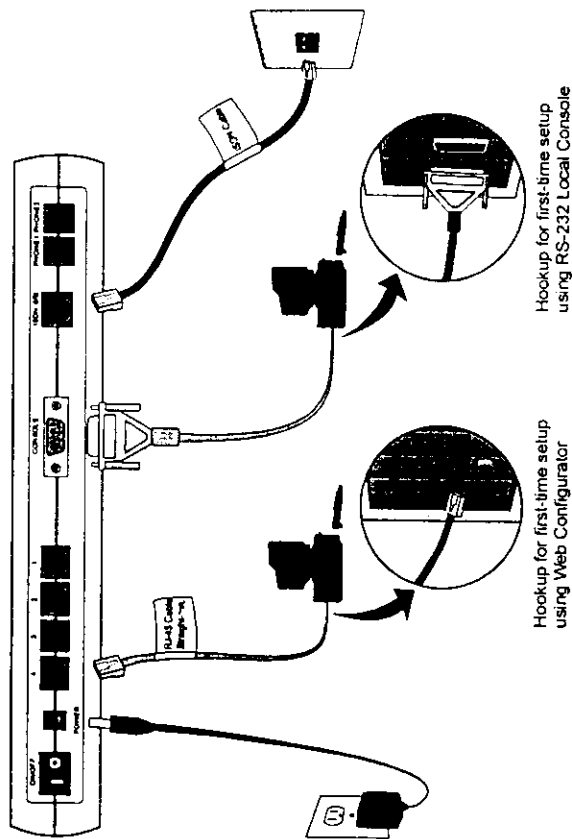


Figure 3-1 Rear Panel Diagram

A Warning On Connection Cables

Several of the connection cables (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 may either use the SMT via the direct serial port interface or the Prestige Web Configurator to configure the Prestige via your Ethernet connection. This manual assumes you will be using the SMT interface. If you wish to use the Prestige Web Configurator to setup the Prestige for Internet access, please refer to the enclosed "Prestige Quick Start Guide".

After the Prestige has been successfully configured, you can modify the configuration through a remote Telnet connection. See Chapter 10 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.

Do not under any circumstances connect an S/T interface directly to the ISDN wall jack.

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

Warning:

The ISDN jack is for ISDN line connection only. Connection of a non-ISDN 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 Prestige.

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 or 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 four UTP Ethernet connections. The UTP ports are used to connect the Prestige 100IH 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.

If this cable is used to connect a Prestige series router to an ISDN line, it may damage your Prestige.

Connecting a Power Adapter to your Prestige

Plug the 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 LED's are listed below:

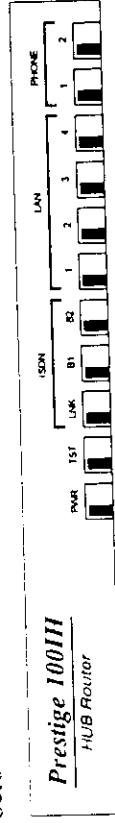


Figure 3-2 Front Panel

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

TST - The TST (Test) LED should be blinking if the Prestige is functioning properly.

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

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

LAN: 1-4 - These LEDs will blink to indicate when there is traffic over the corresponding port on the built-in Ethernet hub..

PHONE: 1 - This LED 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 - This LED 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.
RbS Version: U1.10a 1 9/4/96
ethernet address: 00:a0:c5:40:00:03
Resetting ISDN firmware .....
Switch Type is DSS1 - ISDN Firmware Version: U 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 in below:

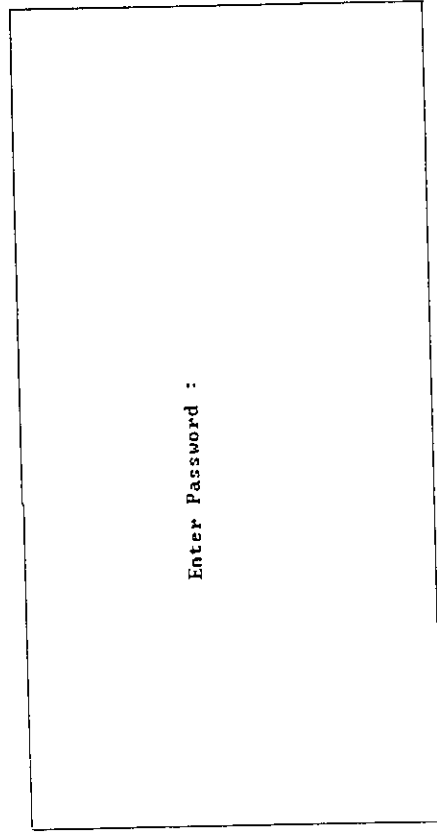


Figure 3-4 Login Screen

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 SMT

The SMT (System Management Terminal) is the interface that you use to configure your Prestige. Several operations that you should be familiar with before you attempt to modify the configuration 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 (Esc) key to move back to the previous menu. The only

exception is the Main Menu, where typing '99' is the only method to exit from 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' which refers to 'Not Available'. This symbol usually 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:

Copyright (c) 1994 - 1996 ZyXEL Communications Corp.	
Prestige 100 Main Menu	
Getting Started	Advanced Management
1. General Setup	21. Filter Set Configuration
2. ISDN Setup	23. System Security
3. Ethernet Setup	24. System Maintenance
4. Internet Access Setup	
Advanced Applications	
11. Remote Node Setup	99. Exit
12. Static Routing Setup	
13. Default Dial-in Setup	
14. Dial-in User Setup	
Enter Menu Selection Number:	

Figure 3-5 SMT Main Menu

Summary

This section summarizes all major SMT Menus:

#	Menu Title	Description
1	General Setup	Setup general information.
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 protocol. There are four static routes for IP 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 11 to provide security, call control, etc.
23	System Security	Setup security related parameters.

