NETBuilder® Family Software Version 9.3 Release Notes

Update Pages for:

Using NETBuilder Family Software
Reference for NETBuilder Family Software

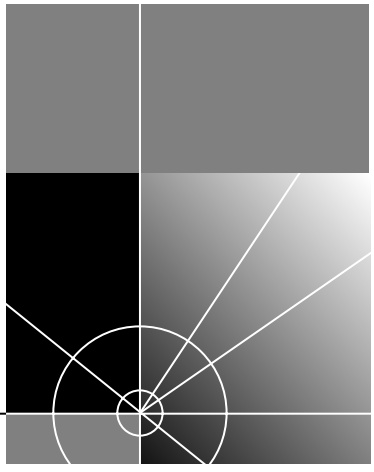
are located at the back of these release notes.
Place the Update Pages at the front of each specified chapter.

3Com provides a documentation CD-ROM that includes all NETBuilder software version 9.3 user guides. To obtain a paper hardcopy version of the 9.3 documentation, order part number 3C6460.

You can order the documentation CD-ROM using part number 3C6461.

Additionally, all documentation for NETBuilder software version 9.3 is located on the 3Com website:

`http://infodeli.3com.com/`



http://www.3com.com/

Part No. 09-0517-003
Published May 1997

3Com Corporation
5400 Bayfront Plaza
Santa Clara, California
95052-8145

3Com Corporation reserves the right to revise this documentation and to make changes in content from time to time without obligation on the part of 3Com Corporation to provide notification of such revision or change.

3Com Corporation provides this documentation without warranty of any kind, either implied or expressed, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. 3Com may make improvements or changes in the product(s) and/or the program(s) described in this documentation at any time.

UNITED STATES GOVERNMENT LEGENDS:
If you are a United States government agency, then this documentation and the software described herein are provided to you subject to the following restricted rights:

For units of the Department of Defense:
Restricted Rights Legend: Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subparagraph (c) (1) (ii) for Restricted Rights in Technical Data and Computer Software Clause at 48 C.F.R. 52.227-7013. 3Com Corporation, 5400 Bayfront Plaza, Santa Clara, California 95052-8145.

For civilian agencies:
Restricted Rights Legend: Use, reproduction, or disclosure is subject to restrictions set forth in subparagraph (a) through (d) of the Commercial Computer Software – Restricted Rights Clause at 48 C.F.R. 52.227-19 and the limitations set forth in 3Com Corporation's standard commercial agreement for the software. Unpublished rights reserved under the copyright laws of the United States.

If there is any software on removable media described in this documentation, it is furnished under a license agreement included with the product as a separate document, in the hard copy documentation, or on the removable media in a directory file named LICENSE.TXT. If you are unable to locate a copy, please contact 3Com and a copy will be provided to you.

Unless otherwise indicated, 3Com registered trademarks are registered in the United States and may or may not be registered in other countries.

3Com, Boundary Routing, NETBuilder, NETBuilder II,and Transcend are registered trademarks of 3Com Corporation.

IBM, AS/400, SNA, and LAN Net Manager are registered trademarks of International Business Machines Corporation. Advanced Peer-to-Peer Networking and APPN are trademarks of International Business Machines Corporation. DECnet is a registered trademark of Digital Equipment Corporation. AppleTalk is a registered trademark of Apple Computer, Inc. NetWare is a registered trademark of Novell, Inc. UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company, Ltd.. VINES is a registered trademark of Banyan Systems. SunOS is a trademark of Sun Microsystems, Inc. XNS is a trademark of Xerox Corporation.

Other brand and product names may be registered trademarks or trademarks of their respective holders.

CONTENTS

***Using NETBuilder Family Software* Update Pages**

***Reference for NETBuilder Family Software* Update Pages**

NETBUILDER SOFTWARE VERSION 9.3 RELEASE NOTES

These release notes provide information on the following topics for NETBuilder® software version 9.3:

- Supported platforms
- New products
- Supported PC flash memory cards
- New features
- Firmware requirements
- NETBuilder Upgrade Management Utilities
- Notes and cautions
- Known problems
- Limitations
- Changes and additions to the following guides:

  Using NETBuilder Family Software

  Reference for NETBuilder Family Software

If you have questions about the software, the guides, or these release notes, contact 3Com® or your network supplier.

For information on the command syntax used in these release notes, refer to "About This Guide" in Using NETBuilder Family Software.

Supported Platforms

NETBuilder software version 9.3 is available for all NETBuilder II®, SuperStack® II NETBuilder, and OfficeConnect™ NETBuilder platforms.

New Products

NETBuilder software version 9.3 supports the new products described below.

DPE Module

NETBuilder software version 9.3 supports the NETBuilder II Dual Processor Engine (DPE) main processor module. The DPE module comes in two versions: the DPE 40 and the DPE 80.

There are two flash memory drives built into the DPE module. The upper drive is drive A, and the lower drive is drive B. The DPE module does not support the floppy disk drive or the flash drive used with the CEC 20 module.

EZBuilt Preassembled NETBuilder II Systems

The EZBuilt NETBuilder II system has been preassembled for you before delivery. Your EZBuilt NETBuilder II system may contain a DPE 40, DPE 80 or CEC 20 processor module. Version 9.3 software is preinstalled on a PC flash memory card, which is inserted into the system before shipment to your site. You will find hardware setup instructions in the hardware installation manual. First-time software installation, booting, and basic settings configuration instructions can be found in *New Installation for NETBuilder II Software*.

NETBuilder II FDDI Link (Dual Wide) Module

The NETBuilder II FDDILink is a dual-wide module designed for the NETBuilder II platform. This module provides higher FDDI interface concentration in the NETBuilder II chassis by requiring only one slot per interface. Up to four FDDI interfaces are allowed in the 8-slot extended chassis.

Model 320 SuperStack II FRAD

The model 320 SuperStack II Frame Relay Access Device (FRAD) provides access to a Frame Relay network. The model 320 SuperStack II has two serial interfaces in addition to the Frame Relay interface and can be software upgraded to a model 323 SNA boundary router or model 327 full router.

OfficeConnect NETBuilder Platforms

Several new OfficeConnect NETBuilder platforms provide a variety of connection options for the small office environment.

OfficeConnect NETBuilder 14x U Series

This OfficeConnect platform provides one Ethernet port, one WAN port, and one ISDN BRI-U interface. The OfficeConnect NETBuilder 14x U series includes the following model options:

OfficeConnect NETBuilder Model	Function	Software Package	Flash Memory	DRAM
141 U	Boundary router	BX	4 MB	8 MB
142 U	Basic router	AB	4 MB	8 MB
143 U	SNA boundary router	BF	4 MB	8 MB
146 U	APPN	AF	4 MB	8 MB
147 U	Full router	OF	4 MB	8 MB

OfficeConnect NETBuilder 11x Series

This OfficeConnect platform provides one Ethernet port and one WAN port. The OfficeConnect NETBuilder 11x series includes the following model options:

OfficeConnect NETBuilder Model	Function	Software Package	Flash Memory	DRAM
111	Boundary router	BX	4 MB	8 MB
112	Basic router	AB	4 MB	8 MB
113	SNA boundary router	BF	4 MB	8 MB
116	APPN	AF	4 MB	8 MB
117	Full router	OF	4 MB	8 MB

OfficeConnect NETBuilder 12x K Series

This OfficeConnect platform provides one Ethernet port (except on FRAD there is no LAN port), one WAN port, and one 56K/64K CSU/DSU port. The OfficeConnect NETBuilder 12x K series includes the following module options:

OfficeConnect NETBuilder Model	Function	Software Package	Flash Memory	DRAM
120 K	FRAD	OF	4 MB	8 MB
121 K	Boundary router	FD	4 MB	8 MB
122 K	Basic router	AB	4 MB	8 MB
123 K	SNA boundary router	BF	4 MB	8 MB
126 K	APPN	AF	4 MB	8 MB
127 K	Full router	OF	4 MB	8 MB

Supported PC Flash Memory Cards

Table 1 lists 3Com-approved vendors of the PC flash memory card.

The 10 MB flash memory card has a formatted capacity of 9.87 MB. The 20 MB flash memory card has a formatted capacity of 19.86 MB. For dual image and full dump capability, 3Com recommends using a 20 MB card.

You can also purchase the blank flash memory card from 3Com:

- DPE 20 MB card is 3C6086
- CEC 10 MB card is 3C6084
- CEC 20 MB card is 3C6085

Table 1 Approved Flash Memory Cards

Module	Size	Vendor and Description	Part Number
DPE	**10 MB**	Intel Series 2	iMC010FLSA
		AMD Series C	AmC010CFLKA
	20 MB	Intel Series 2	iMC020FLSA
		Intel Series 2+	iMC020FLSP
		AMD Series D	AmC020DFLKA
CEC	**10 MB**	Intel Series 2	iMC010FLSA
		SMART Modular Technologies	SM9FA5108IP320
		AMD Series C	AmC010CFLKA
	20 MB	Intel Series 2	iMC020FLSA
		AMD Series D	AmC020DFLKA
		SMART Modular Technologies	SM9FA5208IP320
		SMART Modular Technologies	SM9FA5208AP320

New Features

This section describes new features added since software version 9.1 for the NETBuilder II and SuperStack II bridge/routers and version 9.2 for the OfficeConnect NETBuilder bridge/router.

ChangeDir Command

The ChangeDir command defines the working directory for all subsequent file commands. Refer to Chapter 1 in *Reference for NETBuilder Family Software* for more information.

Access Control and Telnet Authentication

This feature allows multiple users using different manager-defined user names to access a bridge/router instead of allowing only root-defined access. The new access control feature requires maintaining a user database and a user authentication scheme. Refer to Chapter 1 in *Reference for NETBuilder Family Software* for descriptions of the following commands:

- AddUser
- DeleteUser
- EXPire
- PassWord
- UserManage

IP Performance Enhancement

IP performance tuning for FDDI, Fast Ethernet (V3) drivers, and PPP can provide 30 percent to 40 percent higher performance on these high-speed media.

AppleTalk Filter Enhancement

The AppleTalk filter enhancement, Entity Filter, allows or restricts access to named AppleTalk resources on a network.

WAN Response Time Enhancement

WAN Response Time enhancement monitors the status of driver queues and uses the information to regulate packet flow and assure a fair and predictable latency for high-priority traffic. A timer is used to smooth the traffic and deliver packets to keep latency low and the WAN link at full capacity.

ATM RFC1483 PVCs (Source Route Bridging)

ATM RFC1483 PVCs for IP, IPX, and transparent bridging now support source route bridging.

Source route bridging over multiprotocol ATM permanent virtual circuits (PVCs) uses the same design as source route bridging over Frame Relay and SMDS. Both fully meshed and non-meshed topology are supported.

