ISDNLINK™

INET-810

INET-820

INET-830

INET-850

ISDN Router

User's Guide

P/N: 9560860000

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.

Document Version: 1.0

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Chapter 1

About your Internet Router

This Chapter provides an overview of the Internet Router's features and capabilities.

Congratulations on the purchase of your new Internet Router. The Internet Router allows multiple SOHO (Small Office Home Office) users to share a single Internet user account over an ISDN phone link. It provides the cost-effective solution of giving users of your network easy access to the vast resources available on the Internet.

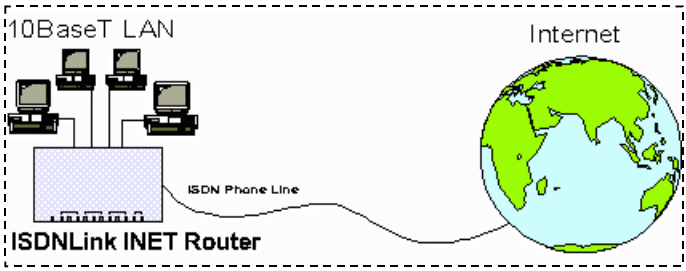

Figure 1: Office to Internet

All of the Internet Router models include a built-in 4 port 10BaseT hub, allowing you to easily create a peer-to-peer network.

Internet Router INET-830 and INET-850 include two (2) analog a/b ports, allowing you to connect the analog a/b (POTS) telephone, answering machine, or fax.

For added versatility, the Internet Router INET-830 and INET-850 include a printer port, allowing LAN users to share the attached printer.

Internet Router Features

The Internet Router incorporates many advanced features, carefully designed to provided sophisticated functions while being easy to use.

LAN Features

- ***Built-in Hub.*** The built-in 4-port hub saves the cost and additional wiring of a separate hub.
- ***Hassle-free LAN Installation.*** Just plug it in, whether or not you wish to use the built-in hub.
- ***DHCP Server Support.*** **D**ynamic **H**ost **C**onfiguration **P**rotocol provides a dynamic IP address to PCs and other devices upon request. The Internet Router can act as a **DHCP Server**.
- ***Multi Segment LAN Support.*** If you have a Router, PCs on other LAN segments can use the Internet Router to access the Internet and, on INET-830 and INET-850, share the printer.

Internet Access Features

- ***Shared Internet Account.*** All users on the LAN can share the same Internet Account.
- ***Additional Bandwidth via Serial Port.*** If the ISDN link is insufficient, you can connect a modem or ISDN TA to the serial port to provide increased bandwidth.
- ***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.

ISDN Features

- ***Easy Configuration.*** No complex technical data or unintelligible prompts. You'll be finished in minutes!
- ***Intelligent B Channel Utilization.*** Internet access will automatically switch between 1 or 2 B channels, depending on the data traffic volume.
- ***Outgoing call ID.*** The Internet Router supports Outgoing call ID for both MSN (Multiple Subscriber Numbering) and SAD (Sub Address).
- ***Analog Ports.*** Two (2) analog a/b ports are provided, to allow connection of your existing analog telephone, answering machine, or fax. **(for INET-820 and INET-850)**
- ***Analog Call Priority.*** If both B channels are in use, one channel will be disconnected when an incoming voice call is detected, or you wish to make an outgoing voice call. (for INET-820 and INET-850)

Printer Sharing Features (for INET-830 and INET-850)

- ***LAN Printer Sharing.*** Users on the LAN can share the printer attached to the Internet Router. All they need to do is install and configure the supplied software on their PC.
- ***Easy installation & configuration.*** The "Internet Router Printer Port" software required for printer sharing installs quickly and requires minimal configuration.

Configuration & Management

- ***Easy Setup.*** Use your WEB browser from anywhere on the LAN for configuration.
- ***Remote Management.*** The Internet Router can be managed, if required, from a workstation anywhere on the LAN, using a WEB browser.

- ***Remote Monitoring.*** Internet access via the ISDN link, or serial port usage, can be monitored from any workstation on the LAN. Printer status can be checked using the standard Windows printer features.

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 Internet 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 Internet 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 Internet 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.

Requirements

- PCs with Ethernet Network cards and 10BaseT connectors
- 10BaseT network cable(s), with RJ45 connectors. One of these cables can be used to connect the ISDN phone line.
- Software drivers for the network cards installed on each PC.
- 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).
- For Printer Sharing, PCs must be running one of the following operating systems:
  - Windows 95 or 98
  - Windows NT 3.51, NT4.0

Package Contents

The following items should be included:

- The Internet Router Unit.
- Power Adapter.
- ISDN RJ-45 connection cable (5M).
- One (1) 1.44M floppy disk (or CD diskette), containing the printer port redirector software.
- This User's Manual.

If any of the above items are damaged or missing, please contact your dealer as soon as possible.

Internet Router INET-810 and INET-830

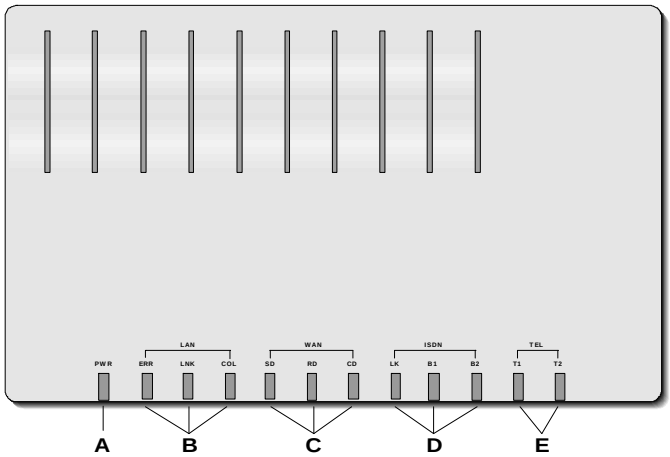

Figure 2: INET-810 and INET-830

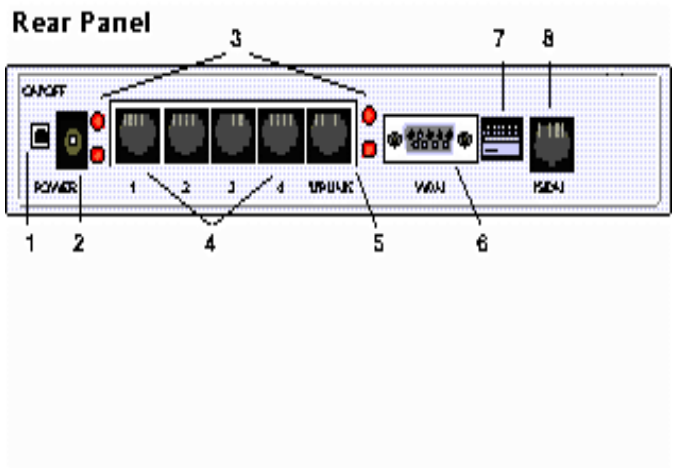

Figure 3: Rear Panel INET-810 and INET-830

Internet Router INET-820

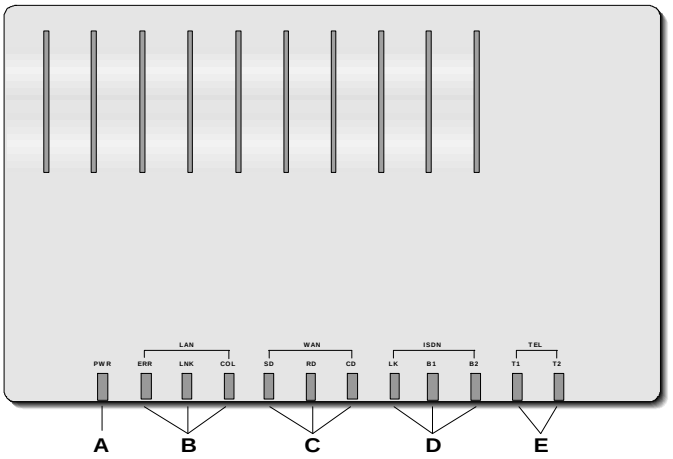

Figure 4: INET-820

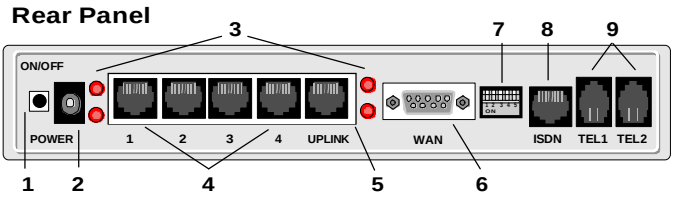

Figure 5: Rear Panel INET-820

Internet Router INET-850

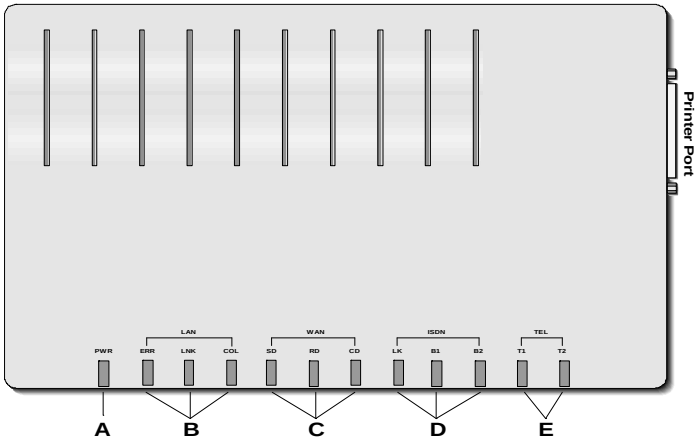

Figure 6: INET-850

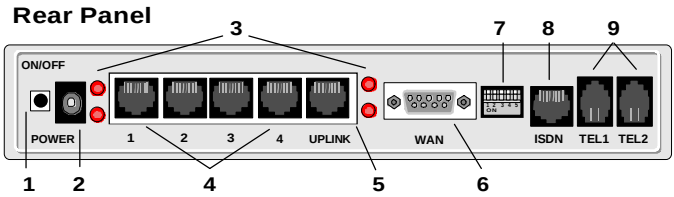

Figure 7: Rear Panel INET-850

LED Indicators

A	**Power**	Lights when power is ON.
B	**LAN**	**ERR** –Indicates an error, but normally lights up briefly during power On. See the following table for more information. **LNK** – Traffic is being transmitted or received on the LAN. This LED also works in conjunction with the ERR LED to indicate errors. See the following table for more information. **COL** – Packet collision. Collisions are normal; only if this light is on most of the time is there a problem.
C	**WAN**	**SD** – Flashes when data is sent through the serial (WAN) port. **RD** – Flashes when data is received through the serial (WAN) port. **CD** – Carrier Detect. This is ON when the WAN (serial port) connection is active.
D	**ISDN**	**LK** – ON while the ISDN connection is being used. **B1** – Flash while the 1st B channel is in use. **B2** – Flash while the 2nd B channel is in use.
E	**TEL**	**T1** – ON while analog port 1 is in use. **T2** – ON while analog port 2 is in use.

All 12 LEDs will light briefly on power on. This is normal.

Link/Error LEDs

Operation of the *Link* and *Error* LEDs is as follows:

Link	Error	Description
On	On	During power On, both LEDs should light, then the error LED should go off. If both LEDs stay on, there is a hardware problem.
On	Off	Idle
Flashing	Off	Normal Operation – transmitting or receiving data via the LAN.
Rapid intermittent flashing of each LED		Hardware error, as detailed below.

