Upgrading Routers from Version 7-11.*xx* to Version 12.00

BayRS Version 12.00
Site Manager Software Version 6.00

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Bay Networks

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Before You Begin

Before using this guide, you must complete the following procedures for a new router:

- Ensure that your router is currently running a version of Router Software Version 7-11.*xx* router software. Also, be sure that you are running Bay Networks Site Manager Version 1.*xx* or later.
- Connect the router to the network and create a pilot configuration file (refer to *Quick-Starting Routers*, *Configuring BayStack Remote Access*, or *Connecting ASN Routers to a Network)*.
- Ensure that the router you want to upgrade meets BayRS Version 12.00 hardware and flash free-space prerequisites. If you need help meeting prerequisites, contact the Bay Networks Technical Solutions Center in your area.
- Install the router hardware.

  For instructions, refer to one of the following guides:

  -- *Installing and Maintaining BN Routers*

  -- *Installing and Maintaining ASN Routers*

  -- *Installing and Starting BayStack AN Routers*

  -- *Installing and Starting 8-Port BayStack ANH Systems*

  -- *Installing and Maintaining FN, LN, CN, AFN, and ALN Routers*

Conventions

angle brackets (< >)	Indicate that you choose the text to enter based on the description inside the brackets. Do not type the brackets when entering the command. Example: if command syntax is **ping** *<ip_address>*, you enter **ping 192.32.10.12**
bold text	Indicates text that you need to enter, command names, and buttons in menu paths. Example: Enter **wfsm &** Example: Use the **dinfo** command.

	Example: ATM DXI > Interfaces > **PVCs** identifies the PVCs button in the window that appears when you select the Interfaces option from the ATM DXI menu.
brackets ([ ])	Indicate optional elements. You can choose none, one, or all of the options.
ellipsis points	Horizontal (. . .) and vertical (⋮) ellipsis points indicate omitted information.
italic text	Indicates variable values in command syntax descriptions, new terms, file and directory names, and book titles.
quotation marks (“ ”)	Indicate the title of a chapter or section within a book.
`screen text`	Indicates data that appears on the screen. Example: `Set Bay Networks Trap Monitor Filters`
separator (>)	Separates menu and option names in instructions and internal pin-to-pin wire connections. Example: Protocols > AppleTalk identifies the AppleTalk option in the Protocols menu. Example: Pin 7 > 19 > 20
vertical line (|)	Indicates that you enter only one of the parts of the command. The vertical line separates choices. Do not type the vertical line when entering the command. Example: If the command syntax is **show at routes** | **nets**, you enter either **show at routes** or **show at nets**, but not both.

Acronyms

AFN	Access Feeder Node
ALN	Access Link Node
BootP	Bootstrap Protocol
CPU	Central Processing Unit
DCE	Data Circuit-terminating Equipment
DCM	Data Collection Module
DTE	Data Terminal Equipment

FTP	File Transfer Protocol
GUI	Graphic User Interface
HDLC	high-level data link control
HSSI	high-speed serial interface
IP	Internet Protocol
IPX	Internet Packet Exchange
LAN	local area network
MAC	media access control
MIB	Management Information Base
OSPF	Open Shortest Path First
PPP	Point-to-Point Protocol
PPX	Parallel Packet Express
PROM	Programmable Read-Only Memory
RAM	random-access memory
RMON	Remote Monitor
RIP	Routing Information Protocol
SIMM	Single In-line Memory Module
SPEX-HS	Stack Packet Exchange-Hot-Swaps
TFTP	Trivial File Transfer Protocol

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Asia/Pacific	61-2-9927-8888	61-2-9927-8899
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Santa Clara, CA	800-2LANWAN	408-495-1188
Valbonne, France	33-4-92-96-69-68	33-4-92-96-69-98
Sydney, Australia	61-2-9927-8800	61-2-9927-8811
Tokyo, Japan	81-3-5402-0180	81-3-5402-0173

Chapter 1
Router Upgrade Overview

This chapter describes the router upgrade process and provides a checklist that you should carefully review before you begin the router upgrade process. Refer to the following topics:

Router Upgrade Process

The process for upgrading routers from Router Software Version 7-11.*xx* to BayRS Version 12.00 consists of four major phases and three optional tasks, depending on your router configuration requirements:

1. Preparing to upgrade (see Chapter 2)
2. Starting the upgrade: upgrading to Site Manager Version 6.00 and BayRS Version 12.00 (see Chapter 3)
3. Continuing the upgrade: transferring the customized image files and associated router files to the router and upgrading PROMs (see Chapter 4)
4. Completing the upgrade: booting the router with the customized image and upgrading the configuration (see Chapter 5)

The optional tasks include:

- Upgrading the DCM software image in BayStack routers (Appendix C)
- Upgrading BayRS routers using Quick2Config (Appendix D)

The router upgrade process applies to the following Bay Networks routers:

- Access Feeder Node (AFN®) (with flash)
- Access Link Node (LN®)
- Access Node (AN®)
- BayStack™ routers (AN, ANH™, and ARN™)
- Access Node Hub (ANH)
- BayStack Access Node Hub
- BayStack Access Remote Node
- Access Stack Node (ASN™)
- Backbone Concentrator Node (BCN®)
- Backbone Link Node (BLN®)
- Concentrator Node (CN®)
- Feeder Node (FN®)

Note: If you are upgrading an AN, ANH, ASN, or ARN router, you must read *Configuring BayStack Remote Access* or *Connecting ASN Routers to a Network* before you begin the upgrade process. These guides explain the special considerations for configuring and booting ANs, ANHs, ARNs, and ASNs.

Router Upgrade Checklist

Review the following items in this checklist before you begin the router upgrade process:

1. **Check your hardware requirements, the amount of contiguous free space on your flash volume, and the version of your Boot PROM.**

   See “Router Upgrade Prerequisites” on page 2-5.

2. **Identify the version of router software you are currently running. You should be running Router Software Version 7-11.*xx*.**

   If you plan to run RMON on a BayStack router (AN, ANH, or ARN), you must first upgrade the DCM software image version to 1.4.2. For instructions on upgrading the DCM software image, see Appendix C.

3. **Identify the hardware configuration of the router you want to upgrade (router model, link modules, and slot assignments for link modules).**

4. **Gather the manuals you will need to refer to during the router upgrade process (Table 1-1). These manuals provide detailed information about many of the concepts and procedures outlined in this manual.**

Table 1-1. Reference Books for Upgrading Routers

To Do This	Refer to This Book
Upgrade Site Manager on a PC or UNIX workstation.	*Quick-Starting Routers*
Upgrade router software on a PC or UNIX workstation.	*Configuring and Managing Routers with Site Manager*
Customize the router software image.	*Configuring and Managing Routers with Site Manager*
Back up the router software image and configuration files	*Configuring and Managing Routers with Site Manager*
Transfer your customized image and router files to the router.	*Configuring and Managing Routers with Site Manager*
Upgrade Boot or Diagnostic PROMs in a router.	*Using Technician Interface Software*
Boot the router with a customized image.	*Configuring and Managing Routers with Site Manager*
Upgrade configuration files on the router.	*Configuring and Managing Routers with Site Manager*

5. **Review the configuration-specific issues that affect router upgrades to determine whether they apply to your situation.**

   Appendix B describes configuration-specific issues affecting router upgrades. If you are upgrading routers in an environment that includes any of the situations shown in Table 1-2, follow the instructions on the pages indicated.

Table 1-2. Configuration-Specific Situations Affecting Router Upgrades

Configuration-Specific Situation	Page
Routers passing X.25 certification	B-2
Standard point-to-point connections over synchronous lines	B-3
Switched Services enhancements and compatibility	B-4
PPP multiline migration	B-6

Chapter 2
Preparing to Upgrade

This chapter describes Site Manager and router prerequisites that you must meet before starting the router upgrade process. See the following topics:

Site Manager Upgrade Prerequisites

Before you upgrade to Site Manager Version 6.00, be sure to review Site Manager system requirements; update TCP/IP, network adapters, and drivers on the PC; and test the TCP/IP network connection.

Reviewing Site Manager System Requirements

Site Manager is a graphical user interface for router configuration and management over an IP network. To run Site Manager Version 6.00, your PC, IBM workstation, SPARCstation, or HP 9000 must meet the hardware and software requirements listed in Table 2-1.

Table 2-1. Site Manager System Requirements

Platform	Hardware and Software Requirements
PC	• 486 PC (Pentium recommended) • Microsoft Windows 95 • 16 MB of RAM (minimum) • 60 MB of free disk space • Microsoft Windows TCP/IP protocol and compatible network adapters and drivers • CD-ROM drive • VGA monitor (SuperVGA monitor recommended)
IBM workstation	• Supported workstations: -- RS/6000 340, 370 -- PowerPC • Supported operating system is IBM AIX Version 4.2 • Window environment: -- CDE 1.0.1 -- AIX Motif 1.2 • 32 MB of RAM (64 MB recommended) • 80 MB of disk space • 32 MB of swap space (64 MB recommended -- use 96 MB of swap space with the NetView for AIX application) • Network adapter appropriate for your network • CD-ROM drive

(continued)

Table 2-1. Site Manager System Requirements *(continued)*

Platform	Hardware and Software Requirements
SPARCstation	• Supported workstations -- SPARCstation 10, 20 -- UltraSPARCstation • Supported operating systems: -- SunOS 4.1.4 -- Solaris 2.5 and 2.5.1 • Window environment for Solaris: -- CDE 1.0.1 -- OpenWindows 3.5 • 32 MB of RAM (64 MB recommended) • 32 MB of swap space • 85 MB of disk space • Network adapter appropriate for your network • CD-ROM drive
HP 9000	• Supported workstations include HP 9000 Series 700 or 800 • Supported operating system is the HP-UX 10.20, including the complete network services directory • Window environment includes CDE 1.0.1 • 32 MB of RAM • 95 MB of free disk space • 32 MB of swap space (64 MB recommended) • Network adapter appropriate for your network • CD-ROM drive

Updating TCP/IP, Network Adapters, and Drivers

Site Manager Version 6.00 for Windows 95 requires the Microsoft TCP/IP protocol stack provided with Windows 95 and a compatible network adapter and driver.

If you purchased a machine with Windows 95 and a network adapter installed, most likely you have the correct TCP/IP protocol stack, network adapter, and driver.

If you need to upgrade from Windows 3.1 to Windows 95, first uninstall any existing 16-bit TCP/IP stack, such as Distinct TCP/IP Run Time. Otherwise, Windows 95 will install that stack instead of the Microsoft TCP/IP protocol stack.

If you already upgraded from Windows 3.1 to Windows 95 and the upgrade kept an existing 16-bit TCP/IP stack, such as Distinct TCP/IP Run Time, you must uninstall the 16-bit TCP/IP stack before adding the Microsoft TCP/IP protocol stack.

To uninstall a 16-bit TCP/IP stack, refer to the TCP/IP provider's documentation and support for help in removing the stack's path statements, services file, and WINSOCK.DLL files dated prior to 7/11/95 (the date of the WINSOCK.DLL file installed by Windows 95).

To add or update a protocol, network adapter, or driver, refer to the appropriate documentation and support from Microsoft and the adapter manufacturer. Protocols and driver updates are added from the Network option of the Control Panel. New network adapters and their drivers are added from the Add New Hardware option of the Control Panel.

Windows 95 attempts to match a driver to the network adapter installed on your PC. If Windows 95 cannot match a compatible driver, you need to update the drivers. Contact the adapter manufacturer for the latest drivers. Microsoft and other Windows 95 Web sites may also have updated drivers.

See the *Microsoft Windows 95 Resource Kit* for additional technical information about these issues. A hard copy is available from Microsoft Press.

Testing TCP/IP

From your Site Manager workstation, send a ping request to the router before installing Site Manager to make sure your computer's TCP/IP function is running:

1. **From the Start menu, choose Programs > MS-DOS Prompt.**
2. **Enter the following command to ping your router:**

   ping <*ip_address*>

   <*ip_address*> is the IP address of your router.

   Messages appear at the prompt indicating whether replies were received. Replies verify that your Microsoft TCP/IP protocol stack is functional.

Upgrading Version 7-9.*xx* Routers

If you have a Version 7-9.*xx* router and you want to upgrade to BayRS Version 12.00 and Site Manager Version 6.00, you must complete the upgrade procedure twice. First, you must upgrade to Router Software Version 10.0 and Site Manager software Version 4.0. Then you must upgrade from Router Software Version 10.0 and Site Manager Version 4.0 to BayRS Version 12.00 and Site Manager 6.00.

For detailed instructions about upgrading Version 7-9.*xx* routers, see Appendix E.

Router Upgrade Prerequisites

Do not begin the router upgrade process until you verify that the router you want to upgrade meets the prerequisites described in this chapter.

Note: If you need help meeting the hardware prerequisites of the Version 12.00 router software upgrade procedure, contact the Bay Networks Technical Solutions Center in your area.

Verifying Minimum Hardware and Configuration Requirements

Before you upgrade to BayRS Version 12.00, perform the following steps to ensure that your router meets all minimum hardware configuration and revision level requirements:

1. **Check the flash memory requirements for the router you are upgrading.**

   Ensure that you have adequate flash memory to accommodate the Version 12.00 router software. For instructions on how to check flash memory, refer to "Verifying Contiguous Free Space on a Flash Volume."