#	Menu Title	Description
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= P100

Location= Alpha Lab

Contact Person's Name= CC

Route IP= Yes

Press ENTER to Confirm or ESC to Cancel:

Figure 3-6 Menu 1 - General Setup

- System Name** - Choose a descriptive name for the Prestige for identification purposes, e.g., p100H. This name should be no more than 8 alphanumeric characters. Spaces are not allowed, but "_" and "." are accepted.
- Location** - Enter the geographic location (up to 31 characters) of your Prestige, e.g., Kansas City.
- Contact Person's Name** - Enter the name (up to 8 characters) of the person in charge of this Prestige, e.g., Peter Housel. The Location and the Contact Person fields are optional.

Setup

Menu 2 is for you to enter 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. If you are in North America, you may also have SPIDs (Service Profile Identifier). 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 #= 5552888

SPID #= 855528881

Analog Call= Phone 1

2nd Phone #= 5554888

SPID #= 855548881

Analog Call= Phone 2

Press Space Bar to Toggle.

Press ENTER to Confirm or ESC to Cancel:

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

1. **Switch Type** - Please 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** - In general, this will be 'Switch/Switch'. If you are only using one B channel (e.g., your Prestige is sharing the ISDN BRI line with another device on the S/T bus), then select 'Switch/Unused'. The default is '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; please 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)** - The SPID (Service Profile Identifier) is a number 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
A/B Adapter 1 = 40101
A/B Adapter 2 = 40103

Subaddress =
Subaddress =

Dial Prefix to Access Outside Line =
PABX Number (Include S/T Bus Number) =
Incoming Phone Number Matching Multiple Subscriber Number (MSN)
Incoming 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
A/B Adapter 1 = 40101
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 outgoing CGPN(Calling Party Number) setting for the ISDN data call. Note that the Prestige only accepts

digits; please 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 the A/B Adapter 1 (POTS port 1) call for the Prestige. It will be used as outgoing CGPN(Calling Party Number) setting for the A/B Adapter 1 call.
5. **A/B Adapter 2 & Subaddress** - Enter the telephone number and subaddress assigned to the A/B Adapter 2 (POTS port 2) call for the Prestige. It will be used as outgoing CGPN (Calling Party Number) setting for the A/B Adapter 2 call.
6. **Dial Prefix to Access Outside Line** - Enter the prefix number if the Prestige is connected to an ISDN PABX. This number will be added to all outgoing calls and should be no longer than 3 digits. Otherwise, leave this field blank.
7. **PABX Number (with S/T Bus Number)** - Enter the S/T bus number if the Prestige is connected to an ISDN PABX. 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 2 call 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 CDPN (Called Party Number) will be answered. All analog calls will be routed to the 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 the 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 field 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, please 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

TCP/IP Ethernet Setup and DHCP

Menu 3 is used to enter Ethernet related information as seen below:


```

Menu 3 - Ethernet Setup
Ethernet Interface= 18BaseT
Input Filter Sets=
Output Filter Sets=

DHCP Setup:
  DHCP= Server
  Client IP Pool Starting Address= 0.0.0.1
  Size of Client IP Pool= 62.48
  Primary DNS Server= 0.65.62.48
  Secondary DNS Server= 0.65.178.72

TCP/IP Setup: 204.247.203.174
IP Address=
IP Subnet Mask= 255.255.255.192
RIP Direction= Both

Press ENTER to Confirm or ESC to Cancel:

```

Figure 3-11 Menu 3 - Ethernet Setup

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

1. **Ethernet Interface** - The Prestige supports the connection for a 10BaseT network (looks like a bigger telephone plug). This is the only interface supported, so there is not need to change this setting.
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 8, come back and define the filter sets.
3. **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.

4. **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.
5. **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.
6. **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.
7. **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. Please note that every machine on the TCP/IP network must have a unique IP address.
8. **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.

9. **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.

4

Configuring for Internet Access

Menu 4 of the SMT allows you to configure Internet access on 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).

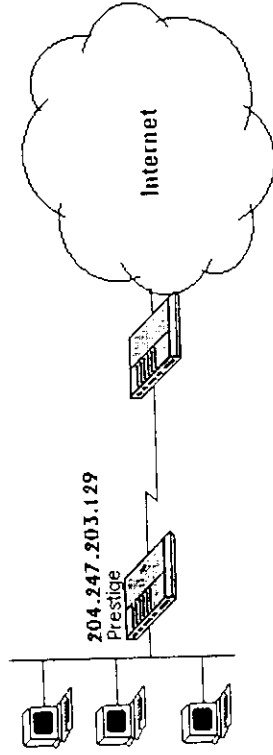


Figure 4-1 Internet Access

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 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, please 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 35 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= xxxxxxxx
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 don't have this data, just leave it blank.
4. **Pri(ary) 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. Please 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** - Please 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. There are four options for this field:
 - **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, please 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.

