BR-SIT01
BR-SXT01

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This manual applies to both the "I" and "X" router models. The "I" model (BR-SIT01) is single protocol TCP/IP only. The "X" model (BR-SXT01) is a multi-protocol router that routes TCP/IP, IPX, DECnet, and Appletalk.

When using this manual with "I" model router, ignore the manual sections pertaining to protocols other than TCP/IP.

* Available on "X" model router only.

* Available on "X" model router only.

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Chapter 1 - Introduction

About the BR Router

Congratulations on your purchase of the BR Router multiport wide area router. The BR Router supports the IP, IPX, AppleTalk, and DECnet network protocols, with dial-on-demand and leased-line operation using the PPP and/or the Frame Relay wide area protocols.

A Note About On-Demand Internetworking

The BR Router 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 BR ROUTER 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.

BR Router Installation Overview

This manual will help you install the BR Router to connect a local Ethernet to 1 or 2 remote networks and/or remote PPP client computers. These connections can be made to other DCB routers, routers from other vendors, or PPP compliant dial-in software packages running on a variety of computers. The wide-area interfaces on the BR Router may be used to interconnect your network with other corporate networks, and to make your network's resources available to dial-in clients.

In short, the installation steps are:

1. **Install** the BR Router hardware and connect it to one or more line communication devices (including modems, 56K CSU/DSU's, ISDN Terminal Adapters, and fractional or full T1 CSU/DSU's).

2. **Select** the management method you wish to use with the router. If you want to use the RouterView management software, you must install the software on a Windows PC or Macintosh computer which is connected to your network.

3. **Configure** the BR Router LAN and WAN parameters using the management method you have chosen.

If you have any difficulties during the installation or use of the BR Router that are not answered by this guide, please call Data Comm for Business or your BR Router reseller. DCB's phone number is listed on the front of this guide. We will be happy to help you.

The manual is divided into several sections that should provide you with all the information you will need to use the BR Router on your network.

Getting Started

This part of the manual describes the contents of the BR Router package and emphasizes the preparation and equipment you will need to install the router.

Hardware Installation

Here you will find step-by-step instructions on how to physically install the BR Router and connect it to your local Ethernet and your wide area network(s). Instructions are included for twisted-pair Ethernet environments as well as modems, 56K CSU/DSUs, ISDN terminal adapters, and fractional or full T1 CSU/DSU's.

RouterView Software Installation

If you plan to use RouterView, DCB's GUI (Graphical User Interface) management software which is included with your router, then read this section. Instructions are provided on how to install RouterView for Windows or Macintosh environments.

Command Line Preparation

If you have decided to use command line management, either out-of-band (through the router's AUX/Console interface), or in-band through Telnet, read this section.

Quickstart Configuration

The Quickstart section provides a list of parameters that must be entered into a router for proper operation.

Appendices

Additional information that might be of interest to you such as technical specifications and a quick reference to specific information can be found at the end of this guide.

Chapter 2 - Getting Started

A Few Notes

Please Read The Manuals

The manuals included with your BR Router contain some very important information about the BR Router 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 BR Router and future products available from DCB.

Warranty and Service

The BR Router is covered by the DCB's Integrated Support Package, which includes a three-year comprehensive warranty, a twenty-four hour advanced replacement program, unlimited phone support, and software upgrades for the life of the product.

Getting Help With the BR Router

If you have a question about the BR Router and can't find the answer in one of the manuals included with the product, feel free to call our technical support department at (217) 352-3207. You may also send support questions via e-mail to *support@dcbnet.com*

What You Will Need To Get Started

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

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

Supplied with the BR Router

Please check your shipping package for the following items:

- BR Router unit

- Wall-mount power supply

- One DB-25 to DB-25 data and auxiliary interface cable

- Windows RouterView diskette

- Macintosh RouterView diskette

- Windows download software diskette

- Macintosh download software diskette

- RouterView reference guide

- Command line reference guide

- Warranty registration card

Needed For Installation

Before connecting the BR Router 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, T1 CSU/DSU).