Error Conditions (G = Green, R = Red)

G-R (repeated)	RAM error
G-G-R-R (twice, repeated)	Flash RAM error
G-G-G-R-R-R (3 times, repeated)	Timer error
G-G-G-G-R-R-R–R (4 times, repeated)	Serial port error
G-G-G-G-G-R-R-R-R-R (5 times, repeated)	LAN port error
G-G-G-G-G-G-R-R-R-R-R-R (6 times, repeated)	ISDN link error

Rear Panel Connectors & Switches

1	**Power switch**	Electrical switch. IN is ON.
2	**Power port**	Connect the power adapter here. Use only the unit provided.
3	**Hub LEDs**	10BaseT port indicators – flash when the hub port is in use.
4	**10BaseT ports**	Connect 10BaseT cabling here, and the other end to the PC.
5	**10BaseT uplink port**	If using both the built-in hub and another hub, use this port to connect to the other hub. When this port is in use, port 4 can NOT be used.
6	**WAN port**	Serial port. If using an external modem, connect it here. See *Chapter 9 – Serial Port* for further information.
7	**DIP switches**	See the following section.
8	**ISDN port**	Use a cable with RJ45 connectors to link this port to the S/T interface on the NT-1.
9	**Analog tele-phone ports**	If using analog devices, connect them here. See *Chapter 8 – Analog Ports* for configuration details.

DIP Switches

Settings					Description
SW1	SW2	SW3	SW4	SW5	
Off	Off	Reserved[1]	Reserved[1]	Reserved[1]	Normal operation
Off	On				Disable DHCP server[2]
On	Off				Restore defaults[3]
On	On				Reserved

[1] Do not change the default values unless advised to do so by technical support staff.

[2] This will override the setting on the *DHCP Server* screen.

[3] Restores the default IP address (192.168.0.1), and clears the password, provided the following procedure is carried out.
If you merely leave the DIP switches is this position, the Internet Router will function normally.

Restore Default IP Address and Clear Password

If the Internet Router's IP Address or password is lost, the following procedure can be used to recover from this situation.

1. Turn the power to the Internet Router OFF.
2. Set DIP switch 1 ON, and DIP switch 2 OFF.
3. Turn the power to the Internet Router ON.
4. Operate DIP switch 1 in the following sequence (you have 15 seconds to complete the sequence):

- OFF, ON, OFF

5. The Internet Router will now reset, and the Red LED will flash. The following changes will have been made. (Other configuration data is unchanged.)

- *IP Address* set to its default value of 192.168.0.1
- *Network Mask* set to 255.255.255.0
- The password cleared (no password).

6. You can now connect to the Internet Router and make any configuration changes required.

Chapter 2

Setup:

Internet Access

This Chapter explains how to install and configure the Internet Router for Internet Access.

Overview

Setup involves:

- Hardware Installation
- Internet Router configuration
- PC configuration

Software installation is required only for printer sharing. Refer to *Chapter 3 – Printer Sharing* for details.

Hardware Installation

1. Connect Network Cables

For each PC, connect one end of a 10BaseT network cable to the Internet Router's RJ-45 socket (port1 to 4) and the other end into the RJ45 socket on the PC. Cable length should not exceed 100 meters (yards).

If connecting the Internet Router to another hub, connect the "Uplink" port on the Internet Router to a normal port on the other hub. Note that when the "Uplink" port is in use, port 4 can NOT be used.

3. Connect ISDN Phone Line

Using a cable fitted with RJ45 plugs, connect the ISDN port on the Internet Router to the S/T interface on the NT-1 (Network Termination 1) ISDN terminator.

4. Connect Printer (INET-830 and INET-850 only)

Using a standard printer cable, connect the printer to the printer port on the Internet Router.

5. Power On and Check the LEDs

Connect the supplied power adapter to the Internet Router and press the ON/OFF switch on the back of the Internet Router. (In is ON.) When the Internet Router is powered On, all LEDs should blink, then, except for the PWR LED, go off.

If the ERR LED stays on, or both the ERR and LNK LEDs continue to blink, there is a hardware problem.

For more information on the LEDs, refer to *LED Indicators* on page 10 and *Link/Error LEDs* on page 11.

Warning! **Only use the power adapter provided. Using a different one may cause hardware damage.**

Internet Router Configuration

The Internet Router contains a HTTP server. This enables you configure it using your Web Browser. Most Browsers should work, provided they support HTML tables and forms.

Preparation

Ensure your PC is using the TCP/IP protocol, and configure it to use the Internet Router's DHCP server, as follows:

DHCP Client Setup - Windows 95/98

1. Select the *Network Neighborhood* icon on the desktop, then *Properties*. You will see a screen like the one below:

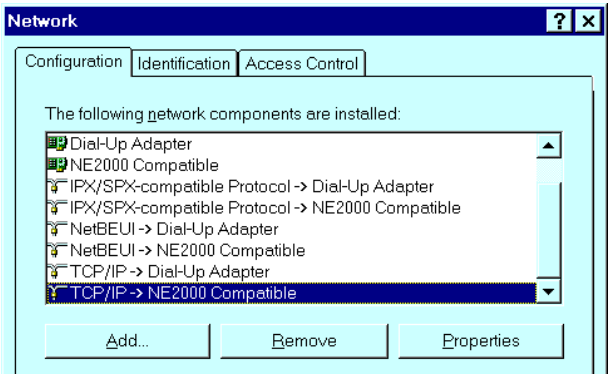

Figure 8: Network Configuration tab

2. If a line like the one highlighted ("TCP/IP -> Network Card") is not listed, select *Add-Protocol-Microsoft-TCP/IP-OK* to add it.
3. Select *Properties* for the "TCP/IP -> Network card" entry. You will see a screen like the following:

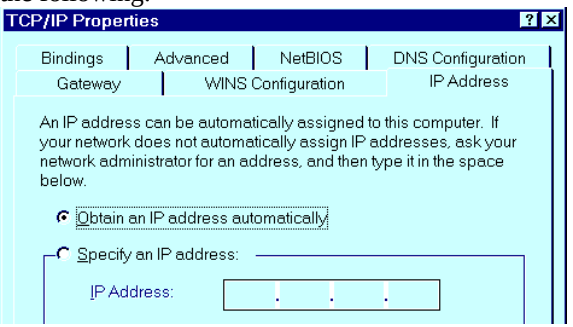

Figure 9: TCP/IP Properties - DHCP

4. On the *IP Address* tab, click the radio button for "Obtain an IP address automatically", as above, then reboot. Your PC will obtain an IP Address from the Internet Router.

If your LAN already has a DCHP Server:

- Set DIP switch 2 ON to disable the DHCP server in the Internet Router.
- Enter a fixed IP Address on your PC, as shown below.

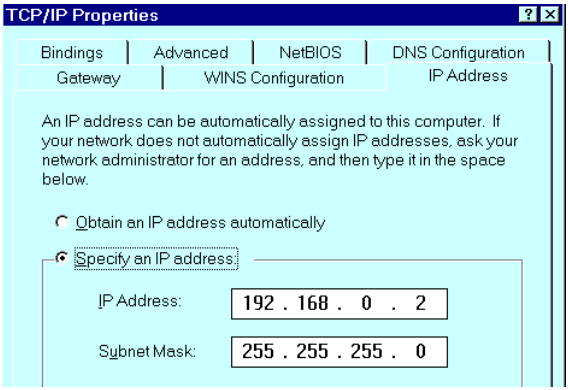

Figure 10: TCP/IP Properties – Fixed IP Address

Connecting to the Internet Router

1. Start your WEB browser
2. In the *Address* box, enter "HTTP://" and the IP Address of the Internet Router. For example (using default IP Address):

   HTTP://192.168.0.1

3. You will see the *Home* screen. Select *Basic Setup*.

If you can't connect, check:

- The Internet Router is properly installed, LAN connections are OK, and it is powered ON.
- Your PC and the Internet Router are on the same network segment. (If there is no router, this must be the case.)
- If another PC or device is using the same IP address (192.168.0.1) as the Internet Router, turn the other device OFF until you assign a new address to the Internet Router.
- That your PC has a compatible IP address (either static or obtained as a DHCP client)
- In the Windows 95/98/NT "Run" dialog, enter:

  winipcfg
- Ensure that the drop-down list is set to your Network

card. The current IP Address and Network mask (Sub-net Mask) will be displayed.

- The IP address must be in the range 192.168.0.2 to 192.168.0.254, and the Network mask must be 255.255.255.0
- Ensure that your PC is NOT configured to use a "Proxy Server". In Internet Explorer, this can be checked using *View – Internet Options - Connection*. In Netscape, check *Options – Network Preferences – Proxies*.

Password

If a password has been set for the Internet Router, you will be prompted for the password, as shown below. (If no password has been set, you will not see this dialog box.)

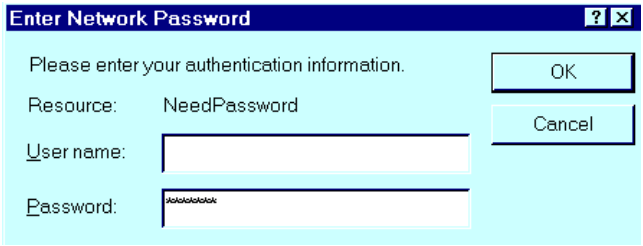

Figure 11: Password Dialog

Leave the "User Name" blank, and enter the password you assigned to the Internet Router.

Navigation & Data Input

- Use the navigation bar on the left of the screen, and the "Back" button on your Browser, to move about.
- You must save your data before changing screens, or any data you have entered will be lost.

Basic Setup Screen

Select the ***Basic Setup*** link from the navigation bar. You will see a screen like the example below.

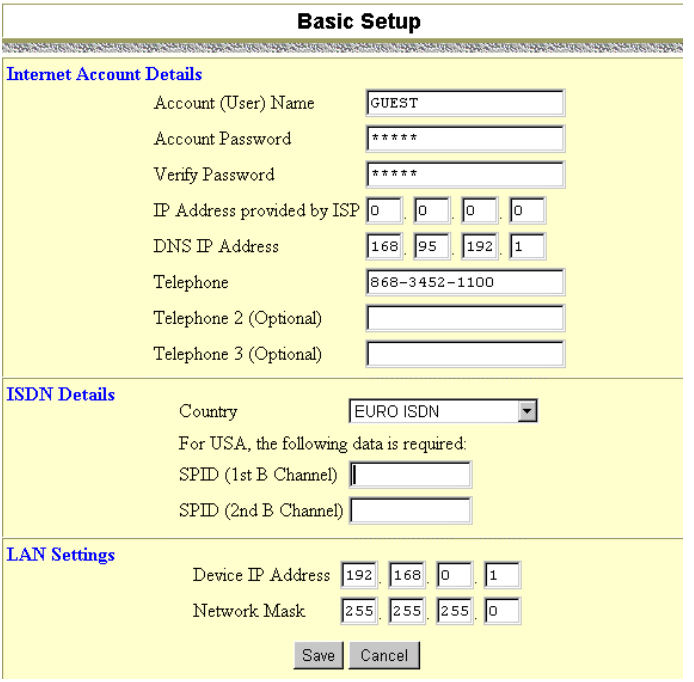

Figure 12: Basic Setup Screen

Internet Account Details

Account (User) Name	Enter the account name provided by your ISP. This name will be used to log in to the ISP's server.
Account Password	Enter the current password for the above account.
Verify Password	Re-enter the password to ensure it is correct.
IP Address provided by ISP	Enter the IP address assigned to you by your ISP. If the ISP issues dynamic IP addresses, leave this field as 0.0.0.0. (With dynamic IP addresses, a valid address is provided upon connection.)
DNS IP Address	The DNS (Domain Name Server) translates names (e.g. microsoft.com) to IP Addresses. Enter the DNS IP address supplied or recommended by your ISP.
Telephone	Enter the telephone number used to connect to your ISP.
Telephone (2) **Telephone (3)**	Optional. Enter the telephone number(s) to try if the first number is busy.