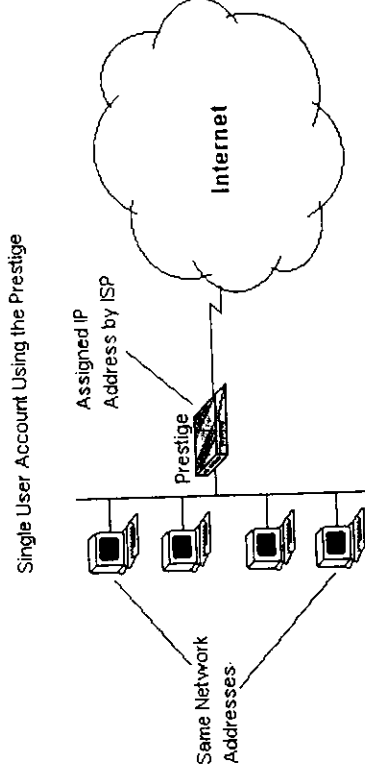


Figure 4-3 A Single User Account Using the Prestige

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.

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.

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:

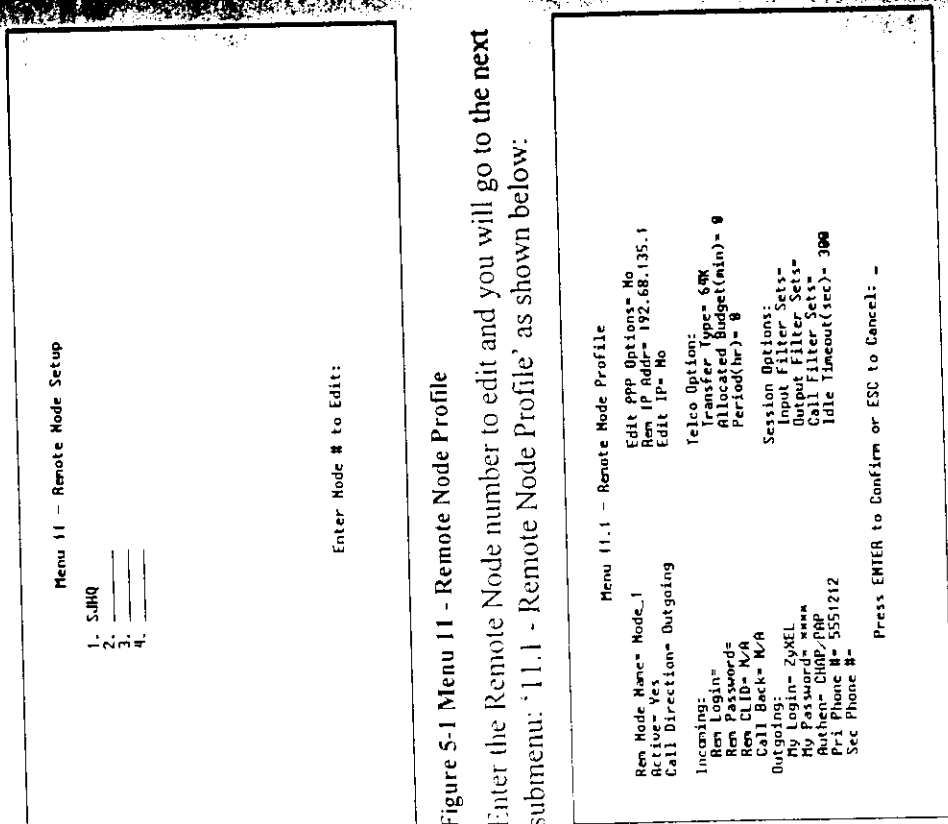


Figure 5-1 Menu 11 - Remote Node Profile

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

Figure 5-2 Menu 11.1 - Remote Node Profile

- 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.
- 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.

12. **Route** - This field determines the protocols that the Prestige will route. The choices for this field are determined by the features enabled on your Prestige.
13. **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, please see the section 'Editing PPP Options'.
14. **IP Addr** - This is a required field if Route is set to 'IP'. Enter the IP address of this Remote Node.
15. **Edit IP** - 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, please refer to the chapter on TCP/IP protocol.
16. **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. There are four options for this field:

- **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.

17. **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.

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

19. **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'). Please note that spaces and ',' are accepted in this field.

For more information on customizing your filter sets, please see Chapter 8. The default is blank, i.e., no filters defined.

20. **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 logical 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) in implementing 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.

g 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 *Remote Dial-in Users* and *Remote Nodes*:

1. The Prestige can make calls to or answer calls from the Remote Node. But the Prestige will only answer calls from the Remote Dial-in User.
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 User. The following sections give two examples of how the Prestige can be setup as a dial-in server for both.

Telecommuting

Telecommuting enables people to work at remote sites and yet still have access to resources in the business office. Typically, a telecommuter will use a client workstation with TCP/IP 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:

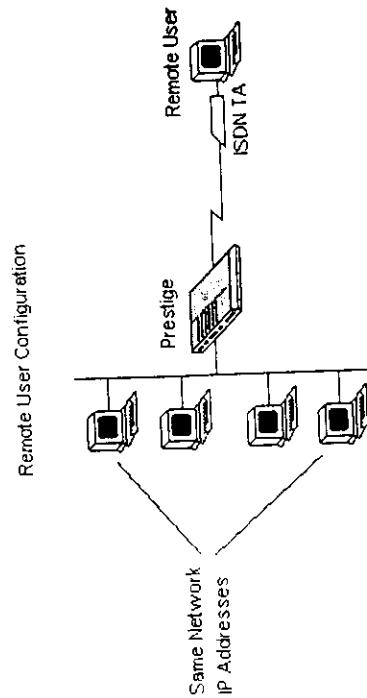


Figure 6-1 Example of Remote User: Telecommuter

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:

