MicroRouter 900i
Installation Guide

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MicroRouter 900i Installation Guide, Version 3.0
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Part number: A00-1095

FCC Notice: This product has been certified to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of FCC Rules. It is designed to provide reasonable protection against radio or television communication interference in a commercial environment. Operation of this equipment in a residential area could cause interference with radio or television communication.

Chapter 1 - Introduction

About the MicroRouter 900i

Congratulations on your purchase of the MicroRouter 900i Ethernet to Internet router. The MicroRouter 900i supports the IP protocol, with dial-on-demand or dedicated operation over voice, leased/switched 56, or ISDN lines, using the PPP or the Frame Relay wide area protocols.

A Note About On-Demand Internetworking

The MicrRouter 900i can be configured to provide cost effective on-demand connections over a wide area communications link (typically a voice phone line, a switched 56 line, or an ISDN line). Your network traffic and the configuration you place in the router will determine how often and for how long such a link is connected.

THE SHIPPING CONFIGURATION IN YOUR MICROROUTER 900i DOES NOT PROVIDE AUTOMATIC ON-DEMAND INTERNETWORKING. YOU MUST FIRST PROGRAM YOUR ROUTER TO WORK IN THIS ROLE ON YOUR NETWORK.

YOU SHOULD CAREFULLY MONITOR PHONE LINE USAGE TO BE SURE THAT YOUR ROUTER CONFIGURATION IS ALLOWING THE ROUTER TO DROP THE COMMUNICATIONS LINK WHEN IT ISN'T NEEDED.

MicroRouter 900i Installation Overview

This manual will help you install the MicroRouter 900i to a local Ethernet to a remote network and/or PPP client computer. This connection can be made to other Compatible Systems routers, routers from other vendors, or PPP compliant dial-in software packages running on a variety of computers. The wide-area interface on the MicroRouter 900i may be used to interconnect your network with other corporate networks, and to make your network's resources available to dial-in clients. You can also use the MicroRouter 900i as an IP only router in non-Internet applications.

In short, the installation steps are:

1. **Install** the MicroRouter hardware and connect it to a line communication device (including a modem, 56K CSU/DSU, or ISDN Terminal Adapter).
2. **Select** the management method you wish to use with the router. If you want to use the CompatiView management software, you must install the software on a Windows PC which is connected to your network.
3. **Configure** the MicroRouter LAN and WAN parameters using the management method you have chosen.

The manual is divided into several sections that should provide you with the basic information you will need to use the MicroRouter 900i on your network. For the latest documentation on Compatible Systems products, including the most current version of this manual, visit the Technical Support section of our Web site at: http://www.compatible.com.

Chapter 2 - Getting Started

This part of the manual describes the contents of the MicroRouter 900i package and emphasizes the preparation and equipment you will need to install the router.

Chapter 3 - Network Installation

This part of the manual includes step-by-step instructions on how to physically install the MicroRouter 900i and connect it to your local Ethernet and your wide area network. Instructions are included for thick, thin, and twisted-pair Ethernet environments as well as modems, 56K CSU/DSUs, and ISDN terminal adapters.

Chapter 4 - CompatiView Software Installation

This part of the manual describes how to install CompatiView, Compatible Systems' GUI (Graphical User Interface) management software which is included with your router.

Chapter 5 - Command Line Preparation

This part of the manual provides basic instructions on setting up command line management and text-based configuration.

Chapter 6 - Basic Configuration Guide

This part of the manual provides a list of parameters that must be entered into a router for proper operation.

Appendices

This part of the manual includes additional information that might be of interest to you such as technical specifications, default settings (including the default factory password) and instructions for down-loading current software.

Chapter 2 - Getting Started

A Few Notes

Please Read The Manuals

The manuals included with your MicroRouter 900i contain some very important information about the MicroRouter 900i and local and wide area networking in general. Please read this manual thoroughly, and refer to the management reference guides as required. It's worth the few minutes it will take.

Also, please fill out the warranty registration card and return it to us today. This will help us keep you informed of updates to the MicroRouter 900i and future products available from Compatible Systems. You can also register on the web at http://www.compatible.com. If you'd like to be notified via e-mail about new products and receive important news from Compatible Systems, please join our e-mail list on the web.

Warranty and Service

The MicroRouter 900i is covered by the Compatible Systems Integrated Support Package, which includes a lifetime comprehensive warranty, a twenty-four hour advanced replacement program, unlimited phone support and software upgrades for the life of the product.