2. **Complete any planned (optional) upgrade from 2 MB flash to 4 MB or 8 MB flash support on your router.**

   This procedure may include a Boot PROM upgrade for the processor module in which your flash card resides. For example, if you have a VME-based router, you upgrade your flash card on a System Controller 2 (SYSCON-II) card. If you have a BN router, you upgrade your flash card in each of your FRE® or FRE-2 processor modules.

BayRS Version 12.00 supports 8 MB flash capacity on BN and ASN routers. Before you upgrade your 8 MB flash card to Version 12.00, make sure that you upgrade your Boot PROM to Version 8.00 or later.

3. **Determine whether any other new router hardware depends on software or PROM upgrades to work properly.**
4. **Complete any planned physical installations of the following router hardware:**
   - Spare FRE/FRE-2 controllers in your Version 7-11.*xx* BLN, BLN-2, or BCN router
   - Additional/spare ASNs on your Version 8.*xx*, 9.*xx*, 10.0, or 11.*xx* ASN router
   - New link modules in the router

Verifying Contiguous Free Space on a Flash Volume

You must determine the amount of contiguous free space required on a flash card to accommodate your customized Version 12.00 router software image and configuration files. The amount of contiguous free space available on the target flash volume must be greater than the combined size of your customized Version 12.00 image and associated files (such as *config*, *ti.cfg*, *install.bat*, and, if appropriate, a Version 12.00 PROM image).

To obtain the amount of contiguous free space available on a selected volume, see the fields at the bottom of the Router Files Manager window in Site Manager (Table 2-2).

Table 2-2. Determining Contiguous Free Space on a Flash Card

Field	Meaning
Total SIze	Total number of bytes (used and unused) on the volume.
Available Free Space	Number of unused bytes on the volume.
Contiguous Free Space	Number of unused bytes in the largest block available on the volume. This space is actual usable memory.

Satisfying Initial Startup Requirements

Before you begin the router upgrade procedure:

- Identify the router software version you are currently running. You should be running Router Software Version 7-11.*xx*.

  Also, if you plan to run RMON on a Version 12.00 BayStack router, you must first upgrade the DCM software image to Version 1.4.1; earlier versions do not work with BayRS Version 12.00.

- Identify the hardware configuration of the router you want to upgrade (router model, link modules, and slot assignments for link modules).

- Consider your memory requirements carefully. Depending on the number of protocols installed on your router, you may require additional memory to run these protocols.

  If you have questions regarding memory requirements, contact the Bay Networks Technical Solutions Center in your area.

- Obtain a working knowledge of both the operating system and the windowing software on the UNIX workstation or PC you will use to run Site Manager software.

- Obtain a 4 MB or 8 MB flash card (depending on your router type) on which to store the Version 12.00 router software image and associated files. A 2 MB flash card will not accommodate the BayRS Version 12.00 files.

- Consider minimum hardware revisions (for example, a link module with hot-swap capability may require a hardware revision for Version 12.00).

- Read these Bay Networks publications:

  -- *Release Notes for BayRS Version 12.00*

  -- *Release Notes for Site Manager Software Version 6.00*

  -- *Known Anomalies: Router Software 12.00 and Site Manager 6.00*

Inspecting the Upgrade Kit

Check your upgrade kit to ensure that it contains the BayRS Version 12.00 and Site Manager Version 6.00 upgrade components listed in Table 2-3.

Table 2-3. BayRS and Site Manager Software Upgrade Components

Component	Software Storage Media and Printed Media	Management Platform
BayRS Version 12.00 includes: • Platform-specific Router Software image files • Platform-specific Boot and Diagnostic image files • *config* file • *debug.al* file • *install.bat* file • *bcc_help* file (AN or BN routers only) • *ti.cfg* file • *ti_asn.cfg* file (for ASN router only) • *ti_arn* file (for ARN router only) • *inst_arn.bat* (ARN router install procedure) Site Manager Version 6.00 includes Technician Interface Scripts.	CD-ROM in High Sierra file format	UNIX workstation or Windows/DOS PC

The upgrade kit also includes a CD that contains both the BayRS Version 12.00 on-line documentation library and the printed versions of the following BayRS Version 12.00 manuals:

- Router upgrade document (Version 7-11.*xx* to Version 12.00)
- Site Manager Release Notes
- Router Software Release Notes
- Known Anomalies

Reviewing Configuration-Specific Issues Affecting Router Software Upgrades

Depending on the current configuration of your Version 7-11.*xx* router, you may need to consider certain issues before you begin the upgrade process. If you are upgrading routers in an environment that includes any of the following configuration-specific situations, see Appendix B for detailed information:

- X.25 certification requirements
- Bay Networks Standard Point-to-Point (PPP) connection guidelines
- Switched Services enhancements and compatibility issues
- PPP multiline migration issues

If none of these situations applies to the router you are upgrading, go to Chapter 3 to begin the router upgrade process.

Using the BCC Help File

The BCC includes a new file called *bcc.help* in the router upgrade media for BayRS Version 12.00. The file ships on the same flash card as the router boot image, as well as in the *rel* directory of the upgrade CD. The file is included in all AN and BN router software suites.

To use BCC online Help, you must transfer the *bcc.help* file onto the router's flash card. For instructions about transferring files to the router's flash card, see "Task 2: Transferring a Customized Image and Router Files to the Router" on page 4-5.

The file is called *bcc.help* by default. You can specify a new path name for this Help file, and then save this change to your existing configuration file as follows:

```
$ bcc
bcc> config
box# help-file-name <slot_number>:<file_name.help>]
box# save config <config_filename>
```

<slot_number> is the slot number on which you want to store the Help file.

<*file_name.help*> is the Help file name (for example, *bcc.help*).

<*config_filename*> is the router configuration file name.

Backing Up Your Files

Store backup copies of the configuration files on the Site Manager workstation. To prevent confusion, use a log to record the location, name, and purpose of each configuration file you back up. Organizing and naming the backup files on the Site Manager workstation will also help you prevent mix-ups.

Caution: Always back up a file before deleting it. This includes configuration and log files. And always back up the current log file on the Site Manager workstation before clearing it; you may want to refer to it later to troubleshoot a problem.

Modifying Configuration Files

A configuration file contains the user-defined configuration for a router and its interfaces. After you have a working configuration file, you can use that file to boot the router.

Bay Networks recommends that you always have a *config* file that you know works and that you test any new or modified configuration file under a unique name, for example, *test.cfg*. In this way, if the router has a problem starting, you can reset it and it will restart with the default file, *config* (see *Configuring and Managing Routers with Site Manager* for instructions about resetting the router).

Before you modify a configuration file, make sure that the router's destination volume has enough space available for the file. If there is not enough space, you will have to copy the original files to another system and delete them from the router (See *Configuring and Managing Routers with Site Manager* for instructions).

Compacting a Flash Memory Card

You should compact a flash memory card to free up space taken by deleted files. This ensures that the flash card has enough contiguous free space to accommodate the new Version 12.00 software image.

Compact your flash card during “off-peak” hours if possible, because of the heavy resources required (FRE memory and CPU cycles). Do not remove a flash card, hot-swap a slot, or reset a slot during flash card compaction, as the card will become corrupted, causing loss of data.

Note: A flash compaction operation may take up to 12 minutes on an AN router. Do not turn the AN router on and off during compaction or you will corrupt the flash card and the AN router will not boot.

Compacting a Flash Memory Card Using Site Manager

Use the Router Files Manager Compact option to copy the active files from the flash memory card to the router’s memory, erase the flash memory card, and copy the files back to the memory card.

To compact the flash memory:

1. **In the main Site Manager window, choose Tools > Router Files Manager.**

   The Router Files Manager window opens.

2. **Select the volume that contains the flash memory media you want to compact.**

3. **Choose Commands > Compact.**

   A confirmation window appears.

4. **Click on OK to begin compacting.**

Compacting a Flash Memory Card Using the Technician Interface

To compact a flash memory card from the Technician Interface, enter the **compact** *<volume>*: command. For example, to compact the files in volume 2, enter:

compact 2:

The file system copies all of the files to memory except for the deleted ones, erases the memory card, and copies the files back to the memory card.

Viewing the Status of the Flash Memory Card

To view the status of a memory card, display its directory. The directory displays the amount of "available free space" or "free space," and the amount of "contiguous free space."

The "available free space" or "free space" is the total number of bytes of unused space plus bytes of space used by files that are deleted.

In order for the memory card to accommodate a file, the file's size must be less than or equal to the "contiguous free space." The "contiguous free space" is the number of bytes of contiguous unused space.

If the file you want to store is less than the "available free space," but more than the "contiguous free space," compact the existing files first. When you finish compacting files on a memory card, the "contiguous free space" matches the "available free space."

Verifying Router Software Image Names on the Router

Make sure that the software image on the router is compatible with the type of router you are using. A router software image is a group of executable files that contains the operating system and protocols on your network for a Bay Networks router. The type of software image a router uses depends on the type of router.

Table 2-4 lists router software images by router type.

Table 2-4. Router Software Image Types

Router	Software Image File Name	Device That Image Runs On
AN	*an.exe*	Flash single inline memory modules (SIMMs)
BayStack AN, ANH, ARN	*an.exe, arn.exe*	Flash single inline memory module (SIMM)
AFN (flash)	*afn.exe*	Flash card
ANH	*an.exe*	Flash card
ARE	*bn.exe*	Flash card

(continued)

Table 2-4. Router Software Image Types *(continued)*

Router	Software Image File Name	Device That Image Runs On
ASN	*asn.exe*	Flash card
BCN	*bn.exe*	Flash card
BLN	*bn.exe*	Flash card
CN, FN, LN (VME)	*ace.out*	Flash card
IN	*in.exe*	Flash card
5380, 5580, 5780	*s5000.exe*	Flash card
5780 ARE	*s5000.exe*	Flash card

The image contains all executable files for the current router software. Most executable files have an extension of *.exe*. The exceptions are protocol files on the CN, FN, and LN routers, which use the extension *.out*, and the ATM Routing Engine (ARE) slots, which use the extension *.ppc*. The *.ppc* files are equivalent to *.exe* files. For example, instead of using *ip.exe* on an ARE slot, the router uses *ip.ppc*.

Verifying the Current PROM Version

You can use Site Manager or the Technician Interface to determine the current version of Boot and Diagnostic PROM images currently running in your router.

Table 2-5 lists the Version 12.00 Boot and Diagnostic PROM file names and associated revision numbers for the various router platforms.

Table 2-5. Version 12.00 Boot and Diagnostic PROM Revisions

Router Platform	Diagnostic PROM File name	Diagnostic PROM Revision Number	Boot PROM File name	Boot PROM Revision Number
AN	*andiag.exe*	v7.28	*anboot.exe*	rel/9.00
AN200	*andiag.exe*	v1.00	*an200boot.exe*	rel/11.01
ARE	*arediag.ppc*	v1.12	*areboot.ppc*	rel/11.02
BN	*frediag.exe*	v4.12	*freboot.exe*	rel/8.10
ASN	*asndiag.exe*	v2.24	*asnboot.exe*	rel/10.00
ARN	*arndiag.exe* *arn_pdbrom.rom*	v1.30 v1.06	*arnboot.exe* *Not applicable*	v1.17 Not applicable
LN/CN	No Diagnostic PROM shipped		*vmeboot.exe*	rel/8.11
AFN	*v3.04* combination boot and diagnostic PROM		*Not applicable*	Not applicable
S5000	*s5000diag.exe*	v0.04	*s5000boot.exe*	11.00

See Appendix A for instructions on how to verify the current PROM version on your router. See “Task 3: Upgrading and Verifying PROMs on the Router” on page 4-10 for instructions on how to upgrade boot and diagnostic PROMs.

Chapter 3
Upgrading Site Manager and Router Software

This chapter describes how to upgrade to Site Manager Version 6.00 and BayRS Version 12.00. It also describes how to customize the router software image and back up a router software image and configuration files. See the following topics:

Task 1: Upgrading to Site Manager Version 6.00

Note: You can use Quick2Config instead of Site Manager 6.00 to configure AN, ANH, and ASN routers to support BayRS Version 12.00. For instructions on how to upgrade an AN, ANH, or ASN to BayRS Version 12.00 using Quick2Config, see Appendix D.

This section describes how to upgrade Site Manager Version 6.00 on your PC or UNIX workstation.

Upgrading Site Manager on a PC

To upgrade Site Manager on your PC:

1. **Check Site Manager system requirements and prerequisites.**

   Ensure that your PC complies with the Site Manager Version 6.00 system requirements and prerequisites listed in Table 2-1 on page 2.

2. **Delete the existing Site Manager state files.**

   Site Manager creates state files for all Site Manager tools you use. State files describe the state of the application when you last exited it. You must delete these files before you install the new version of Site Manager on your PC or Site Manager may not function properly when you restart it.

   To delete the existing Site Manager state files, enter the following command:

   ```
   del   c:\wfl\*.sts
   ```

   c is the name of the hard drive.

3. **Load the Site Manager software.**

   Site Manager software is distributed on CDs. Refer to the appropriate section in *Quick-Starting Routers* for instructions about loading Site Manager Version 6.00 from a CD onto a PC.

4. **Start Site Manager Using Windows 95®.**

   To start Site Manager using Windows 95:

   a. **From the Windows 95 desktop, click on the Start button.**

b. From the Start menu, choose Programs > Site Manager > PC_Site Manager.

The main Site Manager window opens (Figure 3-1), then the Router Connection Options window opens, allowing you to connect to the router. For instructions on how to connect to the router, see *Configuring and Managing Routers with Site Manager*.