ATM LANE Enhancements

Asynchronous transfer mode (ATM) LANE enhancements extend the ATM LANE Client feature to transparent bridging. Support for bridging of large FDDI and Token Ring packets is included.

ATM Performance Enhancement

ATM performance is enhanced through better handling of ATM traffic. The handling of IP traffic within and between ATMLink module configurations has been streamlined to increase throughput.

BSC Passthru Spoofing

Bisynchronous communication (BSC) Passthru allows BSC devices to be tunnelled using DLSw. Separate BSC leased lines are not needed when using BSC Passthru. 3270 and 3780/2780 BSC (EBCDIC only) is supported.

DLSw Capacity

The DLSw capacity feature is a collection of enhancements that enables DLSw to operate efficiently in environments with many low-traffic peers. These enhancements include increasing the number of tunnels and circuits supported (See DLSw in Large Uncorks in the Limitation section). User commands also have been added to allow limiting broadcast frames.

DLSw Performance Enhancement

DLSw performance is enhanced to significantly improve SNA and NetBIOS circuits response time for DLSw and LLC2 data frames and to reduce NETBuilder CPU usage when processing incoming LLC2 data traffic.

DLSw Multicast

The DLSw Multicast feature enhances the scalability of data link switched networks. This feature defers the TCP connection setup until circuit setup is needed between two data link switches. The discovery process is carried out using multicast frames to all the partners.

DLSw multicast implementation benefits include:

- Reduced configuration at the data link switches
- Reduced WAN backbone traffic
- Reduced TCP overhead

Dual Frame Relay PVC for Boundary Routing

The dual Frame Relay PVC for Boundary Routing feature:

- Allows SNA to run over a dedicated PVC in the Boundary Routing Frame Relay environment
- Guarantees response time and bandwidth for SNA
- Allows network managers to separately monitor the SNA pipe

Dual Frame Relay PVC for Boundary Routing is an enhancement to the existing Boundary Routing environment using Frame Relay PVCs as the data link. This feature applies to an environment where System Network Architecture (SNA) traffic is running with other non-SNA protocols (IPX or IP for example) at the leaf node, and the SNA traffic is forwarded to the central site with SNA boundary routing.

In this feature, two PVCs over Boundary Routing Frame Relay are required: one for SNA traffic and one for multiprotocol traffic other than SNA. Both PVCs are sent to a common central NETBuilder II or SuperStack II NETBuilder. SNA traffic at the leaf node is separated to its respective PVC and then shipped out to the central site. Non-SNA traffic is placed on the other PVC and shipped out to the central site.

NetView Service Point (SSCP-PU Support)

NetView Service Point support allows 3Com bridge/routers to be seen by NetView.

Polled Asynch (Alarm Support)

The Polled Asynch feature provides the ability to tunnel asynchronous data across DLSw connections or LLC2 circuits. Using this feature, data from an asynchronous device on a NETBuilder serial port is forwarded across a DLSw circuit to another NETBuilder bridge/router. The DLSw local switching feature may be used so that the circuit between the NETBuilder bridge/routers uses LLC2 instead of DLSw. Alternatively, the DLSw Port Group feature can be used to forward asynchronous data across an LLC2 circuit to another NETBuilder bridge/router.

The NETBuilder bridge/routers allow multiple DLSw circuits or LLC2 circuits to be associated with a single asynch port. You may configure a variety of data forwarding and buffering conditions for asynchronous data, such as idle timers, character counts, and character values. Additional configuration options allow mapping of frames to circuits in a multidrop environment when a frame addressing protocol is in use.

Serial Download of Software

Support for the ZModem file transfer protocol allows software downloads to the CONSOLE port of the DPE and CEC 20 modules. Refer to *Upgrading NETBuilder Family Software* and *New Installation for NETBuilder II Software* for more information about transferring files using ZModem.

Version 9.3 NETBuilder Upgrade Management Utilities

New functions have been added to the utilities since software version 9.1. These functions enhance the upgrade capability for all NETBuilder platforms. The enhancements include the following:

- Supports IBM AIX 4.1.4 and 4.2 in addition to HP-UX 10.0 and 10.20, SunOS 4.1.4, and Sun Solaris 2.5.x operating environments
- Supports automatic recovery for all NETBuilder systems
- Integrates with Transcend Enterprise Manager 4.2.1 for UNIX
- Supports restoring an existing image and configuration onto replacement hardware
- Supports the bcmupdate utility on Windows PCs.

NETBuilder Upgrade Management Utilities

This section includes information about version 9.3 NETBuilder Upgrade Management Utilities.

File Conversion Considerations

7.2.1 BX Package

The 7.2.1 BX package will not perform a remote upgrade in some cases. You must reconfigure this software package using telnet or the console using the CO command.

APPN

APPN file conversion is supported from software release 8.2 and beyond. Upgrading from software versions prior to 8.2 requires manual configuration.

High Performance Routing (HPR) is a new feature for NETBuilder after version 8.3. If the BCMUpdate utility is used to convert your APPN data file from version 8.3 (or later) to 9.3, be sure to turn on HPR if HPR is desired, using:

```
SETDefault !<port> -APPN PortDef = <DLC type> HPR=yes
```

Bridge Static Routes

A static bridge route configured with the off option does not convert properly. You must manually reconfigure this route.

DLSw

Initial Bandwidth for Peer is a new parameter for software versions 8.3 and later. The default for version 9.3 is 8000. If the BCMUpdate utility is used to convert your DLSw data files from version 8.3 (or later) to 9.3, be sure to set the value of the parameter to the desired value using:

```
SETDefault <tunnel id> -Dlsw PEER = <IP address> <PrioMode> <8000 |
other value>
```

PROfile Service

Version 8.0 software and above includes the PROfile Service. Many parameters that belong to the X25 Service were moved to this service. Because the mapping is not one-to-one, the upgrade utility does not convert all parameters. After upgrading from pre-8.0 version software, delete the X25 Service configuration file and reconfigure the parameters under the X25 Service.

The X25VCLIMIT, X25VCTimer, and X25QueueSize parameters, previously in the network layer protocols services (AppleTalk, DECnet, IP, IPX, and so on), were moved to the PROfile Service. If you configured any of these parameters, you need to reconfigure them.

X.25 SVCs

The default values of the X25 Service parameters have changed from versions of software prior to 8.0. To ensure that call initiation between mixed versions of X.25 software is successful, you must configure the Twoway SVCs parameter on both ends of the X.25 connection to the same value.

bcmfdinteg

Do not use the bcmfdinteg utility. The bcmfdinteg utility is used internally by the bcminstall utility. The bcmfdinteg utility should not be used by itself, because by default it removes all files from the current directory.

bcminstall on HP-UX

Bcminstall will not install a NETBuilder package from an 8.3 CD on to an HP-UX Network Management Station. Use the diskettes that are provided with NETBuilder software version 8.3 for HP-UX installation.

bcmdiagnose and HP-UX

If you are using HP-UX and have difficulties passing the tftp portion of bcmdiagnose, you may need to modify the /etc/passwd file. Follow the instructions printed during bcmsetup. You may need to add the following line to the /etc/passwd file:

```
tftp::510:200:,,,:/tftpboot:/bin/false
```

Refer to the HP-UX tftpd man page for more information.

Concurrent Usage

The NETBuilder Upgrade Management utilities are currently designed to run sequentially. Running multiple simultaneous instances of bcmbackup, bcmsysupgrade, bcmrestore, and bcmdiagnose is not supported at this time.

Downloading NETBuilder Upgrade Management Utilities

In addition to being available on CD-ROM, the NETBuilder Upgrade Management Utilities can be downloaded from the FTP site (ftp.3com.com) or from the 3Com bulletin board service (BBS) under Software Downloads, System Software. The files range in size from 1 MB to 3 MB per operating system file and are usually easier and faster to retrieve using the FTP site.

The utilities are UNIX files compressed with the UNIX compress utility. The UNIX uncompress utility must be used to expand the files. The files are:

bcmmib93.Z — Contains the UNIX-compressed MIB used by the NETBuilder Upgrade Management Utilities for the UNIX platforms supported in this release of NETBuilder software.

bcmsol93.Z — Contains the UNIX-compressed NETBuilder Upgrade Management Utilities for Solaris 2.5.x.

bcmsun93Z — Contains the UNIX-compressed NETBuilder Upgrade Management Utilities for SunOS.

bcmhp93.Z — Contains the UNIX-compressed NETBuilder Upgrade Management Utilities for HP-UX 10.10 and 10.20.

bcm93.txt — Contains the instructions for downloading and decompressing the NETBuilder Upgrade Management Utilities.

bcmaix93.Z — Contains the utilities for AIX 4.1.4 and 4.2

See the Technical Support appendix in your guide for telephone access numbers.

IP Address Link

When using bcmsysupgrade in a hardware replacement upgrade, you must use the same IP address as previously used for the router if you have already backed up you software onto the NMS. Using a different IP address will cause the upgrade to fail.

Required Patches for Sun and Solaris Systems

The following patches are required for the remote upgrade utilities software to function reliably.

- SunOS 4.X Patch T101405-01

  This patch corrects a bug where overwriting a larger file with a smaller file results in a file the size of the original.

- Solaris 2.4 and earlier: Patch 102773-01

  This patch corrects performance problems in the TFTP server.

SuperStack II NETBuilder Token Ring Upgrades

If SuperStack II NETBuilder systems that are running software version 8.3 have a boot image named "bundle.68K," the SuperStack II NETBuilder Token Ring system is not upgradable to software version 9.3 unless the sys file is present on the flash drive. In order to work around this, either rename the image to "boot.68k," or copy the 8.3 sys file to the primary boot directory on the NETBuilder.

Upgrading to 9.3 Utilities with Transcend Enterprise Manager

If you have Transcend® Enterprise Manager version 4.2.1 for UNIX, and you installed NETBuilder software on the network management station using the version 9.1 utilities, you must reinstall the NETBuilder software package *after* upgrading to the version 9.3 utilities.

Software and Hardware Specifications

This section provides information about the hardware requirements, software packages, migration path options, and firmware requirements for NETBuilder II, SuperStack II, and OfficeConnect systems. For more information about upgrading to version 9.3 software refer to *Upgrading NETBuilder Family Software*.

NETBuilder II Software Packages

The NETBuilder II bridge/router supports five different software packages in version 9.3. Table 2 outlines each software package and its hardware requirements.