Ethernet Connection Requirements

The BR Router's Ethernet interface directly supports 10BaseT twisted-pair Ethernet. Other Ethernet cabling types (such as thin Ethernet, thick Ethernet, fiber optic cabling or pre-10BaseT twisted-pair) can be supported using a 10BaseT mini-hub or other conversion device.

10Base-T Twisted-Pair Ethernet

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

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

Telco Line Connection Requirements

The BR Router is not a line communications device. In order to connect to a wide area transmission line, you must use a modem, 56K CSU/DSU, ISDN Terminal

Adapter, or T1 CSU/DSU. Which of these devices you use depends on the type of telco line you are connecting one of the router's wide area interfaces to.

❖ **Note**: *Before attempting to connect the BR Router 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.*

The BR Router provides one high-speed V.35 synchronous interface, and one RS-232 sync/async interface, each of which can be independently configured for PPP or Frame Relay operation. The V.35 interface is capable of communicating to another router or a PPP client machine over a 56K CSU/DSU, an ISDN Terminal Adapter, or a T1 CSU/DSU. The RS-232 interface is capable of communicating to another router or a PPP client machine over a modem, 56K CSU/DSU, or ISDN Terminal Adapter.

V.35 Interface

The BR Router does not include a V.35 cable. These cables are available from your reseller, or a number of other suppliers. The BR Router has a female V.35 connector, as do virtually all line communications devices. Thus, the V.35 cable required to connect to a line communications device will usually have male connectors at both ends. The pinouts for this cable are shown in Appendix B.

RS-232 Interface

The BR Router includes one DB-25 to DB-25 RS-232 sync/async cable. This cable supports RS-232 asynchronous modems, synchronous leased and switched 56K CSU/DSU's, and ISDN Terminal Adapters. It can also be used to connect the router's auxiliary interface to a PC running terminal emulation software, or to a dumb terminal.

❖ **Note**: *Please use **only** the supplied DB-25 cable when connecting your line communication device to the BR Router's RS-232 interface. The cables provided with other equipment will generally not have the same internal connections.*

Chapter 3 - Hardware Installation

AUX   Ethernet 0

WAN 0   WAN 1
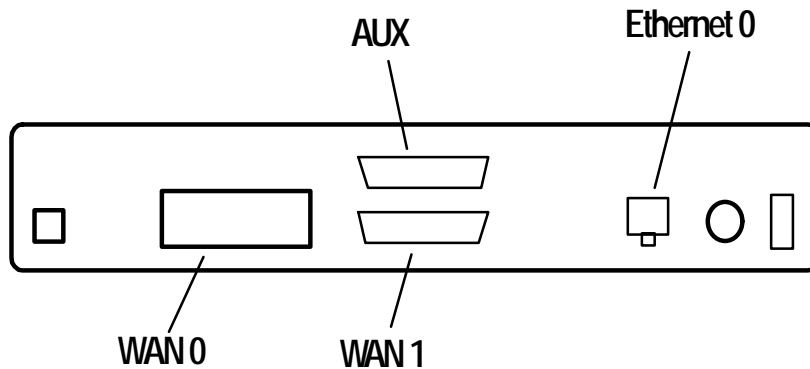
BR Router Back Panel

This section of the manual describes how to connect the BR Router to your Ethernet network and your wide area communications device(s). In summary, the steps for installation are:

1.   **Make sure the router is powered down and not plugged in to the wall.**

2.   **Connect the router to the Ethernet network.**

3.   **Connect the router to the wide area line communications device(s).**

4.   **Power up the line communications devices.**

5. **Plug in the power cable and power up the router.**

Mounting the Router

The BR Router is meant to be left standalone on a desktop or equipment table.

❖ **Note**: *When stacking other equipment on the BR Router, do not exceed 25 pounds of evenly distributed weight on top of the router. Additional weight may bend the case.*

Connecting the Router to the Ethernet

If your twisted-pair hub is already in place, you can connect the router to an active network without interrupting network activity.