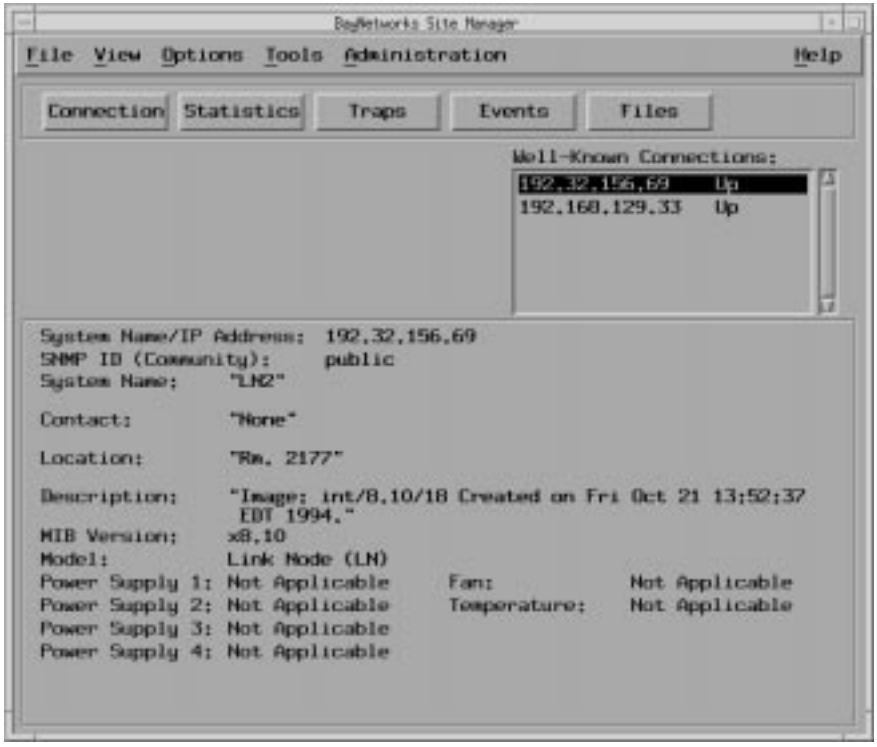

Figure 3-1. Site Manager Window

After you finish upgrading Site Manager software on your PC, go to "Task 2: Upgrading to BayRS Version 12.00" on page 3-6.

If you are having problems upgrading Site Manager, see *Troubleshooting Routers*.

Upgrading Site Manager on a UNIX Workstation

To upgrade the Site Manager software on a Sun SPARCstation (running SunOS or Solaris OS), an IBM workstation, or an HP 9000 UNIX workstation:

1. **Check system requirements and prerequisites.**

   Ensure that your UNIX workstation complies with the Site Manager Version 6.00 system requirements and prerequisites listed in Table 2-1 on page 2-2.

2. **Get superuser privileges.**

   Enter the following command at the UNIX prompt:

   su

3. **Delete the existing Site Manager state files.**

   Site Manager creates state files for all Site Manager tools you use. State files describe the state of the application when you last exited it. You must delete these files before you install the new version of Site Manager on your UNIX workstation or Site Manager may not function properly when you restart it.

Note: Exit from the current version of Site Manager before you delete any Site Manager files. Otherwise, the new version of Site Manager will not overwrite all of the current version files.

   To delete the Site Manager state files, enter the following command from the home directory of every user account:

   rm <*home_directory*>**/.wf***

4. **Install the Site Manager software.**

   Refer to the appropriate section in *Quick-Starting Routers* to install the Version 6.00 Site Manager software on a UNIX workstation.

If You Are Using	See This Section in *Quick-Starting Routers*
Sun SPARCstation running SunOS or Solaris	Installing Site Manager on a SPARCstation
IBM RS/6000 or PowerPC	Installing Site Manager on an IBM Workstation
HP 9000	Installing Site Manager on an HP 9000

5. **Start Site Manager on a UNIX workstation.**

   Start Site Manager from a directory where you have read/write permission, because this directory becomes the working directory for Site Manager operations. Do not start Site Manager from the */usr/wf* directory.

   To start Site Manager on a UNIX workstation:

   a. **With a user account that has been set up for Site Manager, log on to a UNIX workstation.**

      Be sure that the user account has the correct environment variables set and that the workstation meets the system requirements for Site Manager (see *Quick-Starting Routers* for more information).

   b. **Start the window environment.**

      Refer to the documentation for your UNIX workstation for instructions.

   c. **Go to the directory where you want to store router configuration files.**

   d. **Enter the following command:**

      wfsm &

      Site Manager starts and the Router Connection Options window opens, allowing you to connect to the router. For instructions on how to connect to the router, see *Configuring and Managing Routers with Site Manager*.

      You can also start Site Manager from the UNIX command line, but this method is only recommended for users experienced with Site Manager. For instructions, see *Configuring and Managing Routers with Site Manager*.

After you finish upgrading Site Manager on your UNIX workstation, go to "Task 2: Upgrading to BayRS Version 12.00" on page 3-6.

Task 2: Upgrading to BayRS Version 12.00

This section describes how to upgrade to BayRS Version 12.00 on a PC or UNIX workstation.

Bay Networks router software is available on CD only. Table 3-1 shows the files that make up the Version 12.00 router software.

Table 3-1. Router Software Files

File Name	Description
config	Default configuration file. The router references this binary file for configuration data when booting. The file must be named *config* for the router to boot with it automatically. We recommend that you back up the *config* file under a unique name before overwriting it.
bcc.help	Help file for the Bay Command Console (BCC™)
debug.al	ASCII file containing aliases
install.bat	Quick-Start installation script file
ti.cfg	Initial configuration file
ti_asn.config	Configuration file for ASN routers only
ti_arn.cfg	Configuration file for ARN routers only
Platform-specific router software image files	Bootable router software image files (*an.exe,afn.exe, arn.exe, asn.exe, bn.exe, s5000.exe*)
Platform-specific boot and diagnostic image files	Diagnostic image files (*frediag.exe, andiag.exe, an200diag.exe, arediag.ppc, asndiag.exe, arediag.exe, bndiag.exe, arndiag.exe, s5000diag.exe*) Boot image files (*anboot.exe, arnboot.exe, areboot.ppc. an200boot.exe, asnboot.exe, freboot.exe, s5000boot.exe, vmeboot.exe*)

The steps that you follow to load the router software from CD depend on whether you use a PC or a UNIX workstation. The following sections describe how to load the router software from CD onto your PC or UNIX workstation.

Loading the Router Software onto a PC

To load the router software from CD onto a PC:

1. **Insert the CD into the CD-ROM drive.**
2. **Bring up Windows.**
3. **Choose Start > Programs > Windows Explorer.**

   The Explorer window opens.
4. **In the Explorer window, click on the CD-ROM drive icon (for example, drive D).**
5. **Click on the *rtr_xxx* directory, where *xxx* is the router software version.**

   For example, for Version 12.00, you would click on the *rtr_1200* directory.

   You will see a list of directories specific to the version of the router software you are using, such as *an, asn, bn,* and so forth.
6. **Click on the directory for your router platform.**
7. **Copy the router files in the *rtr_1200* directory to a destination folder on your PC.**

   For example, one method you can use to copy the router files to a destination folder is as follows:

   a. **Hold down the shift key and click on each file you want to copy. The files are highlighted.**

   b. **Choose Edit > Copy.**

   c. **Click on the folder to which you want to copy the router files.**

   d. **Choose Edit > Paste.**

      The system copies the router files you selected to the destination folder on your PC. Load the router software for any of the other router platforms by repeating steps 6 and 7.

Loading the Router Software onto a UNIX Workstation

To load the router software from CD onto a UNIX workstation:

1. **Insert the CD into your CD-ROM drive.**
2. **If you have not already created a CD-ROM mountpoint, log in as *root* and create a root-level directory.**

   For example, to create a directory named *cdrom*, enter:

   mkdir /cdrom
3. **Mount the CD-ROM drive on one the following platforms:**

SunOS on a SPARCstation	**Solaris on a SPARCstation**
Enter this command: **mount -r -t hsfs /dev/*sr0*/ cdrom**	Enter this command: **mount -F hsfs -o ro /dev/dsk/*c0t6d0s0*/ cdrom**
IBM workstation	**HP 9000**
Enter this command: **mount -v 'cdrfs' -r" /dev/*cd0* / cdrom**	Enter this command: **/etc/ mount /dev/*dsk*/*c0t2d0*/ cdrom**

Note: If you use Solaris and you are running the *vold* daemon, the CD automatically mounts as */cdrom/release/_xxx_yyy* (where *xxx* is the router software version and *yyy* is the Site Manager version), rather than /*cdrom*. For example, for BayRS Version 12.00 and Site Manager Version 6.00, the CD mounts as */cdrom/release_1200_600*.

4. **Change directories by entering:**

   cd /cdrom
5. **Run the script to load the router software using one of the following commands:**

   On a SPARCstation, enter:

   ./copy.sh

On an IBM workstation, enter:

./copy.sh

On an HP 9000, enter:

./COPY.SH\;1

During the load procedure, you must specify the following:

- The directory where you want to load the router software

  For example, */usr/wf/rtr_1200*

- The router platform

The system then loads the software for the platform you selected.

A sample router upgrade script is as follows:

```
Please choose a Router Upgrade platform to load:

1) afnflash                 Access Feeder Node
2) an                       Access Node
3) asn                      Access Stackable Node
4) bn                       Backbone Node
5) bn/vnr                   Backbone Node VNR
6) in                       Integrated Node
7) vme                      VME Platform

8) ATM/VNR System 5000 Hub  Model 5380 Ethernet Router or Model
                            5580 Token Ring Router installed on
                            System 5000 hubs

9) 5780                     Model 5780 ATM VNR Router
                            installed on 5000AH system

10) dcm                      Data Collection Module
11) arn                      Advanced Remote Node
12) an200                    Access Node 200
q) Quit
```

You can now load the router software image from your PC or UNIX workstation into the Image Builder, as described in the next section.

Task 3: Customizing the Router Software Image

A router software image is a group of executable files that contain a version of the router software for a particular type of router. You can customize the router's software image to fit your router configuration requirements using a Site Manager tool called the Image Builder. For a complete list of the router software images by router type, see "Verifying Router Software Image Names on the Router" on page 2-12.

Loading the Router Software Image into the Image Builder

You load the router software image from your PC or UNIX workstation into the Image Builder. When you open the image file using the Image Builder, Site Manager copies the image to an Image Builder directory. On a PC, the directory is *\wf \builder.dir*. On a UNIX workstation, the directory is defined by the environment variable BUILDER_DIR. You should have already defined this variable during the Quick-Start procedure (refer to *Quick-Starting Routers* for instructions).

To load the router software into the Image Builder:

1. **In the Site Manager main window, choose Tools** > **Image Builder.**

   The Image Builder window opens.

2. **Choose File** > **Open.**

   The Open window appears (Figure 3-2), listing directories and files.

Figure 3-2. Open Window

3. **Go to the directory where the router software image files reside.**

   For example, in Version 12.00, go to directory */usr/wf/rtr_1200*.

4. **Double-click on the directory that contains the router software image you want to load.**

   For example, if you want to load an AN software image, double-click on the directory */usr/wf/rtr_1200/an*.

5. **Choose the file name of the router software image that you want to open.**

   For example, if you want to upgrade the AN image, click on the file *an.exe*.

6. **Click on OK.**

   After you choose the directory and file name of the image, the Image Builder window lists the current components of the current router software image (Figure 3-3). The components listed vary depending on the version of router software you are using.

Figure 3-3. Image Builder Window with Current Components

7. **Go to "Modifying the Router Software Image" on page 3-12.**

Modifying the Router Software Image

You modify the software image to:

- Remove any nonessential files (protocols) that you will not use.

  You might want to remove specific protocols from the router software image to make more space available on the target flash card (NVFS) volume.

  The Image Builder will not allow you to remove essential files. This protects the most important files that make up your router software image. For example, you cannot remove the Operating System Kernel files from the baseline router software component.

- Add components (protocols) that you removed inadvertently.

  If you removed files from an existing router software image, or you changed the router's hardware modules to add functionality, you might want to add components to the router software image.

See *Configuring and Managing Routers with Site Manager* for detailed instructions about removing and adding software components to a router software image.

After you have modified the router software image, you must save the image on your workstation or PC. Go on to "Saving the Router Software Image."

Saving the Router Software Image

Bay Networks recommends that you save modified software images in a different directory, and that you use different image names for each router on your network.

The Image Builder automatically stores a temporary copy of the software image in the Image Builder directory, which is created when you install Site Manager. (See *Quick-Starting Routers* for information about installing Site Manager.) The Image Builder saves only individual components in this directory, which are listed in the Available Components list.

To save the router software image:

1. **In the Image Builder window, choose File > Save.**

   This saves the router software image to your current directory. There is no confirmation window after the image is saved successfully.

2. **Choose File > Exit.**

   You return to the main Site Manager window.

   If you exit the Image Builder without saving your changes, a message asks if you want to discard changes before you exit.

After you finish modifying the image for the router you want to upgrade, back up the router software image and *config* files for that router as described in Task 4.

Task 4: Backing Up the Router Software Image and Configuration Files

Bay Networks recommends that you back up onto your PC or workstation the router software image and *config* files currently stored on the router. It is important to maintain backup copies of these files to ensure that you can restore router operation in case you encounter malfunctions during the upgrade process.