Table 2 NETBuilder II Software Packages

Software Package	Features Supported	Minimum Hardware Required
(AP) - APPN Multiprotocol* (For DPE)	75 maximum virtual ports, bridging, Boundary Routing® central, IP, IPX, AppleTalk, LLC2 tunneling, DLSw, APPN, SNA Boundary Routing, LNM, LAA, SDLC, SHDLC, PPP, MLP, X.25, X.25 switching and tunneling, Frame Relay, SMDS, Dial, WAN Extender, Zmodem, and LAN port support	NETBuilder II DPE module, 4-Slot, 8-Slot, or 8-Slot Extended chassis For single-image† support: 10 MB flash memory Dual-image‡ support: 20 MB flash memory
(CX) - Connection Services (For DPE)	75 maximum virtual ports, bridging, Boundary Routing central, IP, IPX, XNS, OSI, IP and OSI connection services, X.25, X.25 switching and tunneling, LAA, PPP, MLP, Frame Relay, Dial, WAN Extender, Zmodem, and LAN port support	NETBuilder II DPE module; 4-Slot, 8-Slot, or 8-Slot Extended chassis For single-image† support: 10 MB flash memory Dual-image‡ support: 20 MB flash memory
(DW) - Extended WAN (For DPE)	75 maximum virtual ports, bridging, Boundary Routing central, all routing, LLC2 tunneling, DLSw, SNA Boundary Routing, LNM, LAA, SDLC, SHDLC, NetView Service Point, PPP, MLP, Frame Relay, SMDS, X.25, X.25 switching and tunneling, Dial, WAN Extender, Zmodem, and LAN port support	NETBuilder II DPE module; 4-Slot, 8-Slot, or 8-Slot Extended chassis For single-image† support: 10 MB flash memory Dual-image‡ support: 20 MB flash memory
(CP) - Complete Protocols (For CEC 20)	75 maximum virtual ports, bridging, Boundary Routing central, all routing, LLC2 tunneling, DLSw, SNA Boundary Routing, LNM, LAA, SDLC, SHDLC, PPP, MLP, PLG, Dial, WAN Extender, and LAN port support	NETBuilder II CEC 20 MB module; 4-Slot, 8-Slot, or 8-Slot Extended chassis For single-† or dual-image‡ support: 10 MB flash memory. Network boot supported
(FF) - Extended WAN (For CEC 20)	75 maximum virtual ports, bridging, Boundary Routing central, all routing, LLC2 tunneling, DLSw, SNA Boundary Routing, LNM, LAA, SDLC, SHDLC, NetView Service Point, PPP, MLP, PLG, Frame Relay, SMDS, X.25, X.25 switching and tunneling, Dial, WAN Extender, and LAN port support	NETBuilder II CEC 20 MB module; 4-Slot, 8-Slot, or 8-Slot Extended chassis For single-† or dual-image‡ support: 10 MB flash memory. Network boot supported

* This package does not support the NETBuilder II multiprocessor (MP) modules.
† Single-image support allows a manually recoverable upgrade.
‡ Dual-image support allows an autorecoverable upgrade.

NETBuilder II Firmware Requirements

The CEC and NETBuilder II I/O modules require firmware upgrades to support the 9.3 software version (see Table 3 for firmware requirements).

You can determine your CEC firmware version in the following ways:

- Checking the REM number that is displayed on the console when the bridge/router is turned on
- Entering the SI command in the monitor utility and selecting option 1
- Through the software by entering:

```
SHow -SYS VERSion
```

- From a UNIX network management station with the remote upgrade utilities installed, enter:

  bcmuname -w <device>

You can determine your I/O module firmware version through the software by entering:

SHow -SYS IOI

Table 3 NETBuilder II Firmware Requirements

Module	9.3 Firmware Version String
CEC	FW/NBII-FW,2.5
MP6E*	FW/6ETH-FW,1.4.0.70
ATMLink*	FW/ATM-FW,1.1.0.70
HSS 3-port (V.35)*	FW/HSS3-V35,1.1.7.01I
HSS 3-port (RS449)*	FW/HSS3-449,1.1.7.01I
HSS 3-port (RS232)*	FW/HSS3-232,1.1.7.01I

* The NETBuilder II IO Module Firmware Update Utility (version string of FW/NBII-IO,9.3) bundles firmware for these modules.

SuperStack II NETBuilder Software Packages

The SuperStack II NETBuilder bridge/routers support seven different software packages in version 9.3. Table 4 describes the features and associated hardware requirements of each software package.

Table 4 SuperStack II Software Packages

Software Package	Features	Models	Minimum Hardware Required
(AA) - IP Router	Bridging, IP, BGP, PPP, MLP, (ISDN for model 424), Frame Relay, SMDS, X.25, X.25 switching and tunneling services, Dial, FTP, and LAN port support	224, 424*	For single-image† support: 2 MB flash memory drive and 4 MB DRAM. For dual-image‡ support: 4 MB flash memory drive and 4 MB DRAM.
(AB) - IP/IPX Router	Bridging, IP, IPX, PPP, MLP, (ISDN for model 422), Frame Relay, SMDS, X.25, X.25 switching and tunneling, Dial, FTP, and LAN port support	222, 422	For single-image† support: 2 MB flash memory drive and 4 MB DRAM. For dual-image‡ support: 4 MB flash memory drive and 4 MB DRAM.
(BF) - Boundary Routing with IBM SNA support	Boundary Routing leaf, DLSw, SNA Boundary Routing, (NetView Service Point and LAA for models 323 and 523), SDLC, (Polled Asynch and BISYNC for models 323 and 523), (ISDN for models 423 and 523), PPP, MLP, Frame Relay, X.25, Dial, FTP, and LAN port support	223, 323, 423, 523*	For single-image† support: 4 MB flash memory drive and 8 MB DRAM. For dual-image‡ support: 4 MB flash memory drive and 8 MB DRAM.
(BX) - Boundary Routing	Boundary Routing leaf, PPP, MLP, (ISDN for model 421), Frame Relay, X.25, Dial, FTP, and LAN port support	221, 421	For single-image† support: 2 MB flash memory and 4 MB DRAM. For dual-image‡ support: 2 MB flash memory and 4 MB DRAM.
(CF) - Full Routing	Bridging, Boundary Routing central, IP, Multicast IP, BGP, IPX, XNS, AppleTalk, OSI, Vines, DECnet, 3Com LLC2 Tunnel, (NetView Service Point for models 327 and 527), SNA Boundary Routing, (LAA for models 327 and 527), SDLC, SHDLC, (Polled Asynch and BISYNC for models 327 and 527), Frame Relay, SMDS, X.25, X.25 switching and tunneling, PPP, MLP, (ISDN for models 427 and 527), Dial, FTP, and LAN port support	227, 327, 427, 527*	For single-image† support: 4 MB flash memory and 8 MB DRAM. For dual-image‡ support: 4 MB flash memory for the 227 and 427, 8 MB flash memory for the 327 and 527, 8 MB DRAM for the 227, 327, 427 and 527.

(continued)

Table 4 SuperStack II Software Packages (continued)

Software Package	Features	Models	Minimum Hardware Required
(CX) - Connection Services	Bridging, IP, IP and OSI connection services, IPX, XNS, OSI, PPP, MLP, Frame Relay, X.25, X.25 switching and tunneling, Dial, FTP, and LAN port support	228	For single-† and dual-image‡ support: 4 MB flash memory and 8 MB DRAM.
(FD) - FRAD	Bridging, IP, Multicast IP, BGP, IPX, 3Com LLC2, DLSw, NetView Service Point, LAA, SDLC, SHDLC, Polled Asynch and BISYNC, PPP, MLP, Frame Relay, X.25, X.25 switching and tunneling, Dial, and FTP	320	For single-image† support: 4 MB flash memory and 8 MB DRAM. For dual-image‡ support: 8 MB flash memory and 8 MB DRAM for 320.

* Only patch upgrades are supported for models 424, 523 and 527
† Single-image support allows a manually recoverable upgrade
‡ Dual-image support allows an autorecoverable upgrade

OfficeConnect NETBuilder Software Packages

The OfficeConnect NETBuilder bridge/routers support six different software packages in version 9.3. Table 5 describes the features and associated hardware requirements of each software package.

All OfficeConnect NETBuilder bridge/router models come with 4 MB of flash memory and 8 MB of DRAM. If you need 8 MB for the dual-image support required for some models, add 4 MB of SIMMs to the 4 MB of flash memory.

Table 5 OfficeConnect Software Packages

Software Package	Features	Models	Minimum Hardware Required
(AB) - IP/IPX Router	Bridging, IP (routing and OSPF), IPX, PPP, MLP, ISDN, Frame Relay, SMDS, X.25, X.25 switching and tunneling, Dial, FTP, and LAN port support	112, 122 K, 122, 142 S/T, 142 U	For single-image* support: 2 MB flash memory and 4 MB DRAM For dual-image† support: 4 MB flash memory and 4 MB DRAM
(BF) - Boundary Routing with IBM SNA support	Boundary Routing leaf, DLSw, PPP, MLP, SNA Boundary Routing, SDLC, ISDN, Polled Asynch and BISYNC, Frame Relay, X.25, Dial, FTP, and LAN port support	113, 123 K, 123, 143 S/T, 143 U	For single-image* support: 4 MB flash memory and 8 MB DRAM For dual-image† support: 8 MB flash memory and 8 MB DRAM
(BX) - Boundary Routing	Boundary Routing leaf, PPP, MLP, ISDN, Frame Relay, X.25, Dial, FTP, and LAN port support	111, 121 K, 121, 141 S/T, 141 U	For single-image* support: 2 MB flash memory and 4 MB DRAM For dual-image† support: 4 MB flash memory and 4 MB DRAM
(OF) - Full Routing	Bridging, all routing protocols, IP, Multicast IP, BGP, IPX, XNS, AppleTalk, OSI, Vines, DECnet, 3Com LLC2 tunnel, DLSw, SNA Boundary Routing, SDLC, SHDLC, Polled Asynch and BISYNC, PPP, MLP, ISDN, Frame Relay, SMDS, X.25, X.25 switching and tunneling, Dial, FTP, and LAN port support	117, 127, 147 S/T, 147 U	For single-image* support: 4 MB flash memory and 8 MB DRAM For dual-image† support: 8 MB flash memory and 8 MB DRAM
(AF) - APPN Routing	Bridging, IP (routing and OSPF), Multicast IP, IPX, AppleTalk, 3Com LLC2 tunnel, DLSw, SNA Boundary Routing, APPN, SDLC, SHDLC, Polled Asynch and BISYNC, PPP, MLP, ISDN, Frame Relay, X.25, X.25 switching and tunneling, Dial, FTP, and LAN port support	116, 126 K, 126, 146 S/T, 146 U	For single-image* support: 4 MB flash memory and 8 MB DRAM For dual-image† support: 8 MB flash memory and 8 MB DRAM
(FD) - FRAD	Bridging, IP, Multicast IP, BGP, IPX, 3Com LLC2, DLSw, NetView Service Point, LAA, SDLC, SHDLC, Polled Asynch and BISYNC, PPP, MLP, Frame Relay, X.25, X.25 switching and tunneling, Dial, and FTP	120 K, 120	For single-image† support: 4 MB flash memory and 8 MB DRAM For dual-image‡ support: 8 MB flash memory and 8 MB DRAM

* Single-image support allows a manually recoverable upgrade.
† Double-image support allows an autorecoverable upgrade.