Compatible Systems maintains copies of current software updates on the Internet. You may download product software from these sources at any time. For more information on downloading current product software, see the appendices of this manual.

Getting Help With the MicroRouter 900i

If you have a question about the MicroRouter 900i and can't find the answer in one of the manuals included with the product, please visit the technical support section of our Web site (http://www.compatible.com). This site includes extensive technical resources which may answer many of your questions. You can also request technical support by filling out a brief form. Technical support requests received via the Web form will receive expedited treatment. You may also call Compatible Systems Corporation or send support questions via e-mail to *support@compatible.com.* Compatible Systems' phone number is listed on the front of this guide. We will be happy to help you.

What You Will Need To Get Started

Before connecting the MicroRouter 900i, please check the list below to make sure that you have received all of the items that are supplied with the MicroRouter 900i package.

You should also make sure you have any additional items that are necessary to connect the router to your network.

Supplied with the MicroRouter 900i

Please check your shipping package for the following items:

- MicroRouter 900i unit
- Wall-mount power supply
- One DIN-8 to DB-25 RS-232 sync/async data cable
- CD-ROM including:
  - CompatiView software
  - Operating software
  - HTML versions of product documentation (which can be viewed with your favorite web browser)
- *CompatiView Management Software Reference Guide*
- *Text-Based Configuration and Command Line Management Reference Guide*
- Warranty registration card

Needed For Installation

Before connecting the MicroRouter 900i to your network, you need to make sure that you have the necessary equipment for connecting to the local Ethernet and the wide area transmission device(s) (modem, 56K CSU/DSU, ISDN terminal adapter).

Ethernet Connection Requirements

The MicroRouter 900i's Ethernet port directly supports thick, thin and 10BaseT twisted-pair Ethernet. Switching among the three ports is automatic – simply plug the proper Ethernet connector into its port. Other Ethernet cabling types (such as fiber optic cabling or pre-10BaseT twisted-pair) can be supported using adapters which connect to a thick Ethernet port.

Thick Ethernet

To connect the router's Ethernet port to a standard (thick) Ethernet cable you will need a transceiver cable connection at the correct location on your Ethernet cable. The transceiver cable will attach directly to the DB-15 connector on the router.

Thin Ethernet

To connect the router's Ethernet port to a thin Ethernet cable you will need a T-connector installed at the correct location on your Ethernet cable. A T-connector is required for proper termination of the cable.

10Base-T Twisted-Pair Ethernet

To connect the router's Ethernet port to twisted-pair Ethernet cabling you will need an unshielded twisted-pair wire that is connected to a 10BaseT-compatible twisted-pair hub.

❖ **Note**: *Ethernet cables and cable connectors are not supplied with the MicroRouter product. Please contact your reseller or your Compatible Systems sales representative for information on obtaining the correct Ethernet cabling supplies.*

❖ **Note**: *These hardware installation instructions assume that your Ethernet cabling is already in place. Thin coaxial Ethernet network cabling should be terminated at each end with 50 Ohm terminator plugs. A T-connector or transceiver must be available in the location where you will be installing the router.*

Telco Line Connection Requirements

The MicroRouter 900i is not a line communications device. In order to connect to a wide area transmission line, you must use a modem, 56K CSU/DSU, or ISDN Terminal Adapter. Which of these devices you use depends on the type of wide area line to which you are connecting.

❖ **Note**: *Before attempting to connect the MicroRouter 900i to a leased telco line, use the loopback features of your CSU/DSU's to check the line. This can save you a considerable amount of time, since the more equipment you have on the line, the more difficult it becomes to determine where a problem is occurring.*

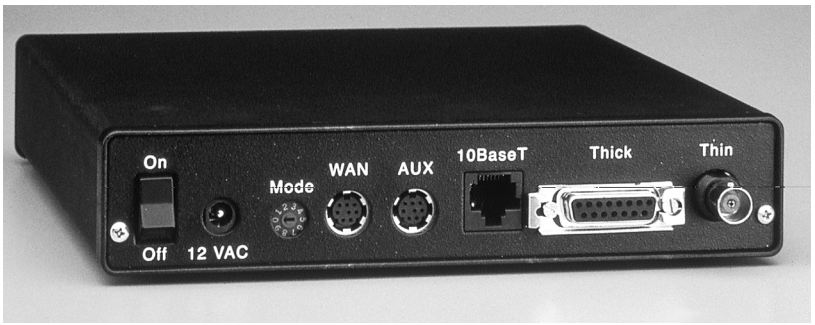
RS-232 Port

No matter which type of wide area line you plan to connect to, the line communications device you use must provide an RS-232 connection in order to be used with the MicroRouter.