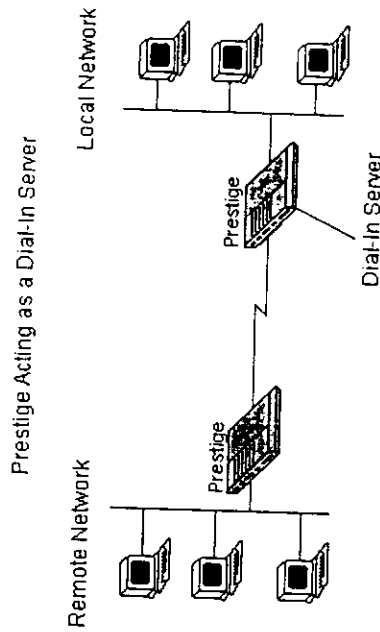


Figure 6-2 Example of a Dial-In Server Application

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:
CLID Authen= None
IP Address Supplied By:
Dial-in User= No
IP Pool= Yes
IP Start Addr= 204.5.1.1
IP Count(1,2)= 2

PPP Options:
Recv Authen= CHAP/PAP
Compression= Yes
Mutual Authen= No
PAP Login= N/A
PAP Password= N/A
Output Filter Sets=
Idle Timeout= 300

Session Options:
Input Filter Sets=
Multiple Link Options:
Max Trans Rate(Kbps)= 128

Callback Budget Management:
Allocated Budget(min)= 0
Period(hr)= 0

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, please 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 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. **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. Please 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'). Please note that spaces and ',' are accepted in this field. For more information on customizing your filter sets, please see Chapter 8 on Filter Configuration. The default is blank, i.e., no filters.

14. **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 6-2 Menu 14.1 - Edit Dial-in User'.

```

Menu 14.1 - Edit Dial-In User

User #: 1
User Name= JoeSmith
Active= Yes
Password= *****
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., brentharper.
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. Please 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 0's 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 Application

A typical LAN-to-LAN application is to use the Prestige to call from a branch office to the headquarters. Up to four users can access the Prestige simultaneously on the LAN as depicted in the following diagram:

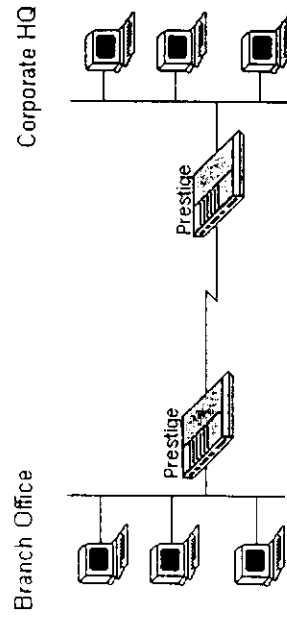


Figure 7-1 LAN-to-LAN Application

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 procedures 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** - 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

```

Rem IP Addr: 0.0.0.0
Rem Subnet Mask= 0.0.0.0
My WAN Addr= 1.1.1.1
Single User Account= Yes
Server IP Addr= 0.0.0.0
Metric= 2
Private= No
RIP= None

```

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. Please note that this is the address assigned to the local Prestige, not the remote router.

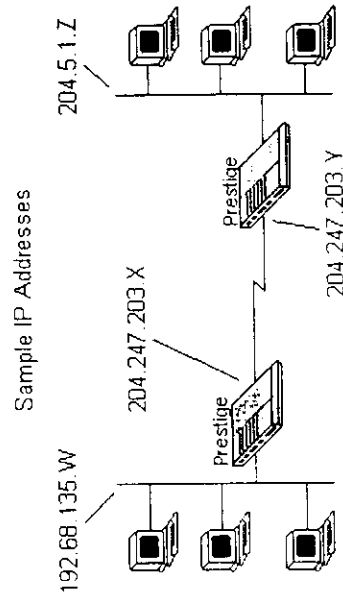


Figure 7-3 Sample IP Addresses

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).

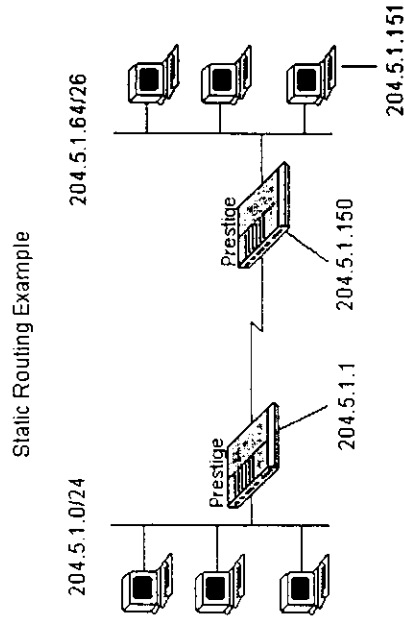


Figure 7-4 Static Routing Example

Please 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
1. default
2. test (ISP)
3.
4.

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= 7
IP Subnet Mask= 7
Gateway IP Address= 7
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 field 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. Please 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 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:

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 the **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 Set #	Comments	Filter 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= 9
Edit Comments*
Press ENTER to Confirm or ESC to Cancel:

Figure 8-2 Menu 21 - Filter Set Configuration

Outgoing Packet Filtering Process

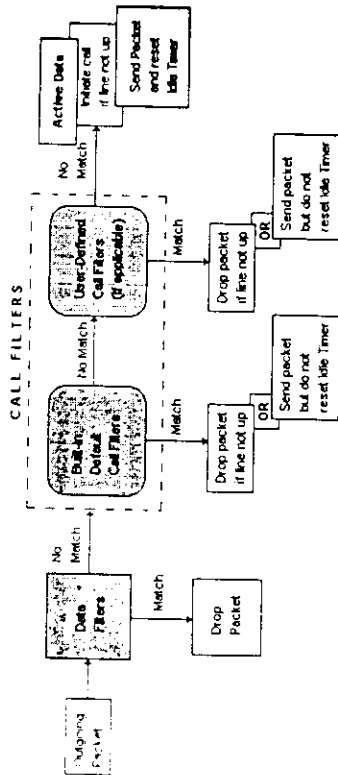


Figure 8-1 Outgoing Packet Filtering Process

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.

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, or 'IP' for TCP/IP.
- **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
1	Y	IP	Pr=17, SA=204.247.203.2, SP=520, DN=192.68.135.1
2	Y	Gen	Off=4, Len=2, Mask=ffff, Value=0002
3	N		
4	N		
5	N		
6	N		

Figure 8-3 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.

For more information on configuring the filter rule parameters, please 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= TCP/IP Filter Rule
Active= Yes
IP Protocol= 17 IP Source Route= No
Destination: IP Addr= 172.16.1.35
IP Mask= 255.255.255.255
Port # 528
Port # Comp= None
Source: IP Addr= 289.247.283.2
IP Mask= 255.255.255.255
Port # 528
Port # Comp= Equal
TCP Estab= N/A Log= None
More= No
Action Matched= Forward
Action Not Matched= Drop
Press ENTER to Confirm or ESC to Cancel:
Press Space Bar to Toggle.

