



ISDN Router

User Manual

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Table of Contents

1. Your ISDN Router	1
Features	1
Connectors and Components.....	3
Specifications.....	5
2. Setup & Operation	6
Overview	6
Requirements	6
Hardware Installation	6
Software Installation	7
Setup	7
PC Setup (Required for every PC).....	10
Operation.....	11
3. Other Configuration	12
Overview	12
DHCP	12
Routing	13
ISDN.....	13
Password.....	13
4. Advanced Features	14
Overview	14
Internet Features	14
Other Features	14
5. Troubleshooting	15
Overview	15
Internet Access	15
Dial-in	17

Your ISDN Router

1

Features

The Level One ISDN Router incorporates many advanced features, carefully designed to provide sophisticated functions while being easy to use.

LAN Features

- **10/100BaseT Support**
The LAN connection will auto-detect 10BaseT and 100BaseT connections.
- **DHCP Server Support.**
A DHCP (**D**ynamic **H**ost **C**onfiguration **P**rotocol) Server provides a dynamic IP address to PCs and other LAN devices upon request.
The Level One ISDN Router can act as a **DHCP Server**.
- **Multi Segment LAN Support.**
If you have a Router, PCs on other LAN segments can use the Level One ISDN Router to access the Internet. A static routing table is provided to support multiple routers if needed.

Internet Access Features

- **Shared Internet Account.**
All users on the LAN can share the same Internet Account.
- **Dial-On-Demand & Auto-Disconnect.**
A connection is established to the Internet as required, and automatically disconnected when no longer needed. This reduces on-line charges to the minimum possible level.
- **PPP Authentication.**
This is used to validate the log-on to your Internet Service Provider.
- **Advanced Internet Functions.**
 - **Virtual Servers.** This feature allows Internet users to access Internet servers on your LAN.
 - **Special Internet Applications.** Internet applications such as Internet Videoconferencing, Telephony, Games Servers, and other special-purpose Servers are supported.
 - **Exposed Computer.** One (1) PC on your local LAN can be exposed to the Internet. This allows unrestricted 2-way communication between this PC and servers or users on the Internet.

ISDN Features

- **Easy Configuration**
No complex technical data. You'll be finished in minutes!
- **Intelligent B Channel Utilization**
Internet access will automatically switch between 1 or 2 B channels, depending on the volume of data.
- **Outgoing Call ID**
The Level One ISDN Router supports Outgoing call ID for both MSN (Multiple Subscriber Numbering) and SAD (Sub Address).

Configuration & Management

- **Easy Setup.**
Connect to the Level One ISDN Router with your WEB browser from anywhere on the LAN for configuration.
- **Remote Management.**
The Level One ISDN Router can be managed from a workstation anywhere on the LAN, using a WEB browser.
- **Remote Monitoring.**
Using the Web-based interface, Internet access via the ISDN link can be monitored from any workstation on the LAN.

Advanced Functions

- **Dial-in Remote Access.**
Remote users can dial in using their ISDN phone line, and use the Level One ISDN Router to connect to the LAN and access LAN resources.
- **LAN-to-LAN Connectivity.**
Using 2 Level One ISDN Routers, 2 LANs can be connected via the ISDN link. The Level One ISDN Router will dial the remote LAN whenever required. Operation is completely automatic and transparent.

Security Features

- **Configuration Data.**
Optional password protection is provided to prevent unauthorized users from modifying the configuration.
- **Firewall Protection.**
All incoming data packets are monitored and all incoming server requests are filtered, thus protecting your network from malicious attacks from external sources.