Notes and Cautions

This section describes notes, cautions, and other considerations to be aware of when using the NETBuilder software. The topics are presented in alphabetical order.

8-Slot Chassis with Removable Center Divider and Extended Chassis

The NETBuilder II 8-Slot chassis with removable center divider supports the maximum MP and I/O combinations shown in Table 6. The MP is a double-wide module that requires two slots. In these combinations, an I/O module refers to one of the following NETBuilder II modules:

- Ethernet
- Ethernet 2-Port 10BASE-FL
- FDDI MAC or MAC+
- FDDI PHY
- ATMLink module
- MP Modules
- Token Ring or Token Ring+
- HSS V.35/RS-232 and RS-449
- HSS 3-Port: V.35, RS232, RS449, and X.21
- 100BASE-TX and 100BASE-FX
- HSSI
- HSS G.703
- HSS I.431
- Flat FDDI

The NETBuilder II Extended chassis supports the maximum MP and I/O combinations shown in Table 7.

Table 6 MP and I/O Combinations, 8-Slot Chassis

MP	I/O
0	8
1	6
2	4
3	2
4	0

Extended Chassis

The NETBuilder II Extended chassis supports the maximum combinations shown in Table 7.

Table 7 MP and I/O Combinations, Extended Chassis

MP Modules	I/O Modules
0	8
1	7
2	6
3	5
4	4
5	3
6	2
7	1
8	0

APPN Connections to 3174 through Token Ring

When you connect to a 3174 on a token ring, you may need to enable transparent bridging on the bridge/router. The 3174 may send exchange identification (XID) as a non-source routed frame.

Asynch Tunnelling on Serial Ports

For best results, set the Linetype parameter to leased and set the NETBuilder Superstack II 32x platform connector type for the universal port to RD-232. In order for the path to come up, the NETBuilder must see a DTR or DSR control signal from the device. Or, if the device does not generate a control signal, a loop-back connector should be used to supply the control signal.

ATM LAN Emulation Clients and Large 802.3 Frames

This release of LAN Emulation software does not support large 802.3 frame encapsulation as specified in the LANE standard 1.0. When IP routing from FDDI to an ELAN, packets larger than 1500 will be sent fragmented per IP fragmentation rules.

ATM Modules

The NETBuilder II supports 4 ATM modules and a system maximum of 32 Emulated LANS.

Automatic Line Detection

When set to the value of Auto, the -PATH LineType parameter first attempts to bring up the path as a leased line by raising the data terminal ready (DTR) signal. If the path comes up, but a DTR-base dial modem is attached to the path, the modem will not hang up until brought down manually with the HangUp command. To avoid this situation, set the -PATH LineType parameter to Dialup.

Bandwidth-on-Demand Timer Precedence

Two PORT Service parameters are used to configure bandwidth-on-demand ports. The DialIdleTime parameter sets the time in seconds before all dialup lines in a port are disconnected if the port is not in use. The DialSamplPeriod parameter sets the time (in seconds) to sample before taking an action to bring paths up or down, based on traffic load for bandwidth-on-demand. The value specified for the DialIdleTime parameter takes precedence over the value specified for the DialSamplPeriod parameter.

Baud Rates for WAN Ports in DCE Mode

The following baud rates are supported in DCE mode:

- 1200
- 1800
- 2400
- 3600
- 7200
- 9600
- 19K
- 38K
- 56K
- 64K
- 112K
- 128K
- 256K
- 384K
- 448K
- 768K
- 1344K
- 1536K
- 1580K
- 2048K

If you configure a baud rate that is different from those listed, the system will fall back to the nearest supported rate.

BSC Cabling and Clocking

The data communication equipment (DCE) cable for SuperStack II should be 07-264-000-01 (rev. 1) to work in BSC internal clocking mode.

Boundary Routing and NetView Service Point

When configuring NetView Service Point in a Boundary Routing environment, note that the SSCP-PU session actually flows over LLC2 rather than DLSw, even though the -SNA PortDef parameter is defined as DLSw. As a result, the session does not show up as a DLSw circuit.

Compression Requirements

Compression must use the same configuration at both ends of the connection. If one side of a connection is configured as per-packet while the other is configured as history, the PPP link will not come up.

Configuring BSC and NCPs

When connecting a NETBuilder bridge/router with an Network Control Program (NCP) for a BSC configuration, be careful when disabling the 3780/2780 EP lines. If you try to pull the cable out, the NCP may go into a state that will require the NCP to be rebooted. Check with your IBM service representative.

CONNectUsage Parameter Default Change

The default value of the -SYS CONNectUsage parameter has been changed to High for NETBuilder bridge/routers with a DPE module. The default value of CONNectUsage for all other platforms remains Low. This change has been made to simplify DLSw configurations.

When the DPE module is used in a non-DLSw configuration, a small amount of memory is allocated (226K of approximately 12 MB). Non-DLSw configurations in very large networks running OSPF and BGP may require that the CONNectUsage parameter be changed to Low to recapture this 226K of memory. For all other configurations, this additional small memory allocation should have no effect.

DLSw Circuit Balancing

Circuit balancing will not work properly if WAN links are set to different speeds. For circuit balancing to work properly, you must have WAN links of the same speed. If the WAN links are different speeds, for example, T1 and 64K, the bridge/router with circuit balancing learns the route from the T1 link before learning the route from the 64K link. All circuits are directed to the DLSw tunnel on the T1 link instead of being distributed on both 64K and T1 DLSw tunnels. Only after alternate routes are in the circuit-balancing router cache will subsequent session establishment be balanced.

DLSw Prioritization

The FLush -SYS STATistics command does not flush DLSw priority statistics. You must use the FLush -DLSw PRioritySTATistics command.

Deleting Virtual Ports

The addresses associated with virtual ports must be deleted before deleting the ports.

Disaster Recovery on Ports Without Leased Lines

The Port Service DialControl parameter controls port attributes for a dial-up port in the event the bandwidth set for a leased line drops below what has been set as the normal bandwidth. Setting this parameter to DisasterRecovery for a port without leased lines prevents port idle out.

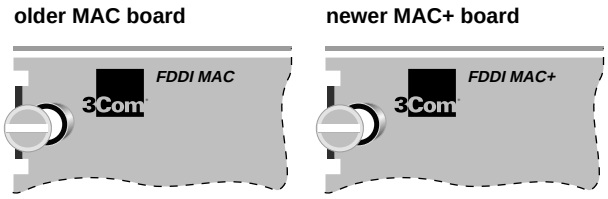
DTR Modems

DTR modems should not be configured as a dynamic path and a dial pool.

FDDI Module Configurations Supported

The following sections describe the configurations of older and newer FDDI modules in the NETBuilder II 4-Slot chassis, the single-wide and dual-wide 8-Slot chassis, and the Extended chassis.

The FDDI module includes either the older MAC board or the newer MAC+ board. Identify which version you have by referring to the following illustration:

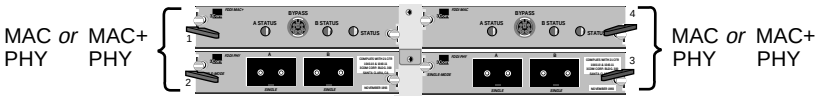


There are two versions of the NETBuilder II 4- and 8-Slot chassis. The older, single-wide versions of the NETBuilder II 4-Slot and 8-Slot chassis have two ejector tabs for each module. The newer, dual-wide versions have one ejector tab for each module, except the CEC module slot which has two ejector tabs. The dual-wide chassis has a removeable center column that allows you to install extended-format modules.

4-Slot Chassis

The following illustration shows the possible configurations for the NETBuilder II 4-Slot chassis, both single-wide and dual-wide versions.

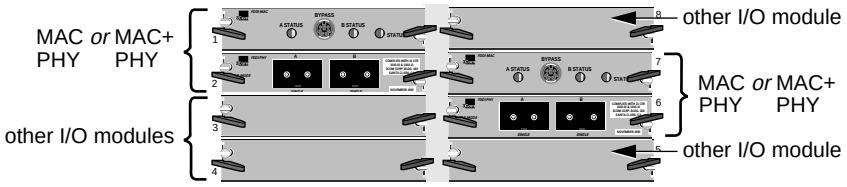
NETBuilder II 4-Slot chassis



Single-Wide 8-Slot Chassis

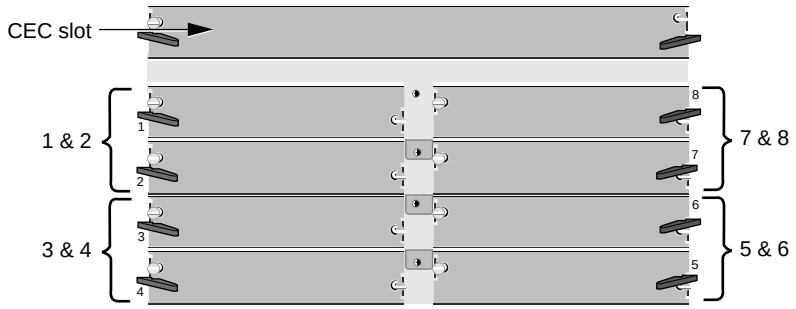
The following illustration shows the possible configurations for the single-wide NETBuilder II 8-Slot chassis.

Single-wide NETBuilder II 8-Slot chassis



Dual-Wide 8-Slot Chassis

The FDDI module set must be installed in the dual-wide 8-Slot chassis in slot pairs as shown in the following illustration. You cannot install a set of MAC and PHY boards side by side.

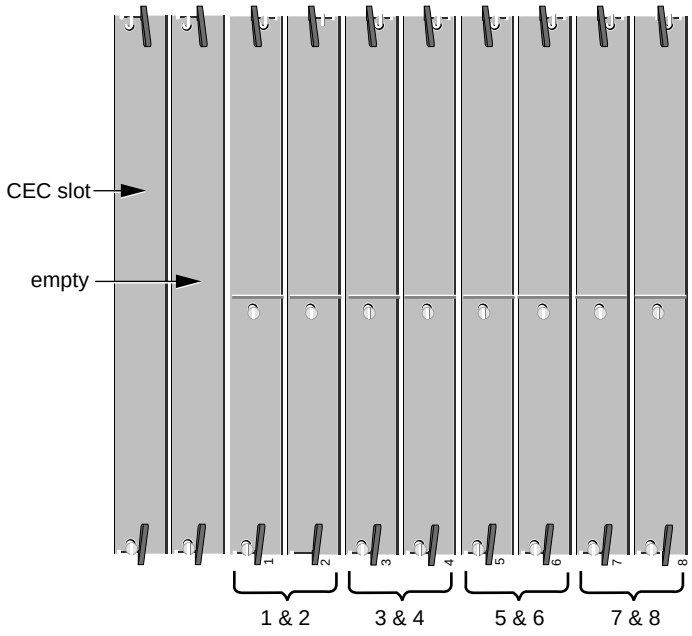


The maximum configuration of FDDI modules is as follows:

- If you have *any* older FDDI modules in your chassis, you can install a maximum of two FDDI modules, even if the second FDDI module is a newer one.
- If you have only newer FDDI modules in your chassis, you can install up to four FDDI modules.