```

Figure 8-4 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 in 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 in 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 11). 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'. The fields in the menu are indicated in **bold** type.

'1155ABF8'. If the result from the masked packet matches **Value**, then the packet is considered matched.

Once you have completed filling in 'Menu 21.1.1.1 - 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 21.1.1 - Filter Rules Summary'.

Menu 21.1.1.2 - Generic Filter Rule

Filter #: 1,2

Filter Type- Generic Filter Rule

Action- Yes

Offset- 4

Length- 2

Mask- ffff

Value- 0802

More- No

Log- None

Action Matched- Drop

Action Not Matched- Check Next Rule

Press Space Bar to Toggle.

Press ENTER to Confirm or ESC to Cancel:

Figure 8-5 Menu 21.1.1.1 - Generic Filter Rule

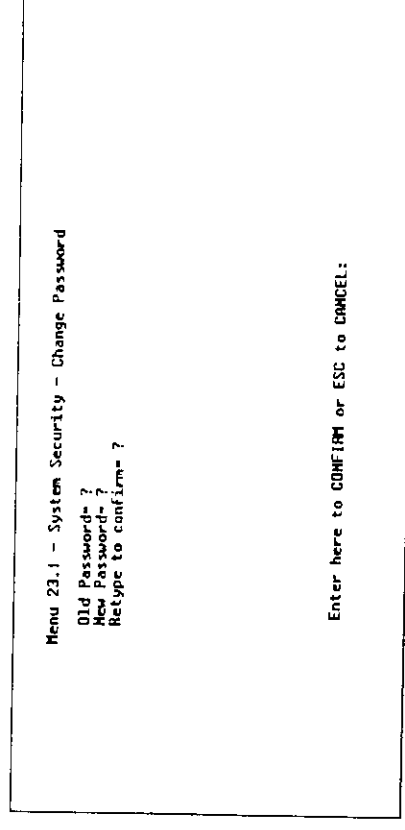
- Offset** - Offset refers to the value of the byte that you want to use as your starting offset. That is, in the data packet, at what point do you want to begin the comparison. The range for this field is from 0 to 255. *Default = 0*
- Length** - This field refers to the length (in bytes) of the data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

9 System Security

About System Security For the Prestige

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. 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.

Configuring the SMT Password

A screenshot of a terminal window showing the 'Menu 23.1 - System Security - Change Password' screen. The screen contains the following text: 'Old Password- ?', 'New Password- ?', and 'Retype to confirm- ?'. At the bottom, it says 'Enter here to CONFIRM or ESC to CANCEL:'.

```
Menu 23.1 - System Security - Change Password
Old Password- ?
New Password- ?
Retype to confirm- ?

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

Figure 9-1 Menu 23.1 - System Security - Change Password

The following steps describe a simple setup procedure for configuring the SMT password. From the Main Menu, select option '23. System Security'. This will bring you to 'Menu 23 - System Security'.

1. From this menu, you can select option '1. Change Password'. This will bring you to 'Menu 23.1 - System Security - Change Password'.
2. Type in your previous system password and press ENTER.
3. Type in your new system password and press ENTER.
4. 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.

10 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:

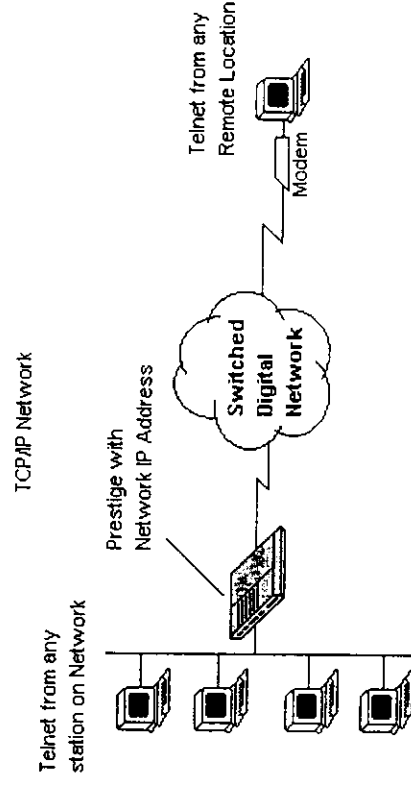


Figure 10-1 Telnet Configuration on a TCP/IP Network

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. Please 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.

System 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.

11 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.

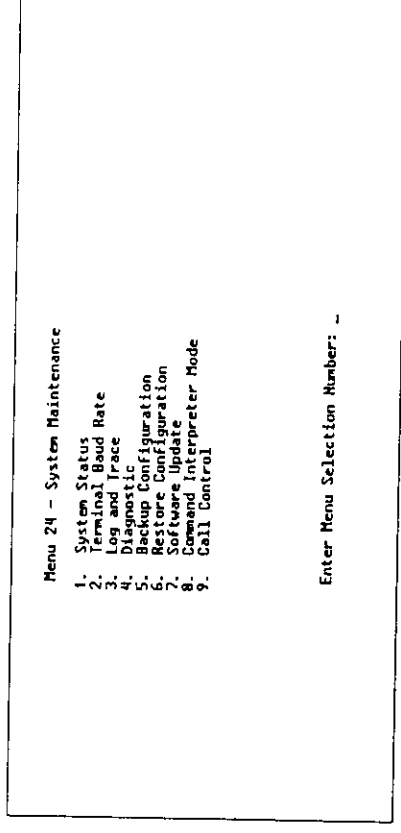


Figure 11-1 Menu 24 - System Maintenance