ISDN Details

Country	Select your country from the drop-down list. Note that there are 5 entries for the USA. If in the USA, select the entry to match the "Switch Type" used by your telephone company.
SPID (1st B Channel)	If you live in the USA, enter the SPID (Service Profile Identifier) provided by your phone company. The most common format for the SPID is 10 digits (area code + local number) for the phone number, followed by 4 digits for the device ID.

	e.g. 555-555-1234-0101 (Where 555-555-1234 is the phone number, and 0101 is the device ID.) However, there is wide variation in SPID formats, and you must use the method advised by your phone company. If your telephone company did not provide this information, leave this blank.
SPDI (2nd B Channel)	Enter the SPID for the 2nd B Channel. (See above)

LAN Settings

We recommend that you use the DHCP server function in the Internet Router.

- **If you wish to use the built-in DHCP server:**

  No changes are required.

- **If your LAN already has a DHCP server:**

- Give the Internet Router an *IP address* compatible with the addresses allocated by the DHCP server. (i.e. the last 3-digit number is NOT within the addresses allocated by the DHCP server; the other numbers are the same as the addresses allocated by the DHCP server.)
- The *Network Mask* must be the same as the value used by the DHCP server.
- If not already done, set DIP switch 2 ON to disable the DHCP server in the Internet Router.

- **If you wish to use static (fixed) IP Addresses:**

- Give the Internet Router an *IP Address* within the same address range as PCs on your LAN. (Only the last 3-digit number should be different for each device.)
- The IP Sharer's *Network Mask* must be the same value as PCs on your LAN.

PC Configuration

TCP/IP Settings

If you use the DHCP Server function:

- Configure each PC to be a DHCP client, as shown in *Figure 9: TCP/IP Properties - DHCP* on page 17.

If your LAN already has a DHCP server:

- Configure your existing DHCP server to provide the Internet Router's *IP Address* as the "Default Gateway".

If your LAN has a Router or Routers

- Do NOT change any TCP/IP settings on any PC.
- Configure the router. See *Chapter 6 – Routing* for details.

If you use static (fixed) IP Addresses:

On each PC:

- Set the *Default Gateway Address* (on the ***Gateway*** tab) to the *IP Address* allocated to the Internet Router.
- On the ***DNS*** tab, enter the same value as entered in the Internet Router.

Internet Settings

Each PC must be configured for Internet access via the LAN, rather than by dial-up connection. In Windows 95/98:

- Select *Start Menu - Accessories – Internet Tools*.
- Run the Wizard called *Get on the Internet* or *Connection Wizard*.
- When prompted, select "Access via LAN".

Peer-to-Peer Networking

Appendix C – Windows Peer-to-peer contains more information on Windows 95/98 peer-to-peer networking.

Operation – Internet Access

Once your PC is configured to use Internet access via the LAN, simply use your Browser to connect to any Internet site.

Accessing AOL

To access AOL (America On Line) through the Internet Router, the following items are required:

- Internet account with an ISP, in addition to your AOL account. The Internet Router must be configured with details of the Internet account, as described in this chapter.
- Version 2.5, 3.0 or later of *AOL for Windows* communication software.
- The *AOL for Windows* software must be configured to use TCP/IP network access, rather than a dial-up connection. The configuration process is described below.

AOL for Windows Configuration

Ensure that the Internet Router is configured first, then carry out the following procedure.

- Start the *AOL for Windows* communication software (Version 2.5, 3.0 or later). Click the *Setup* button.
- Select *Create Location*, and change the location name from "New Locality" to "Internet Router".
- Click *Edit Location*. Select *TCP/IP* for the *Network* field. (Leave the *Phone Number* blank.)
- Click *Save*, then *OK*.
  Configuration is now complete.
- Before clicking "Sign On", always ensure that you are using the "Internet Router" location.

Chapter 3
Printer Sharing

This Chapter explains how to share the printer attached to the Internet Router INET-830 and INET-850.

Overview

To have shared access to the printer connected to the Internet Router INET-830 and INET-850, **each PC** requires the following:

- Printer port software supplied with the INET-830 and INET-850 must be installed and configured.
- The Windows Printer Driver for the printer attached to the INET-830 and INET-850 must be installed and configured.

These procedures are detailed in the following sections.

Note that no additional Internet Router configuration is required. However, it must have a valid IP Address and Network Mask, and be recognized as a valid device on your LAN.

The printer driver software supplied works with the following operating systems:

- Windows 95 and 98
- Windows NT 3.51
- Windows NT 4.0

Software Installation

1. Run the **SETUP** program on the supplied floppy disk.
2. Select the desired installation directory.
3. Complete the installation as normal. Reboot your system when setup is complete.
4. The Setup program will add the following files to your system:

- The *Printer Port driver*, prtserv.dll, to the Windows\System directory (Win 95) or Windows\System32 directory (Windows NT).
- *Uninstall* information file, and the *Readme* file, to the installation directory.
- *Shortcuts* to the Readme file, and the Uninstall program, to the Windows *Start Menu*.
- The Uninstall program to the Windows directory.

PC Configuration

This section provides detailed instructions for Windows 95/98, Windows NT 4.0, and Windows NT 3.51.

Preparation

Before proceeding, check the following:

- LAN is operational and using the TCP/IP protocol.
- Internet Router is ON and has a valid IP Address and Network Mask. The default IP Address is 192.168.0.1 and the default Network Mask is 255.255.255.0.
- Printer is connected to the Internet Router, and on-line.

Printer Port Configuration Data

When you reach the stage of configuring the printer port, the following data will be required.

Port Name	Enter a descriptive name (9 alpha-numeric characters). This name will be shown in the Printer's *Properties*. **Note:** This name cannot be changed once entered.
Enable Banner	Select this option to enable a banner page to be printed before each print job. The Banner page contains the value in the **User Name** field, which helps to identify the owner of the print job.

PostScript	If using a PostScript Printer and banner page is enabled, enable this option. Not enabling this option will cause errors in the print job.
User Name	The user or work group name to be printed on the banner page.
Retry Interval	Sets how often Windows will poll the Print Server to establish a connection when the printer is busy. Values range from 40-110 seconds.

Windows 95/98 Configuration

1. Go to *Start* ▸ *Settings* ▸ *Printers*.
   Start the *Add Printer* Wizard.
2. Select the **Local printer** option.
3. Choose the *Printer Model* matching the printer attached to the Internet Router.
4. Select **PrintServer** as the port in the *Available Ports* screen, as shown below.

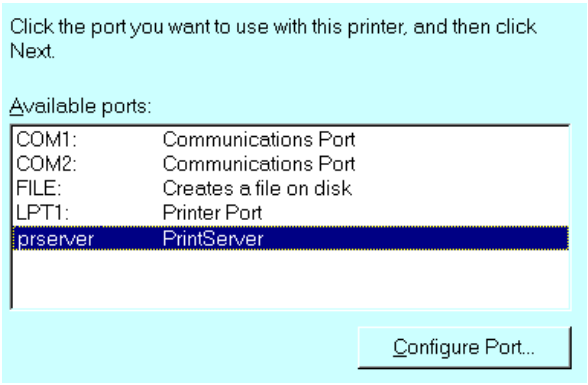

Figure 13: Available Ports (Win 95/98)

5. Click the **Configure Port** button. The following *Configure Print Server* screen will appear

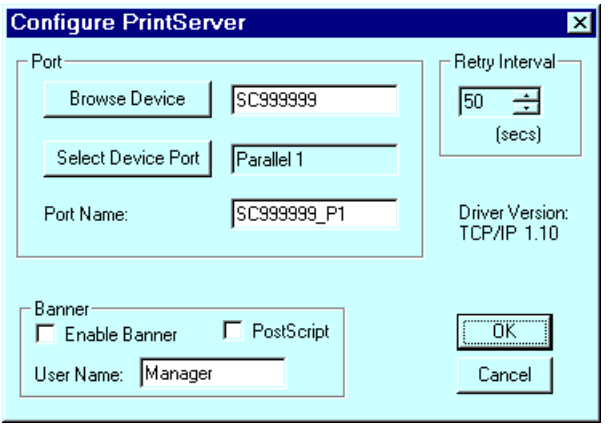

Figure 14 Printer Port Configuration

6. Click the *Browse Device* button. All Internet Routers on your LAN will be listed. Select the desired unit.

The name shown is the Internet Router's default name, which includes the Hardware Address of the device.

7. Enter the configuration information as detailed in *Printer Port Configuration Data* on page 26.

8. Follow the on-screen instructions to finish adding a printer as normal.

Configuration is now complete. You can now print using the printer connected to the Internet Router.

Windows NT 4.0

1. Go to *Start* ▸ *Settings* ▸ *Printers*. Start the *Add Printer* Wizard.
2. When prompted for which computer will manage the printer, select the **My Computer** option.
3. Choose the *Printer Model* matching the printer attached to the Internet Router.
4. Select **PrintServer** as the port in the *Select Port* screen. Ensure that ONLY the **PrintServer** port is selected, as shown in the example below.

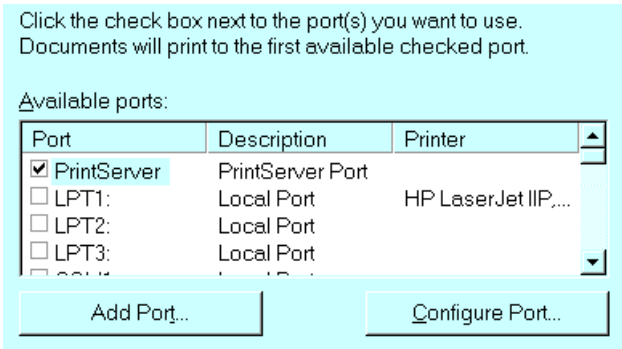

Figure 15: Select Port (NT 4.0)

5. Select the **Configure Port** button. The following *Configure Print Server* screen will appear

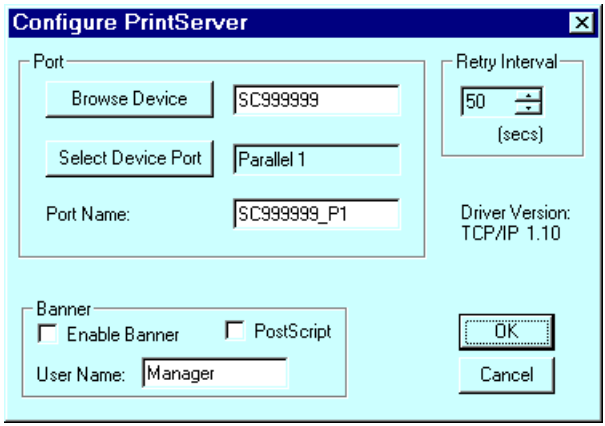

Figure 16 Printer Port Configuration

6. Click the *Browse Device* button. All Internet Routers on your LAN will be listed. Select the desired unit.

The name shown is the Internet Router's default name, which includes the Hardware Address of the device.