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 BR Router

The BR Router supports high-speed synchronous operation over a V.35 connector. It also supports lower speed synchronous/asynchronous operation over an RS-232 connector.

The BR Router independently supports PPP and Frame Relay link protocols on each WAN interface.

Connecting Devices to the V.35 Interface

This interface -- WAN 0 -- can be used to connect to a wide variety of line communications devices, including those which support either leased or dialed operation. Examples include leased 56K CSU/DSU's, switched 56K CSU/DSU's, fractional T1 CSU/DSU's, ISDN terminal adapters, and full T1/E1 rate CSU/DSU's.

You may select either dial-on-demand, redial if down ("always up" mode), 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 a V.35 cable (not supplied) between the router and the device.

Connecting Devices to the RS-232C Interface

This interface -- WAN 1 -- 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/DSU's, and ISDN terminal adapters.

You may select either dial-on-demand, redial if down ("always up" mode), 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 BR Router 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 BR Router 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 AUX/Console interface on the back of the BR Router. You can use a dumb terminal or a computer equipped with VT100 terminal emulation.

The default baud rate for the AUX/Console interface is 9600.

Powering Up the Router

Power up all modems, CSU/DSU's, and TA's <u>before</u> powering up the router. This allows the router to immediately sense which of its interfaces are connected. At power-up, the router will take approximately one minute to become visible to RouterView.

❖ **Note**: *If you want to use Telnet as a management method, you must first configure an IP address into the router with an out-of-band console, with RouterView, or with a reconfigured IP host or workstation on the same Ethernet segment as the router. See the chapter in this manual on Setting Up Command Line Management.*

Chapter 4 - RouterView Software Installation

All of the routers in DCB's multiprotocol family, can be managed from a single management platform called RouterView. Both a Windows and a Macintosh version of RouterView were included with your BR Router.

❖ **Note**: *Although the installation procedures for the Windows and Macintosh versions of RouterView are slightly different, the programs themselves are virtually identical. Once you have installed RouterView on the platform of your choice, you can find more information on how to use it in the RouterView Reference Guide which was included with your router.*

RouterView for Windows

RouterView for Windows allows you to manage the BR Router from an IBM-compatible PC running Windows 3.1, Windows for WorkGroups, Windows 95, 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 RouterView for Windows, you need:

- IBM PC or compatible w/ 386 or later processor

- Windows 3.1, Windows for Workgroups, Windows 95, or Windows NT installed

- VGA or better monitor

And an IPX configuration or an IP configuration (or both) consisting of:

- A Windows 3.1 Novell IPX client configuration, using IPXODI.COM

    - or -

    A Windows for Workgroups, Windows 95, or Windows NT machine running IPX/SPX Compatible Transport

- A WinSock client configuration on an IP network

❖ **Note:** *The "IPX 101" appendix to the RouterView Reference Guide contains some tips on getting Novell's IPX ODI running on your Windows client machine.*

❖ **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.*

Installation and Operation

This version of the RouterView program can be found on a 3.5-inch diskette labeled "RouterView - Windows Disk" that was included with your BR Router.

Start Windows. Insert the diskette into your computer's disk drive. At the Windows Program Manager, select "Run" from the File menu and type A:SETUP (where A: is the drive containing the RouterView diskette). This will invoke an auto-installation program supplied with RouterView.

The installation program will ask you to select (or create) a directory in which it should locate RouterView and its associated files and database subdirectory.

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

❖ **Note**: *RouterView will be able to use the transport protocol (IP or IPX) you have selected to access DCB routers anywhere on your internetwork. This means you can use the IP transport option to manage routers across the Internet.*

❖ **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 RouterView installation directory.*

RouterView for Macintosh

RouterView for Macintosh allows you to manage the BR Router from an Apple Macintosh or compatible computer. RouterView for Macintosh uses the AppleTalk protocol to communicate with the router.

System Requirements

A Macintosh version of RouterView was included with your router. You can run RouterView from any Macintosh on your network that meets the following technical specifications:

• Macintosh with 68030 or later processor (including PowerPC)

• System 7.0 or later.