```

Menu 24.1 --- System Maintenance - Status

ISDN
B1 Link Type 0Kbps TXPkt 0 RXPkt 0 Error 0 CLU 0 ALU 0 Up Time 0:00:00
B2 Idle 306V 64Kbps 96 72 0 0 0x 0x 0:01:00

Total Outcall Time: 0:00:00

Ethernet
Link: Up
TX Pkt: 1287
RX Pkt: 2553
Collision: 0

LAN Packet Which Triggered Last Call: (Type: IP)
45 00 00 3C 07 33 00 00 30 01 31 49 00 00 00 00 C0 44 87 01 08 00 20 04
20 04 00 02 00 2A DE 74 C0 04 87 01 00 01 02 03 04 05 06 07 08 09 0A 0B

Name: 306V
RAS SW Version: U1.10.1.8/12/96
ISDN F/W Version: U Prestige 4.06
Ethernet Address: 00:00:C5:10:00:72
Country Code: 225

Press Command: --

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

```

Figure 11-2 Example of Menu 24.1 - System Maintenance - Status

- To get to the System Status, select option '24. System Maintenance. This will bring you to 'Menu 24 - System Maintenance'.
- From this menu, select option '1. System Status'.
- 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.
- 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.
- ISDN** - shows statistics for **B1** and **B2** channels respectively. These are the information displayed for each channel:
- Link** - shows the Remote Node the channel is currently connected to or the status of the channel (Idle, Calling, or Answering).
- Type** - the current connecting speed (56K or 64K).
- TXPkt** - the number of transmitted packets on this channel.
- RXPkt** - the number of received packets on this channel.
- Error** - the number of error packets on this channel.
- CLU** - (Current Line Utilization) - percentage of current bandwidth used on this channel.
- ALU** - (Average Line Utilization) - average CLU for this channel.
- Up Time** - time this channel has been connected to the current Remote Node.
- Total Outgoing call Time** - shows the total outgoing call time for both **B1** and **B2** channels since the system has been powered up.
- Ethernet** - shows the current status of the LAN connection on your Prestige.
- 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).
- TX Pkt** - the number of transmitted packets to LAN.
- RX Pkt** - the number of received packets from LAN.
- Collision** - number of collisions.
- Name** - displays the system name of your Prestige. This information can be modified in 'Menu 1 - General Setup.
- RAS S/W Version** - refers to the version of the current RAS software.
- 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.

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.

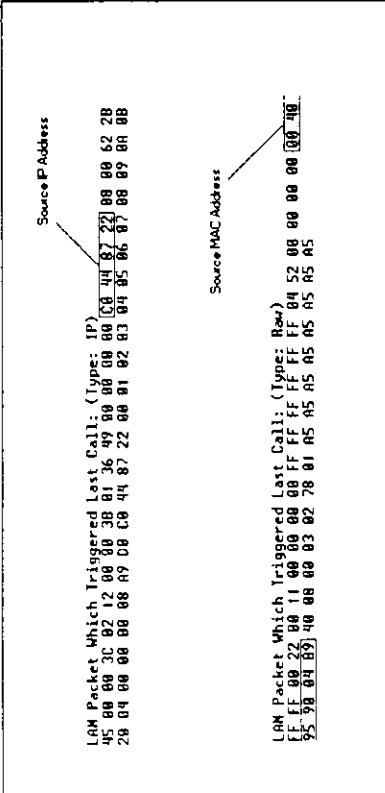


Figure 11-3 LAN Packet Which Triggered Last Call

inal 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.

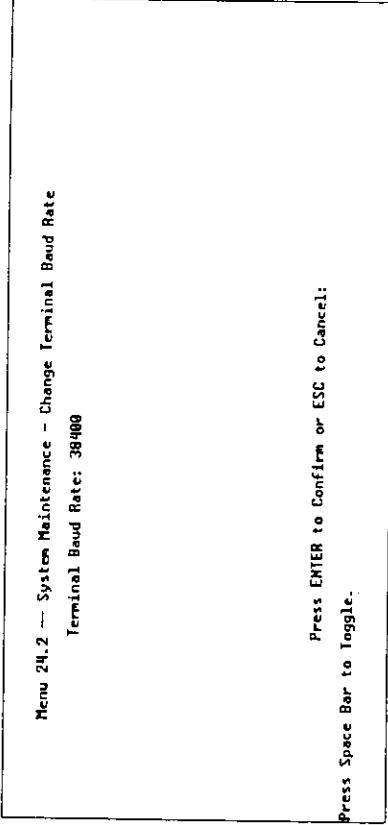


Figure 11-4 Menu 24.2 -System Maintenance - Change Terminal Baud Rate

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 11-5 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 or 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.

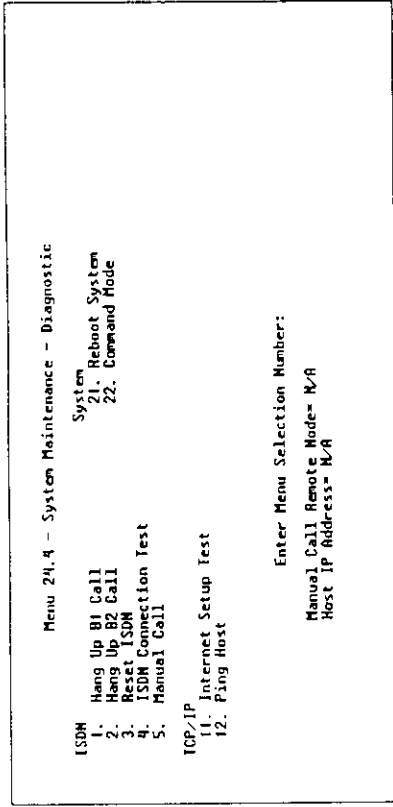


Figure 11-6 Menu 24.4 - System Maintenance - Diagnostic

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.

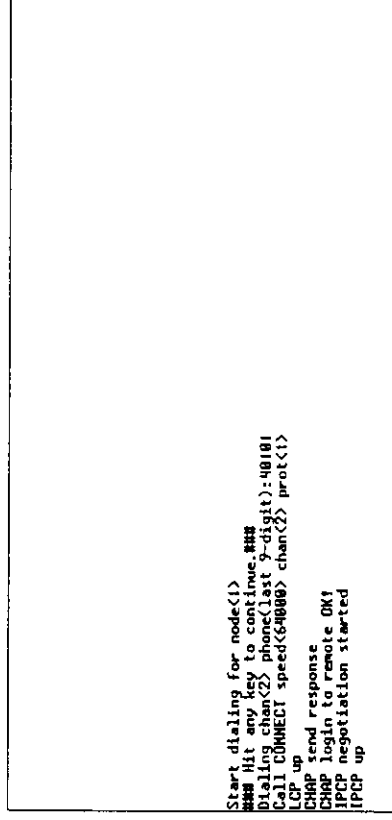


Figure 11-7 Trace Display for a Successful IPCP Connection via Manual Call
Below is an example of a failed Trace Display for a Successful IPCP Connection via Manual Call.