7. Enter the configuration information as detailed in *Printer Port Configuration Data* on page 26.

8. Follow the on-screen instructions to finish adding a printer as normal. When prompted for *Sharing*, select *Not Shared*.

Configuration is now complete. You can now print using the printer connected to the Internet Router.

Windows NT 3.51

1. Go to *Printer Manager*. Select *Printer* ▸ *Create Printer*.
2. Select the *Printer Driver* for the printer connected to the Internet Router.
3. In the *Print to* dialogue box, select **PrintServer**. If **PrintServer** is not listed, select *Other*.. and then choose **PrintServer** from the *Print Destinations* list.
4. Click on *Settings*. The *Configure Print Server* window will appear. It will look like the screen below.

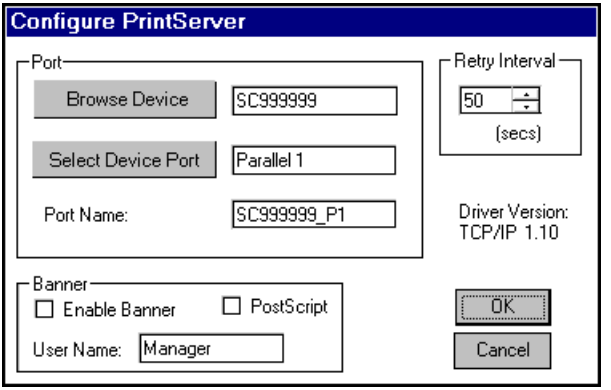

Figure 17 Printer Port Configuration (NT 3.51)

5. Click the *Browse Device* button. All Internet Routers on your LAN will be listed. Select the desired unit.
6. Enter the configuration information as detailed in *Printer Port Configuration Data* on page 26.
7. When finished, click *OK* and then follow the on-screen instructions to finish adding a printer as normal.

Configuration is now complete. You can now print using the printer connected to the Internet Router.

Chapter 4
Advanced Setup

This Chapter contains an overview of the features available from the "Advanced Setup" screen.

Advanced Setup Screen

This screen can be reached by the *Advanced Setup* link on the navigation bar.

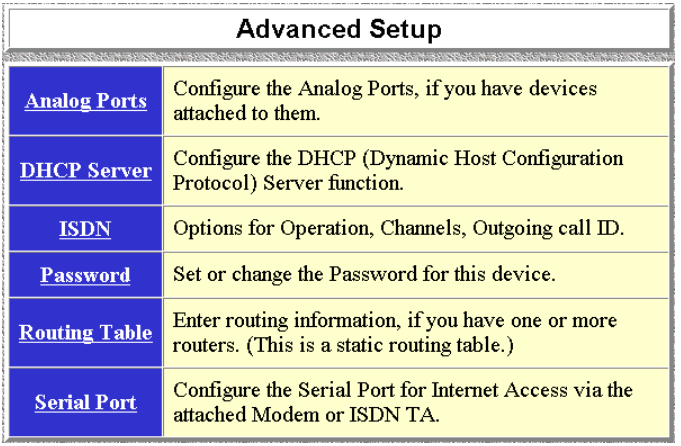

Figure 18: Advanced Setup Screen

To see whether or not you require each feature, please refer to the table below.

Feature	Required:
Analog Ports (Chapter 5)	If you attach any device (telephone, fax, etc) to either Analog Port.

DHCP Server (Chapter 6)	If you want to turn the DHCP server OFF, or increase the number of DHCP clients supported. (Default is 50, maximum is 253.)
ISDN (Chapter 7)	To use 1 B channel instead of 2, set B channel parameters as advised by the phone company or tech support, or set the outgoing call ID.
Routing (Chapter 8)	If you have a router or routers on your LAN.
Serial Port (Chapter 9)	If you wish to connect a modem or ISDN TA to the Serial Port (for Internet Access only).

Where use of a certain feature requires that PCs or other LAN devices be configured, this is also explained in the relevant chapter.

Chapter 5
Analog Ports

This Chapter explains how to configure the "Analog Ports" screen.

Overview

Configuration of the *Analog Ports* screen is only required if you have analog devices such as a telephone, answering machine, or Fax machine attached to one or both of these ports.

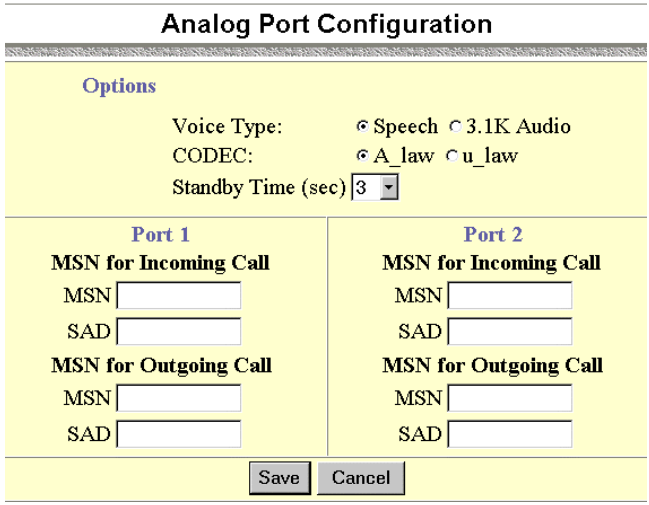

Figure 19: Analog Ports Screen

Data

Voice Type	This sets the bandwidth available for the analog line. The default is "Speech". The "3.1K Audio" option uses more bandwidth, but improves sound quality.
Codec	There should no need to change this setting; it is determined by the "Country" setting. Japan and the USA use u_law; other

	countries use A_law. Only change this if advised to do so by technical support staff.
Standby Time	The default value is 3; this should only be changed if advised to do so by technical support staff.
MSN, SAD **M**ultiple **S**ubscriber **N**umber SubAddress	**Incoming Calls** Enter the MSN telephone number and/or SAD you wish to assign to each port. The attached telephone device will ring only if the incoming call dials the number entered. **Outgoing Calls** If provided, receivers of calls made through this port will see this telephone number, and the phone company will bill this number. You can assign the same number to both incoming and outgoing calls; the reason for having both entries is to provide greater flexibility.

Chapter 6
DHCP

This Chapter explains the settings on the DHCP Server screen

Overview

A DHCP (Dynamic Host Configuration Protocol) server provides a valid IP address, Gateway address and DNS addresses to a DHCP client (PC or device) upon request.

The Internet Router can act as a **DHCP server**. The default value is ON (enabled), and use of this feature is strongly recommended. Normally, the default values should not need to be changed.

The PCs must be configured to act a DHCP **clients**. See page 16 for details of this procedure.

DHCP Server Screen

This screen can be used to:

- Disable the DHCP server function
- Change the range of IP Address allocated to PCs by the DHCP server.
- Increase the number of DHCP clients which can be accepted. (Default is 50, maximum is 253).

This screen is reached by the *Advanced – DHCP Server* hyperlink. An example screen is shown below.

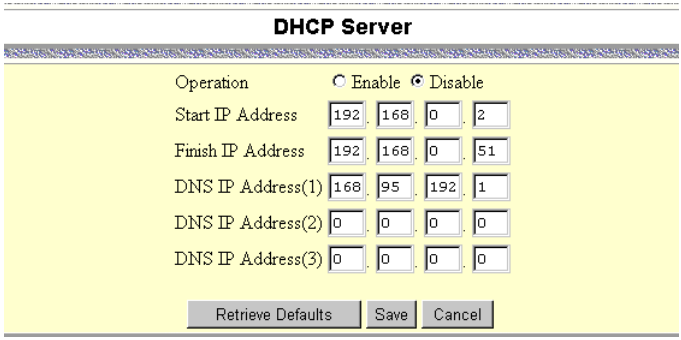

Figure 20: DHCP Server Screen

Configuration Data

Operation	Use this to enable/disable the DHCP server function.
Start IP Address **Finish IP Address**	These fields set the values used by the DHCP server, when it allocates IP Addresses to DHCP Clients. This range also determines the number of DHCP clients supported. (Maximum number of clients is 253.)
DNS IP Address	Enter the IP Address or Addresses you wish the DHCP Server to use. Multiple entries should be entered in the order you want them accessed. (The first available DNS will be used.)

The DNS field will display the DNS entered in the "Basic Setup" screen.

Chapter 7
ISDN

This Chapter explains how to configure the Advanced ISDN options of the Internet Router.

Overview

In most situations, there is no need to change these settings. They are provided to allow you to:

- Temporarily switch the ISDN link OFF.
- Use 1 B Channel for Internet access, rather than both.
- Set the B Channel line speed to 56K, rather than 64K.
- Set the outgoing call MSN and SAD.

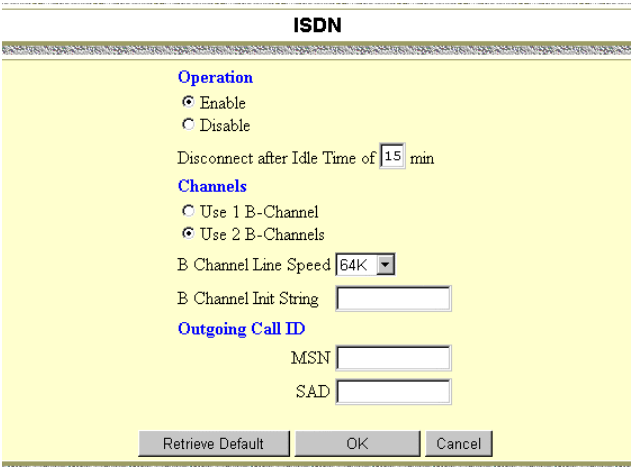

Figure 21: ISDN Screen

Note!

The "Use 2B channels" function includes the Bandwidth On Demand (BOD) feature. In the first access request from LAN users, Internet Router will establish one B channel only. But it will monitor the data traffic in the B channel to establish another B channel if users need more bandwidth to get better

performance. To drop the second B channel is depended on the data traffic, incoming voice call, or requesting an outgoing voice call to reduce usage charge and provide more flexibility for voice service.

Data

Operation	Use this to temporarily disable the ISDN link, and later restore it.
Disconnect after Idle Time	Sets the time after which an Internet connection will be broken, if there is no data being transmitted or received.
Channels	Normally, both B-Channels are used. Set this to 1 B-Channel if desired.
B Channel Line Speed	The default is 64K. Set to 56K only if advised to do so by your phone company.
B Channel Init String	This is normally not needed. If required, enter the value advised by technical support staff.
Outgoing Call ID	**MSN** (Multiple Subscriber Numbering) If provided, enter the MSN number which receivers of your calls will see. Your phone company will bill this number for calls made. **SAD** (SubAddress) The SAD acts like an extension number to your main ISDN number. If provided, enter the SAD.

Chapter 8
Routing

8

This Chapter explains the Routing features of the Internet Router.

Overview

While the Internet Router includes a standard routing table, this feature 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 Internet Router correctly, as described in the following sections.

See page 42 for an example of configuring both the Internet Router and the Router.

Internet Router Configuration

An entry in the routing table is required for each LAN segment on your Network, other than the segment to which this device is attached.

The routing table is accessed by the *Routing* link on the navigation bar. This link appears only on the *Device Screen*

An example *Routing* screen is shown below.