Extended Chassis

The FDDI module set must be installed in the NETBuilder II Extended chassis in slot pairs as shown in the following illustration:



The maximum configuration of FDDI modules is as follows:

- If you have *any* older FDDI modules in your NETBuilder II chassis, you can install a maximum of two FDDI modules, even if the second FDDI module is a newer one.
- If you have only newer FDDI modules in your chassis, you can install up to four FDDI modules.

Firmware Configuration

If you are setting IP addresses for firmware on a NETBuilder II system and you select BootP as your Address Discovery protocol, you must set all five IP address options to None.

Firmware Update

The bridge/router updates firmware as part of its software boot process. In some cases, some text will be displayed during the firmware upgrade process, which appears similar to the following:

```
>>>>updating firmware boot bank A
>>>>famd_blk_erase: block addr less than 512K: 0x10000
>>>>famd_blk_erase: block addr less than 512K: 0x20000
>>>>Firmware boot bank update is complete.
```

These messages do not indicate a problem and can be ignored.

FTP

When a File Transfer Protocol (FTP) PUT command is initiated on the bridge/router, the following error message may be displayed, even when the bridge/router is functioning properly:

```
Can't create data socket (...): Address already in use.
```

One possible cause for this error message is that there is a hung process on the FTP server that must be killed.

FTP and Remote Configuration Files in a Bridged Domain

If you are accessing configuration files for NETBuilder II systems remotely on an FTP server in a bridged domain, and you have redundant LAN paths to the server, you must ensure that Spanning Tree is turned on. If this is a looped configuration, you will see file access errors when defining new macros, and duplicate macro names when undefining the macros.

HPR and DLur Downstream PUs

Because the -APPN DlurLink Sta parameter does not provide the high performance routing (HPR) option, the bridge/router does not support downstream physical units (DSPUs) that are HPR-capable.

IBM-Related Services in Token Ring

IBM -related services such as DLSw and APPN are affected by parameter settings in the BRidge, SR, and LLC2 Services. Table 8 shows the required settings in source route (SR), source route transparent (SRT), and transparent bridging environments for each of the IBM-related services. When a NETBuilder Token-Ring port is configured for both an IBM service such as DLSw and transparent bridging or SRT bridging, connectivity problems and frame copy errors can occur. For this reason, 3Com recommends configuring token ring ports for source route only when possible.

In Table 8, tunneling refers to 3Com's proprietary method of LLC2 tunneling, DLSw refers to data link switching, and LNM refers to LAN Net Manager. The settings are shown in abbreviated form. 3Com-recommended configurations are shaded and shown in **bold**.

Table 8 IBM-Related Feature Settings for Token Ring Ports

Services	Port Configuration	Source Route Briding (-SR SRB)	Transparent Bridging (-BR TB)	Bridging (-BR CONT)	Route Discovery (-SR RD)	LLC2 CONTrol (-LLC2 CONT)	Frame Copy Errors
Bridging only	**SR**	**SRB**	**NTB**	**B**	**NoLLC2**	**Disable**	**None**
Bridging only	SRT	SRB	TB	B	NoLLC2	Disable	Low # Possible
Bridging only	T	NSRB	TB	B	NoLLC2	Disable	Low # Possible
LNM	**SR**	**SRB**	**NTB**	**B**	**LLC2**	**Enable**	**None**
DLSw/ Tunneling	**SR**	**SRB**	**NTB**	**NB | B**	**LLC2**	**Enable**	**None**
DLSw/ Tunneling	**SRT**	**SRB**	**TB**	**NB* | B***	**LLC2**	**Enable**	**High # Possible**
DLSw/ Tunneling	**T**	**NSRB**	**TB**	**NB* | B***	**NoLLC2**	**Enable**	**High # Possible**
APPN	**SR**	**SRB**	**NTB**	**NB | B**	**LLC2**	**Disable**	**None**
APPN	SRT	SRB	TB	NB | B	LLC2	Disable	None
APPN	T	NSRB	TB	NB | B	LLC2	Disable	None
Default Setting	SRT	SRB	TB	NB	NoLLC2	Disable	None

* 3Com recommends that you disable global bridging for this configuration. However, with global bridging disabled, the Token-Ring hardware does not filter unwanted transparent packets. The Token-Ring hardware copies each transparent packet for processing by the NETBuilder software. This can generate many frame copy errors (see Token Ring Frame Copy Errors below for more information.) If you are seeing many Frame Copy Errors, consider setting global bridging on, which allows the hardware to learn and filter unwanted transparent packets. Since DLSw (and LLC2 tunneling) cannot block bridging loops, you must insure that none exist. As an alternative, you can prevent the bridge from forwarding by entering the following command: SETDefault -BRidge CONTrol = NoForward. The NoForward parameter allows the hardware to filter unwanted transparent packets, allows DLSw (and LLC2 Tunneling) to send and receive LLC2 SNA and NetBIOS packets, but prevents these and other packets from bridging.

The row in Table 8 labeled DLSw/Tunneling with port configuration SR represents DLSw or 3Com LLC2 tunneling in a source-route-only port configuration. The entries in this row expand to the following NETBuilder software configuration syntax:

```
SETDefault -BRidge CONTrol = Bridge | NoBridge
SETDefault !<port> -SR SrcRouBridge = SrcRouBridge
SETDefault !<port> -BRidge TransparentBridge = NoTransparentBridge
SETDefault !<port> -SR RingNumber = <number> (1–4095) | 0x<number>
   (1-FFF)
SetDefault !<port> -SR BridgeNumber = <number> (0-15) | 0x<number>
   (0-F)
SETDefault !<port> -SR RouteDiscovery = LLC2
SETDefault !<port> -LLC2 CONTrol = Enable
```

In this configuration, global bridging (-BRidge CONTrol) can be set to either Bridge or NoBridge. Transparent bridging is disabled on token ring ports, source routing and route discovery are configured, bridge numbers must be unique for each bridge/router on the same ring, and LLC2 is enabled on Token Ring ports.

Token Ring Frame Copy Errors

For transparent bridge or source route transparent configurations, token ring end systems may generate a small number of MAC frame copy error reports when the NETBuilder II Bridge/Router token ring interface is initializing or when the bridge/router ages out a MAC address from its bridge table.

For the bridge/router to learn the MAC addresses of transparent end systems on the token ring, it copies a packet with an unknown source address and sets the address-recognized (A) and frame-copied (C) bits in the Frame Status (FS) field. A problem occurs when the FS (A) and (C) bits have been set and the destination of the frame is an end system on the local ring. The destination end system expects the (A) and (C) bits to be zeros. When it receives a frame with these values already set, it reports an error. The end system counts these errors and accumulates them until the MAC layer Soft Error Report Timer period is reached; the default is two seconds. A MAC Report Error packet is then sent to the Ring Error Monitor (REM) Network Management entity.

A Source Route only configuration eliminates frame copy errors. Frame copy errors do not occur in source route only environments when the NETBuilder Bridge/Routers are configured properly. This is because the NETBuilder hardware filters source-routed packets based on the route information field, not the MAC address. If the bridge/router is configured for source route only, it never copies frames destined for a station on the local ring. Frame copy errors can be eliminated by running in source-route-only mode.

Frame Copy Errors under LAN Net Manager

Whenever LAN Net Manager is enabled, the token ring driver is set to N-way bridging mode, which means the bridge/router copies all frames that match the bridge number specified on the receiving port. If two NETBuilder Bridge/Routers are connected to the same ring with the same bridge number, frame copy errors will occur. To prevent this problem, do not configure two NETBuilder Bridge/Routers with the same bridge number on the same ring.

Table 9 shows the features supported on the NETBuilder II, and NETBuilder SuperStack II Token Ring platforms.

Table 9 3Com Bridge/Routers and Supported Features

Platform	Source Route/Transparent Bridging	Routing	Source Route Transparent Gateway	Source Routing
NETBuilder II	Yes	Yes	Yes	Yes
SuperStack II NETBuilder Token Ring	No	Yes	No	Yes

IPX Routing, Route Receive and Route Advertisement Policies

When routing IPX over a Frame Relay meshed topology and SAP Route Receive and Route Advertisement policies are configured on the Frame Relay port, these policies do not take effect until the SAP table is flushed.

LAN Network Manager with NETBuilder II Systems

If you have previously configured your LAN Network Manager to use the NETBuilder II system as a virtual ring, and you want to use it as a physical ring, you must set your virtual ring number back to None.

LLC2 Frames and PPP

LLC2 frames are not sent or received over PPP unless global bridging is enabled using the SETDefault -BRidge CONTrol = Enabled command. You must enable LLC2 on the port using:

```
SETDefault !<port> -LLC2 CONTrol = Enabled.
```

If bridging is enabled and you do not want bridging, either set the -BRidge CONTrol parameter to NoForward, or disable bridging on individual ports by setting the following command:

```
SETDefault -BRidge TransparentBridge = NoTransparentBridge
```

Remote Access Default Change

To increase network security, the default value for the NetAccess parameter in the SYS Service has been changed from Remote (enabling remote access by default) to NoRemote. This means that by default, no remote connection attempts will be accepted by the bridge/router. If you are accustomed to or want to use remote access, you must specifically set the value of the NetAccess parameter to Remote.

SuperStack II and OfficeConnect Boot Path

For SuperStack II and OfficeConnect NETBuilder bridge/routers, flash memory is the only storage media, which is not designated with a drive letter. When entering the boot path, do not specify a drive letter. Specifying a drive letter causes the boot load to fail.

User Interface

The NETBuilder OfficeConnect U and integrated CSU/DSU does not support the simplified user interface for boundary routing leaf nodes. It supports the traditional user interface for full routers.

V.25bis Modem Setup

If you are using a V.25bis modem with a NETBuilder boundary routing leaf node and you configure the line type explicitly as dial rather than auto, be certain to also set he DialMode to V.25bis rather use the default of DTR.

WAN Port Owner Change

If you need to change a WAN port from one owner type to the other (for example, from X.25 to PPP), you need to disable the port before making the owner change. After the owner change is made, be sure to re-enable the port.

Known Problems

This section describes known problems in software version 9.3. Topics are in alphabetical order.