Firewall Protection

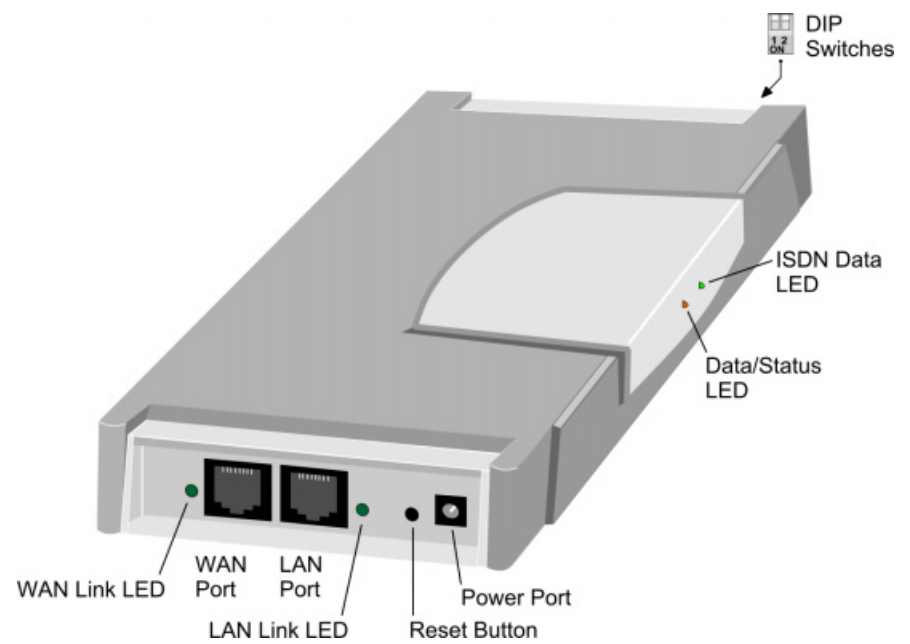
The firewall protection provided by the Level One ISDN Router is an intrinsic side effect of IP sharing. All users on the LAN share a single external IP address. From the external viewpoint, there is no network, only a single device.

For internal users, the Level One ISDN Router acts as a "transparent proxy server", translating the multiple internal IP addresses into a single external IP address.

For external requests, any attempt to connect to local resources are blocked. The Level One ISDN Router will not "reverse translate" from a global IP address to a local IP address.

This type of "natural" firewall provides an impregnable barrier against malicious attacks.

Connectors and Components



LEDs

LAN

LAN link LED is On when a LAN connection is established, and flashes when data is transmitted or received

ISDN LEDs

WAN Link LED is ON when an ISDN "D" channel connection is established.
ISDN Data LED flashes when data is transmitted or received via the ISDN "B" Channel.

Data LEDs

Note: The Data/Status LED has 2 colors - Orange and Green.

Data/Status LED	Data LED	Description
OFF	OFF	No power.
ON (Orange, then Green)	ON, then OFF	Normal power ON (start up) sequence.
ON (Green)	OFF	Idle
Flashing (Green)	Flashing	Normal operation.
Flashing Orange, Green (repeated)	-	Hardware error. Contact technical support.

DIP Switches

SW1	SW2	Description
OFF	OFF	Normal operation (default)
OFF	ON	DHCP Server disabled.
ON	OFF	Restore device IP and password (see below)
ON	ON	Normal Operation

Restore Device IP Address and Password

Use the following procedure to:

- Restore the device IP address to the factory default of 192.168.0.1
- Set the Network Mask to 255.255.255.0
- Set the password to NULL (no password)

Procedure:

1. Power off the Level One ISDN Router.
2. Set DIP switch 1 to ON, and switch 2 to OFF.
3. Power on the Level One ISDN Router
4. Operate DIP switch 1 in the following sequence (you have 15 seconds to complete the sequence):
 - OFF
 - ON
 - OFF
5. If everything is OK, the *Status LED* should flash once after about 5 seconds. The Level One ISDN Router is now ready for use with the default IP Address and password.

Specifications

Dimensions	120mm(W) * 93mm(D) * 30mm(H)
Operating Temperature	0° C to 40° C
Storage Temperature	-10° C to 70° C
Network Protocol:	TCP/IP
Ethernet Interface:	1 * 10/100BaseT (RJ45)
ISDN Interface:	1 * RJ45 for S/T interface.
LEDs	2 * RJ45 connection status 2 * Data Transfer
External Power Adapter	12 V DC

FCC Statement:

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

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

CE Marking Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Setup & Operation

Overview

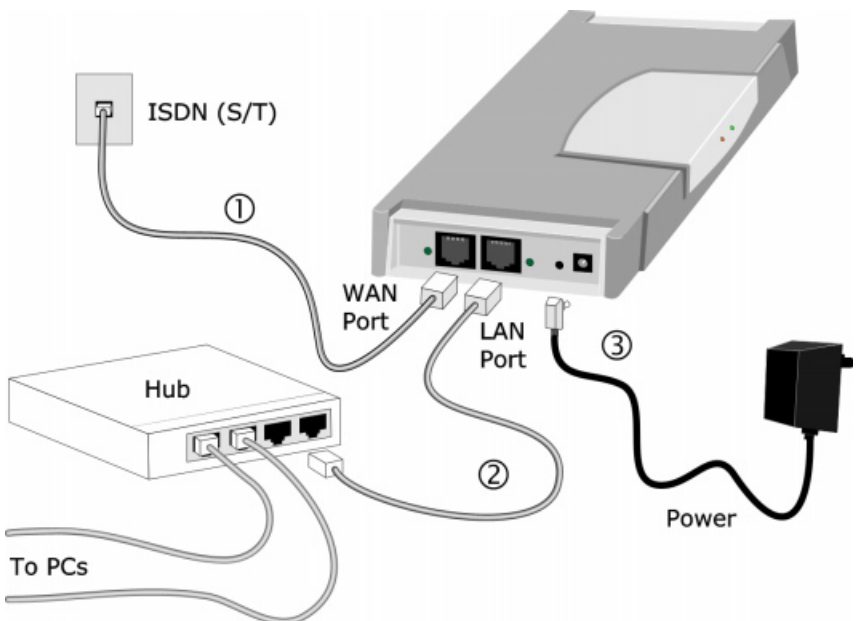
For most situations, this chapter contains all the information required to provide shared Internet access via the Level One ISDN Router. The required steps are:

1. Hardware Installation
2. Software Installation
3. ISDN Router setup, using the supplied software.
4. PC and/or LAN configuration.

Requirements

- 10BaseT or 100BaseT Ethernet network.
- ISDN phone line, fitted with a NT-1 (Network Termination 1) termination and RJ45 sockets for S/T connection.
- Internet Access account with a local ISP (Internet Service Provider).
- The *Manager* utility program requires:
 - Windows 95/98, or Windows NT4.0, or later.
 - Internet Explorer (IE) V3.0 or later.

Hardware Installation



Note! The Level One ISDN Router incorporates a DHCP Server. If your LAN already has a DHCP Server, you can set DIP switch 2 ON to disable the DHCP Server in the ISDN Router.

1. Use the supplied cable to connect the WAN port to the S/T connector on your ISDN NT1 (Network Terminator 1).
2. Connect the LAN port to your 10BaseT or 100BaseT hub.
3. Connect the supplied power supply.

Software Installation

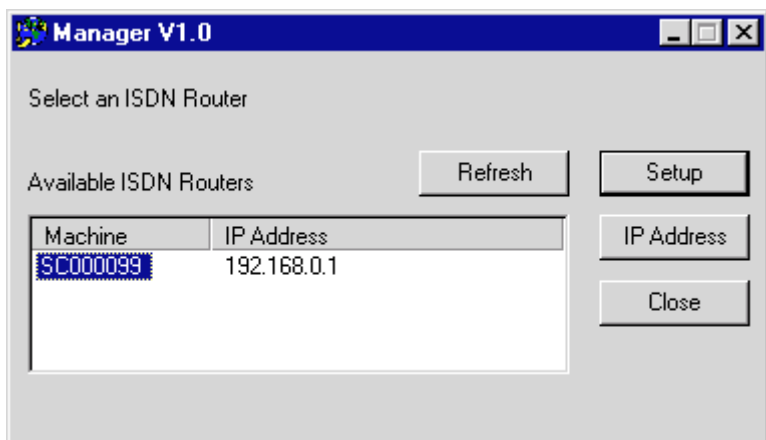
1. Insert the supplied CD-ROM into your drive, and run SETUP.EXE in the ISDN directory.
2. Follow the prompts to complete the installation.
3. The ISDN Router setup program will now run.



If necessary, configuration may be performed using a Web browser instead of the supplied Windows utility. See [Web Based Setup](#) for details.

Setup

1. On the first screen, select the Level One ISDN Router, and click "Setup".



2. If the current IP Address is unworkable, the IP Address screen (below) will suggest new values.
 - Change the suggested IP Address if it is already in use by a device which is not powered on.
 - Click "Change" to continue.

Note: If the current IP Address is OK, you will not see this screen.