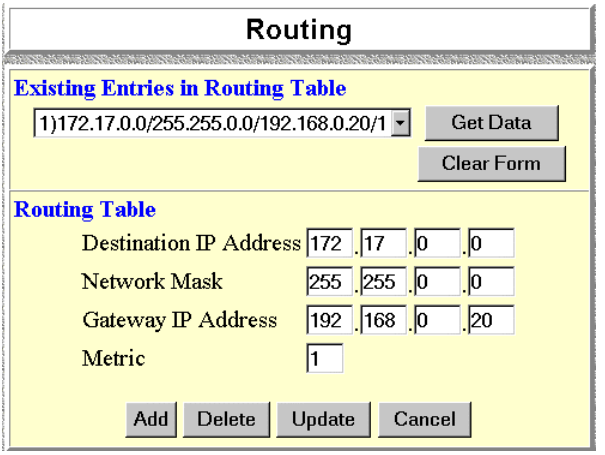

Figure 22: Routing Screen

Operations

- **To Delete an Existing Entry:**
  Select the Entry from the drop-down box, then click the *Delete* button.
- **To Change an Existing Entry's Details**:
  Select from the drop-down box, click *Get Details* to view the existing data, then change any fields you wish.
  Click *Update* when finished.
- **To Add a New Entry**:
  Ignore the drop-down box, click the *Clear Form* button, and enter the details in the fields provided.
  Click *Add* when finished.

Routing Table Data

The data in the Routing Table is as follows.

Destination IP Address	The network address of the remote LAN segment. For standard class "C" LANs, the network address is the first 3 fields of this *Destination IP Address*. The 4th (last) field can be left at 0.

Network Mask	The Network Mask used on the remote LAN segment. For class "C" networks, the standard Network Mask is 255.255.255.0
Gateway IP Address	The IP Address of the Router on the LAN segment to which this device is attached. (NOT the router on the remote LAN segment.)
Metric	The number routers which must be navigated to reach the remote LAN segment. The default value is 1.

Routing tables normally have an "Interface" field. Here, all entries are for the LAN Interface, so this field is absent.

Router Configuration

It is essential that all IP packets for devices not on the local LAN be passed to the Internet Router, so that they can be forwarded to the Internet. To achieve this, the Routers must be configured to use the Internet Router as the *Default Route*.

Local Router

The local router is the Router installed on the same LAN segment as the Internet Router. This router *Default Route* is the Internet Router itself. Typically, routers have a special entry for the *Default Route*. It should be configured as follows.

Destination IP Address	Normally 0.0.0.0, but check your router documentation.
Network Mask	Normally 0.0.0.0, but check your router documentation.
Gateway IP Address	The IP Address of the Internet Router.
Metric	1

Other Routers

Other routers must use the Internet Router's *Local Router* as the *Default Route*. The *Gateway IP Address* will be:

- For routers connected to the Internet Router's local Router, the address of the Internet Router's local router.
- For routers which must forward packets to another router before reaching the Internet Router's local router, the *Gateway IP Address* will be the address of the intermediate router.

Routing Example

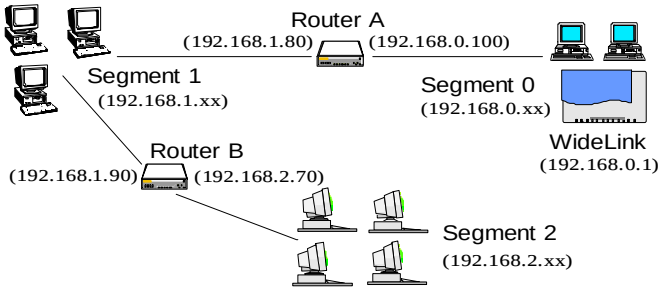

Figure 23: Routing Example

For the LAN shown above, with 2 routers and 3 LAN segments, the required entries would be as follows.

For the Internet Router's Routing Table

The Internet Router requires 2 entries as follows.

Entry 1 (Segment 1)	
Destination IP Address	192.168.1.0
Network Mask	255.255.255.0 (Standard Class C)
Gateway IP Address	192.168.0.100 (Internet Router's local Router)
Entry 2 (Segment 2)	
Destination IP Address	192.168.2.0

Network Mask	255.255.255.0
Gateway IP Address	192.168.0.100

For Router A's Default Route

Destination IP Address	0.0.0.0
Network Mask	0.0.0.0
Gateway IP Address	192.168.0.1 (Internet Router's IP Address)

For Router B's Default Route

Destination IP Address	0.0.0.0
Network Mask	0.0.0.0
Gateway IP Address	192.168.1.80 (Internet Router's local router)

This page was deliberately left blank.

Chapter 9
Serial Port

This Chapter explains how to configure the serial (WAN) port on the Internet Router for Internet Access.

Overview

Currently, the serial (WAN) port can be used only for Internet access, to provide additional bandwidth.

Either a modem or ISDN TA can be connected to the serial port. The attached device will be used only when the ISDN link is fully utilized.

To use a Serial port device

To use the serial (WAN) port on the Internet Router for Internet Access:

- Use a standard serial cable to connect the modem or ISDN TA to the serial (WAN) port on the Internet Router.
- Connect the modem or ISDN TA to the phone line and power outlet.
- Configure the Internet Router's *Serial Port Configuration* screen with details of the attached device, and the Internet Account to which it will connect.
- If your ISP uses a non-standard log-in procedure, or your modem/ISDN TA uses non-standard AT commands, you also need to configure the *Advanced Port* screen.

Serial Port Configuration

Selecting the ***Serial Port*** hyperlink will reveal a screen like the example below.

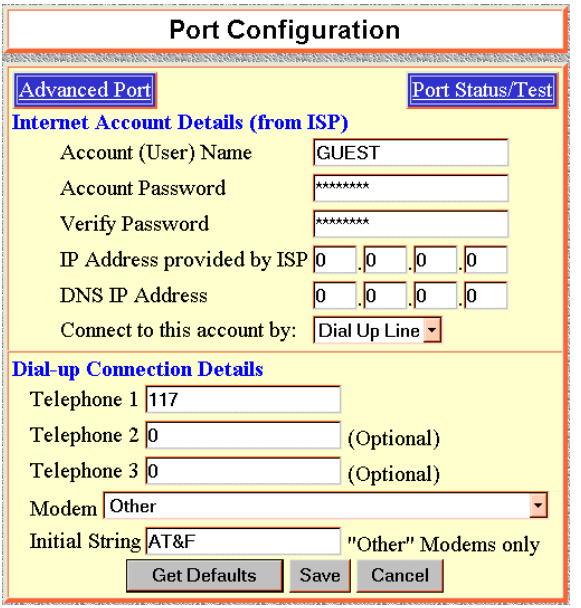

Figure 24: Port Configuration

Hyperlinks

Click the ***Advanced Port*** link to switch to the *Advanced Port* screen for the serial port. (See page 48 for details.)

Click the ***Port Status/Test*** link to move to the *Status/Test* screen for the serial port. (See page 59 for details.)

Internet Account Details

The following data is available from your ISP (Internet Service Provider).

Account (User) Name	Enter the account name provided by your ISP. This name will be used to log in to the ISP's server.
Account Password	Enter the current password for the above account.
Verify Password	Re-enter the password to ensure it is correct.
IP Address provided by ISP	Enter the IP address assigned to you by your ISP. If the ISP issues dynamic IP addresses, leave this field as 0.0.0.0. (With dynamic IP addresses, a valid address is provided upon connection.)
DNS IP Address	The DNS (Domain Name Server) translates names (e.g. microsoft.com) to IP Addresses. Enter the DNS IP address supplied or recommended by your ISP.
Connect to this Account by	Select **Dial up line** if you connect by Modem or ISDN TA. Select **Leased Line(Null modem)** if you have a continuous connection. You can then ignore the *Dial-up Connection* section.

Dial-up Connection Details

If you are using a dial-up connection, the following data must also be provided.

Telephone	One (1) number is essential. Use the format described in your modem's user manual.
Modem	If your modem or ISDN TA is listed, simply select it. Otherwise, try "Hayes compatible". If this does not work, select "Other" and enter the required "Initial String", as described below

Initial String (AT Commands)

For the Internet Router to function correctly, the modem or ISDN TA must be configured correctly. The following table shows the required settings, and the usual AT command.

Setting	AT Command
Fixed baud rate setting	AT&B1
RTS/CTS flow control	AT&K3
DCD to track the presence of a carrier	AT&C1
DTR off to hang-up modem	AT&D2
DSR always on	AT&S0
Modem to return modem-to-modem data link speed	ATX4

Using these commands, the *Initial String* would be as follows:

AT&F&B1&K3&C1&D2&S0X4

The first command (AT&F) sets the modem to its factory defaults. See *Appendix B - AT Commands* for further details.

Advanced Port Settings

Most users should not have to change these settings. They are provided for the following situations:

- Your modem uses non-standard AT commands.
- Your ISP does not use the standard PPP connection, and requires a special log-in procedure.
- You wish to change the "Time-out" period after which an inactive connection will be terminated.

The Advanced Port Screen is reached by clicking the *Adv. Port* button on the *Port Configuration* screen. You will then see a screen like the example below.

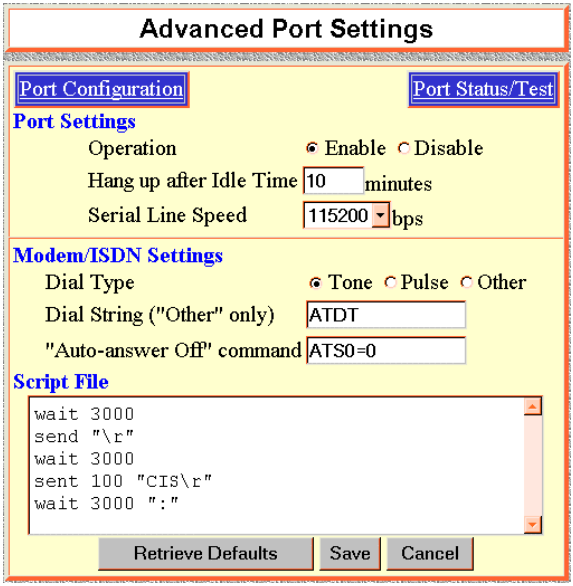

Figure 25: Advanced Port Settings

Advanced Port Settings

Operation	If set to ***Enable***, a connection to the Internet will be made as needed. ***Disable*** means the port cannot be used at all.
Idle Timeout	If a connection remains inactive, it is terminated after this time period. Allowable range is 0-99 minutes. For a leased line, set this value to 0.
Serial Line Speed	Select the speed which is equal to or below the fastest SERIAL line speed (NOT phone line speed) of your modem. Available speeds range from 4.8K to 230.4.K (bps).
Dial Type	Select "Tone", "Pulse" or "Other" to match your system. For "Other", you must provide the ***Dial String*** below.

Dial String	Only required if you are NOT using Tone or Pulse dialing. Enter the command (sometimes called the "Dial Prefix String") your modem requires to precede the phone number.
Auto Answer OFF Command	Enter the command strings which sets the "Auto-answer" function in your modem or ISDN TA OFF. The standard AT command is “ATS0=0”

Script File

If your ISP uses a standard PPP connection and authentication, you do NOT need a script file.

Script files are used to automate the log-in process for ISPs that use non-standard log-ins or proprietary security measures. For example, if you connect to the Internet via CompuServe, you DO need a script file.

Script File Commands

Three commands, listed below, can be used within a script file. Note the following points:

- Items in [ ] are optional, and the [ ] themselves are NOT used.
- Strings must be enclosed in double quotes.
- There must be spaces between commands and parameters (times and strings).