The MicroRouter 900i includes one DIN-8 to DB-25 RS-232 sync/async data cable. This cable supports RS-232 asynchronous modems, synchronous leased and switched-56K CSU/DSU's, and North American ISDN Terminal Adapters.

❖ **Note**: *Please use only this cable when connecting your line communication device to the MicroRouter 900i. The cables provided with other equipment do not provide all of the connections required between connector pins for correct hardware handshaking and synchronous clocking.*

Chapter 3 - Network Installation



900i MicroRouter Back Panel

This section of the manual describes how to connect the MicroRouter 900i to your Ethernet network and your wide area communications device. In summary, the steps for installation are:

1. Make sure the router is powered down and not plugged to any power source.
2. Wall mount the router, if required.
3. Connect the router to the Ethernet network.
4. Connect the router to the wide area line communications device.
5. Power up the line communications device.

❖ **Note**: *You should either wait to connect a synchronous line device such as a CSU/DSU until after the interface has been configured as a synchronous port, or power up the router before powering up the CSU/DSU. (See **Chapter 6 - Basic Configuration Guide** for more information on configuring the router.)*

6. Plug in the power supply and power up the router.

Mounting the Router

The MicroRouter 900i can be left standalone on a desktop or equipment table, or can be wall mounted.

❖ **Note**: *Wall mounting requires a wall-mount bracket kit (part number A00-0987) from Compatible Systems.*

For wall mounting, follow the instructions included with the wall-mount bracket kit.

Connecting the Router to the Ethernet

For thick or thin Ethernet networks, you should have installed your Ethernet cabling before you install the MicroRouter 900i.

If you are installing a twisted-pair connection, and the twisted-pair hub is already in place, you can connect the router to an active network without interrupting network activity.

Connecting to Thick Ethernet

To connect the router to a thick Ethernet network, simply plug one end of a transceiver cable into the DB-15 transceiver connector located on the back panel of the unit. Then, plug the other end of the transceiver cable into the transceiver which should already be attached to the thick Ethernet cable.

Connecting to Thin Ethernet

In order to connect the router to a thin Ethernet cable, connect a T-connector to the BNC connector located on the rear panel of the unit.

Connecting to Twisted-Pair Ethernet

Before connecting the router to twisted-pair cabling you need an unshielded twisted-pair cable that is already connected to your 10BaseT-compatible twisted-pair hub.

To connect the router to the twisted-pair network, simply plug the twisted-pair cable into the RJ-45 connector on the back of the unit.

Connecting a Line Device to the MicroRouter 900i

The MicroRouter 900i supports high-speed synchronous or asynchronous operation over one RS-232 connector.

The MicroRouter 900i supports both PPP and Frame Relay link protocols on this WAN port.

Connecting Devices to the RS-232C Port

This interface can be used to connect to synchronous or asynchronous line communications devices at rates up to 256Kbps (sync), or 230.4 Kbps (async). Examples include modems, leased or switched 56K CSU/DSUs, and ISDN terminal adapters.

❖ **Note**: *If connecting to a synchronous device such as a CSU/DSU, the*

router must first be configured for synchronous operation before connecting to the device. See ***Chapter 6 - Basic Configuration Guide*** *for configuration information.*

You may select either dial-on-demand, always up (i.e., redial if down), or leased line operation. This interface may also be set to receive ISDN or switched-56 incoming calls.

To connect a device, first make sure that both units are powered off. Then, simply connect the supplied RS-232 cable between the router and the device.

❖ **Note**: *The MicroRouter 900i RS-232 interfaces require that your asynchronous line communications device be set to supply the RS-232 DCD signal when a connection has been made. A synchronous RS-232 device should be set to provide DSR.*

❖ **Note**: *The MicroRouter 900i includes a special cable to facilitate connections to RS-232 line communications devices. This cable includes support for several asynchronous and synchronous control signals.* ***Off-the-shelf cables generally do not support these signals.***

Connecting an Out-of-Band Management Console

If you wish to connect an out-of-band management console, use the supplied cable and connect to the Console interface on the back of the MicroRouter 900i. You can use a dumb terminal or a computer equipped with VT100 terminal emulation.