❖ **Note**: *Although older Macintoshes such as SE/30's and IIsi's will run RouterView adequately for infrequent use, a newer/faster machine is preferable for larger networks where RouterView will be used more often.*

Installation and Operation

To install RouterView for Macintosh, simply insert the RouterView diskette into the floppy drive of your Macintosh. Then double click on the self extracting archive (.sea) icon. You will be asked where you would like to locate your copy of the RouterView program and data files.

Double-click on the RouterView icon and the program will start up and ask you to select/create a location for its data files. Once the data files have been created, this message will not reappear when you run RouterView.

For further information on using RouterView, see the RouterView Reference Guide included with your router.

Chapter 5 - 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 BR Router's AUX/Console interface.

Telnet is a remote terminal communications protocol based on TCP/IP. With Telnet you can log into and manage the router from anywhere on your IP internetwork, including across the Internet if you choose. To do this, you must run Telnet client software on your local computer, which will communicate with the Telnet server built into the router.

In order to be able to access the command-line interface via Telnet, you must first set some IP parameters in the router.

You can set basic IP parameters out-of-band using the AUX/Console interface and a terminal or a PC with terminal emulation software, or in-band with a reconfigured IP host or RouterView.

After the IP parameters are set and saved to Flash ROM, you can complete the configuration in-band with Telnet.

Out-of-Band Command Line Management

You can use command line management 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, set a terminal or a PC to a baud rate of 9600, and connect it to the router's AUX/Console interface using the cable which was supplied with the router. Press the <Return> key one or two times.

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 using the command line interface in the Command Line Reference Guide that was supplied with your router. Otherwise, see the section below (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 router's IP parameters to allow in-band Telnet access. Once you have set these parameters you will want to change the host's configuration back to its original settings.

If you wish to set the router's basic IP parameters in this fashion, the host must be on the same Ethernet segment as the router's Ethernet interface. You can set the host's IP address to 198.41.12.2, with a class C mask (255.255.255.0) and then Telnet to 198.41.12.1.

Enter the default password *letmein* at the password prompt. The command line interface prompt will appear on the screen.

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

In order to communicate to the router via Telnet from any host on your IP internetwork, you must complete basic IP configuration for the router interface which is connected to your Ethernet.

Basic IP configuration can be done using the **interface**, **set ip,** and **save** commands from a console or a reconfigured host. For more information on these commands, see the *interface(misc)*, *ip(set)*, and *save(misc)* commands in the Command Line Reference Guide which was supplied with your router.

The required parameters for Telnet access to an interface are the IP address, IP subnet mask, and IP broadcast address. To change the configuration parameters in the BR Router, the router will request a password. The default for this password is also *letmein*.

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

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

Chapter 6 - Quickstart Instructions

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

This section does not include information on setting up packet filters for using the router as a Firewall. See the RouterView manual or Command Line manual regarding IP packet filters for more information.

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 section.

In this section:

RV = RouterView

CL = Command Line

❖ **Note**: *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 BR Router.*

❖ **Note**: *Considerably more information on the meaning of the router's parameters is provided in the RouterView Reference Guide and the Command Line 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, IPX, AppleTalk, or wide-area protocols, see the Appendices in the RouterView Reference Guide.*

Ethernet Interface Configuration

Ethernet interfaces are considerably easier to set up than wide area interfaces since there are no choices that need to be made regarding line communications devices and their 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

RV: Use the Ethernet - IP screen to set these parameters.

CL: Use the **interface**(misc) and **ip**(set) commands.

Suggested for IP

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

- IP RIP 1 (Routing Information Protocol version 1)

and/or

- IP Static Routes

RV: Use the Ethernet - IP screen to set RIP, and the IP Static Routing Window (All - IP) to set static routes.

CL: Use **interface**(misc) and **ip flags**(set) to set RIP, and **ip route**(add) to add static routes and a default route/router.