For instructions on how to back up the router software image and *config* files onto the hard disk of your Site Manager PC or UNIX workstation, See *Configuring and Managing Routers with Site Manager*.

Chapter 4
Transferring Customized Files to the Router and Upgrading PROMs

This chapter describes how to prepare the router to receive a new software image, how to transfer the customized image and associated router files to the router, and how to upgrade and verify PROMs on the router. See the following topics:

Task 1: Preparing the Router to Receive a New Software Image

Before you can transfer a customized image to the router you want to upgrade, you must first prepare the router's flash card or flash SIMM to receive a customized image and a configuration file. See the following table for further instructions.

If the Number of Flash Memory Cards in the Router Is	Refer to This Section
1	Preparing Routers with One Flash Cards or Preparing Routers Configured for Netboot
Greater than 1	Preparing a Router with Multiple Flash Cards
Greater than 1 (and the cards contain files for an earlier release of the router software)	Using Flash Cards from Previous Releases (see Appendix E)

Note: AFN routers support only one flash card. AN routers support only one SIMM.

Preparing Routers with One Flash Card

To prepare a router equipped with one flash card to accept a customized software image:

1. **Verify that you have backed up the router's Version 7-11.*xx* boot image to your Site Manager workstation.**

   You saved a copy of the Version 7-11.*xx* boot image when you backed up the router software image and configuration files in "Task 4: Backing Up the Router Software Image and Configuration Files" on page 3-14.

2. **Load all the *.str* files from the router's flash card into the router's memory.**

   From the Technician Interface, enter the following command:

   string load

   It is important that you load the *.str* files into the router's memory before deleting the previous router software image (step 3). If you fail to load the *.str* files and then delete the previous router software image from the router's flash card, the software image running in memory may need to pull some *.str* files from the image that was previously stored on the flash. However, that image no longer exists or has been partially updated to a new software image.

3. **Delete the current router software image (for example, *an.exe, asn.exe,* or *bn.exe)* from the router's flash card.**

In the File Manager window, choose Commands > Delete.

Perform this step if the router is an AN and your network is not configured to perform a Netboot operation on an AN router.

4. **Compact the router's flash card.**

   In the Router Files Manager window, choose Commands > Compact.

   A message appears asking whether you want to proceed with the file compaction.

   Compacting the flash card ensures that it has enough contiguous free space to accommodate the Version 12.00 software image.

Note: The AN may require approximately 12 minutes to finish compacting its flash file space.

5. **Click on Yes in the message window.**

   An hourglass appears for the duration of the file compaction. After several minutes, a window displays the following message, where *x* is the volume you are compacting:

   `Last file system command, "compact x:" finished successfully.`

Go to "Task 2: Transferring a Customized Image and Router Files to the Router" on page 4-5.

Preparing Routers Configured for Netboot

If you have an AN or ASN router with one flash card and you have configured your router to boot off the network (using Netboot or Directed Netboot), consider the following:

- Do not delete the Version 7-11.*xx* boot image from the router's flash card.

  You may need a backup boot image in case the new boot image is corrupted.

- Do not compact the contents of the card.
- Perform a Netboot operation on the AN router using a customized Version 12.00 router software image residing on a BootP server in your network.

With this approach, the Version 12.00 image runs in active memory on the router, but the Version 7-11.*xx* image remains available on the router's flash card as a backup.

After you verify that the Netboot operation ran successfully, you can install the Version 12.00 image on either the AN flash SIMM, ASN (flash), or BayStack flash card. You do this to ensure that the router software version stored in the router's memory is compatible with the one stored on the AN flash SIMM, ASN flash, or BayStack flash card. By installing the Version 12.00 router software image onto the flash SIMM or flash card, you will have a backup version of the 12.00 image in case the Netboot operation fails.

Before you install the Version 12.00 image on flash SIMM or flash card:

1. **Delete the Version 7-11.*xx* image from the AN flash SIMM.**
2. **Compact the contents of the flash SIMM.**
3. **Use TFTP to transfer your customized Version 12.00 image, *an.exe*, from your Site Manager workstation to the flash SIMM volume on the router.**

See *Cofiguring BayStack Remote Access* or *Connecting ASN Routers to a Network* for detailed information on how to perform a Netboot operation on a router.

Preparing a Router with Multiple Flash Cards

Bay Networks recommends that you use two flash cards in a router that supports multiple flash cards. This allows you to keep the active (Version 7-11.*xx*) software image on one flash card while you use the TFTP command in Site Manager to transfer the new (Version 12.00) image to another flash card designated for the upgrade. Once you successfully install and verify the new router software image, you can delete the earlier image version.

To prepare a router equipped with multiple flash cards to receive a customized software image:

1. **Insert a flash card into your router.**

   This is the backup flash card onto which you will store the Version 12.00 router software image and associated router files.

2. **Back up the contents of your flash card to your Site Manager workstation.**

   You do this as a safeguard in case your flash card malfunctions.

3. **Reformat the flash card, making sure that the volume or slot number in which the flash card resides is correct.**

   In the Router Files Manager window, choose Commands > Format.

   This operation deletes all files from the flash card and compacts its contents.

   Now your backup flash card is blank and is ready to accept the Version 12.00 image and associated files.

4. **Copy the Version 12.00 router image files from your Site Manager workstation to the flash card you just formatted.**

Go on to "Task 2: Transferring a Customized Image and Router Files to the Router," to copy the router software image to the router.

Task 2: Transferring a Customized Image and Router Files to the Router

You can use the Router Files Manager to transfer a customized software image and associated router files to the router you want to upgrade using the Trivial File Transfer Protocol (TFTP) command. For a list of the files you need to transfer to the router, refer to "Task 2: Upgrading to BayRS Version 12.00" on page 3-6.

Before attempting to transfer a customized image to the router, consider the following conditions and guidelines:

- If the router you want to upgrade has only one flash card and you have not updated the router's Boot PROM for Version 8.10 or 9.*xx*, you must rename your customized Version 12.00 image to *boot.exe* before attempting to transfer that image to the router.
- If the router you want to upgrade has multiple flash cards and you have not updated the router's Boot PROM for Version 8.10 or 9.*xx*, you must:

  a. **Transfer the customized image (for example, *asn.exe* or *bn.exe*) to an alternate flash volume on the router.**

  b. **Boot the Version 12.00 image on the router by performing a "named boot" from the Technician Interface prompt, as follows:**

     <slot>:***bn.exe*** *<slot>*:***config***

<slot> is the slot containing the image name *bn.exe* and the original configuration file, *config*.

Note: We recommend that you ping the router before you transfer the customized image file to it. For instructions on how to ping a router, see *Configuring and Managing Routers with Site Manager*.

- If space is available, you should retain the old software image on the router you want to upgrade until you succeed in booting it with the new software image. If adequate space is not available, delete the old image and then transfer the new one.

To transfer a customized image file to the router you want to upgrade, complete the following steps:

1. **Copy the router files from the directory in which you loaded the router software (*/usr/wf/rtr_1200/an*).**
2. **In the main Site Manager window, choose the router to which you want to transfer the software image by clicking on its IP address in the Well-Known Connections list.**
3. **Choose Tools > Router Files Manager.**

   The Router Files Manager window opens (Figure 4-1.)

Figure 4-1. Router Files Manager Window

4. Verify space on the destination volume.

Make sure that the router destination volume has enough space available for the file you want to transfer. The Router Files Manager window shows the available free space and contiguous free space on the router.

For a DOS file system, refer to the number of bytes displayed for available free space.

For an NVFS file system, refer to the number of bytes displayed for contiguous free space.

If the file system on the router is an NVFS, compact the memory card to optimize the available free space, as follows:

a. **In the Router Files Manager window, choose Commands > Compact.**

b. **Click on OK in the Confirmation window.**

5. **Choose File > TFTP > Put File(s).**

   The TFTP Put File Selection window opens (Figure 4-2), invoking the Trivial File Transfer Protocol (TFTP) software to execute file transfers.

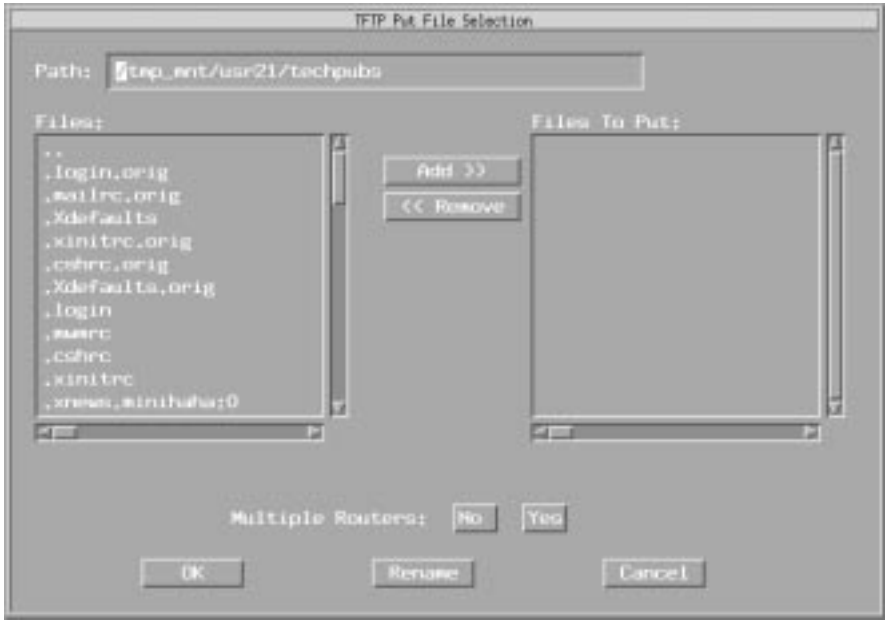

Figure 4-2. The TFTP Put File Selection Window

6. **In the Path field, enter the path to the directory on the Site Manager workstation that contains the image file you want to transfer.**

   The file names in that directory appear in the Files list. You may transfer more than one file at a time, if applicable.

7. **In the Files list, click on the image file and the associated router files that you want to transfer to the router.**

8. **Click on Add.**

   The selected files appear in the Files To Put list.

   If you inadvertently add a file that you do not want to transfer to the router, choose that file in the Files To Put window and click on Remove.

9. **If you want to send the image file and associated router files to only one router, click on No in the Multiple Routers field. Click on Yes to send these files to multiple routers.**

   Refer to *Configuring and Managing Routers with Site Manager* for more information about transferring files to multiple routers.

10. **Click on OK.**

    The Router Files Manager transfers the file to the router. If a file of the same name already exists in that directory, the transferred file overwrites it.

    If the file transfer fails, check your setup for the TFTP operation. Then try to transfer the file again.

    If you need assistance, call the Bay Networks Technical Solutions Center.

Note: If you cannot transfer the customized image to the router successfully, do not reboot the router. On single flash card systems, the router fails to boot because there is no image available from which it can boot.

Next, you must update the PROMs on the router and boot the router to load the new Version 12.00 software image. Go on to "Task 3: Upgrading and Verifying PROMs on the Router."

Task 3: Upgrading and Verifying PROMs on the Router

The router's programmable read-only memory (PROM) contains software images for its bootstrap and diagnostic code. Bootstrap and diagnostic PROM code is included on the BayRS Version 12.00 release media.

Bay Networks strongly recommends that you upgrade PROMs in a router to implement the latest software or hardware features before upgrading to a new version of the router software.

Why You Upgrade Boot and Diagnostic PROMs

You upgrade Boot PROMs in a router for the following reasons:

- You want to implement a Version 8.10 or later software or hardware feature that depends on the availability of the Version 8.10 or later Boot PROM image. For example, if you want to implement flash partitioning for your AN router, you must upgrade the Boot PROM image, *anboot.exe*, in that router to Version 8.10 or later.

  See Table A-1 on page A-5 for the list of features that require a Version 8.10 or later Boot PROM image.

- You want to implement the new router software image-naming convention, which uses the router-specific image names introduced in Router Software Version 8.10 (Table 4-1).

Table 4-1. Router-Specific Image Names

Router	Image Name	Description
AN, ANH, AN200	*an.exe*	Bootable image for the AN, ANH, and AN200
AFN (flash)	*afn.exe*	Bootable image for the AFN
ASN	*asn.exe*	Bootable image for the ASN
ARN	*arn.exe*	Bootable image for the ARN
BCN, BLN, and BLN-2	*bn.exe*	Bootable image for the BCN, BLN, and BLN-2
System 5000 net modules	s5000.exe	Bootable image for the System 5000 net modules

Note: CN, FN, LN, and ALN (VME) routers continue to use the router software image name *ace.out*.

To implement the new naming convention, upgrade the Boot PROMs on all routers, except the FN, ALN, LN, and CN. The Boot PROM is located on PROM or flash PROM on each processor board. After upgrading, Version 8.10 and later Boot PROMs look only for the new router software image name at boot time.

In addition, Version 8.10 and later Boot PROMs for AN and AFN routers are backward-compatible. That is, the Boot PROM looks first for a Version 8.10 or later router software image name (*an.exe* or *afn.exe*, depending on the router) at boot time. If the Version 8.10 or later AN or AFN Boot PROM cannot find the router-specific image name, it searches next for the Version 7-8.*xx* image name, *boot.exe*.

You upgrade Diagnostic PROMs in routers when the diagnostic image version number for the new release of the router software is higher than the diagnostic image version number for the router software currently installed on your router.

To determine the current version of the Boot or Diagnostic PROM in your router, see Appendix A.