The default settings for the Console interface are VT100 terminal emulation, 9600 bps, 8 bits, no parity, 1 stop bit, no Flow Control.

Powering Up the Router

Power up any modem, CSU/DSU, or TA before powering up the router. This allows the router to immediately sense whether its secondary interface is connected. The exception to this rule is when connecting an RS232 interface to a CSU/DSU. In such a case, you must power up the router before powering up the CSU/DSU. At power-up, the router will take approximately one minute to become visible to CompatiView.

❖ **Note**: *If you want to use Telnet as a management method, you must first configure an IP address into the router using an out-of-band console, or reconfigure the IP address on an IP host or workstation on the same Ethernet segment as the router. See* ***Chapter 5 - Command Line Management*** *for more information.*

Chapter 4 - CompatiView Software Installation

All of the routers in Compatible Systems' internetworking and VPN families, including all RISC Router and MicroRouter models, can be managed from a single GUI management platform called CompatiView. CompatiView for Windows is included on the CD-ROM which was shipped with your MicroRouter 900i.

❖ **Note**: *An older version of CompatiView for Mac OS was included on the CD-ROM shipped with your router, but does not contain some of the features of the newest Windows version.*

CompatiView for Windows

CompatiView for Windows allows you to manage the MicroRouter 900i from an IBM-compatible PC running Windows 95/98 or Windows NT. The PC can either be configured as an IPX client on a Novell NetWare internet, or as an IP WinSock client on an IP internet.

System Requirements

In order to successfully run CompatiView for Windows, you need:

- IBM PC or compatible w/486 or later processor
- Microsoft Windows 95/98, or Windows NT installed
- VGA or better monitor
- IP - A WinSock-compatible transport stack

  - and/or -

  • IPX - A Netware or Microsoft Client installation

❖ **Note**: *To choose the active transport protocol on a Windows machine which has both IPX and IP installed, select "Options" from the Administration menu and click the appropriate radio button under "Default Transport."*

Installing and Running CompatiView for Windows

The Windows version of the CompatiView program can be found in the Network Management/CompatiView/Windows directory on the CD-ROM that was included with your MicroRouter 900i.

Run the auto-installation program (CV5x file) by double-clicking on it. The installation program will ask you to select (or create) a directory in

which it should locate CompatiView and its associated files and database subdirectory.

Once the installation is complete, double-click on the CompatiView icon to open the program. For further information on using CompatiView, see the *CompatiView Management Software Reference Guide* included with your router.

❖ **Note**: *For an up-to-date description of the changes (if any) made to Windows system files by the installation program, see the README.TXT file located in the CompatiView installation directory.*

Transport Protocols and CompatiView

CompatiView will be able to use the transport protocol (IP or IPX) you have selected to access Compatible Systems products anywhere on your internetwork. Depending on your security setup, you may also be able to use the IP transport option to manage devices across the Internet.

The IP protocol does not provide a method for CompatiView to automatically discover the router. To initially contact the router over IP using CompatiView, you must first enter a valid IP address into the router. You can do this either on a console directly connected to the router or by setting a workstation's IP address to 198.41.12.2 with a Class C subnet mask (255.255.255.0) so that it can communicate over Ethernet with 198.41.12.1 (the shipping default of Ethernet 0). After setting the router's IP address, be sure to change the workstation's configuration back to its original settings.

The IPX protocol does allow CompatiView to automatically discover the router. Compatible Systems devices are configured to autoseed the two most common IPX frame types upon startup (802.2 and 802.3 (raw)). If CompatiView has the IPX/SPX protocol selected as its transport, it will be necessary to either powerup the router before powering up the workstation, or reboot the workstation after the router has completed its boot sequence. This process will ensure that the workstation and the router have the proper IPX network bindings for communication.

Chapter 5 - Setting Up Command Line Management

The command line interface allows you to configure and monitor the router in-band via Telnet or out-of-band with a terminal connected to the MicroRouter 900i's Console interface.

❖ **Note**: *Proper syntax is vital to effective operation of command line management. Case is not significant – you may enter commands in upper case, lower case, or a combination of the two.*

Out-of-Band Command Line Management

You can use command line management and text-based configuration out-of-band as a permanent management method, or only temporarily in order to set the router's IP parameters to allow in-band Telnet access.