IPX Protocol

Required for IPX

There are generally no required changes from the shipping Ethernet configuration for IPX. The Ethernet interface will autoconfigure to use the two most common IPX frame types, and will autoadapt to conditions on the Ethernet.

Suggested for IPX

You may want to set your own network numbers, rather than using the autoconfigured values. You may also want to turn off unused frame types.

RV: Use the Ethernet - IPX screen.

CL: Use **interface**(misc) and **ipx**(set).

AppleTalk Protocol

Required for AppleTalk

There are generally no required changes from the shipping Ethernet configuration for AppleTalk. The Ethernet interface will autoconfigure to use AppleTalk Phase 2, and will autoadapt to conditions on the Ethernet.

Suggested for AppleTalk

You may want to set your own network numbers, rather than using the autoconfigured values. You may also want to use more meaningful zone names.

RV: Use the Ethernet - AppleTalk screen.

CL: Use **interface**(misc) and **appletalk**(set).

DECnet Protocol

Required for DECnet

The router's shipping configuration does not have DECnet turned on. You must turn it on and set several DECnet parameters.

- Turn DECnet on

- Set DECnet area

- Set DECnet node

RV: Use the Main DECnet screen (All - DECnet).

CL: Use **decnet**(set).

Suggested for DECnet

Setting the parameters above should be adequate for most installations.

WAN Interface PPP Configuration

This section covers the settings required for PPP (point-to-point) protocol operation of the BR Router WAN interfaces. In general, the parameters listed here should be set for each WAN interface on which you plan to use PPP. Note that one WAN interface can be running PPP while the other is running Frame Relay.

There are a few differences between the capabilities of the V.35 WAN interface and the RS-232 WAN interface. The V.35 interface can only be run synchronously, at rates up to 2 Mbps per second. The RS-232 interface can be run synchronously or asynchronously, at rates up to 256Kbps (sync), or 230.4Kbps (async).

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.

• IP RIP 1 (Routing Information Protocol version 1)

and/or

• IP Static Routes

• IP Default Route/Router

❖ **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 DCB router at the other end of the link.*

RV: Use the WAN - IP screen to set RIP and the update method, and the IP Static Routing Window (All - IP) to set static routes and a default route/router.

CL: Use **interface**(misc) and then **ip flags**(set) to set RIP, and **ip wan**(set) to set the update method, and **ip route**(add) to add static routes and a default route/router.

IPX Protocol

Required for IPX

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

Suggested for IPX

If you plan to use dial-on-demand for this link, you should set the update method "triggered" to avoid the link being brought up by transmission of IPX RIP information. You should only use triggered operation when you are connecting to another DCB router at the other end.

When you set up an on-demand link with IPX, you should carefully monitor link usage to determine whether the link is being activated only when it is needed. Additional router configuration will be required for many networks in order to achieve optimal link usage.

- Update Method

RV: Use the WAN - IPX screen.

CL: Use **interface**(misc) and then **ipx wan**(set).

AppleTalk Protocol

Required for AppleTalk

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

Suggested for AppleTalk

If you plan to use dial-on-demand for this link, you should set the update method to triggered to avoid the link being brought up by transmission of AppleTalk RTMP information. You should only use triggered operation when you are connecting to another DCB router at the other end.

When you set up an on-demand link with AppleTalk, you should carefully monitor link usage to determine whether the link is being activated only when it is needed. Additional router configuration will be required for many networks in order to achieve optimal link usage.

- Update Method

RV: Use the WAN - AppleTalk screen.

CL: Use **interface**(misc) and then **appletalk wan**(set).

DECnet Protocol

Required for DECnet

WAN interfaces which are set for PPP dial-on-demand operation should have their DECnet hello timers and DECnet routing timers set for a fairly long period, since the link will be brought up when this information is transmitted.

Because of the need to regularly bring the link up to exchange routing information, on-demand operation using DECnet is not recommended.

- Hello timer
- Routing timer

RV: Use the WAN - DECnet screen.

CL: Use **interface**(misc) and then **decnet wan**(set).