ATMLE VCC Timer

Do not set VccTime to a value greater than 120 minutes in the ATM LANE Service (ATMLE). A VCC timer value greater than 120 minutes will cause the bridge/router to crash. To set the VCC timer use:

```
SETDefault !<port> -ATMLE VccTime = <minutes> (1-65535)
```

For example, enter:

```
SETDefault !1 -ATMLE VccTime = 120
```

ATM Connection Table

In a LAN Emulation environment with may LAN Emulation Servers (LESs), a performance drop may occur when the NETBuilder is able to connect to the LAN Emulation Configuration Server (LECS), many of the LESs are down or unreachable. Disabling the ETHATM virtual ports corresponding to the unreachable LESs will alleviate this situation.

Boot Cycle Continuous Loop

If the OfficeConnect bridge/router fails to complete the boot cycle and enters a boot cycle loop (for example, when the boot image is corrupted), press the ESC key to interrupt the boot cycle and enter monitor mode.

Change Configuration and Diagnostic Menu

The options on the Change Configuration and Diagnostic menu do not apply to the OfficeConnect 1x1 because ISDN ports are not present on this system.

CP-CP Sessions and SNA Boundary Routing

If you set up APPN routing in an SNA Boundary Routing configuration from a NETBuilder II Bridge/Router to a leaf node bridge/router, CP-CP sessions between the remote site PC and the NETBuilder II will come up before you can configure the Boundary Routing configuration on the NETBuilder II. However, after you set the -BCN CONTrol parameter for IBM traffic and enabled the -BCN Service, the NETBuilder II no longer receives the CP-CP sessions. To work around this problem, first turn off BOOTP on the NETBuilder II port at the central site. An alternative workaround is to configure APPN with DLSw at the central site, and at the remote site use the CEC's MAC address.

CP-CP Sessions on Parallel TGs

When parallel transmission groups (TGs) are configured between 3Com network nodes and both TGs support CP-CP sessions, a CP-CP session on one TG will not switch to the other TG if the user disables the port or path. This happens because both sides learn about the link failure at different times. The network node with the disabled port or path learns about the link failure right away and tries to bring CP-CP sessions up on the second TG. However, the second network node does not learn about the link failure until LLC2 times out; because it thinks the link is still up, the second network node does not allow CP-CP sessions to start on the second TG. After five attempts at bringing up CP-CP sessions on the second TG, the second TG will be flagged as not supporting CP-CP sessions, preventing CP-CP sessions from coming up on that second TG. To prevent this situation, manually stop the first TG by entering the SET -APPN LinkStaCONTrol <LinkName> Deactivate command before disabling the port/path. By doing this, both network nodes will learn that the link has gone down at the same time, and CP-CP session can be activated on the second TG.

Deleting ATM Neighbors

Bridge ATM Neighbors must be deleted before deleting the associated virtual ports.

Dynamic Paths

Dynamic paths might not be released back into the dial pool from the port if an incoming call arrives during a disconnect state. If the SHow -POrt PAths command indicates that a path from the dial pool is attached to a port but is no longer in use, it can be released by re-enabling the port.

EraseDump Command Usage

Do not use the df command on a card that you have prepared for dumping with the EraseDump command.

History-Based Compression Negotiation Failure

If you are using history-based compression on a line with excessive errors and the negotiation attempts exceed the retry count, the device must be rebooted to clear the condition and reset the retry count.

IPX to Non-IPX Configuration Error

A mechanism does not exist to prevent adding a path from a non-IPX routing port to an IPX routing port. If this situation occurs, the router stops routing IPX traffic, even though the primary port has been up the whole time. To restart IPX routing, re-enable the port.

VTAM Program Temporary Fixes

VTAM Program Temporary Fixes (PTFs) are required on a mainframe when APPN DLU services are used. Mainframe network management (NetView) services will not function for downstream physical units (PUs) if the PTFs are not installed. VTAM Version 4.2 requires PTF #UW20787. VTAM Version 4.3 requires PTF #UW20788.

Visible symptoms of this problem can be seen as a lack of network management data for PUs that are downstream of a NETBuilder II Bridge/Router using APPN DLU services. The NetView message "AAU251I AAUDRTIB 02 UNEXPECTED SENSE CODE X'1002' ENCOUNTERED FOR TARGET=pu_name" is printed in the log file when this problem occurs.

Limitations

This section describes limitations of the software version 9.3. Topics are in alphabetical order.

APPN

9.3 APPN does not support PLG, SMDS, or LLC2 tunneling.

APPN DLUr Connections to 3174 Systems

When configuring an APPN dependent LU requestor (DLUr) connection from a NETBuilder II to a 3174 cluster controller, both the NETBuilder II network node and the 3174 must be on the same ring. In this configuration, the NETBuilder II Token Ring port must be set to transparent bridging only.

ATMLink Module Support

The AP and CX packages do not support the ATMLink module.

BSC and Leased Lines

The BSC pass-through feature is limited to leased lines, and cannot use dialup links.

Definable LUs for NetView Service Point

There are currently no LUs definable for NetView Service Point.

DLSw and IBM Boundary Routing in Large Networks

The following considerations are related to DLSw in large networks.

Leaf Node Sessions Support

When a leaf node has more that 50 end stations, use the following tuning parameters:

```
SETDefault !<port> -LLC2 TransmitWindow = 1
SETDefault !<port> -LLC2 RetryCount = 20
SETDefault !<port> -LLC2 TImerReply = 10000
```

Use these parameters for the leaf node and central node WAN ports.

Number of DLSw Circuits

The -SYS CONNectionUsage parameter controls the maximum number of DLSw circuits. The default value of the CONNectionUsage parameter is High for NETBuilder with a DPE module and for the boundary router peripheral node, but the default value is low for all other NETBuilder platforms. You can change this value using:

```
SETDefault -SYS CONNectionUsage = Low | Medium | High
```

You must reboot the bridge/router before this change takes effect. Table 10 shows the maximum number of circuits possible with the different CONNectionUsage parameter settings. The practical limit may be lower and depends on the traffic load, CPU and memory usage by other services.

Table 10 DLSw Circuit Maximums with CONNectionUsage Parameter Settings

	Maximum Number of DLSw Circuits		
System	**Low**	**Medium**	**High**
OfficeConnect and SuperStack II NETBuilder bridge/routers	190	390	790
Boundary router peripheral node*	n/a	n/a	790†
NETBuilder II bridge/router			
DPE Modules	390	790	7990
CEC 20 Module	390	790	1590

* The CONNectionUsage parameter is set to High by the Boundary Router Peripheral node software; it cannot be changes.

† The IBM Boundary Router peripheral node uses two LLC2 circuits to support one LLC2 end system. Therefore, the maximum number of LLC2 end systems supported by an IBM Boundary Router peripheral node is 395.

Number of TCP Connections

3Com LLC2 tunneling uses one TCP connection for each LLC2 session. DLSw scales to large networks better than LLC2 tunneling because it multiplexes all LLC2 sessions over one TCP connection per tunnel. Each Telnet session also uses one TCP connection. Table 11 shows the maximum number of TCP connections possible with the different CONNectionUsage parameter settings. The practical limit may be lower and depends on the traffic load, CPU and memory usage by other services.

Table 11 TCP Circuit Maximums with CONNectionUsage Parameter Settings

	Maximum Number of TCP Circuits		
System	**Low**	**Medium**	**High**
OfficeConnect and SuperStack II NETBuilder bridge/routers	32	256	512
Boundary router peripheral node*	n/a	n/a	790
NETBuilder II bridge/router			
DPE Modules	32	512	2048
CEC 20 Module	32	512	1024

* The CONNectionUsage parameter is set to High by the Boundary Router peripheral node software; it cannot be changed.

Ethernet 6-port 10BASE-T or 10BASE-FL Module Support

The AP package does not support the NETBuilder II multiprocessor (MP) 10BASE-T or 10BASE-FL module.

Front-End Processor/Frame Relay Access for LLC2 Traffic

The maximum number of FradMap entries that may be defined for each Frame Relay port is 50.

HPR and ISR Configurations

High Performance Routing (HPR) is enabled by default. Therefore, if you are configuring APPN Intermediate Session Routing (ISR), you must disable HPR on both the PortDef and the AdjLinkSta parameters by setting HPR = No.

IBM Boundary Routing Topology Disaster Recovery

In an IBM Boundary Routing topology that uses disaster recovery through PPP (when two paths are mapped to one port), a disruption to existing SNA and NetBIOS sessions occurs if the primary link fails and the redundant link is activated. If this happens, end users will need to log on and initiate another session.

Maximum BSC Line Speed

For V.35 and RS-232 links, the maximum baud rate supported for BSC traffic is 38.4. If the baud rate is higher, BSC traffic will suffer errors and retransmissions.

Maximum SAP Entries

The SuperStack II NETBuilder bridge/router can support a maximum of 1500 SAP entries. If a SuperStack II NetBuilder exists in a network with more than 1500 SAPs, use SAP Policies to limit the number advertised to the bridge/router.

Multilink PPP Configurations

Multilink PPP (MLP) is supported for multiple WAN links connected to the same port running PPP.

When configuring MLP:

- For maximum performance on a NETBuilder II Bridge/Router, 3Com recommends that similar hardware interface types be configured for each MLP bundle. For instance, bundle HSS modules with HSS modules, and bundle HSS 3-port module links with HSS 3-port module links.
- For the best performance, use MLP on interfaces with matched line speeds. Avoid mismatched baud rates of ratios greater than 10 to 1 for bundled links.
- If your baud rate ratios on two links are greater than 4 to 1, the MLP feature automatically turns off fragmentation. For baud ratios of less than 4 to 1, you may choose to turn off fragmentation for performance considerations. Turn off fragmentation using the MIpCONTrol parameter in the PPP Service.
- MLP does not support the HSSI module.
- Before you re-enable a port running MLP, disable the port and allow the remote port to go down. This action prevents loss of packet sequence numbers synchronization, which causes packets to be dropped when the MLP port is enabled.

RouteDiscovery

If RouteDiscovery is enabled on all protocols (-SR RouteDiscovery = All), you will experience a significant drop in the maximum packet forwarding rate during route discovery. 3Com recommends that you enable RouteDiscovery only for the protocols you use. Increasing the value of the -SR HoldTime parameter minimizes the drop in forwarding rate for these protocols.

SDHLC Half-Duplex Mode

SDHLC does not support physical half-duplex mode.

SDLC

SDLC requires the following:

- XID spoofing must be turned on if the IBM Communication Manager is used for 3270 communications and is defined as a PU type 2.0. Use the following syntax:

  ```
  SETDefault !<PU name> -SDLC CUXId = <value> (8 Hexadecimal digits)
  SETDefault !<PU name> -SDLC CUXidDefined = Yes
  ```

- SDLC end-to-end through local switching (conversion to a single LLC2 LAN connection between two NETBuilder bridge/routers) requires different virtual ring numbers in the LLC2 Service.

SDLC Adjacent Link Stations for APPN

When you configure SDLC adjacent link stations for APPN, if an active link becomes inactive and you change the port definition using the PortDef parameter, the link remains inactive. If you try to reactivate the link using the SET -APPN LinkStaCONTrol command, the link will reactivate within 30 seconds. To activate the link immediately, you must enable the APPN port using the SET -APPN PortControl = Enable command.