In order to access the command line out-of-band, do the following:

1. Set a terminal or a PC equipped with VT100 terminal emulation to a baud rate of 9600, 8 bits, no parity, 1 stop bit and no Flow Control.
2. Connect it to the router's Console interface using the cable which was supplied with the MicroRouter 900i.
3. Press the <Return> key one or two times.
4. Enter the default password ***letmein*** at the password prompt. The command line interface prompt will appear on the screen.

If you plan to use out-of-band access for ongoing management of your router, you can find further information on configuring your router in ***Chapter 6 - Basic Configuration Guide***. Otherwise, see the section later in this chapter on Setting Up Telnet Operation for information on setting the router to allow Telnet access from hosts on its network.

Temporarily Reconfiguring a Host for Command Line Management

You can temporarily reconfigure an IP host in order to set the server's IP parameters to allow in-band Telnet access.

If you wish to set the server's basic IP parameters in this fashion, the host must be on the same Ethernet segment as one of the router'sEth-

ernet interface. You can then do the following:

1. Set the host's IP address to 198.41.12.2, with a Class C subnet mask (255.255.255.0) and then Telnet to 198.41.12.1.
2. Enter the default password ***letmein*** at the password prompt. The command line interface prompt will appear on the screen.
3. Use the **configure** command and set the **IPAddress**, **SubnetMask**, and **IPBroadcast** keywords in the **IP Ethernet 0** section.
4. Use the **save** command to save the changes to the device's Flash ROM.
5. Change the host's configuration back to its original settings

See the next section (Setting Up Telnet Operation) for information on setting the router to allow Telnet access from hosts on its network.

Setting Up Telnet Operation

Telnet is a remote terminal communications protocol based on TCP/IP. With Telnet you can log into and manage the MicroRouter 900i from anywhere on your IP internetwork, including across the Internet if your security setup allows it.

To manage the router with Telnet, you must:

1. Run Telnet client software on your local computer, which will communicate with the Telnet server built into the MicroRouter 900i.
2. You must also set some basic IP parameters in the router. The required parameters for Telnet access to an interface are the IP address, IP subnet mask, and IP broadcast address. There are several ways to set them.
    - You may set them using the command line either out-of-band via the Console interface or in-band via a reconfigured IP host. Instructions for setting up these two methods were given earlier in this chapter. Once you have set up the command line interface, do the following:
        A. Use the **configure** command and set the **IPAddress**, **SubnetMask**, and **IPBroadcast** keywords in the **IP Ethernet 0** section.
        B. Use the **save** command to save the changes to the device's Flash ROM.
    - You may also use CompatiView from a reconfigured IP host (if

using the IP transport protocol), or anywhere on your network (if using the IPX transport protocol). Instructions for these two methods are given in ***Chapter 4 - CompatiView Software Installation***.

- With CompatiView, basic IP parameters can be set using the TCP/IP Routing: Ethernet 0 Dialog Box. Use the Save to/Device option under the File menu to save the changes.

After you have set these IP parameters and saved the changes, you can use Telnet to access the router from any node on your IP network. Invoke the Telnet client on your local host with the IP address of the router you wish to manage.

Chapter 6 - Basic Configuration Guide

This chapter briefly discusses the major parameters that must be set in order to use the router.

Detailed information on the meaning of the router's parameters is provided in the *CompatiView Management Software Reference Guide* and the *Text-Based Configuration and Command Line Management Reference Guide*. You should use this list as a starting point to look up more specific information in the other documents.

If you need more general information on IP or wide area protocols, see the Appendices in the *CompatiView Management Software Reference Guide*.

There are a number of parameter settings which are optional, in the sense that they are not required for all installations. These settings are not covered in this chapter.

In this chapter:

CV = CompatiView

TB = Text-Based Configuration

In order to successfully connect to an Internet Service Provider (ISP), you must use router configuration parameters which will be provided by the technical staff of the ISP. These parameters must include all IP addresses, WAN settings, and any applicable authorization routines. Please check with your ISP **before** configuring or changing the configuration of your MicroRouter 900i.

Ethernet Interface Configuration

Ethernet interfaces are considerably easier to set up than wide area interfaces since there are fewer choices that need to be made regarding communications protocols and parameters. We recommend that you begin by configuring any Ethernet interface parameters before proceeding to configure WAN interface parameters.

IP Protocol

Required for IP

These parameters set the basic address characteristics of the interface. They provide enough information for another IP node to find the interface (such as a Telnet client), but not enough information for routing to take place.

- IP Address
- IP Subnet Mask
- IP Broadcast Address

CV: Use the TCP/IP Routing: Ethernet Dialog Box to set these parameters.