IP Address [X]

Current Settings

IP Address 192.168.0.1

Network Mask 255.255.255.0

Change

Cancel

Suggested Settings

IP Address 192 . 168 . 0 . 5

Network Mask 255 . 255 . 255 . 0

3. Enter the required data on the *Quick Setup* tab below.

SC000099 [X]

Access Control | Internet Application | LAN-to-LAN | ISDN

Quick Setup | Status | Password | LAN | Dial-in

Internet Access

☒ Enable Internet Access

Account Name quest

Account Password xxxxxxxx Verify xxxxxxxx

IP Address from ISP ☒ Dynamic ☐ Fixed

Idle Time-out 15 minutes (0 = Unlimited)

DNS IP Address 0 . 0 . 0 . 0

Telephone (Required)

Telephone 2 (Optional)

Telephone 3 (Optional)

ISDN

Country Euro ISDN

For USA, The following data is required:

SPID (1st B Channel)

SPID (2nd B Channel)

TCP/IP

Device IP Address 192.168.0.1

Network Mask 255.255.255.0

OK Cancel

Internet Access (from ISP)	
Account (User) Name	Account name provided by your ISP (Internet Service Provider).
Account Password Verify Password	Password for the above account.
IP Address from ISP	<i>Dynamic</i> IP addresses are the most common. If <i>Fixed</i> , use the address provided by your ISP.
Idle Time-out	If a connection is idle for longer than this time period, it is terminated.
DNS IP Address	DNS IP address supplied or recommended by your ISP.
Telephone	ISP's telephone number; 2 nd and 3 rd numbers are optional.
ISDN Details (from Telephone Company)	
Country	Select your country If in the USA, select the entry to match the "Switch Type" used by your telephone company.
SPID	If you live in the USA, enter the SPID (Service Profile Identifier) provided by your phone company.
LAN	
IP Address Network Mask	These are read-only.

- Normally, no other configuration is required, but if your LAN has a router, or you wish to change the IP Addresses allocated by the DHCP Server, refer to Chapter 3.

PC Setup (Required for every PC)

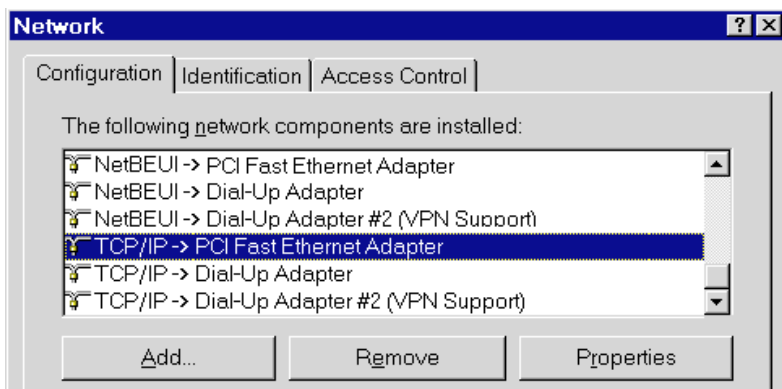
TCP/IP Setup

Note!

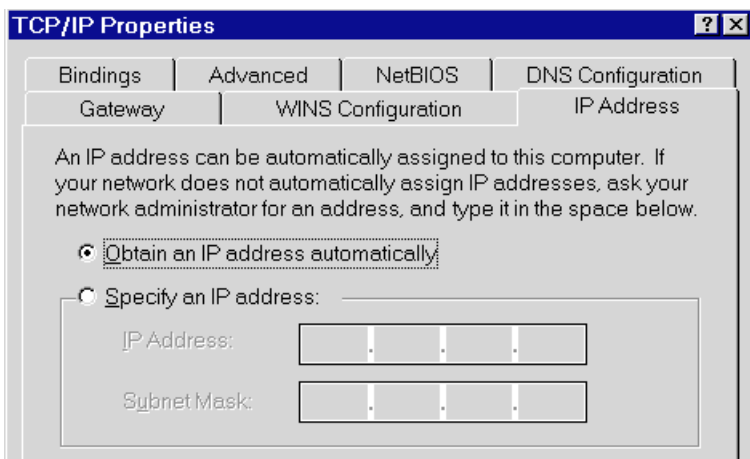


If your LAN already has a DHCP Server, or a Router, do NOT make any changes to TCP/IP settings on the PCs. See Chapter 3 for details of LAN configuration.

1. Use *Start - Settings - Control Panel - Network* to locate the screen below.



2. Select the "TCP/IP -> Network card" entry, as highlighted above, and click *Properties* to see the screen below.



3. Use the appropriate settings for your situation:
 - Use "Obtain an IP address automatically", as shown above, if using the DHCP Server feature in the Level One ISDN Router, or an existing DHCP Server.
 - If using "Specify an IP Address":
 - Do not make any changes on the **IP Address** tab.
 - On the **Gateway** tab, set the *Default Gateway Address* to the Level One ISDN Router's *IP Address*.
 - On the **DNS Configuration** tab, enter the same value used when configuring the Level One ISDN Router.