Methods for Upgrading PROMs

Depending on which router you are upgrading, you upgrade PROMs in that router in the following ways:

- By reprogramming the PROM components using the Technician Interface. This process of erasing the contents of PROM and transferring new bootstrap and diagnostic images is sometimes called “burning” the PROM.
- By physically replacing the existing PROM with the PROM version shipped with Router Software Version 8.10 or later.

Table 4-2 summarizes the methods for upgrading PROMs in various routers.

Table 4-2. Methods for Upgrading Boot PROMs in Various Routers

If Router Model Is	PROM Replacement Method Is	Refer to
AFN (flash)	Physical replacement	*Installing a Flash Memory Upgrade in an Access Feeder Node*
AN or ANH (with motherboard revision level earlier than 14)	Physical replacement	*Installing Boot and Diagnostic PROMs in an AN Router*
AN, ANH, or BayStack routers (with motherboard Revision 14 or later)	Technician Interface **prom** command	*Installing Boot and Diagnostic PROMs in an AN Router*
ASN or BN (BLN, BLN-2, BCN, ARE)	Technician Interface **prom** command	"Upgrading and Verifying PROMs" in this chapter
FN, LN, ALN, CN	Technician Interface **prom** command	No Boot PROM upgrade required

Caution: Systems with one-time programmable (OTP) PROMs require component replacements to upgrade the PROM version. These systems include AFNs and ANs with motherboards earlier than Revision 14. AN motherboards Revision 14 and later provide flash-in-place capability; you upgrade these PROMs by downloading new code from the flash file system.

Depending on your AN or ANH model, you transfer new boot and diagnostic code to PROM using either

- A PCMCIA flash card (BayStack AN and BayStack ANH)
- SIMM-based flash memory (AN and ANH models without a PCMCIA slot)

To upgrade the PROMs in a SIMM-based AN router with a motherboard revision lower than 14, you must order a PROM Upgrade Kit (Order No. 109435) to physically replace the PROM components.

Go on to "Upgrading and Verifying PROMs."

Upgrading and Verifying PROMs

You use the **prom** command from the Technician Interface to upgrade and verify the software on the Diagnostic or Boot PROM. This command is restricted to the Manager access level.

When you upgrade PROMs, the system erases the existing PROM and copies the contents of the newer PROM image file to the PROM. To verify the PROM, the system compares the contents of the new image file to the actual contents of the PROM.

Note: Before upgrading any router software, make sure that you save a copy of the original configuration file and boot image as a safeguard in case you encounter problems after upgrading.

To upgrade and verify PROMs on a router, begin at the Technician Interface prompt and complete the following steps:

1. **Establish a Technician Interface session with the router.**

   Enter the following command at the Technician Interface prompt:

   Manager

   Refer to *Using Technician Interface Software* for more information on how to open a Technician Interface session with the router.

2. **Insert a flash card with contiguous free space sufficient to accommodate the PROM images you want to upgrade on the router.**

   To determine the amount of contiguous free space, display the directory of the flash volume by entering the following command from the Technician Interface prompt:

   dir *<volume_no.>***:**

   <volume_no.> is the slot in which the flash card resides.

   If you need more contiguous free space for the PROM image:

   a. **Delete unnecessary or obsolete files.**

   b. **Compact the contents of the flash card by entering:**

      compact *<volume_no.>***:**

      The following message appears:

```
Compacting file system on volume <vol>:...
This may take several minutes...Please wait...

100% Complete

Compaction completed
```

The space is compacted when the Technician Interface prompt reappears.

c. **Verify that the amount of contiguous free space and available free space on the volume are the same by entering:**

dir

3. **Transfer the PROM image files (for example,** *freboot.exe* **and** *frediag.exe***) to the router's flash card by using the tftp command.**

For more information about the **tftp** command, see *Using Technician Interface Software*.

4. **Update the boot PROM by entering:**

prom -w *<volume_no.>*:*<Boot_PROM_source_file>* *<slot_ID >*

<volume_no.> is the slot number of the Boot PROM source file located on a volume.

<Boot_PROM_source file> is the name of the Boot PROM source file (for example, *freboot.exe*).

<slot_ID> is the slot location of the Boot PROM that you want to update.

For AN, ANH, and ARN routers, the *<slot_ID>* is always 1.

For example:

prom -w 2:freboot.exe 3
or
prom -w 1:arnboot.exe 1

This command erases the Boot PROM on slot 3 and copies the contents of the *freboot.exe* file on volume 2 to the PROM on slot 3.

Note: Once you enter the **prom** command, it must run to completion. The control-c (abort) command is disabled for the duration of the **prom** command execution to allow it to run to completion. Updating takes from 2 to 10 minutes per PROM. Verifying takes up to 2 minutes per PROM.

5. **Update the Diagnostic PROM by entering:**

   prom -w *<volume_no.> <Diag_PROM_source_file> <slot_ID>*

   <volume_no> is the slot number of the Diagnostic PROM source file located on a volume.

   <Diag_PROM_source file> is the name of the diagnostic PROM source file (for example, *frediag.exe*).

   <slot_ID> is the slot location of the diagnostic PROM file you want to update.

   For AN, ANH, and ARN routers, the *<slot_ID>* is always 1.

   For example:

   prom -w 2:frediag.exe 3
   or
   prom -w 1:arndiag.exe 1

   This command erases the Diagnostics PROM on slot 3 and copies the contents of the *frediag.exe* file on volume 2 to the PROM on slot 3.

6. **Upgrade PROMs on multiple slots on your router.**

   If you need to update PROMs on multiple slots, use a dash to indicate a range of slots (2-5), or use commas or spaces to separate multiple slot locations (2, 3, 4, or 2 3 4).

   For example:

   prom -w 2:frediag.exe 2, 3, 4, 5

   This command erases the diagnostic PROMs on slots 2, 3, 4, and 5 and copies the contents of the *frediag.exe* file on volume 2 to the PROMs on slots 2, 3, 4, and 5.

Note: Boot PROM incompatibilities can exist if you have different Boot PROM revisions on different slots on your router. For example, the Boot PROM image in a slot running Boot PROM Version 8.00 will look for *boot.exe*. A Boot PROM image running Version 8.10 or later on a BN router will look for the image name *bn.exe*.

For more information about updating PROMs on multiple slots, see *Using Technician Interface Software*.

7. **Verify the PROM upgrade by entering the following command:**

   prom -v *<volume_no.> <Diag_PROM_source_file> <slot_ID>*

   For example, for a boot PROM, enter:

   prom -v *<volume_no.>***: [freboot.exe | asnboot.exe | anboot.exe | arnboot.exe]** *<slot_ID>*

   For a diagnostics PROM, enter:

   prom -v *<volume_no.>***: [frediag.exe | asndiag.exe | andiag.exe | arndiag.exe]***<slot_ID>*

   The system verifies that the PROM image on a designated flash volume (that is, the image file used as a source for upgrading the PROM) matches the image actually stored in the boot or diagnostics PROM, on a designated slot.

   When you use the **-v** option, the console displays one of the following messages after the verification terminates:

   ```
   prom: slot <slot ID> completed successfully
   ```

   ```
   prom: PROM data does not match file data on slot <slot ID>
   ```

   If the operation succeeds, the new images stored in the Boot and Diagnostic PROMs run when you reboot the router.

   If the operation fails, the console displays a message describing the cause of the failure.

   For additional examples of using the **prom** command to update and verify PROMs, see *Using Technician Interface Software*.

Upgrading PROMs in a Router from a Remote Site

This section summarizes the procedure for upgrading PROMs in a router that is located in a remote site. Be sure to read the special considerations in this section before upgrading router PROMs remotely.

Caution: If the PROM upgrade process is interrupted, the router could be disabled.

When upgrading PROMs in a router from a remote site, follow these guidelines to ensure that the PROM upgrade is successful:

- Store the PROM executable files (for example, *frediag.ex*e and *freboot.exe*) on a flash card that resides on the slot in the system that you use the least.
- Perform the upgrade during nonpeak hours to ensure a minimum traffic load across all rails of the backplane (PPX).

  The operations involved in updating PROMs are both data-transfer and CPU intensive, as are the regular functions of routing and forwarding normal data traffic. Because periods of high traffic (peak periods) may cause timeouts or other failures of the PROM upgrade process, it is important to perform PROM upgrades during off-peak periods. A failure during a PROM upgrade makes it necessary to repeat the procedure.
- On multislot systems, upgrade the PROM for each slot separately. Attempting to upgrade multiple slots at the same time increases the load on the router backplane.

Caution: Never reset or reboot a router while upgrading PROMs. Should a failure occur, restart the procedure immediately.

After you upgrade PROMs on the router, boot the router with the customized image and upgrade your existing configuration file to support the new Version 12.00 features. Go to Chapter 5.

Chapter 5
Booting the Router with the Customized Image and Upgrading the Configuration

This chapter describes how to boot the router with the customized image and upgrade the existing configuration file to support new BayRS Version 12.00 features. It also describes how to upgrade frame relay circuits and transfer script files to the router. See the following topics:

Task 1: Booting the Router with the Customized Image

After you successfully transfer the customized image to the router and upgrade the PROMs, you can boot the router with the customized image. The first time you successfully boot an ASN router from a Version 12.00 image, the boot time may be longer. After that, you can shorten the boot interval by changing the default Netboot settings.

Begin by entering the following commands at the Technician Interface prompt:

bconfig image local
bconfig config local

The ASN boots exclusively from the local image and a local configuration file.

To boot the router with the customized image:

1. **In the Site Manager window, select Administration > Boot Router.**

   The Boot Router window opens (Figure 5-1), showing the default router volume for the router boot image file (*ace.out*) and the default configuration file name (*config*). The file name and volume vary depending on the router.

   For routers that use flash memory cards or single inline memory modules (SIMMs), the default volume is the first available card or module, which is designated by its slot number. For routers that use diskettes, the volume is the letter A.

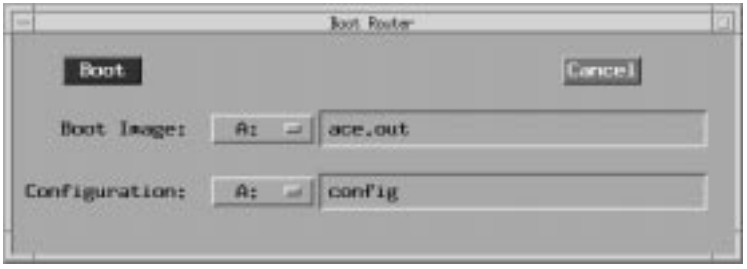

Figure 5-1. Boot Router Window

2. **Choose the correct router volume.**

Note: If the router you want to upgrade has only one flash card, do not change the volume displayed.

   a. **Click on one of the small buttons next to Boot Image volume number (an "A" in Figure 5-1) or the Configuration slot number (also "A").**

      A pop-up window displays the available router volumes containing the router software image and the available slots containing the configuration file.

b. **Click on the number of the slot you want your router to boot or configure from.**

   The pop-up window closes and the new slot number appears.

3. **Verify the name of the new router software boot image.**

   The default router-specific image name appears in the Boot Image box.

Note: If you are upgrading a router that is running Version 8.10, 9.*xx*, 10.0, or 11.0 Boot PROMs to Version 12.00 and that router contains multiple flash cards, remove the Version 8.10, 9.*xx*, 10.0, or 11.0 backup flash card from the router. Otherwise, when you reset or cold-start the router, it will run different software versions on different slots.

4. **Verify the configuration file from which you want to boot the router.**

   The default configuration file name *config* appears in the Configuration box.

5. **Click on Boot.**

   A confirmation window appears.

6. **Click on OK.**

   The router boots using the router software image and the configuration file you specified.

   Wait a few minutes to give the router time to boot. The boot time may be longer if you are booting an ASN router for the first time from a Version 12.00 image.

7. **Verify that the router booted successfully with the customized image and configuration file.**

   In the main Site Manager window, choose View > Refresh Display.

   If the router booted successfully, Site Manager establishes a connection to the router and displays system information (such as the system name, contact, location, description, and MIB version).

   If Site Manager does not display system information, the router did not boot successfully. Consider the following:

   - If you have a router with one flash card, use a local console to reboot the router from the Technician Interface. If this operation fails, call the Bay Networks Technical Solutions Center in your area.

- If your router has multiple flash cards, boot the router off the original flash card (pre-Version 12.00). Follow the instructions in “Preparing a Router with Multiple Flash Cards” on page 4-4.

Task 2: Upgrading the Existing Configuration File

This section describes how to upgrade your existing configuration files to support the new Version 12.00 features. Optionally, you can create a new Version 12.00 configuration file to replace your existing configuration file for the router.

Booting the Existing Configuration File

To upgrade an existing configuration file to Version 12.00, boot it on a router running a Version 12.00 router software image. This router software loads the existing configuration file into the router’s memory and updates the configuration file’s version stamp to match the Version 12.00 router software. It does not, however, automatically save that version to the file on the flash card until you save the configuration file in dynamic mode.

Saving the Configuration File in Dynamic Mode

After you boot the router with the existing configuration file, save the configuration file in dynamic mode. When you save the configuration file in dynamic mode, the file is saved directly to the router.

To save the existing configuration file in dynamic mode:

1. **In the Site Manager window, choose Tools > Configuration Manager > Dynamic.**

   The Configuration Manager window appears (Figure 5-2), displaying the real-time router hardware and software configuration.