Link Configuration

Required for Dedicated/Leased Line Operation

Dedicated line operation is the simplest to set up.

- Set Dedicated connection

- Set PPP connection

RV: Use the WAN - Link screen.

CL: Use **interface**(misc) and then **wan connect**(set).

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

RV: Use the WAN - Link screen.

CL: Use **interface**(misc) and then **wan connect**(set).

Suggested for Dial-On-Demand Operation

Outgoing dial-on-demand requires some additional information.

- Set dialing method

- Create dial-out script

- Set dial-out script to be used

- Set inactivity time

RV: Use the WAN - Link window to set the dialing method and to select a chat script (once you have created one). Use the Chat Script Editor window (All - Link) to create your chat script.

CL: Use **interface**(misc) and then **wan connect**(set) to set the dialing method and inactivity time, and to select a chat script (once you have created one). Use the **chat**(edit) command to create a chat script.

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.

RV: Use the WAN - General window.

CL: Use **interface**(misc) and then **wan serial**(set).

WAN Interface Frame Relay Configuration

This section covers the settings required for Frame Relay operation of the BR Router WAN interfaces. In general, the parameters listed here should be set for each WAN interface on which you plan to use Frame Relay. Note that some WAN interfaces can be running Frame Relay while others are running PPP.

There are a few differences between the capabilities of the V.35 WAN interface and the RS-232 WAN interface. The V.35 interface can only be run synchronously, at rates up to 2 Mbps per second. The RS-232 interface can be run synchronously or asynchronously, at rates up to 256Kbps (sync), or 230.4Kbps (async).

IP Protocol

Required for IP

Frame Relay operation requires that the WAN interface is set to be a "numbered interface." This means that the interface (and thus the Frame Relay network) must have an IP address, etc.

- IP numbered interface

- IP Address

- IP Subnet mask

- IP Broadcast Address

RV: Use the WAN - IP screen to set these parameters.

CL: Use the **interface**(misc) and **ip wan**(set) commands.

Suggested for IP

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

- IP RIP 1 (Routing Information Protocol version 1)

and/or

- IP Static Routes

- IP Default Route/Router

RV: Use the WAN/IP screen to set RIP, and the IP Static Routing Window (All - IP) to set static routes and a default route/router.

CL: Use **interface**(misc) and then **ip flags**(set) to set RIP, and **ip route**(add) to add static routes and a default route/router.

IPX Protocol

Required for IPX

Frame Relay operation requires that the WAN interface is set to be a "numbered interface." This means that the interface (and thus the Frame Relay network) must have an IPX network number.

- IPX numbered interface

- IPX Network Number

RV: Use the WAN - IPX screen.

CL: Use **interface**(misc) and then **ipx wan**(set).

Suggested for IPX

The settings above are all that is generally required for IPX operation over Frame Relay.

AppleTalk Protocol

Required for AppleTalk

Frame Relay operation requires that the WAN interface is set to be a "numbered interface." This means that the interface (and thus the Frame Relay network) must have an AppleTalk network number and the interface must have an AppleTalk node number.

- AppleTalk numbered interface

- AppleTalk Network Number

- AppleTalk Node Number

RV: Use the WAN - AppleTalk screen.

CL: Use **interface**(misc) and then **appletalk wan**(set).

Suggested for AppleTalk

The settings above are all that is generally required for AppleTalk operation over Frame Relay.

DECnet Protocol

Required for DECnet

WAN interfaces which are set for Frame Relay operation do not need any additional parameters set in order to function.

Link Configuration

Frame Relay is presently supported in the BR Router only via synchronous dedicated line operation.

- Set interface for Synchronous operation

- Set Dedicated connection

- Set Frame Relay connection

RV: Use the WAN/Link screen.

CL: Use **interface**(misc), **wan serial**(set), and **wan connect**(set).

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 DCB router, this information is not required for Frame Relay operation. DCB 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 BR Router interfaces will be connected to an ISP via Frame Relay, check with your ISP technical staff on whether you must manually enter DLCI information or not.*

RV: Use the DLCI Mapping Database window.