TB: Use the **configure** command and the **IPAddress**, **SubnetMask**, and **IPBroadcast** keywords in the **IP Ethernet 0** section.

Suggested for IP

These parameters help supply information about the segment that the interface is connected to. With this information, routing can take place.

- Set IP RIP 1, IP RIP 2, or OSPF (Open Shortest Path First)
- IP Static Routes

CV: Use the TCP/IP Routing: Ethernet Dialog Box to set RIP, and the IP Static Routing Dialog Box (under Global/IP Static Routes) to set static routes. To set parameters for OSPF, refer to the *CompatiView Management Software Reference Guide*.

TB: Use **configure** and the **RIPVersion** keyword for the **IP Ethernet 0** section. Use **edit config** and add static routes in the **IP Static** section.

WAN Interface Configuration

In order to use a WAN interface, you may first need to set some physical parameters and then set up the link and protocol parameters.

The RS-232 interface can be run synchronously or asynchronously, at rates up to 256Kbps (sync), or 230.4Kbps (async).

Physical Communications Settings

You may need to set the baud rate, sync/async operation, and other physical communications parameters for the WAN interface. These

parameters will depend on the line communications device you are using.

❖ **Note**: *Frame Relay and SMDS are presently supported in the MicroRouter 900i only via synchronous operation. An external clock signal is generated for Frame Relay.*

CV: Use the Physical Configuration: WAN 0 Dialog Box.

TB: Use **configure** and set the **LinkType** keyword or other keywords in the **RS232 Interface WAN 0** section.

PPP Configuration

This section covers the settings required for PPP (point-to-point) protocol operation of the WAN interfaces.

Link Configuration

Required for Dedicated/Leased Line Operation

Dedicated line operation is the simplest to set up.

- Set Dedicated connection
- Set PPP connection

CV: Use the Link Configuration: WAN 0 Dialog Box.

TB: Use **configure** and set the **Mode** and **ConnectMode** keywords in the **Link Config WAN 0** section.

Suggested for Dedicated/Leased Line Operation

Dedicated line operation generally does not require additional parameters for operation.

Required for Dial-On-Demand Operation

Incoming dial-on-demand operation requires only slightly more information than dedicated line setup. Outgoing dial-on-demand requires additional information (see the suggested settings below).

- Set dial-up connection
- Set PPP connection
- Set to allow dial-in and/or dial-out

CV: Use the Link Configuration: WAN 0 Dialog Box.

TB: Use **configure** and set the **Mode**, **ConnectMode**, **DialIn** and/or **DialOut** keywords in the **Link Config WAN 0** section.

Suggested for Dial-On-Demand Operation

This mode of operation is only supported on the WAN RS-232 interface. Outgoing dial-on-demand requires some additional information.

- Create dial-out script
- Set dialing method
- Set dial-out script to be used
- Set inactivity time

CV: Use the Link Configuration: WAN 0 Dialog Box to set the dialing method and to select a chat script (once you have created one). Use the WAN Chat Scripts Dialog Box (under Global/WAN Chat Scripts) to create your chat script.

TB: Use **configure** and then set the **Dialing**, **DialOutScript**, and **DropInact** keywords in the **Link Config WAN 0** section. Use **edit config** and create a **Chat** section to contain your dialing script.

IP Protocol

Required for IP

WAN interfaces which are set for PPP operation do not generally use an IP address. They are set to act as an "unnumbered interface." In this mode of operation, there are no required settings.

Suggested for IP

These parameters help supply information about the segment that the interface is connected to. With this information, routing can take place.

- Set IP RIP 1, IP RIP 2, or OSPF (Open Shortest Path First)
- IP Static Routes

CV: Use the TCP/IP Routing: WAN 0 Dialog Box to set RIPor OSPF, and the IP Static Routing Dialog Box (under Global/IP Static Routes) to set static routes.

TB: Use **configure** and set either the **RIPVersion** keyword or the **OSPFEnabled** keyword in the **IP WAN 0** section. Add static routes and a default router using the **edit config IP Static** command.

❖ **Note**: *If you set RIP to "on" for a dial-on-demand link, you must also set the **update** method to **triggered** to avoid the link being brought up by transmission of RIP information. You should only use triggered*

operation when you are connecting to another Compatible Systems router at the other end of the link.

Frame Relay Configuration

This section covers the settings required for Frame Relay operation of the MicroRouter 900i WAN interfaces. In general, the parameters listed here should be set for each WAN interface on which you plan to use Frame Relay.