Source Route Transparent Bridging Gateway (SRTG) Interoperability

The NETBuilder II Bridge/Router cannot interoperate with Cisco or IBM routers if the NETBuilder is configured using Source Route Transparent Gateway (SRTG) with Source Route bridging on the token ring LAN port and Transparent Bridging on the PPP or Frame Relay WAN ports. In this configuration, the NETBuilder II Bridge/Router is sending using PPP bridge encapsulation 802.5 token ring format, while the IBM 6611 and the Cisco 400 router are using PPP bridge encapsulation 802.3 Ethernet format.

SDLC Ports and NetView Service Point

An SDLC port defined for NetView Service Point cannot be used for SDLC-to-LLC2.

Source-Route Transparent Gateway

The source-route transparent gateway is not currently supported on Emulation ports.

Token Ring+ Modules

The maximum physical frame size that can be forwarded by the Token Ring+ modules with version 8.3 and earlier is 4,500 bytes. This limitation affects routing, source route bridging, and transparent bridging.

Token Ring Auto Startup

The Token Ring and Token Ring + modules may enter the ring at the wrong speed with certain MAU or station configurations. You can manually configure the -PATH BAud value to 16,000 or 4,000 to avoid this situation.

USING NETBUILDER FAMILY SOFTWARE UPDATE PAGES

This section includes update pages with changes and additions to *Using NETBuilder Family Software*, software version 9.3.

Place the update pages at the front of each specified chapter.

36 CONFIGURING THE NETBUILDER II TO USE A WAN EXTENDER

9.3 Release Notes, *Using NETBuilder Family Software*

Place this update section at the front of Chapter 36.

Make the changes to this chapter as indicated.

Configuring WAN Extender and NETBuilder II for Remote Connections

Replace the second paragraph in the "Configuring WAN Extender and NETBuilder II for Remote Connections" section that starts "Only 3Coms NETBuilder bridge/routers at the remote sites...." with two new paragraphs that describe the new -PORT WEProfileList parameter.

If you use an SCID (SysCallerID) to identify the remote callers, only 3Com NETBuilder bridge/routers at the remote sites can be interconnected with a WAN Extender to a NETBuilder II bridge/router at a central site. If you are interconnecting remote bridge/routers to a central site using switched circuit services such as ISDN or Switched 56, you need to use SCID to identify the remote bridge/routers.

If you configure a T1 or E1 channelized leased lines with the -PORT WEProfileList parameter, you do not need to enter a SCID string to identify the remote bridge/routers that connect with the central NETBuilder II bridge/router. In this case, you can connect 3Com bridge/routers as well as other vendor's remote bridge/routers to a central NETBuilder II bridge/router.

Interconnecting Leased DSOs to Channelized TI

Add a new step 6 between steps 5 and 6 of the "Configuring the NETBuilder II Bridge/Router" procedure within the "Interconnecting Leased DSOs to Channelized T1" section.

Configuring the NETBuilder II Bridge/Router

1 If you do not want the remote bridge/routers that are attached to the channelized leased line to submit a SCID string to establish a connection with the centralized NETBuilder II bridge/router, enter:

```
ADD !V1 -PORT WEProfileList 3 10
ADD !V1 -PORT WEProfileList 3 11
```

3 is the NETBuilder II bridge/router slot number where the RS-449 module resides to which the WAN Extender is connected, and 10 and 11 are the leased WAN Extender profiles to which the virtual port is mapped. The profiles are mapped to one or more leased channels.

Troubleshooting Channelized Leased Configurations

Under the "Troubleshooting Channelized Leased Configurations" section, add a new bulleted item before the bulleted item that starts "The SysCallerID (SCID) string set..." This new bulleted item provides information for when you configured a virtual port with the WEProfileList parameter.

Also replace the bulleted item that starts "The SysCallerID (SCID) string set..." with a new bulleted item that describes the possibility of configuring the virtual port with the WEProfileList parameter.

- You have configured your channelized leased line with the -PORT WEProfileList parameter so that you do not need to identify a remote site with a SCID identifier, and the profile ID configured for a virtual port was already in the database for another port. Or you have entered more than the maximum of sixteen profileIDs for a given virtual port.
- You have not configured your channelized leased line with the -PORT WEProfileList parameter, and the SysCallerID (SCID) string set for the virtual port designated for the remote site does not match the Service SysCallerID parameter string of the remote site.

46 CONFIGURING LOCAL AND GLOBAL SWITCHING

9.3 Release Notes, *Using NETBuilder Family Software*

Place this section containing new information at the front of Chapter 46.

Switching can occur on either a switched virtual circuit (SVC) or a permanent virtual circuit (PVC).

When configured for a switched virtual circuit and switching occurs, a switched virtual circuit is established. The switched virtual circuit is disconnected automatically when communication is completed.

When you use X.25 PVC support for tunneling, the circuit stays up at all times when the associated underlying interfaces are in the up state. When the PVC is properly configured and the NETBuilder II is booted, or when the HSS or LAN state is bounced, the tunnel setup continuously attempts to connect the local end to the remote end until a tunnel circuit is established and running. The PVC tunnel is in the down state only when the HSS or LAN interface is in the down state.

When the XSWitch Service receives an incoming X.25 call, it looks in the X25Prefix table to find an entry whose X.25 address prefix matches the address of the called address. When a match is found, the associated HSS port is used for switching. These X.25-prefix-to-HSS-port entries are user-configurable.

Setting Up Local Switching on a PVC

This new section describes setting up local switching on a permanent virtual circuit.

Figure 46-1 is an example of using local switching on a PVC to forward an X.25 call from WAN #1 to WAN #2. This difference between local switching on an SVC and local switching on a PVC is the way in which the circuit is maintained.

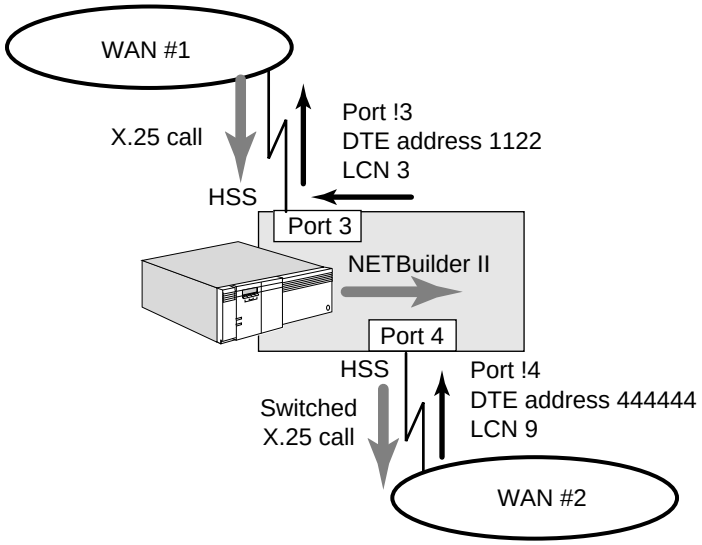


Figure 46-1 Local Switching on a PVC

In local switching with PVCs, one router with two HSS ports is involved for each switched circuit. The configuration requires an XSWPVC to indicate an incoming PVD and the switched outgoing PVC mapping. As in global switching circuits, the local switching PVC circuit should stay up and running as long as the router is operating and both HSS ports are in the up state.

To configure local switching on a permanent virtual circuit, follow these steps:

1 Configure the permanent virtual circuits by entering:

```
ADD !3 -X25 PVC 3,3 1122 FF 0
ADD !4 -X25 PVC 9,9 444444 FF 0
```

These commands create PVC connections on ports 3 and 4. The PVCs carry switched traffic as specified by the protocol ID FF to and from logical channel numbers 3 and 9 with DTE addresses 1122 and 444444.

Always use protocol identifier FF to indicated switched PVCs.

2 To verify the X.25 PVC configuration, enter:

```
SHow -X25 PVC
```

A display similar to the following appears:

```
Port !3 PVC 3,3 1122 FF 0
Port !4 PVC 9.9 444444 FF 0
```

3 Specify the tunnel by entering:

```
ADD !3 -XSWitch XSWPVC 1122 3 !4 444444 9
```

This command maps a circuit from port 3 with DTE address 1122 and logical channel number 3 into the target destination DTE address 444444 and logical channel number 9, which is port 4.

4 To verify the configuration, enter:

```
SHow -XSWitch XSWPVC
```

A display similar to the following appears:

```
Port#/IPAddr  SDTE    SLCN      DESTPort/IPAddr   DDTE      DLCN
!3            1122    3         !4                444444    9
```

This display shows that a PVC from source port 3 with DTE address 1122 will be switched to destination port 4 with DTE address 444444 and local channel number 9.

5 To verify that a locally switched X25 PVC is up and running enter:

```
SHOW -XSWitch SWitchedVC
```

A display similar to the following appears.

```
SW#       XSRC    SDST      SRC(LCN)  DST(LCN   STATE    BYTESXFER
0         1122    444444    3(4)        4(9)    ACT      0*
```

* Indicates X25 in the switch circuit.

Setting Up Global Switching on a PVC

This section describes how to configure global switching (X.25 tunneling over IP). Figure 46-2 shows an example of a bridge/router using tunneling to forward an X.25 call from WAN #1 to WAN #2 on a permanent virtual circuit.

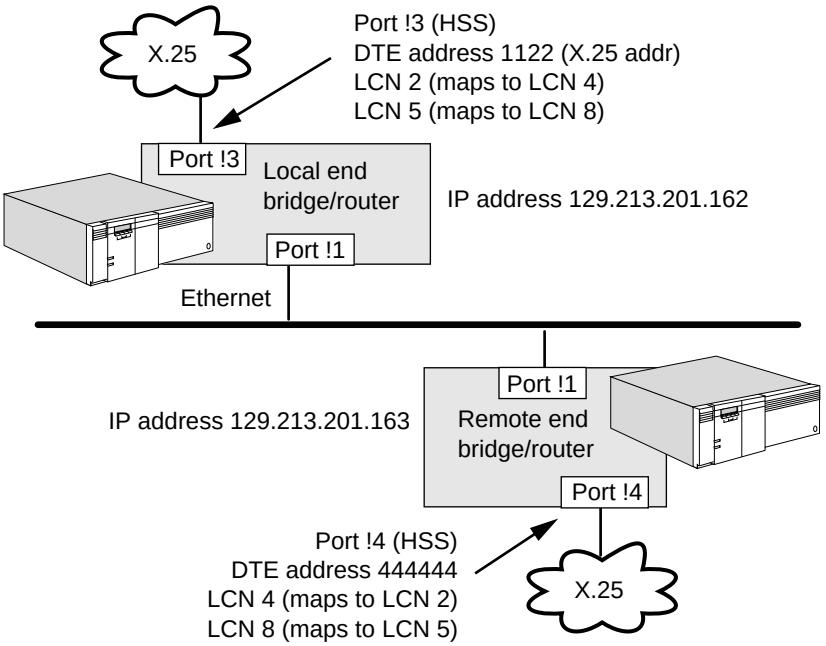


Figure 46-2 Global Switching on a Permanent Virtual Circuit over a LAN

A tunnel is established between two NETBuilder bridge/routers with one bridge/router acting as the local end and the other acting as the remote end. Multiple circuits can be supported between two NETBuilder bridge/routers where each circuit is set up independently.