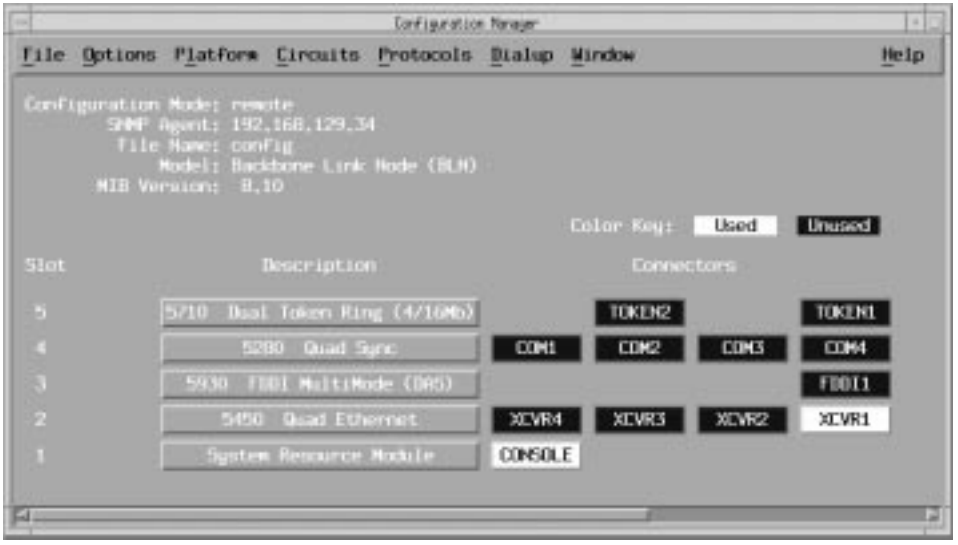

Figure 5-2. Configuration Manager Window

2. **Choose File > Save As.**

   The Save Configuration File window appears (Figure 5-3.)

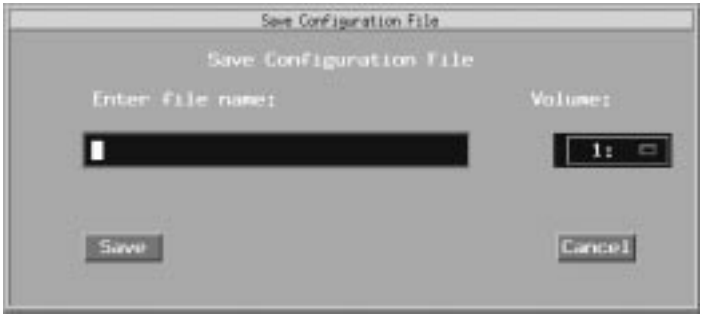

Figure 5-3. Save Configuration File Window

3. **Enter the configuration file name** *config***.**
4. **Choose the correct volume by clicking in the volume field.**

If the file system on the router is an NVFS, and the volume (slot location of the memory card on the router) is not the volume to which you want to save this file, choose an alternate volume. Otherwise, go to the next step.

5. **Click on Save.**

   The File Saved window opens (Figure 5-4), asking you to confirm your decision to save the file.

Figure 5-4. File Saved Window

6. **Click on OK.**

   This rewrites the configuration file, *config*, out of the router's memory and saves it to the router's flash card with the Version 12.00 version stamp.

Task 3: Upgrading Frame Relay Circuits

If you are running router software earlier than Version 7.60 and the configuration file you upgraded in Task 3 had frame relay circuits, complete this task. Otherwise, go to "Task 4: Transferring Script Files to the Router."

The upgrade procedure does not convert all frame relay circuit records, and Site Manager does not display them. You must delete all interfaces on which frame relay was configured and reconfigure the interfaces, as follows:

1. **Open your current configuration file, using the Configuration Manager.**
2. **Choose Delete Circuits from the Circuits menu.**

   The Circuit List window displays the circuits.
3. **Choose each circuit on which frame relay was configured in the configuration file you just upgraded.**
4. **Click on Delete.**

   The system removes the selected circuit.
5. **Click on Done.**
6. **In the Circuits menu, click on Add Circuit.**
7. **Configure a new frame relay circuit for each circuit you deleted.**

Task 4: Transferring Script Files to the Router

Transfer to the router from your Site Manager PC or UNIX workstation to the router any Version 12.00 Technician Interface scripts useful for your router configuration. These scripts let you manage the router using information stored in the Management Information Base (MIB). You can use the scripts to display information about protocols and network services and to enable and disable protocols, circuits, lines, and services.

Technician Interface Script Descriptions

The Technician Interface scripts are *.bat* and *.mnu* files; you must transfer these files to a memory card in each router you want to upgrade to Version 12.00.

- The *.bat* files enable you to generate information about a protocol or service that the router supports.
- The *.mnu* files enable you to display this information from menus.

Each script contains subcommands to support the options that it provides. For a complete list of script files and definitions, refer to *Using Technician Interface Scripts*.

For each router you want to upgrade to Version 12.00, you must transfer a minimum set of scripts, regardless of which protocol-specific scripts you want to run on your router. Table 5-1 lists these scripts.

Table 5-1. Minimum Set of Scripts to Transfer to a Router

Script Filename	Description
show.bat	Helps you isolate problems such as circuits that are not working, packets that are not being forwarded, and so forth.
setpath.bat	Sets the search path and aliases for the script commands.
menu.bat	Provides a menu from which you can select the script you want to run.
main.mnu	Displays a top-level menu from which you can select other *.bat* files currently on the system.
monitor.bat	Displays the same information as the **show** command, but refreshes the display periodically so you can examine trends and changes.

In addition to the required script files listed in Table 5-1, you can transfer to your router any protocol-specific scripts to support the protocols on the router you are upgrading to Version 12.00. For example, if you want to run only IP and frame relay on a router, transfer to that router the following script files*: ip.mnu, fr.bat*, and *fr.mnu*.

Appendix A
Determining the PROM Version on the Router

This appendix describes how to determine the current version of Boot and Diagnostic PROM images currently running in your router using Site Manager and the Technician Interface. It also describes Boot PROM upgrades for new feature support.

On the back panel of some routers, a label displays the installed version of Boot and Diagnostic PROMs. For example, an AN router with a SIMM-based flash file system has a label that indicates the current PROM version number. See the guide contained in the PROM upgrade kit (*Installing Boot and Diagnostic PROMs in an AN Router*) for more information.

Using Site Manager to Determine the PROM Version

To obtain PROM version information from any router currently connected to your Site Manager PC or UNIX workstation:

1. **In the main Site Manager window (see Figure 3-1 on page 3-3), choose Tools > Statistics Manager.**

   The Statistics Manager window opens.

   The Statistics Manager displays the current router's configuration. That is, it displays the circuit type and location of the router's network interfaces and the bridging and routing protocols that are enabled on each interface.

2. **Choose Tools > Quick Get.**

   The Quick Get Facility window opens, showing the objects in the Management Information Base (MIB). Use the browser window to scroll through and select objects from the MIB. Then use Quick Get to get all instances of the object you select and to display that information in columns in the Quick Get Facility window.

3. **Scroll through the MIB Browser window and choose the top-level object group,** `wfHardwareConfig`**.**

   The MIB displays subordinate object groups pertaining to router hardware configuration.

4. **Click on the object group** `wfHwTable`**.**

5. **Continue choosing object groups and descending through the tree until the MIB Browser displays the object** `wfHwBootPromRev` **or** `wfHwDiagPromRev` **(depending on which PROM version you want to verify).**

6. **Select the object** `wfHwBootPromRev` **or** `wfHwDiagPromRev`.

   The Object Information field at the top right of the Quick Get window displays information about the object.

7. **In the Quick Get window, click on Retrieve Request.**

   All router slots (indicated by the Instance ID field in the Quick Get data retrieval window) and the Boot PROM version associated with each slot appear.

   The format for the Boot PROM revision that appears in the output window is eight hexadecimal numerals in a 32-bit display. The first four characters are major revisions; the last four are minor revisions.

   Convert the hexadecimal numerals to decimal to determine the PROM revision level. For example, the PROM image version number returned for the Version 9.*xx* router software is 0x00090000.

Note: Slots that have a System Resource Module (SRM) do not show a corresponding Boot PROM revision number.

8. **Click on Done to exit the Quick Get Facility window.**

   For more information about using Quick Get, refer to *Configuring and Managing Routers with Site Manager.*

Using the Technician Interface to Determine the PROM Version

To determine the version number of PROM images residing in a router while working from a local console, a Telnet session, or a modem, enter the following commands at the Technician Interface prompt:

1. **To obtain the version number of Boot PROM images residing in a router, enter:**

   get wfHwEntry.19.*

With a BLN router, for example, information similar to the following appears, with one `wfHwEntry.wfHwBootPromSource` line for each slot:

```
wfHwEntry.wfHwBootPromSource.1 = (nil)
wfHwEntry.wfHwBootPromSource.2 = "rel/12.00/freboot.exe"
wfHwEntry.wfHwBootPromSource.3 = "rel/12.00/freboot.exe"
wfHwEntry.wfHwBootPromSource.4 = "rel/12.00/freboot.exe"
wfHwEntry.wfHwBootPromSource.5 = "rel/12.00/freboot.exe"
```

Each line of response to the command specifies:

- A slot number (for example, "`wfHwEntry.wfHwBootPromSource.`**`2`**" identifies slot 2).
- A path name that contains the version number of the image stored in the Boot PROM (for example, "`rel/12.00/freboot.exe`" identifies the Version 12.00 Boot PROM image *freboot.exe* in slot 2).

Note: The command does not return a Boot PROM version number for slot 1 because slot 1 contains a System Resource Module (SRM). This applies to all routers except AN and ASN routers.

2. **To obtain the version number of Diagnostic PROM images residing in a router, enter:**

   get wfHwEntry.16.*

With a BLN router, for example, information similar to the following appears, with one `wfHwEntry.wfHwDiagPromSource` line for each slot:

```
wfHwEntry.wfHwDiagPromSource.2 =
"/harpdiag.rel/v6.00/wf.pj/harpoon.ss/image.p/frediag.exe"
wfHwEntry.wfHwDiagPromSource.3 =
"/harpdiag.rel/v6.00/wf.pj/harpoon.ss/image.p/frediag.exe"
wfHwEntry.wfHwDiagPromSource.4 =
"/harpdiag.rel/v6.00/wf.pj/harpoon.ss/image.p/frediag.exe"
wfHwEntry.wfHwDiagPromSource.5 =
"/harpdiag.rel/v6.00/wf.pj/harpoon.ss/image.p/frediag.exe"
```

Each line of response to the command specifies:

- A slot number (for example, "`wfHwEntry.wfHwDiagPromSource.2`" identifies slot 2).
- A pathname that contains the version number of the image stored in a diagnostics PROM (for example, `"/harpdiag.rel/v6.00/wf.pj/harpoon.ss/image.p/frediag.exe"` identifies the "v6.00" (Version 6.00) diagnostics PROM image *frediag.exe* in slot 2).

  Refer to *Using Technician Interface Software* for more information.

See Table 2-5 on page 2-14 for Version 12.00 Boot and Diagnostic PROM file names and associated revision numbers for the various router platforms.

If you determine that you need to upgrade PROMs in your router, refer to "Upgrading and Verifying PROMs" on page 4-13.

Features Associated with PROM Upgrades

Table A-1 describes router features implemented between Versions 7.70 and 12.00 that require a new version of Boot PROM. Upgrade the Boot PROM if the features you need depend on a Boot PROM version more recent than the version now in your router.

Note: The Boot PROM version that appears in the AFN MIB corresponds to the version of the AFN Diagnostics PROM code. (The AFN has a combined Boot/Diagnostic PROM device.)

Table A-1. Boot PROM Upgrades for New Feature Support

Router Model	Boot PROM Version	PROM File Name	PROM Features	If PROM Version Is at This Version	Reason for Upgrading PROM
AN/ANH	8.00	*anboot.exe*	4 MB flash capability.	Upgrade to PROM Version 9.00.	2 MB flash might be too small to accommodate Version 10.0 image.
	8.10	*anboot.exe*	New router-specific Boot image name (*an.exe*).	No action required.	No new features beyond Version 8.10.
	9.00	*anboot.exe*	None.	No action required.	No new features beyond Version 8.10.
	9.00b	*anboot.exe*	None.	No action required.	No action required.
AN200	11.01	*an200boot.exe*	Support Router Software Version 11.01.	No action required.	No action required.
ARN	V1.17	*arnboot.exe*	None.	No action required.	No action required.
ASN	8.00	*asnboot.exe*	4 MB flash capability.	Upgrade to PROM Version 10.0.	2 MB flash might be too small to accommodate Version 10.0 image.
	8.10	*asnboot.exe*	New router-specific Boot image name (*asn.exe*). Support for Hot-Swap SPX network module.	No action needed.	No new features beyond Version 8.10.
	9.00	*asnboot.exe*	None.	No action.	No new features beyond Version 8.10.
	10.00	*asnboot.exe*	None.	No action.	---

(continued)

Table A-1. Boot PROM Upgrades for New Feature Support *(continued)*

Router Model	Boot PROM Version	PROM File Name	PROM Features	If PROM Version Is at This Version	Reason for Upgrading PROM
BN	7.70/7.71	*freboot.exe*	Support for FRE-2 controller.	Upgrade to PROM Version 9.00.	4 MB flash capability; changed to router-specific boot image name.
	8.00	*freboot.exe*	4 MB flash capability.	Upgrade to PROM Version 8.10.	2 MB flash might be too small to accommodate Version 10.0 image.
	8.10	*freboot.exe*	New router-specific Boot image name (*bn.exe*).	No action required.	No new features beyond Version 8.10.
	9.01	*areboot.ppc*	ARE/ATM-specific feature.	No action required.	Not applicable.
VME	8.00	*vmeboot.exe*	4 MB flash capability.	Upgrade to PROM Version 8.10.	2 MB flash might be too small to accommodate Version 10.0 image.
	8.11	*vmeboot.exe*	None.	No action needed.	Support for Quad Token Board.
AFN (Flash)	3.03	No file name	Support for 4 MB flash capability.	Upgrade to PROM Version 8.10.	2 MB flash might be too small to accommodate Version 10.0 image.
	3.04	No file name	New router-specific image name change.	No action required.	No new features beyond Version 3.04.
ARE s5000	A0000	*areboot.ppc*	Support for 5780.	No action required.	No action required.
	11.02	*areboot.ppc*	Support for router software version 11.02	No action required.	No action required.
	11.00	*s5000boot.exe*	Support for router software version 11.00.	No action required.	No action required.