```

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 11-8 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.

up 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.

Please 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. Please 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*.

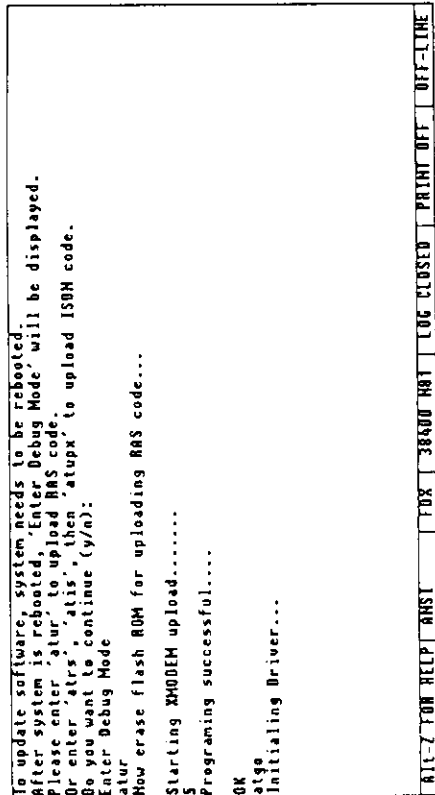


Figure 11-9 Example of Uploading RAS Using *PCPLUS*

and 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, please check ZyXEL Web site or send email to ZyXEL Support Group.

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

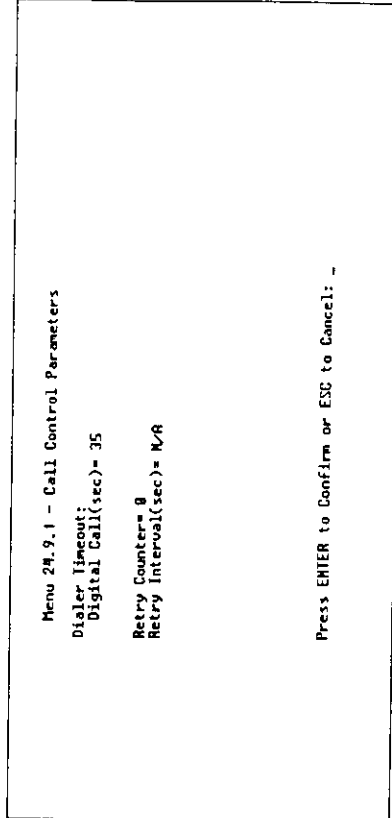


Figure 11-10 Call Control Parameters

- **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 11-11 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 Mode

1. 3060
2.
3.
4.
5. Dial-in User

Connection Time/Total Budget

0:00/6:00

0:00/4:00

Elapsed Time/Total Period

0:07/24:00

0:00/24:00

Reset Mode (0 to update screen):

Figure 11-12 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.