Send [*msec*] *string*	Send the characters in *string*, with a. *msec* (milliseconds) delay between the sending of each character.
Wait *msec*	Wait for *msec* milliseconds before executing the next script line.
Wait [*msec*] *string*	Wait for *msec* milliseconds to receive the string. If the string is not received within the specified time, the connection is reset. If *msec* is not specified and the string is not received immediately, an error condition will arise.

Script File Variables

Eleven string variables can be used within the *string* above. These are used to include special characters within the string.

Variable	Description
\a	alert (normally creates a beep)
\b	backspace
\f	form feed
\n	new line
\r	carriage return
\t	horizontal tab
\v	vertical tab
\?	Literal question mark
\’	literal single quotation mark
\”	literal double quotation mark
\\	literal back slash

- Quote characters are special characters.
- Because each of these variables starts with a backslash, the backslash character (\ ) is also a special character.

As an example, to send the string "User Name" (including the quotes), the script file entry should be as follows:

```
send "\"User Name\""
```

CompuServe Script

The following script file could be used to log on to CompuServe, and can be used as an example for other situations.

wait 3000
send "\r"
wait 3000
send 100 "CIS\r"
wait 3000 ":"
send 100 "*user id*\r"
wait 3000
send 100 "*password*\r"
wait 60000 "!"
send 100 "GO PPPCONNECT\r"

Command	Explanation
wait 3000	Pause for 3 seconds
send "\r"	Send the carriage return character.
wait 3000	Pause for 3 seconds
send 100 "CIS\r"	Send the string "CIS", then a carriage return character. Pause for 100 ms between characters.
wait 3000 ":"	Wait for 3 seconds to receive the character ":" If not received in time, the connection is dropped.
send 100 "*user id*\r"	Send the string *user id*, where *user id* is your log-in name, then a carriage return. Pause for 100 ms between each character.
wait 3000	Pause for 3 seconds
send 100 "*password*\r"	Send the string *password*, where *password* is your password, then a carriage return. Pause for 100 ms between each character.
wait 60000 "!"	Wait for 60 seconds to receive the character "!". If not received in this time, the connection will be dropped.
Send 100 "GO PPPCONNECT\r"	Send the string "GO PPPCONNECT", then a carriage return character. Pause for 100 ms between

	each character. This command tells the server to switch to a PPP connection.

Operation

When the ISDN link is fully utilized, a connection will be made through the serial port's modem or ISDN TA to increase the available bandwidth.

Note that if using an analog modem, there will be a delay of 10 to 20 seconds while this connection is established.

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Chapter 10
Status & Monitoring

Overview

The Internet Router allows you to connect to it through the LAN while it is operating. You can monitor the operation of the ISDN link, DHCP server, and the Serial Port.

Status Screen

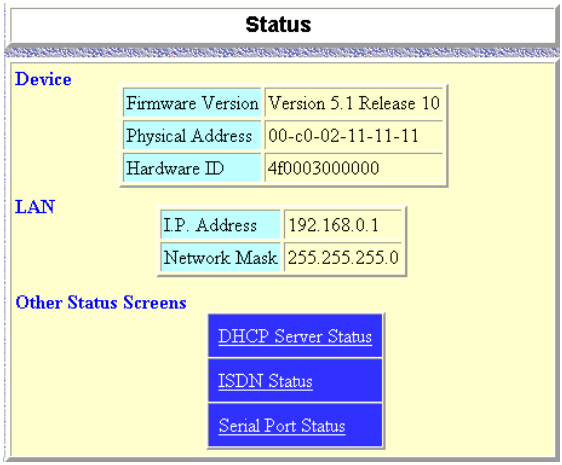

Figure 26: Status Screen

Data

Device

Firmware Version	Version of the firmware (embedded software, including this program) which is currently installed. Technical support staff may ask for this information.
Physical Address	The hardware address of this device.
Hardware ID	The hardware ID of this device, used by the manufacturer for identification.

LAN

IP Address	The IP Address of this device.
Network Mask	The Network Mask value stored in this device. This must match the Network Mask for the LAN segment to which this device is connected.

DHCP Status

If the DHCP Server function in the Internet Router has been **Enabled**, you can check its operation by choosing the *DHCP Server Status* link on the "Status" screen.

An example screen is shown below.

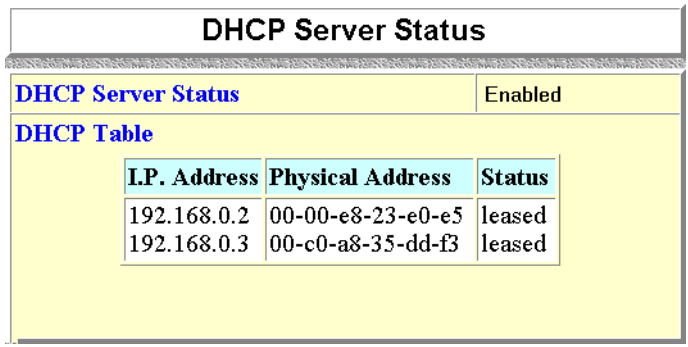

Figure 27: DHCP Server Status

Data

DHCP Server Status	This will display “Enabled” or “Disabled”.
DHCP Table	This table will be empty unless DHCP has been "Enabled". If DHCP is being used, this table lists the devices which have been allocated IP Addresses by the DHCP server function
IP Address	The IP Address allocated by the DHCP server to the other device.
Physical Address	The Hardware Address (Network Adapter Address) of the device which has been allocated a IP Address.
Status	Possible Status values are "Leased" (the IP Address is allocated to the device shown) or "Reserved" (the IP Address is not available).

ISDN Status

By selecting the *ISDN Status* link on the *Status* screen, you can monitor the operation of the ISDN connection.

The buttons on this screen have the following effect:

- ***Hang-up*** will break an existing connection

- ***Dial*** will dial the ISP
- ***Tech Log*** will display ISDN messages instead of connection messages
- ***Clear log*** will clear the log, so that new messages can be read more easily
- ***Refresh*** will reload the screen, updating the log messages.

An example screen is shown below.

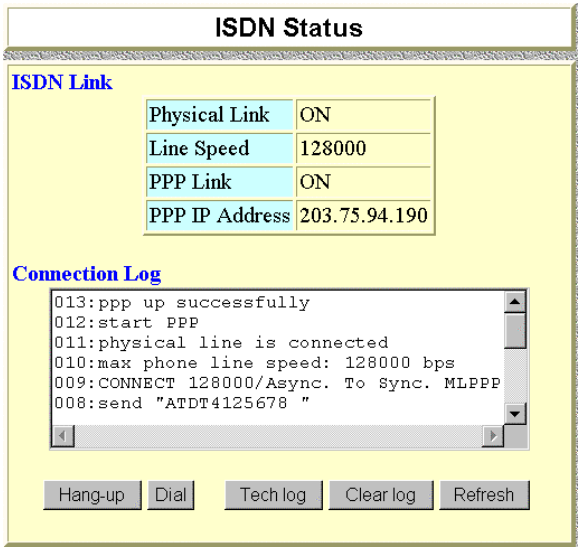

Figure 28: ISDN Status

ISDN Link Data

Physical Link	If operating, the link will show ON. This means the modem was able to connect to the number dialed.
Line Speed	The connection speed over the ISDN link.
PPP Link	If ON, a PPP connection was successfully negotiated.
PPP IP Address	The IP Address used by this device. This address is provided by the ISP on connection.

Connection Log

This shows status to the PPP link over the ISDN line.

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.)

Port Status/Test Screen

This screen can be reached by links on the *Status*, *Port Configuration* and *Advanced Port Settings* screens.

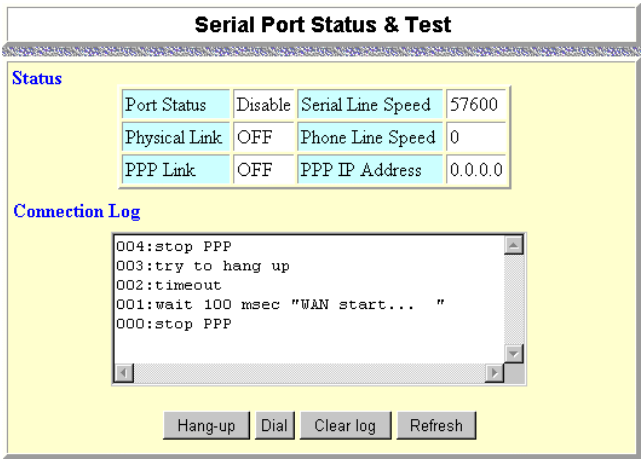

Figure 29: Port Status &Test

Operation

- **Hang-up** will hang up the modem, if it is currently connected
- **Dial** will dial the ISP, if not currently connected.
- **Clear Log** will remove all data in the *Log* window, making new data easier to read.
- **Refresh** will update the display with fresh data.

Status Data

Port Status	This shows the current port operation. Possible values are: - Internet Access - Idle - Disabled
Physical Link	If operating, the link will show ON. This means the modem was able to connect to the number dialed.
PPP Link	If ON, a PPP connection was successfully negotiated.
Phone Line Speed	The connection speed over the phone line, between your modem and the number dialed.
Serial Line Speed	The connection speed between this device and the modem.

PPP IP Address	The IP Address used by this device. This address is provided by the ISP on connection.

Modem Log

This shows the commands sent to the modem, and any status messages returned by the modem. Note that this is not "live"; you must click *Refresh* to update the information.

The following table shows the more common messages, and their meaning.

Message	Description
Dialing	Dialing the ISP
Try to establish physical connection.	The device is trying to connect with the ISP, using the modem.
Busy error	The number dialed was busy.
Physical line is connected	Physical connection to ISP has been established.
CONNECT *nnnnnn*	Physical connection was successful; *nnnnnn* indicates the speed of the serial link as currently configured.
Max phone line speed *nnnnnn* bps	*nnnnnn* is the maximum speed of the modem, according to the current configuration.
DCD low, DSR low	Physical line break, connection lost.
send “-----“ wait “-----“	“AT” commands sent to the modem are displayed as they are sent. Commands in the Script file are also displayed as they are executed.
Start PPP	Having established a physical connection, 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.

Try to hang up	Attempting to get the modem to hang up.
Time out	There was no response from the modem
No carrier No answer	The number dialed did not answer.
Idle timer expires	The time period (in the configuration) to disconnect if the link is not used is up.
No dial tone	The modem could not obtain a dial tone.
Set baudrate nnnn	The serial line speed is being set to the speed set in the configuration.

Normal Operation

The following sequence of messages is typical of normal operation.

```
send "ATDT 0123456789"
CONNECT 115200
max phone line speed 28800 bps
physical line is connected
start PPP
ppp up successfully
```

Error Conditions

The following table shows messages which indicate an error condition, and the suggested corrective action.

No dial tone	The modem could not obtain a dial tone. Check your connections on the phone line and the modem.
Busy error	The number dialed was busy. Check that the number is correct. If it is, try dialing later. If this occurs regularly, check with your ISP.
DCD low **DSR low**	The connection was lost. This could indicate a bad line or poor connection. Normally, if a connection is lost, it will automatically be re-established.
PPP up fail	The ISP rejected the attempt at connection. Check that your username and password is correct. If it is, check with your ISP to see why the connection is being rejected.

Time out	No response. Check that the modem is ON and properly connected to the Internet Router.
No carrier **No answer**	There was no response from the phone number dialed. Check that the phone number is correct, and the modem is working. If both of these are OK, check with your ISP.

Appendix A Troubleshooting

This Appendix covers the most likely problems and their solutions.