Internet Settings

1. Run *Start Menu-Settings-Control Panel-Internet Options*.
2. On the *Connection* tab, click the *Setup* button.
3. Step through the Wizard, and ensure that Internet access is set to "via local area network (LAN)" and the other options are NOT selected.
4. Configuration is now complete.

Operation

Internet Access

Once configured, operation is automatic. You can use your Web Browser to access any Web Site. The Level One ISDN Router will connect and disconnect from your ISP as required.

Special Internet Applications

These server-based applications, such as Video-conferencing and on-line games, have special requirements, but many will work with the Level One ISDN Router. See *Chapter 4 - Advanced Features* for further details.

Status Tab

On the Windows *Manager* utility, the *Status* tab can be used to check the Level One ISDN Router.

- *Device* section provides details of the Level One ISDN Router.
- *ISDN* shows the current connection status.
- *Log* lists messages regarding the connection. Common messages are shown in the following table.

Message	Description
Dialing	Dialing the ISP
Try to establish physical connection.	The device is trying to connect with the ISP.
Busy error	The number dialed was busy.
Physical line is connected	Physical connection to ISP has been established.
Start PPP	A PPP connection is now being established.
PPP up fail	The PPP connection could not be established.
PPP up successfully	The PPP connection was established successfully.
Stop PPP	The PPP connection was terminated. This will occur at the end of a session, or an error condition.
Idle timer expires	The "Idle time-out" has been triggered. (There was no data sent or received for the duration of the "Idle time" period.)

Other Configuration

Overview

In most cases, the configuration covered in this chapter is not necessary.

DHCP

A DHCP (Dynamic Host Configuration Protocol) server provides an IP address and related data to a DHCP client (PC or device) upon request.

Existing DHCP Server

If using an existing DHCP Server:

- Configure it to provide the Level One ISDN Router's IP Address as the *Default Gateway*.
- The DHCP Server in the Level One ISDN Router should be disabled. This setting is on the *LAN* tab.

ISDN Router's DHCP Server

Normally, the default values do not need to be changed. However, if your LAN already has some devices using fixed IP Addresses, you need to set the IP Address range used by the DHCP Server to be compatible.

- The Level One ISDN Router's IP Address must be within the address range you wish to use. This should have been set during initial configuration.
- DHCP Server settings are on the *LAN* tab of the *Manager* utility.

Enable/Disable	Enable/Disable the DHCP Server.
Start IP Address Finish IP Address	Sets the addresses allocated to DHCP clients by the DHCP server. This also sets the number of DHCP clients - maximum is 253.
DNS IP Address	If multiple entries are provided, the first available DNS will be used.



Devices having fixed (static) IP Addresses must NOT use an IP Address within the range used by the DHCP Server.

Routing

The Routing feature (on the *LAN* tab) can be completely ignored if you do not have a router in your LAN.

If you DO have a router, it is necessary to configure BOTH the Router and the Routing table in the Level One ISDN Router correctly.

See [Routing](#) for further details.

ISDN

The *ISDN* tab on the *Manager* program allows you to:

- Temporarily switch the ISDN link OFF.
- Use 2 B Channels for Internet access, rather than 1.
- Set the outgoing call MSN and SAD. (MSN and SAD allow you to have multiple phone numbers).
- Set the B Channel line speed, or enter an "Initial Sting" (Only if advised to do so by your phone company.)

In most situations, there is no need to change these settings.

Password

If entered, the password protects the ISDN Router's configuration data. If a password is not set, anyone can change the configuration.

- To enter a password, use the ***Password*** tab on the *Manager* program.
- When you attempt to change the configuration, you will be prompted for this password.

Advanced Features

Overview

Use of any of these features is optional. The **Manger** utility must be used to configure the Level One ISDN Router.

Follow the appropriate link for further details

Internet Features

Access Control

Allows administrators to restrict Internet Access by individual workstations (PCs).

Special Applications

Internet Application Tab

Provides the ability to use Internet applications which require 2-way communication, multiple connections, or combined TCP/UDP connections

Exposed Computer

Internet Application Tab

Provides complete 2-way communication between one (1) computer and the Internet.

This allows you to use any application or special-purpose server, but also creates a security risk.

Virtual Servers

Internet Application Tab

Allows Internet users to access Servers on your LAN, via the Level One ISDN Router.

Other Features

Dial-in

Remote users can dial the Level One ISDN Router using an ISDN TA and the same software that they use for dial-in Internet access. (e.g. *Dial-up Networking*).