Appendix B
Configuration-Specific Issues Affecting Router Upgrades

This appendix describes the Version 7-10.*xx* to 12.00 upgrade configuration-specific issues that may concern you, depending on the current configuration of your Version 7-10.*xx* router. Read this appendix if you are upgrading routers in an environment that includes any of the following situations:

- X.25 Configurations
- Standard Point-to-Point Connections
- Switched Services
- PPP Multiline Circuits

Verifying X.25 Certification Requirements

Due to possible differences between older and newer link modules supporting connections to your X.25 network, you must verify that the router you need to upgrade to BayRS Version 12.00 can pass X.25 certification requirements.

Note: If the router you want to upgrade is a model AN or ASN, or if the router does not support any X.25 configurations, go to the next section that applies to your environment or to Chapter 3 to begin the upgrade process.

Configuring FN, AFN, ALN, CN, or BN Routers to Run X.25

If you are configuring an FN, AFN, ALN, CN, or BN router to support any X.25 configurations, follow the instructions in Table B-1.

Table B-1. Configuring FN, AFN, ALN, CN, or BN Routers to Run X.25

Router Software Version	Action
Version 7.60 or earlier	The behavior of the serial controller chips on link modules differs slightly from the X.25 standard, making them noncertifiable in X.25 networks.
Version 7.60 or later	The MK Thompson 5025 serial controller chip in the link modules now performs the LAPB function of X.25. This change significantly improves performance. However, you may still need to replace some link modules that have earlier versions of the MK5025 chip set to ensure that the router passes X.25 certification.

Ensuring that Link Modules Pass X.25 Certification

Follow these guidelines to ensure that you are using a link module that can pass X.25 certification:

- Do not upgrade AFN hardware.
- Do not replace link modules delivered after June 1992.
- Upgrade link modules directly attached to the X.25 network that were delivered before October 1991.
- Inspect only the link modules directly attached to the X.25 network that were delivered between October 1991 and June 1992. Determine which modules to replace by removing the link module from the router and reading the revision level of any MK5025 chip on that module. If the revision level is C03 or later, do not replace.

Note: If you need hardware to upgrade your router for X.25 support, contact your Bay Networks representative to order it. Specify that the router needs this hardware to satisfy X.25 certification requirements.

Reviewing Standard Point-to-Point Connection Guidelines

If the router you want to upgrade has no synchronous, point-to-point connection requirements, go to the next section that applies to your environment or to Chapter 3 to begin the upgrade process. Otherwise, read this section.

Configuring Point-to-Point Connections over Synchronous Lines

If you need to configure any point-to-point connections over synchronous lines**,** you must designate at both ends of the line an HDLC local address and a remote address. The router at each end receives packets at the designated local address and sends packets to the remote (destination) address.

For each of these parameters, the Configuration Manager allows you to do one of the following:

- Set an implicit address value of DCE (which the router recognizes as a value of 0x01) or DTE (which is 0x03).
- Set an explicit address value of 0x02, 0x04, 0x05, 0x06, or 0x07.

Whatever local-remote address pair you assign at one end of a point-to-point synchronous line, you reverse at the opposite end of the line. For example, the synchronous circuit on Router A in Figure B-1 has an explicit local address (LA) value of 0x04 and a remote (destination) address (RA) of 0x05. In this case, you configure the synchronous circuit on Router B at the opposite end of the same line with a local address value of 0x05 and a remote address value of 0x04.

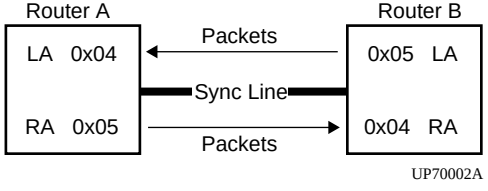

Figure B-1. Address Assignments on a Point-to-Point Synchronous Line

Setting Explicit Local and Remote Address Values with the Technician Interface

If the Configuration Manager constraints prove impractical due to the requirements of your existing network configuration, you can set explicit local and remote address values by entering the following commands at the Technician Interface prompt of the Version 12.00 router:

s wfSyncEntry.wfSyncLocalAddress.*<slot>.<connector> <integer value>;*
commit

s wfSyncEntry.wfSyncRemoteAddress.*<slot>.<connector> <integer value>***;**
commit

save config *<config filename>*

<slot>.<connector> is the slot and connector (that is, the synchronous circuit) you want to configure.

<integer value> is the explicit address value in the range 0x00 to 0x99, excluding 0x01 (the DCE setting) and 0x03 (the DTE setting).

Reviewing Switched Services Enhancements and Compatibility Issues Affecting Router Upgrades

This section describes how Version 12.00 Switched Services enhancements and compatibility issues affect the Version 7-10.*xx* to 12.00 upgrade process.

Upgrading Dial Services to Use PAP and CHAP for Caller Resolution

Bay Networks has completed its migration of dial services, which began in Version 8.10, from address-based caller resolution –- *whoami (*who-am-I) –- to authentication-based caller resolution.

Thus, when you use dial services (Dial-on-Demand, Dial Backup, Bandwidth-on-Demand) over any public switched network, such as an Integrated Services Digital Network (ISDN), you no longer can use an address-based method (IP or IPX addresses) to identify a peer router. Instead, you must configure your router to use one of the PPP authentication protocols: Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP).

PPP uses CHAP names and PAP IDs to identify the caller and to determine which circuit to bring up. You enter CHAP names or PAP IDs in a caller resolution table and associate each name or ID with a demand, primary, or bandwidth-on-demand circuit.

PAP requires the peer router to send a PAP packet that contains a plain-text user identifier and password to the originating router before the interface can advance to the network-layer protocol phase. For more information about PAP and CHAP, refer to *Configuring PPP Services*.

Table B-2 lists the methods used to identify a peer router, beginning with Router Software Version 7.60.

Table B-2. Caller Resolution Methods

Router Version	Caller Resolution Mechanism
Version 7.60-8.00	Router used PPP NCP address information to identify a peer router.
Version 8.10	Router used either PPP NCP address information or CHAP name to identify a peer router.
Versions 9.00, 10.0, 11.0, and 12.00	Router uses CHAP name or PAP ID information to identify a peer router.

Upgrading Dial-on-Demand or Dial Backup Circuits

If you have a Version 7.*xx*-8.00 router that uses Dial-on-Demand or Dial Backup circuits and that initiates calls, and you want to upgrade that router to BayRS Version 12.00, the receiving router must be running Router Software Version 8.10 or later. Otherwise, there is no mechanism by which the receiving router can identify the caller.

If you have multiple routers running Router Software Version 8.10 that use Dial-on-Demand or Dial Backup circuits, and you want to upgrade a router to BayRS Version 12.00, then you can upgrade the router on either end of the circuit. However, to ensure that caller resolution completes on the receiving end of the call, you must configure CHAP authentication and caller resolution information for both the caller and the receiver.

PPP Multiline Migration Issues Affecting Router Upgrades

This section describes PPP multiline migration issues and how they affect router upgrades.

Running LCP on All Lines in a Multiline Circuit

Beginning with Router Software Version 9.00, PPP multiline circuits can negotiate and run the Link Control Protocol (LCP) on all lines in a multiline circuit, as opposed to only one line. By negotiating and running LCP on all lines in a multiline circuit, you can:

- Detect an initial looped-back condition on any line during LCP negotiation.
- Run an Echo Request on any or all lines independently.
- Run periodic CHAP authentication on any or all lines independently.
- Run Link Quality Reporting (LQR) on any and all lines independently.

Ensuring Backward-Compatibility for PPP Multiline Circuits

PPP multiline circuits did not run LCP on all lines of a circuit before Router Software Version 9.00. Therefore, Version 9.00 and later PPP multiline circuits and pre-Version 9.00 multiline circuits are incompatible.

Appendix C
Upgrading the DCM Software Image in BayStack Routers

This appendix describes how to upgrade the DCM software image in BayStack routers (AN, ANH, or ARN) using either Site Manager or the Technician Interface.

Instructions include:

- Verifying Hardware and Software Compatibility for DCM
- Verifying Minimum DCM Requirements
- Upgrading the DCM Software Image

Verifying Hardware and Software Compatibility for DCM

Before installing a Ethernet data collection module (DCM) in a BayStack router, you must ensure hardware and software compatibility.

For RMON operation in BayStack routers, Bay Networks recommends running DCM Agent Software Version 1.4.2 and BayRS Version 12.00 software. However, earlier versions of software are supported.

The minimum requirements for RMON operation differ for BayStack AN/ANH and BayStack ARN routers. See the following table for AN/ANH and ARN requirements:

BayStack AN and ANH Minimum Requirements	BayStack ARN Minimum Requirements
BayRS Version 9.0 (*an.exe* v9.00) or later	BayRS Version 11.02 (*arn.exe* v11.02) or later
DCM Agent Software Version 1.4 (*in11_140.obj*)	DCM Agent Software Version 1.4.1 (*in11_141.obj)* or 1.4.2 (*in11_142.obj*)
	ARN Boot PROM Version 1.17 (*arnboot.exe* v1.17) or later
	ARN Diagnostic PROM Version 1.30 (*arndiag.exe* v1.30) or later
	DCM Hardware Revision D or later

Caution: Enabling an ARN DCM with DCM Agent Software Version 1.4 or earlier could disable the ARN.

Verifying Minimum DCM Requirements

To verify the minimum DCM hardware and software requirements:

1. **Establish a Technician Interface session on the router by logging in via Telnet or a dialup modem.**
2. **Display the current version of DCM agent software.**

   Your version of router software determines which commands you enter:

   - On a router running Router Software Version 11.0 or later, enter the following command to display the DCM agent software version:

     [1:1]$ get wfDCMEntry.wfDCMagentImageVersion.*

   The Technician Interface displays a message similar to the following:

   ```
   wfDCMmw.wfDCMagentImageVersion.1 = ”V1.4.2“
   ```

   (There are two entries if there are two DCMs installed in an ARN.)

- On an AN or ANH router running Router Software Versions 9.0 to 10.0*x*, you access different MIB objects. Enter the following command:

  [1:TN]$ get wfDCMmw.wfDCMAgentImageVersion.0

  The Technician Interface displays information similar to the following:

  ```
  wfDCMmw.wfDCMAgentImageVersion.0 = ”V1.4.0“
  ```

If the Agent Image Version line does not indicate “V1.4.1” or “V1.4.2,” see the next section to upgrade the DCM agent software.

3. **To verify the correct ARN hardware revision, enter the following command:**

   [1:TN]$ get wfDCMEntry.wfDCMhwRev.*

   The Technician Interface displays a message similar to the following:

   ```
   wfDCMEntry.wfDCMhwRev.1 = "D"
   wfDCMEntry.wfDCMhwRev.2 = "D"
   ```

   If the Hardware Revision line indicates “C” or earlier, you must upgrade to DCM hardware Revision D or later.

Upgrading the DCM Software Image

Upgrading the DCM software image in BayStack routers using Site Manager or the Technician Interface involves:

- Transferring the DCM software image from CD-ROM to your PC or UNIX workstation.
- Transferring the DCM software image from your PC or UNIX workstation to the router’s flash card.
- Transferring the DCM software image from the router’s flash memory to the DCM’s flash memory.

Using Site Manager

To upgrade the DCM software image in a BayStack router using Site Manager:

1. **Transfer the DCM software image (for example, *in11_142.obj*) to a PC or UNIX workstation from:**

   - The latest BayRS CD-ROM release media
   - The World Wide Web URL:

     http://support.baynetworks.com/software/Router/

   See "Task 2: Upgrading to BayRS Version 12.00" on page 3-6 for instructions.

2. **Transfer the DCM software image from your PC or workstation to the router's flash memory.**

   Refer to "Task 2: Transferring a Customized Image and Router Files to the Router" on page 4-5 for instructions.

3. **Transfer the DCM software image from the router's flash memory to the DCM flash memory, as follows:**

   In the Configuration Manager window (Figure C-1), choose Platform > DCM 11.0 and later > Global... > Base Module DCM.

Figure C-1. Choosing DCMMW Global Configuration Parameters

The Edit Base Module DCM Parameters window opens (Figure C-2).

Figure C-2. Edit Base Module DCM Parameters Window

4. **Change the Enable/Disable option to Disable.**
5. **Change the Boot Option from Local to Download.**

   This specifies that you want the Ethernet DCM to boot the downloaded DCM image from the Ethernet DCM's flash memory and not from the router's shared memory.
6. **In the Image Name field, specify the target volume and the file name of the new DCM software image (*in11_142.obj*).**

   For example: **1: in11_142.obj.**
7. **Choose the Save option in the Image Save Mode field and click on OK.**

   The Edit Base Module DCM Parameters window closes.