Link Configuration

Frame Relay is presently supported in the MicroRouter 900i only via dedicated line operation.

- Set Dedicated connection
- Set Frame Relay connection

CV: Use the Link Configuration: WAN 0 Dialog Box.

TB: Use **configure** to set the **Mode** and **ConnectMode** keywords in the **Link Config WAN 0** section.

Suggested for Dedicated/Leased Line Operation

Dedicated line operation generally does not require additional parameters for operation.

Frame Relay DLCI Mappings

If you are connecting to another Compatible Systems router, this information is not required for Frame Relay operation. Compatible Systems uses IARP (Inverse Address Resolution Protocol) to dynamically generate this information. To connect to other vendors' routers which do not support IARP, you must provide DLCI-to-protocol mapping information.

❖ **Note**: *Many Internet Service Providers (ISP's) do not support IARP as a default. If one of your MicroRouter 900i interfaces will be connected to an ISP via Frame Relay, check with your ISP technical staff on whether you must manually enter DLCI information.*

CV: Use the DLCI Mapping Database Dialog Box. (Use WAN 0/Link Configuration, select Frame Relay Link from the Link Type pull-down menu, and click on **DLCI** button.)

TB: Use **configure** and set the **DLCI** keyword in the **Frame Relay WAN 0** section.

IP Protocol

Required for IP

There are two ways to set up Frame Relay. One is to set the WAN interface as a "numbered interface." This means that the interface (and thus the Frame Relay network) will have an IP address, subnet mask, etc. The other is to set it as an unnumbered interface and specify that the link is point-to-point Frame Relay and set the local DLCI.

Required for IP Numbered Interface

- IP numbered interface
- IP address
- IP subnet mask
- IP broadcast address

CV: Use the TCP/IP Routing: WAN Dialog Box.

TB: Use the **configure** command and the **Numbered**, **IPAddress**, **SubnetMask**, and **IPBroadcast** keywords in the **IP WAN 0** section.

Required for IP Unnumbered Interface

- IP unnumbered interface
- Point-to-Point Frame Relay
- Local DLCI

CV: Use the TCP/IP Routing: WAN 0 Dialog Box, and check the **Point to Point Frame Relay** checkbox.

TB: Use the **configure** command and the **Numbered**, **PointToPoint-Frame**, and **InterfaceDLCI** keywords in the **IP WAN 0** section.

Suggested for IP

These parameters help supply information about the segment that the interface is connected to. With this information, routing can take place.

- Set IP RIP 1, IP RIP 2, or OSPF (Open Shortest Path First)
- IP static routes

CV: Use the TCP/IP Routing: WAN Dialog Box to set RIPor OSPF, and the IP Static Routing Dialog Box (under Global/IP Static Routes) to set static routes.

TB: Use **configure** and set either the **RIPVersion** keyword or the **OSPFEnabled** keyword in the **IP WAN 0** section. Add static routes and a default router using the **edit config IP Static** command.

Saving a Configuration File to Flash ROM

Once a configuration is complete, you can save it to the router's Flash ROM. Until saved, all changes are made in a separate buffer and the actual router interfaces run as before the changes were made.

CV: Use the Save to/Device option from the File menu.

TB: Use the **save** command.

Appendix A - Shipping Defaults

Default Password

- letmein

Ethernet Port

IP Defaults

- On
- Address: 198.41.12.1
- Subnet Mask: 255.255.255.0
- Broadcast Address: 198.41.12.255
- IP RIP off
- Default route to WAN port

WAN Port

IP Defaults

- On
- Unnumbered interface
- RIP off
- Van Jacobson compression off
- Default route to WAN port

Link & Physical Defaults

- PPP
- Dial-in
- Async @ 115.2Kbps
- Hardware flow control

Appendix B - Connector and Cable Pin Outs

Pin Outs for DIN-8 to RS-232 Data Cable (DCE/Male)

DIN-8 (DTE)	RS-232		DB-25 Data (DCE/Male)	RS-232
1	RTS	->	4 & 20	RTS & DTR
2	CTS	<-	5	CTS
3	Tx Data	->	2	Tx Data
4	Ground	<->	7	Ground
5	Rx Data	<-	3	Rx Data
6	Tx Clock	<->	15	Tx Clock
7	DCD	<-	8	DCD
8	Rx Clock	<-	17	Rx Clock
Shield		<->	Shield	

Notes:

1. DCD must be supported in order for the router to sense a completed connection.
2. Tx Clock direction is determined by an internal jumper. The line device sourcing clock (i.e. <-) is the default.