CL: Use **interface**(misc) and then **frelay**(set).

Physical Communication 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.

RV: Use the WAN - General window.

CL: Use **interface**(misc) and then **wan serial**(set).

Appendix A - Shipping Defaults

Ethernet Interface

IP Routing Defaults

- On

- Address: 198.41.12.1

- Subnet Mask: 255.255.255.0

- Broadcast Address: 198.41.12.255

- IP RIP off

IPX Routing Defaults

- 802.3 on, autoseeding

- 802.2 on, autoseeding

- Type II off

- 802.2 SNAP off

AppleTalk Routing Defaults

- Phase I off

- Phase II on

DECnet Defaults

- Off

WAN Interfaces

IP Defaults

- On

- Unnumbered interface

- RIP off

- Van Jacobson compression off

IPX Defaults

- On

- Unnumbered interface

AppleTalk Defaults

- On

- Unnumbered interface

DECnet Defaults

- Off

V.35 (WAN 0) Link & Physical Defaults

- PPP

- Dedicated

- Sync, external clock

RS-232 (WAN 1) Link & Physical Defaults

- PPP

- Dial-in

- Async @ 115.2Kbps

- Hardware flow control

Appendix B - Connector and Cable Pin Outs

Pin Outs for V.35 Female Connector (DTE)

V.35 (DTE)	Signal	
A	Chassis Ground	<->
B	Signal Ground	<->
C	Request to Send	->
D	Clear to Send	<-
E	Data Set Ready	<-
F	Receive Line Signal Detect	<-
H	Data Terminal Ready	->
J	Local Loopback	->
P	Tx Data	->
R	Rx Data	<-
S	Tx Data	->
T	Rx Data	<-
U	Tx Clock Out	->
V	Rx Clock In	<-
W	Tx Clock Out	->
X	Rx Clock In	<-
Y	Tx Clock In	<-
AA	Tx Clock In	<-

Pin Outs for DB-25 Male to DB-25 Female RS-232 Data & AUX/Console Cable

The cable supplied with the BR Router is twenty-five conductors, straight through. Connections on both the auxiliary interface and the data interface follow the standard RS-232 pin outs. Note that the data interface may be set for synchronous operation and in this mode the data interface will use the clock lines provided by RS-232.

Appendix C - LED Patterns and Test Switch Settings

BR Router LED Patterns

The BR Router uses a number of light patterns on its front LED bars to indicate operating conditions.

Power On, No Traffic

The router will scan through the left (Ethernet) LED bar, from left to right, illuminating one element at a time.

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

Ethernet **Traffic Indicators (Ethernet LED Bar)**

Scan from 2 to 5: Ethernet transmit packet

Scan from 9 to 6: Ethernet receive packet

Other Indicators (on All LED Bars)

Transmit and receive packets - per WAN interface as marked on front label.

5,6 flashing: Router stacks starting up

3,4 & 7,8 flashing: No OS loaded. Running from ROM.

5,6 on solid, 2 (bars 1 & 3) and 9 (bars 2 & 4) flashing : Erasing OS in Flash ROM

4,5,6,7 on solid, 2 (bars 1 & 3) and 9 (bars 2 & 4) flashing : Erasing config in Flash ROM

Scanning from 2 to 9 (bars 1 & 3), and scanning from 9 to 2 (bars 2 & 4): Flash ROM erase due to switch setting five or six is complete. Set switch to zero and cycle power.

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. Please call DCB Technical Support if your router shows a software panic.

BR Router Switch Settings

0   **Normal Operation**

1   Unused*

2   Unused*

3   **Run Boot ROM Downloader**

4   Unused*

5   **Erase Flash ROM (OS and Configuration)**

6   **Erase Flash ROM (Configuration Only)**

7   Unused*

8   Unused*

9   **Allow** *letmein* **password for 5 minutes after powerup**

Notes:

1. Settings marked with an asterisk may erase your Flash ROM. Please don't use these settings without <u>first</u> contacting DCB Tech Support.