If you choose the No Save option, the Ethernet DCM boots with the new software image, but does not save the image to the Ethernet DCM's flash memory.

Next, you need to complete steps 8 through 10 to boot the Ethernet DCM with the new DCM software image. You complete these steps at the Configuration Manager window.

8. **In the Configuration Manager window (Figure C-1), choose Platform > DCM > Global.**

   The Edit Base Module DCM Parameters window opens (Figure C-2).

9. **Choose Enable in the Enable/Disable option and click on OK.**

   This boots the Ethernet DCM board with the new DCM software image that you specified in the Image Name field and saves the new DCM software image in flash memory, if specified.

10. **Choose Local in the Boot Option box.**

    You choose the Local option after you have saved the DCM software image to the Ethernet DCM's flash and you want to boot the Ethernet DCM from its flash.

11. **Choose OK to exit the Edit Base Module DCM Parameters window.**

Using the Technician Interface

1. **Use UNIX or PC file transfer commands to transfer the DCM software image (for example, *n11_142.obj*) to a PC or UNIX workstation from:**

   - The latest BayRS CD-ROM release media
   - The World Wide Web URL:

     http://support.baynetworks.com/software/Router

   Contact the Bay Networks Technical Solutions Center if you do not have access to these sources.

2. **Use FTP or TFTP to transfer the DCM image file and the *dcmload.bat* Technician Interface script from the workstation to the flash memory card on the router.**

3. **Enter the following Technician Interface command to download the new software image from the router flash memory card to the DCM flash memory:**

   [1:1]$ dcmload

   The Technician Interface displays information about the **dcmload** script, and then prompts:

   ```
   Do you want to download an image to the Base Module DCM
   or the Expansion Module DCM (b/e) [b]
   ```

4. **If the DCM is installed on an AN, ANH, or ARN base module, accept the default response, b. If the DCM is installed on an ARN expansion module, enter e.**

   The Technician Interface displays the following prompt:

   ```
   Specify DCM image name (volume:filename):
   ```

5. **Enter the image name in the form *<volume:filename>*, where *<volume>* is 1 and *<filename>* is the name you gave the DCM image during the file transfer.**

   For example, enter **1: in11_142.obj** or **1:dcm142image**.

   The Technician Interface displays the following prompt:

   ```
   Do you want DCM to save this image on its FLASH? (y/n)[y]
   ```

6. **Answer yes (y).**

   Answering no (**n**) uses the downloaded image only once, reverting to the previous image at the next boot. The Technician Interface displays the following prompt:

   ```
   Do you want to start the download process? (y/n)[y]
   ```

7. **Answer yes (y) to begin downloading the new image, overwriting the existing DCM software image.**

   The downloading process takes less than a minute.

8. **Verify that the DCM software image is now Version 1.4.1 or 1.4.2.**

   See step 2 in the previous section, "Verifying Minimum DCM Requirements" on page C-2.

Sample Display – dcmload.bat

```
        Use this script to download a DCM image from the router's
        Flash to a DCM board.

        When prompted for the image file name, use the form
        <volume:filename>.

        When prompted whether to save the image on the DCM Flash,
        answer yes (y) to overwrite the existing image on the DCM
        Flash with the new image. Answer no (n) to use the downloaded
        image once, but lose it at the next boot.

Specify DCM image name (volume:filename): 1:in11_142.obj

Do you want DCM to save this image on its FLASH? (y/n) [y]: y

Image Name is 1:dcmboot.exe
Image will be saved by DCM in its FLASH

Do you want to start the download process? (y/n) [y]: y
Downloading of DCM image has started. It will take few seconds to complete
```

Appendix D
Upgrading Router Software Using Quick2Config

This appendix provides guidelines for upgrading your existing AN, ASN, or ANH router to BayRS Version 12.00 using Quick2Config. We assume that you have knowledge of basic Quick2Config operations.

For detailed information about installing and using Quick2Config, refer to *Installing the Quick2Config Tool* and *Configuring Your Router Using the Quick2Config Tool*.

To upgrade an AN, ASN, or AHH router to BayRS Version 12.00 using Quick2Config:

1. **Copy the router software image file (*asn.exe* or *an.exe)* from the CD to your PC (refer to "Task 2: Upgrading to BayRS Version 12.00" on page 3-6.)**
2. **Start the Quick2Config application.**

   To learn how to start Quick2Config from Windows 95, refer to *Configuring Your Router Using the Quick2Config Tool*.
3. **From the Starting Quick2Config Session Dialog Box, choose the Connect to a router on the network option (the default).**
4. **Click on OK.**

   If the IP address for the router appears in the connection list, choose it. Otherwise, enter the router's IP address in the IP address box.

5. **Transfer the existing *an.exe* or *asn.exe* image from the router to the PC.**

   a. **Choose File > Router File Manager.**

      The Router File Manager window opens.

   b. **Choose the *an.exe* or *asn.exe* image file name and the volume on which the image file resides.**

      If there are multiple volumes on the router, choose the correct volume.

   c. **In the Router File Manager window, choose File > Get from Router > TFTP.**

      This step ensures that you have a backup of the existing image if you need it.

6. **Remove the existing router software image from your router.**

   With the *an.exe* or *asn.exe* image file still selected (highlighted), choose File > Delete from the Router File Manager window.

   The Delete File Dialog Box opens.

7. **Click on OK to delete the file.**

8. **Compact the contents of the flash card.**

   In the Router File Manager window, choose File > Compact.

   Make sure that you choose the same volume from which you just deleted the *an.exe* or *asn.exe* image file.

   Compacting the flash card ensures that it contains enough contiguous free space to accommodate the new Version 12.00 software image.

9. **Transfer the Version 12.00 *an.exe* or *asn.exe* image file from the PC to the router's flash card.**

   In the Router File Manager window, choose File > Send to Router > TFTP.

   Be sure to transfer the new Version 12.00 software image to the same volume from which you removed the previous one.

10. **Close the Router File Manager.**

    Choose File > Exit to exit the Router File Manager.

11. **Boot the router with the new Version 12.00 image (*an.exe* or *asn.exe*).**

    Quick2Config boots the router using the specified router software image and configuration file.

    Refer to *Configuring Your Router Using the Quick2Config Tool* for detailed instructions on booting a router using Quick2Config.

Appendix E
Upgrading Version 7-9.*xx* Routers

This appendix summarizes how to upgrade Version 7-9.*xx* routers to BayRS Version 12.00 and Site Manager Version 6.00. It also describes the flash card format compatibility between routers running previous versions of the router software and describes how to convert the contents of a flash card to formats compatible with the current version of the router software.

To upgrade Version 7-9.*xx* routers to BayRS Version 12.00 and Site Manager Version 6.00, you must complete two upgrade procedures:

- Upgrade to Router Software Version 10.0 and Site Manager Version 4.0.
- Upgrade from Router Software Version 10.0 and Site Manager 4.0 to BayRS Version 12.00 and Site Manager 6.00.

Upgrading Routers from Router Software Version 7-9.*xx* to Version 10.00

To upgrade routers from Version 7-9.*xx* to Router Software Version 10.0 using Site Manager, complete the tasks in Table E-1.

Table E-1. Upgrading Routers from Version 7-9.xx to Version 10.0

To Do This	Refer to Chapter
1. Back up your existing (Version 7.*xx*, 8.*xx*, or 9.*xx*) configuration file and router files on the router's flash card.	"Backing Up Your Files" on page 2-10.
2. Upgrade to Site Manager 4.0.	"Task 1: Upgrading to Site Manager Version 6.00" on page 3-2.

(continued)

Table E-1. Upgrading Routers from Version 7-9.xx to Version 10.0

To Do This	Refer to Chapter
3. Upgrade to Router Software Version 10.0	"Task 2: Upgrading to BayRS Version 12.00" on page 3-6.
4. Customize the Router Software Version 10.0 software image using the Image Builder.	"Task 3: Customizing the Router Software Image" on page 3-10.
5. Transfer the router software image (Version 7.x, 8.x, or 9.x) and Boot and Diagnostic PROM files to your workstation or PC.	"Task 2: Transferring a Customized Image and Router Files to the Router" on page 4-5.
6. Using the Technician Interface, upgrade the Boot and Diagnostic PROMs on the router.	"Task 3: Upgrading and Verifying PROMs on the Router" on page 4-10.
7. Boot the router using the Version 10.0 customized image and the existing configuration file.	"Task 1: Booting the Router with the Customized Image" on page 5-1.
8. Save the Version 10.0 configuration file to the router's flash card. This writes the configuration file in the router's memory and saves it to the router's flash card with a Version 10.0 MIB stamp. You now have a Version 10.0 software image and configuration file on the router's flash card.	"Task 2: Upgrading the Existing Configuration File" on page 5-4.

After you upgrade to Router Software Version 10.0 and Site Manager 4.0, you must now upgrade Version 10.0/4.0 to BayRS Version 12.00 and Site Manager Version 6.00. Go on to "Upgrading Routers from Router Software Version 10.0 to BayRS Version 12.00."

Upgrading Routers from Router Software Version 10.0 to BayRS Version 12.00

To upgrade from Version 10.0/4.0 to BayRS Version 12.00 and Site Manager Version 6.00 using Site Manager:

1. **Upgrade your PC or UNIX workstation to Site Manager Version 6.00.**

   See Task 1: Upgrading to Site Manager Version 6.00 on page 3-2.

2. **Transfer the Version 12.00 software image and router files (including PROMs) to your Site Manager workstation or PC.**

   See "Task 1: Upgrading to Site Manager Version 6.00" on page 3-2.

3. **Customize the Version 12.00 software image using Image Builder.**

   See "Task 3: Customizing the Router Software Image" on page 3-10.

4. **Transfer the Version 12.00 image and PROM files to the router's flash card.**

   See "Task 2: Transferring a Customized Image and Router Files to the Router" on page 4-5.

5. **Using the Technician Interface, upgrade the PROM files, if necessary.**

   See "Task 3: Upgrading and Verifying PROMs on the Router" on page 4-10.

6. **Exit from the router and install any required hardware.**

7. **Start the router and boot it using the 12.00 software image and the Version 10.0 configuration file.**

   See "Task 1: Booting the Router with the Customized Image" on page 5-1.

8. **Save the configuration file using its old file name.**

   See "Task 2: Upgrading the Existing Configuration File" on page 5-4.

   This saves the configuration file in the router's memory and saves it to the router's flash card with a Version 12.00 MIB stamp.

   You now have a Version 12.00 software image and configuration file on the router's flash card.

Using Flash Cards from Previous Releases

All Bay Networks routers running Router Software Version 7.60 to 8.10, and AFNs running Router Software Version 7.5*x*, write to flash cards using a 68-space file format. Bay Networks BNs (BLN, BLN-2, and BCN) running Router Software Version 7.5*x* write to flash cards using a 61-space file format.

Table E-2 shows which Bay Networks routers can read, write, and boot from the different file format types.

Table E-2. Flash Volume File Compatibility Between Routers Running Different Versions of Router Software

Files Written to Flash Memory by:	Router Capabilities to Read, Write, or Boot from Files			
	FNs, LNs, CNs, and BNs Running Versions 7.60, 7.7*x*, 7.80, 8.0*x*, 8.10, or 9.00	**AFNs Running Versions 7.60, 7.7*x*, 7.80, 8.0*x*, 8.10, 9.00**	**BNs Running Version 7.5*x***	**AFNs Running Versions 7.5*x*, 7.60, 7.7*x*, 7.80, 8.0*x*, 8.10, 9.00, 10.00**
Any router running Versions 7.60, 7.7*x*, 7.80, 8.0*x*, 8.10, 9.00	Read, Write, Boot	Read, Write, Boot	Read, Boot	Read, Write, Boot
AFN running 7.5*x*	Read, Write, Boot	Read, Write, Boot	Read, Boot	Read, Write, Boot
BN running 7.5*x*	Read, Write, Boot	None	Read, Write, Boot	None

When a BN running Router Software Version 8.10 or 9.00 reads a flash card that contains files written by a BN running Router Software Version 7.5*x*, and you enter the **dinfo** command at the Technician Interface prompt, the display indicates that the volume is corrupted. If you request a directory of the volume's contents (using the **dir** command), the display indicates that the contiguous free space is 0 (zero). You can, however, read and boot from the files.

You must convert the contents of a flash card to a format compatible with the router software currently running on a BN router. You do this by copying the files to the router's memory, reformatting the flash card, and copying the files in memory back to the flash card. Follow these steps:

1. **Insert the flash card into the BN router.**
2. **Display the flash card's directory.**

   In the Router Files Manager window, choose Command > Directory.

   If the available free space and contiguous free space are equal, you cannot compact the flash card at this time; go to step 3. Otherwise, go to step 5.
3. **Fragment the flash card volume so you can compact it.**

   Copy the smallest file on the flash card to the same volume, giving it a new file name. Choose Command > Copy from the Router Files Manager.
4. **Delete the original file you created in step 3.**

   This fragments the volume, dividing the contiguous space on the flash card. This allows you to compact the contents of the flash card.
5. **Compact the contents of the flash card.**

   In the Router Files Manage window, choose Commands > Compact.

   The router copies and rewrites all of the files in the correct format for the software that is currently running.

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