12 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 LED's 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.

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

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

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
ITR6	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. Please 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

Provisioning Feature	Setting
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

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
Additional Call Offering (ACO)	Yes or No (set to opposite of ACO)
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	Yes or No

Provisioning Feature	Setting
(E)TS	
Additional Call Offering (ACO)	Yes or No (set to opposite of ACO)

14 Index

- 10Base-T, 23
- ITR6, 12, 32, 33, 113
- A/B Adapter, 1, 13, 31, 33, 34
- Accounting, 97, 98
- AUI, 95, 111
- BACP. *See* Bandwidth Allocation Control Protocol
- Bandwidth Allocation Control Protocol, 3, 42, 53, 55
- Bandwidth Allocation Protocol, 3
- Bandwidth On Demand. *See* BOD
- BAP. *See* Bandwidth Allocation Protocol
- Base Transmission Rate, 55
- Blacklist, 104, 105, 106
- BOD, 3, 55, 56
- BTR. *See* Base Transmission Rate
- Budget Management, 63, 104, 107
- Call Detail Record, 99
- Calling Line ID, 51
- Canadian User Information, iv
- Challenge Handshake Authentication Protocol. *See* CHAP
- CHAP, 4, 52, 62, 63, 89
- CLID, 51, 62, 67, 68, 99, 111
- Contacting ZyXEL, vi
- Data Over Voice Bearer Service, 31, 43, 54
- DHCP, 36, 41
- DHCP server, 37
- Dial On Demand, 2, 49
- dial-in server, 28, 59, 60
- DOVBS. *See* Data Over Voice Bearer Service
- DSSI, 12, 32, 33, 34, 113
- Dynamic Host Configuration Protocol, 3, 36
- FCC Information, iii
- Front panel LED's, 24
- IANA, 40, 41, 45
- Internet, 4
- Internet Assigned Numbers Authority. *See* IANA
- IOC, 11. *See* ISDN Ordering Code
- IP Address, 14, 37
- IP Subnet Mask, 14, 37, 69, 72, 76

- ISDN
 - connecting the line, 22
 - ISDN Ordering Code, 11, 113
 - LAN, 1, 2, 5, 6, 7, 9, 21, 25, 28, 38, 40, 44, 45, 49, 59, 60, 70, 71, 72, 76, 92, 95, 96, 111, 112
 - Local Area Network. *See* LAN
 - MAC address, 96
 - Max. Transmission Rate, 55
 - MP, 42, 45, 53, 55, 56
 - Multilink Protocol. *See* MP
 - North American ISDN, 30
 - PABX, 33
 - PAP, 4, 52, 62, 63, 89
 - Password Authentication Protocol. *See* PAP
 - Ping, 96, 102
 - Plain Old Telephone Service. *See* POTS
 - Point-to-Point
 - Protocol/Multilink
 - Protocol. *See* PPP/MP
 - POTS, 1, 13, 25, 31, 33
 - PPP/MP, 3, 42
 - Remote Dial-in Users, 1, 5, 28, 45, 59, 60, 61, 63, 64
 - Remote Node, 1, 2, 28, 49, 50, 51, 52, 53, 54, 56, 57, 59, 60, 61, 63, 64, 65, 71, 72, 73, 74, 76, 89, 94, 95, 100, 101, 104, 107, 111
 - RIP, 38, 54, 73, 74, 77
 - Routing Information
 - Protocol. *See* RIP
 - RS-232, iv, 21, 24, 91, 92, 96, 103, 109
 - S/T Interface, 2, 11, 22
 - SAP, 77, 96
 - Service Profile Identifier. *See* SPID
 - SPID
 - Single User Account, 1, 4, 43, 44, 45, 46
 - SMT, 23, 26, 27, 28, 29, 39, 43, 89, 90, 109
 - SPID, 11, 12, 13, 30, 31, 110, 113
 - SUA. *See* Single User Account
 - switch types, 2, 13, 31, 110, 113
 - System Management
 - Terminal, 26. *See* SMT
 - Target Utility, 55, 57
 - TCP/IP, 2, 4, 14, 36, 37, 40, 43, 49, 59, 69, 80, 81, 82, 85, 92, 102
 - Telco Options, 43, 53, 54, 62
 - Telecommuting, 5, 59
 - Telnet, 8, 22, 90, 91, 92, 103
 - U Interface, 2, 11, 22
 - UNIX, 72, 98, 99
 - WAN, 24, 72, 73
 - Warranty, ii
 - Warranty Card, ii
 - worksheet, 10, 11, 12, 13, 14

Notes From John Castreje about this draft.

- 1) The FCC information has not been confirmed. I have just used P100 Information.
- 2) Phone features are not available right now, but will be by the time we release the P100IH. I suggest not printing this manual for FCS until we can add the phone feature details. It would not look very good to have a addendum to a manual with it FCS package.
- 3) Since we do not have a working unit in-house, we were not able to document the procedure for uplinking the hub to another hub.
- 4) All the screen shots in this draft are taken from the P100. These need to be updated (if different) to the P100IH before the final draft is printed.
- 5) We are working on the following to be added to the final draft.
 - a) Appendix for Workstation setup (Windows 95, NT and Mac System 8).
 - b) Rewriting Chapter 8 (Filtering) to be a bit more novice friendly.
 - c) Updating the FAQ/troubleshooting appendix.