Pin Outs for DIN-8 to RS-232 Console Cable (DTE/Female)

DIN-8 (DTE)	RS-232		DB-25 Data (DTE/Female)	RS-232
1	RTS	->	5	CTS
2	CTS	<-	4	RTS
3	Tx Data	->	3	Rx Data
4	Ground	<->	7	Ground

5	Rx Data	<-	2	Tx Data
6	Tx Clock	<->	17	Tx Clock
7	DCD	<-	8	DCD
8	Rx Clock	<-	15	Rx Clock
Shield		<->	Shield	

Notes:

1. This cable is a null-modem DTE-to-DTE cable.
2. Because it is a null-modem cable, it can be connected “back-to-back” with a DCE/Male data cable in order to create a router-to-router test connection cable.

Appendix C - Light Patterns and Test Switch Settings

MicroRouter 900i Light Patterns

The MicroRouter 900i uses a number of light patterns on its front LED bar to indicate operating conditions.

2 & 9 on steady: Router is powered on.

❖ **Note**: *Lights 1 and 10 are directly connected to the router's 10BaseT interface and indicate 10BaseT link (1) and 10BaseT polarity (10).*

Traffic Indicators

Scan from 2 to 5: Ethernet receive packet

Scan from 5 to 2: Ethernet transmit packet

Scan from 6 to 9: WAN receive packet

Scan from 9 to 6: WAN transmit packet

Other Indicators

5 & 6 on steady: Flash ROM checksum in progress

5 & 6 flashing: Router stacks starting up

2,3,4 & 7,8,9 flashing: Running from ROM

2,3,4 & 7,8,9 on solid: Erasing Flash ROM

2,3 & 8,9 on solid: Writing Flash ROM

4 & 7 on solid: Compressing Flash ROM image

Level 1 Panic Indicators

Any continuous flashing pattern not noted above may be caused by a software "panic." This is a sign that a condition has been detected that the software does not know how to deal with: either an unusual network condition, or a hardware failure.

❖ **Note**: *Level 1 panics are very unusual. These are not the same as Level 2 panics, which cause the router to save the reason for the panic and restart. The existence of a Level 2 panic signature will be reported by CompatiView or the command line.*

MicroRouter 900i Switch Settings

0	Normal Operation
1	RAM Test*
2	Ethernet Test*
3	Unused*
4	Unused*
5	Erase Flash ROM (OS and configuration)
6	Flash ROM Test*
7	Manufacturing Burn In*
8	Serial Test*
9	**Allow** *letmein* **password for 5 minutes after powerup**

Caution: *Settings marked with an asterisk may erase your Flash ROM. Please do not use these settings without* ***first*** *contacting Compatible Systems Technical Support. Very few units experience hardware failures; almost all problems can be traced to telco line problems and/or incorrect configuration.*

Appendix D - Downloading Software From Compatible Systems

We make the latest versions of operating software for all Compatible Systems products available at our Web site. The latest version of CompatiView management software is also available.

To download software, follow the instructions below.

1. Use your browser to access http://www.compatible.com/, and find the link on our home page to “Software Downloads.”
2. Select the product and software version you want, and click on the appropriate file to download it.

❖ **Note**: *Uncompressed downloads (suitable for TFTP and CompatiView Windows downloading) are stored as .DLD files. Self-extracting Windows compatible style files (and CompatiView for Windows itself) are stored as .EXE files. Self-extracting Macintosh style files are stored as .sea.bin (MacBinary format) and/or .sea.hqx files.*

❖ **Note**: *These files are also accessible directly via Anonymous FTP at* **ftp.compatible.com/files/**.

Appendix E - Terms and Conditions

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3. **Payment Terms**. Payment shall be made prior to shipment or upon delivery, unless otherwise agreed to in writing. Payment shall not constitute acceptance of the goods.

4. **Force Majeure**. All orders accepted by Compatible Systems are subject to postponement or cancellation for any cause beyond the reasonable control of Compatible Systems, including without limitation: inability to obtain necessary materials and components; strikes, labor disturbances, and other unavailability of workers; fire, flood, and other acts of God; war, riot, civil insurrection, and other disturbances; production or engineering difficulties; and governmental regulations, orders, directives, and restrictions.

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