Overview

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

ISDN Line

Problem 1	**I'm not sure if the ISDN phone line is working How can I test it?**
Solution 1	Perform a self-test with this procedure: 1. Disconnect the ISDN phone line 2. Connect a telephone to analog port 1 or 2. 3. Pick up the phone. The LED associated with the port should light. 4. Press the "Flash" key. The LED will start flashing. 5. Press the following keys in sequence: * 0 # 6. If the ISDN link is OK, you will see both analog port LEDs flash slowly, and hear the dial tone. 7. If you hear a busy tone, and both LEDs flash quickly, the test has failed. Contact our local distributor for advice. 8. Hang-up the phone, and connect the ISDN phone line again 9. Pick up the phone, you will see the LK led on or hear a dial tone from handset. If not, contact our local distributor for advice.

Internet Access

Problem 1	**Can't connect to the Internet** Router **to configure it.**
Solution 1	Check the following: ■ The Internet Router is properly installed, LAN connections are OK, and it is powered ON. ■ Ensure that your PC and the Internet Router are on the same network segment. (If you don't have a router, this must be the case.) ■ Ensure that your PC is using an IP Address within the range 192.168.0.2 to 192.168.0.254 and thus compatible with the Internet Router's default IP Address of 192.168.0.1. In Windows, this is done by using *Control Panel-Network* to check the *Properties* for the TCP/IP protocol. You can also use the "WinIPcfg" program by entering "WinIPcfg" (without the quotes) in the "Run" dialog box.
Problem 2	**When I enter a URL or IP address I get a time out error.**
Solution 2	A number of things could cause this. Try the following troubleshooting steps. 1. If using static IP Addresses, ensure that your workstations IP settings are correct, including IP address, default gateway and DNS. 2. Ping the Internet Router. Use the "Run" command to enter the following command: Ping xxx.xxx.xxx.xxx where xxx.xxx.xxx.xxx is the IP address assigned to the Internet Router. 3. If the ping command fails, check that the Internet Router is connected and ON. If it is connected and on, there is a problem with your LAN. 4. Run your Browser and connect to the Internet Router. 5. On the *ISDN* screen, check that *Operation* is set to

	"Enable". 6. Check the *ISDN Status* screen, and examine the Connection Log. For details of the Log messages, refer to *Connection Log* on page 58.
Problem 3	**My Modem/ISDN TA is working fine with a dial-up connection. How do I find what "Initial String" it is using before connecting it to the Internet Router serial port?**
Solution 3	Use the procedure described in Finding the current Initial String on page 70.
Problem 4	**Some applications do not run properly when using the Internet** Router**.**
Solution 4	The Internet Router processes the data passing through it, so it is not transparent. Some programs may have limited functionality when used with the Internet Router. The number of supported applications is being expanded as rapidly as possible. The following applications and protocols are supported by firmware V5.0: Telnet, FTP, HTTP, ping POP/SMTP, Archie, NNTP TFTP, IRC, Gopher DNS, SNMP, Real Audio

Printer Sharing

Problem 1	**While adding my printer as instructed, I received a message stating that "The printer could not be found".**
Solution 1	Some printer drivers poll the printer to see if it is installed. If the Printer is installed as a **Local Printer**, but using the Internet Router printer port, the printer does not respond and the “Printer could not be found” message is displayed. The following *Add Printer* procedure will overcome this

	problem: 1. Select *Network printer* when asked "How is the printer attached to your computer?" 2. When prompted for *Network Path or Queue name* enter a dummy name such as \\12345 and select *Next*. 3. The printer wizard will display a message stating "The Network Printer is off-line". This is OK. Continue to install the printer as normal. Do NOT attempt to print a test page. 4. When you are finished adding your printer, go to *Settings* ▸ *Printers* and select your printer. The printer icon will be faded out indicating the printer is "off-line" and unavailable. 5. For Windows 95, select *Properties* ▸ *Details*. For Windows NT 4.0, select *Ports*. Then select **print server (PrintServer)** as the port for this printer. 6. Close the *Properties* window. With the Printer icon still selected, goto the File menu and ensure *Work Off-line* is NOT checked. 7. If the printer is connected properly and powered On, the printer icon should now be enabled and ready for printing.
Problem 2	**I connected and configured a WPS (Windows Printing System) printer as described, but I can't get the print job to print.**
Solution 2	When a WPS printer is configured as a Local printer, the printer driver polls the printer before sending print data. Since the printer is networked, the printer is not detected and no data is sent. Simply add your printer as a **network printer** as described in Solution 1 above. Some popular WPS printers are listed below: Canon LBP-430W Epson ActionLaser 1300/W Epson EPL-5500/W HP LaserJet 5L Lexmark WinWriter 100,200,400,600

	NEC SuperScript series Olivetti PG304 Samsung MyLaser-4 Samsung MyLaser-5 Samsung MyLaser-6
Problem 3	**The Banner Page does not print properly.**
Solution 1	If you have a Windows GDI printer, the Banner Page can NOT function properly. Disable the Banner printing in the *Configure Port* screen.
Problem 4	I am using a PostScript printer and I enabled the Banner option in the *Configure PrintServer* dialogue box. But when I print, I get either garbage or nothing at all.
Solution 4	If you are using a Post Script printer and enabled the banner option, you must also enable the PostScript option.
Problem 5	When printing from some software applications such as Power Point, printing is very slow and contains errors.
Solution 5	The problem is caused because the printer is configured to *Start printing after first page is spooled*. To change the configuration, do the following: 1. Go to Control Panel Printers and click on your printer. 2. Select File Properties Details. 3. When the *Details* screen appears, click the *Spool Settings* button. 4. When the *Spool Settings* dialogue box appears, choose ***Start printing after last page is spooled*** and click OK.

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Appendix B
AT Commands

Required Settings

For the Internet Router to function correctly, the modem or ISDN TA must be set as follows.

Setting	AT Command
Fixed baud rate setting	AT&B1
RTS/CTS flow control	AT&K3
DCD to track the presence of a carrier	AT&C1
DTR off to hang-up modem	AT&D2
DSR always on	AT&S0
Modem to return modem-to-modem data link speed	ATX4 (see Note below)

Note!

- For some Microcom and other modems, the “ATX4” command is not sufficient; a “W2” command (no “AT”) must be used as well.
- For an ISDN TA, the above commands may not be sufficient. Check your user manual. The following section may also be helpful.

For a modem which uses the standard AT commands shown above, the *Initial String* would look like the following:

AT&F&B1&K3&C1&D2&S0X4

The first command (AT&F) sets the modem to the factory defaults, to ensure a consistent starting point.

Finding the current Initial String

If your modem or ISDN TA is already working correctly through the serial port, but you don’t know what the modem initialization string is, you can use the following procedure to find out.

1. Select My Computer, then Dial-Up Networking.
2. Select the icon for your connection, then Properties.
3. Click the Configure button, then the Connection tab, as shown below.

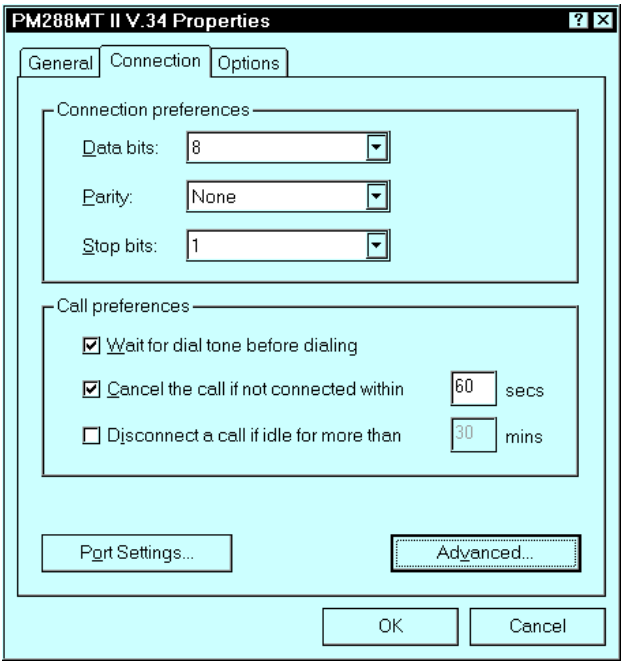

Figure 30:- Connection Properties (W95)

4. Select *Advanced* to see the screen below.

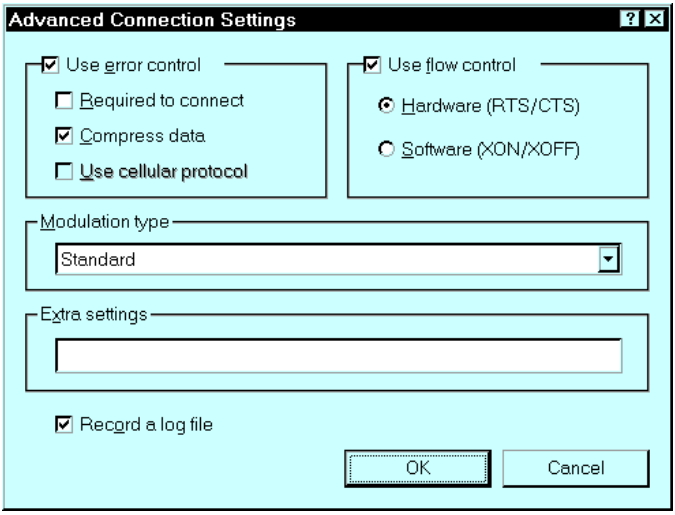

Figure 31:- Advanced Connection (W95)

5. Check the option *Record a log file*. Then click *OK* and exit.
6. Use Dial-up Networking to make your on-line connection normally. A log file MODEMLOG.TXT will be created in your Windows directory.
7. Use Notepad or another editor to read and print the file MODEMLOG.TXT.
8. Examine the file to determine the *Initial String* value.

AT Commands

Most modems use the standard AT commands, as shown in the following tables. Consult the manual for your modem to set what AT commands it supports.