They can then access the LAN resources as if they were a local user. To other devices on the LAN, the dial-in user will appear to be a local PC having an IP Address allocated by the Level One ISDN Router.

LAN-to-LAN

The LAN-to-LAN feature allows the Level One ISDN Router to automatically connect to a remote LAN, when required.

The remote LAN must also have an Level One ISDN Router or compatible device; each device must be configured to allow connection to the other.

Overview

This section covers some common problems that may be encountered while using the ISDN Internet. If you follow the suggested steps and the Level One ISDN Router still does not function properly, contact your dealer for further advice.

Internet Access

Problem 1	Level One ISDN Router is not listed in the Windows utility.
Solution 1	<p>Check the following:</p> <ul style="list-style-type: none">• The Level One ISDN Router is properly installed, LAN connections are OK, and it is powered ON.• Ensure that your PC and the Level One ISDN Router are on the same network segment. (If you don't have a router, this must be the case.)
Problem 2	When I enter a URL or IP address I get a time out error.
Solution 2	<p>Try the following troubleshooting steps.</p> <ol style="list-style-type: none">1. If using static IP Addresses, ensure that your workstations IP settings are correct, including IP address, default gateway and DNS.2. Ping the Level One ISDN Router. Use the "Run" command to enter the following command: <code>Ping xxx.xxx.xxx.xxx</code> where xxx.xxx.xxx.xxx is the Level One ISDN Router's IP address.3. If the ping command fails, check that the Level One ISDN Router is connected and ON. If it is connected and on, there is a problem with your LAN.4. On the <i>Quick Setup</i> screen, check that <i>Enable Internet Access</i> is checked.5. Check the <i>ISDN Status</i> screen, and examine the Connection Log. For details of the Log messages, refer to page 11.6. Check your "Proxy Server" settings on your PCs.<ul style="list-style-type: none">• The Level One ISDN Router is NOT a Proxy Server; PCs do not require "Proxy Server" settings to use it.• If you have Proxy Server on your local LAN, you should turn it Off, and disable the "Proxy Server" settings in your PC applications.• If your ISP has a Proxy Server, follow the instructions provided by the ISP.

Problem 3	Some applications do not run properly when using the Level One ISDN Router.
Solution 3	<p>The Level One ISDN Router processes the data passing through it, so it is not transparent.</p> <p>The following applications and protocols are transparently supported by firmware V5.0:</p> <p>Telnet, FTP, HTTP, ping POP/SMTP, Archie, NNTP TFTP, IRC, Gopher DNS, SNMP, Real Audio</p> <p>For applications which are not transparently supported, 2 features can be used:</p> <ul style="list-style-type: none"> Special Applications <i>(Internet Application tab)</i>. If possible, you should use this feature. You can add additional applications to those already listed, using the data provided by the service provider. Note: At any time, only 1 PC can use a particular Special Application. Exposed Computer <i>(Internet Application tab)</i>. If an Internet Application cannot be made to work using the <i>Special Application</i> feature, you can use this method. However, this is a security risk, so should only be used when essential.

Dial-in

Problem 1	My modem can't establish a connection to the Level One ISDN Router.
Solution 1	You can NOT use a modem. You must use an ISDN TA, and establish an ISDN link.
Problem 2	I always get a busy tone when I try to dial-in.
Solution 2	<p>Check the <i>Usage</i> setting on the <i>ISDN</i> tab. If set to "Always use 2 B channels", then dial-in is only possible when the Level One ISDN Router is idle.</p> <p>If set to "Dynamically use 2 B Channels", then dial-in access will be provided by dropping 1 B channel if necessary.</p>
Problem 3	When using Dial-in, I get an IP Address conflict involving the dial-in PC.
Solution 3	<p>This can happen if you are not using the DHCP Server feature of the Level One ISDN Router.</p> <p>The Level One ISDN Router must allocate an IP Address to the dial-in PC, even if the DHCP Server is disabled. It allocates the IP Address shown in the <i>Start IP Address</i> field for the DHCP Server (on the LAN tab of the Manager utility).</p> <p>If this causes an IP Address conflict, you can change this value as follows:</p> <ol style="list-style-type: none">1. On the LAN tab, enable the <i>DHCP Server</i> function.2. Select an unused IP Address from the address range used on your PC, and enter in the <i>Start IP Address</i> field.3. Disable the <i>DHCP Server</i> function.4. Click <i>OK</i> to save.