Basic AT Command Set

Command	Description
<any key>	Terminate current connection attempt
+++	Escape sequence code, entered in data state, wait for modem to return to command state
ATA	Force answer mode on-line

ATBn		Handshake operation
	B0	Select ITU-T V.22 for 1200 bps communication
	B1	Select Bell 212A for 1200 bps communication
ATD		Dial number and options that follow
	P	Pulse dial
	T	Tone dial
	,	Pause for a specified time
	;	Return to command state after dialing
	!	Hook flash, call transfer
	W	Wait for second dial tone
	@	Wait for 5-second silence before proceeding, otherwise return O ANSWER”
	R	Reverse Dial (Originate a call in answer mode)
ATDL		Dial last number
ATDSn		Dial number stored in NVRAM at position ***n.*** n=0-9
ATEn		Command mode local echo of keyboard commands
	E0	Echo off
	E1	Echo on
ATHn		On/Off hook control
	H	Hang up modem
	H0	Hang up (on hook), same as ATH
	H1	Get off hook
ATIn		Display inquired information
	I0	Display product code
	I1	Display product information and ROM checksum
	I2	Link status report

ATLn		Speaker volume control. n=0-7
ATMn		Speaker control
	M0	Speaker always off
	M1	Speaker on until carrier is detected
	M2	Speaker always on
	M3	Speaker on after last digit dialed, off at carrier detect
ATNn		Ring volume control, ***n***=0 disables ring function. n=0-7
ATO		Return to on-line state
ATP		Pulse dial
ATQn		Result code displayed
	Q0	Modem returns result code
	Q1	Modem does not return result code
	Q2	Return result code but quiet in answer mode (will not show in AT&V*n*)
ATS0=n		Number of rings required before modem answers. n=0 disables auto-answer.
ATSr.b=n		Set bit ***b*** of S-register ***r*** to ***n***. (0 or 1)
ATSr.b?		Inquiry bit ***b*** of S-register ***r***
ATSr=n		Set S-register ***r*** to value ***n***, where ***n*** is a decimal number between 0-255
ATSr?		Display value stored in S-register ***r***
ATT		Tone dial
ATVn		Verbal/Numeric result codes
	V0	Display result codes in numeric form
	V1	Display result codes in verbose form
ATXn		Result code options. n=0-7
ATZn		Reset the modem and set power-on profile. n=0-4

	Zn	Reset modem and load user profile ***n*** (0-3)
	Z4	Reset modem and load factory settings
AT$		Help, Basic command summary
AT&$		Help, Extended AT& command summary
AT*$		Help, Extended AT* command summary

Extended "AT&" Commands

(Includes RTS/CTS Flow Control Commands)

Command		Description
&Bn		Data rate, terminal-to-modem
	&B1	DTE/DCE rate fixed at DTE setting
&Cn		Carrier Detect operations
	&C1	Carrier Detect tracks presence of carrier
&Dn		Data Terminal Ready (DTR) operations
	&D2	DTR off causes modem to hang up
&F		Load the default factory settings,
&Kn		Data flow control, DTE/DCE, n=0,3,4
	&K0	Flow control disabled
	&K3	Hardware (RTS/CTS) flow control
	&K4	Software (XON/XOFF) flow control
&Sn		Data Set Ready (DSR)
	&S0	DSR overridden, DSR always on

Appendix C
Windows Peer-to-peer

Overview

This appendix explains how to configure Windows 95/98 to enable a Peer-to-peer network, using the TCP/IP protocol.

A “Peer-to-peer” network is a network which does not have a dedicated server, but one or more PCs will allow the other PCs to access their resources (Disk, folders, or printer).

Procedure

The steps are:

- Install Network cards and drivers
- Install and Configure the TCP/IP protocol.
- Configure Peer-to-peer networking.

Install Network Cards & Drivers

1. Install a Network card (NIC) on each PC. Follow the instructions provided with the NIC.
2. Connect cables from each PC to the hub.
3. Restart each PC, and install the drivers for the Network card. Follow the instruction provided with the NIC.
4. If you need to change the drivers used by your NIC, follow this procedure:

- Go to *Settings-Control Panel-System-Device Manager*.
- Click on the "+" sign next to "Network Adapter" to display your NIC. Click on your NIC, then select *Properties*.
- Select the *Driver* Tab.
- Click the "Update Driver" button, and follow the prompts.

TCP/IP Installation

1. Navigate to the *Network Properties* screen. This can be done by either:

- Selecting *Start-Settings-Control Panel-Network*
- Selecting the *Network Neighborhood* icon on the desktop, and right-clicking to select *Properties*.

2. The "Configuration" tab of the *Network Properties* screen will appear. An example screen is shown below.

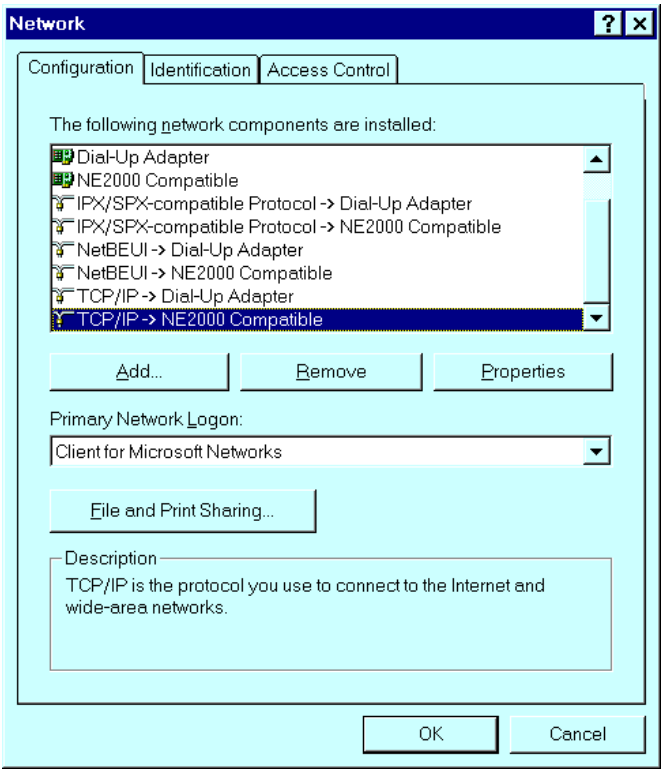

Figure 32: Network Properties

3. If a line like the one highlighted ("TCP/IP -> NIC") is not listed, select *Add-Protocol-Microsoft-TCP/IP-OK* to add it.
4. Select *Properties* for the "TCP/IP -> NIC" entry. You will see a screen like the following.

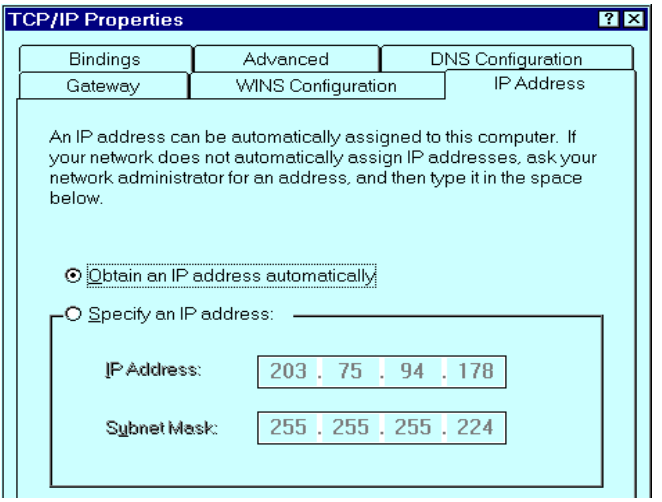

Figure 33: TCP/IP Properties

5. It is essential for your PC to have an IP Address.

   If you click the "Obtain and IP address automatically" button, as shown above, you need a DHCP (Dynamic Host Configuration Protocol) Server.
   The Internet Router can act as a DHCP Server. The DHCP server will provide all necessary IP information (*IP Address*, *Subnet Mask*, *Gateway* and *DNS*) to your PC when it boots.

   If you don't wish to use a DHCP Server, you must give each PC a **unique** *IP Address*, and the **same** *Subnet Mask*.

Peer-to-Peer Networking

To enable PCs to communicate with each other:

- On the *Identification* tab of "Network Properties" (see Figure 32), each PC needs a **unique** *Computer Name*, but the **same** *Workgroup*. Only PCs in the same *Workgroup* will be visible to your PC.
  (You can ignore the *Access Control* tab. In Peer-to-peer Networks, you must use "Share Level Access Control".)

- Each PC **must** log-in to the network. The *Primary Network Logon* (see Figure 32) must be set to *Client for Microsoft Networks*.
- On boot-up, when the network log-in screen appears, you **must** log-in, even if you don't use a password.
  If you press ESC, or click *Cancel*, no network resources will be available.

To make resources on a PC available to other users:

- On the "Network Properties" screen, (see Figure 32), click the *File and Printer Sharing* button, and enable sharing.
  You will need to restart your computer for this to take effect.
- In *My Computer*, select the device (drive, folder, or printer) you wish to share. Select *File-Sharing* or *Properties-Sharing*. (This option is not available if you have not enabled *File and Printer Sharing*.)
- Enable sharing.
- Give the resource a name.
- Provide a password if you wish to restrict access.

To gain access to shared resources on other PCs:

- Select the desktop icon *Network Neighborhood*, and then browse the network by double-clicking *Entire Network*. Wait a few seconds, and you will see all PCs which:
- Are Powered On.
- In the same workgroup.
- Have enabled *File and Printer Sharing*.
- Double-click on a PC to view the resources it has made available for sharing.
- To gain access to a folder or drive, select it, then select *File-Map*. Select the drive letter to use for this resource, and check the *Reconnect at Startup* option. You will then be able to access this shared drive or folder using Windows Explorer, or the File-Open/File –Save dialogs in any Windows application.
- To gain access to a shared printer on another PC, right-click on the printer icon, and select *Install*.
- If you wish, you can now go to the "Network Properties" screen, (see Figure 32), select *Client for Microsoft Networks - Properties* and check *Quick Log-in*. This will speed the boot process, and avoid error messages if the sharing PC is not turned on when you boot.

Appendix D
Specifications

Internet Router INET-810

Dimensions	245mm(W) * 140mm(D) * 40mm(H)
Operating Temperature	0℃ C to 40℃ C
Storage Temperature	-10℃ C to 70℃ C
Network Protocol:	TCP/IP
Network Interface:	4 * 10BaseT (UTP) connectors
ISDN Port	RJ45 connector, S/T interface, 4 wire full duplex, AMI line code
Serial Port:	1 male DB-9 connector
Serial Port Speed	230.4 Kbps max (async.)
LEDs	1 Power indicator 3 LAN status 3 ISDN Status 3 Serial port status 4 LAN connection status on rear
Power Adapter	External 12V DC

Internet Router INET-820

Dimensions	245mm(W) * 140mm(D) * 40mm(H)
Operating Temperature	0℃ C to 40℃ C
Storage Temperature	-10℃ C to 70℃ C
Network Protocol:	TCP/IP
Network Interface:	4 * 10BaseT (UTP) connectors
ISDN Port	RJ45 connector, S/T interface, 4 wire full duplex, AMI line code
Analog port (POTS)	2 * R-interface port RJ11 connectors
Serial Port:	1 male DB-9 connector
Serial Port Speed	230.4 Kbps max (async.)
LEDs	1 Power indicator 3 LAN status 3 ISDN Status 3 Serial port status 2 Phone status 4 LAN connection status on rear
Power Adapter	External 12V DC

Internet Router INET-830

Dimensions	245mm(W) * 140mm(D) * 40mm(H)
Operating Temperature	0℃ C to 40℃ C
Storage Temperature	-10℃ C to 70℃ C
Network Protocol:	TCP/IP
Network Interface:	4 * 10BaseT (UTP) connectors
ISDN Port	RJ45 connector, S/T interface, 4 wire full duplex, AMI line code
Serial Port:	1 male DB-9 connector
Max. Serial Port Asyn. Speed	230.4 Kbps
Parallel port	1 Centronic female DB25 connector
LEDS	1 Power indicator 3 LAN status 3 ISDN Status 3 Serial port status 2 Phone status 4 LAN connection status on rear
Power Adapter	External 12V DC

Internet Router INET-850

Dimensions	245mm(W) * 140mm(D) * 40mm(H)
Operating Temperature	0 C to 40 C
Storage Temperature	-10 C to 70 C
Network Protocol:	TCP/IP
Network Interface:	4 * 10BaseT (UTP) connectors
ISDN Port	RJ45 connector, S/T interface, 4 wire full duplex, AMI line code
Analog Port (POTS)	2 * R-interface port RJ11 connectors
Serial Port:	1 male DB-9 connector
Max. Serial Port Asyn. Speed	230.4 Kbps
Parallel port	1 Centronic female DB25 connector
LEDS	1 Power indicator 3 LAN status 3 ISDN Status 3 Serial port status 2 Phone status 4 LAN connection status on rear
Power Adapter	External 12V DC