The local end (source) and remote end (destination) addresses can be an IP address or HSS port. For tunnel mapping, one address must be an HSS port and the other

must be an IP address. When the local end (source) is an HSS port the and the remote end (destination) is an IP address, the circuit is called a local end of the tunnel. When the local end (source) is an IP address and the remote end is an HSS port, the tunnel is called a remote end tunnel. The NETBuilder II bridge/router can support both local end and remote end of the tunnels at the same time as long as each circuit is properly configured on both NETBuilder bridge/routers.

Configuring the Local-end Router

This example shows how to configure two PVC switch circuits in a tunnel. To configure global switching on a permanent virtual circuit, on the local end NETBuilder II bridge/router, follow these steps:

1. To specify the permanent virtual circuit with a profile ID (FF) set to switching, enter:

   ```
   ADD !3 -X25 PVC 2,2 1122 FF
   ADD !3 -X25 PVC 5,5 1122 FF
   ```

   These commands indicate that logical channel numbers 5 and 2 from port 3 with the DTE address 1122 will be switched.

2. Verify that the PVC is properly configured by entering:

   ```
   SHow -X25 PVC
   ```

   A display similar to the following appears:

   ```
   Port !3 PVC 5,5 1122 FF 0
   Port !3 PVC 2,2 1122 FF 0
   ```

   These two entries indicate that logical channel numbers 5 and 2 from port 3 with DTE address 1122 will be switched.

3. To specify the tunnel, enter:

   ```
   ADD !3 -XSWitch XSWPVC 1122 2 129.213.201.163 444444 4
   ADD !3 -XSWitch XSWPVC 1122 5 129.213.201.163 444444 8
   ```

   The first command maps a circuit from port 3, DTE #1122, logical channel number 2 into a remote end through the tunnel into 129.213.201.163 with a final destination of DTE#444444, logical channel number 4. The second command maps a circuit from port 3, DTE #1122, logical channel number 5 into a remote end through the tunnel into 129.213.201.163 with a final destination of DTE#444444, logical channel number 8.

4. Verify that the tunnel is configured properly by entering:

   ```
   SHow -XSWitch XSWPVC
   ```

   A display similar to the following appears:

   ```
   Port#/IPAddr     SDTE   SLCN   DESTPort/IPAddr      DDTE       DLCN
   !3               1122   2      129.213.201.163      444444     4
   !3               1122   5      129.213.201.163      444444     8
   ```

   Entry number one maps a circuit from port 3 with DTE#1122 and logical channel number 2 into a remote tunnel with its final destination as DTE #444444 with logical channel number 4. Entry number two maps a circuit from port 3 with DTE address 1122 and logical channel number 5 to its final destination at DTE address 444444 with logical channel number 8.

Configuring the Remote End Router

To configure global switching on a permanent virtual circuit, on the remote end NETBuilder bridge/router, follow these steps:

1 To specify the permanent virtual circuit with a profile ID (FF) set to switching, enter:

```
ADD !4 -X25 PVC 8,8 444444 FF
ADD !4 -X25 PVC 4,4 444444 FF
```

These commands indicate that logical channel numbers 8 and 4 from port 4 with the DTE address 444444 will be switched.

2 Verify that the PVC is properly configured by entering:

```
SHow -X25 PVC
```

A display similar to the following appears:

```
Port !4 PVC 8,8 444444 FF 0
Port !4 PVC 4,4 444444 FF 0
```

These two entries indicate that logical channel numbers 8 and 4 from port 4 with DTE address 444444 will be switched.

3 To specify the tunnel, enter:

```
ADD !129.213.201.162 -XSWitch XSWPVC 1122 2 !4 444444 4
ADD !129.213.201.162 -XSWitch XSWPVC 1122 5 !4 444444 8
```

The first command maps a circuit from IP address 129.213.201.162 with the DTE source DTE#1122, logical channel 2 into its destination through the HSS port 4 with local channel 4 and DTE address 444444. The second command maps a circuit from IP address 129.213.201.162 to the DTE#1122, logical channel number 5 into its destination through the HSS port 4 with local channel number 8 and DTE address 444444.

4 Verify that the tunnel is configured properly by entering:

```
SHow -XSWitch XSWPVC
```

A display similar to the following should appear:

```
Port/IPAddr       SDTE    SLCN    DEST Port/IPAddr     DDTE     DLCN
129.21.201.162    1122    2       !4                   444444   4
129.21.201.162    1122    5       !4                   444444   8
```

Entry one shows that a tunnel is mapped from 129.213.201.162 with the DTE address of DTE#1122 and logical channel number 2 into its destination through the HSS port 4, with logical channel number 4 and DET address DTE#444444.

Entry two shows that a tunnel is mapped from 129.213.201.162 with the DTE address of 1122 and logical channel number 5 into its destination through the HSS port 4, with logical channel number 8 and DET address 444444.

5 Verify that the tunnel X25 PVC is up and running by entering:

```
Show -XSWitch SWitchedVC
```

A display similar to the following appears:

```
SW#  XSRC  SDST    SRC(LCN)          DST (LCN)  STATE   BYTESXFER
0    1122  444444  129.213.201.162   !4(4)      ACT     0*
1    1122  444444  129.231.201.162   !4(8)      ACT     0*
```

* Indicates X25 in the switch circuit.

When correctly configured, the local and remote bridge/routers attempt to set up a tunnel between each other automatically. Automatic setup also occur swhen the port is bounced (port down and then back up again).

If this is the first configuration for the router, you may need to toggle the path and port to start the PVC tunnel setup sequence.

A typical error occurs when the two ends of the tunnel have a mismatch in the XSWPVC values. When a mismatch occurs, the tunnel will not set up properly. When the router detects this configuration error, it reports the following messages:

```
WARNING: A misconfiguration of PVC or XSWPVC!!!
Please: Correct the configuration and
DELete -XSWitch SWitchedVC ALL on both sides.
```

When this message is displayed, follow these recovery steps:

1 Check your network diagram and verify that the configuration setup for PVC and XSWPVC are matched on both ends of the tunnel.

On both the local and the remote routers, enter:

```
SHow -X25 PVC
SHow -XSWitch XSWPVC
```

Correct the parameters as required.

2 Bounce (toggle) the HSS port by disabling the path and then re-enabling the path.

3 Verify that the setup is correct by entering:

```
SHow -XSWitch SwitchedVC
```

A display similar to the following appears:

```
SW#  XSRC  SDST      SRC (LCN)    DST (LCN)       STATE   BYTESXFER
0    1122  5555555   !3 (2)       10.11.12.14.    ACT     168*
```

* Indicates and X25 PVC in the switch circuit.

The ACT state indicates that the tunnel is in active state.

The Bytesxfer field reports the number of data bytes traveling through this circuit.

Setting Up Switching on a PVC over a WAN

This section describes how to configure global switching over WAN media. Figure 46-3 shows an example of a bridge/router using tunneling to forward multiple X.25 calls from WAN #1 to WAN #2, WAN #3 and WAN #4 on a permanent virtual circuit.

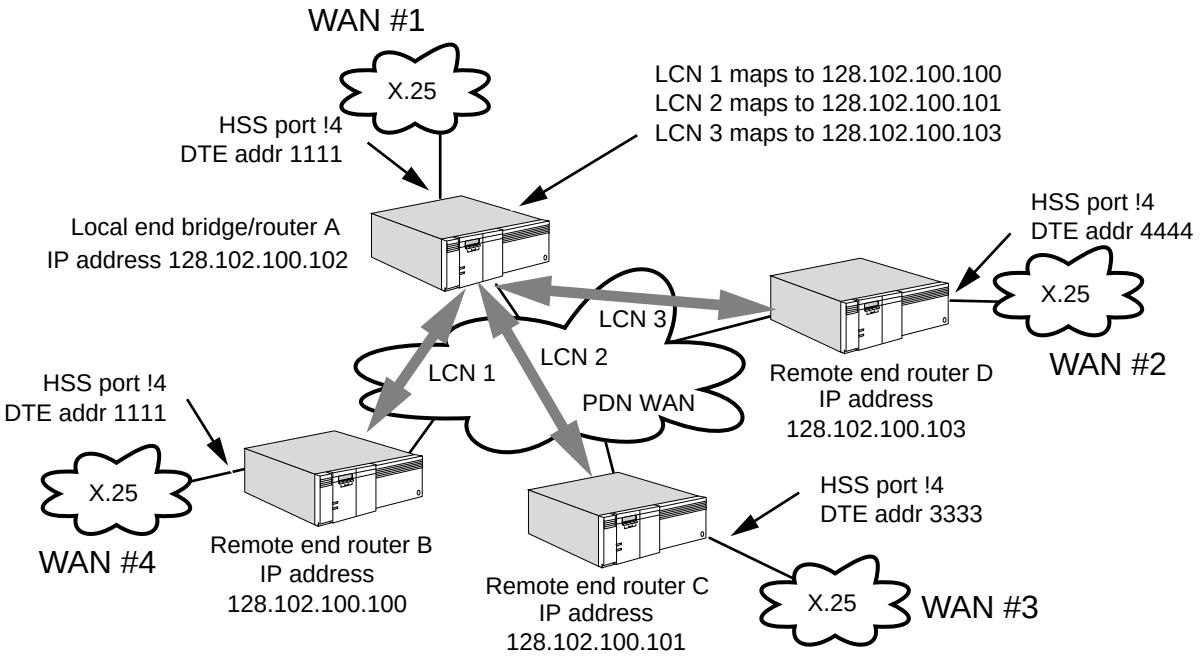


Figure 46-3 Global Switching on a PVC over a WAN

Figure 46-3 is an example of setting up NETBuilder II bridge/routers to use tunnelled PVCs to other routers. In this example, the HSS port used on each router is port 4. The user profile identifier 0 also is used. For each PVC, a fake DTE address is created to associate with the PVC to identify the local end and the remote end of the tunnel. 1111, 2222, 3333, and 4444 are fake IDs. One fake DTE address can associate may PVC. For example, 1111 in bridge/router associates with its local logical channel numbers 1, 2, and 3.

Configuring Local Router A

To configure bridge/router A, follow these steps:

1. Configure -X25 PVC for logical channel numbers 1, 2, and 3 by entering:

```
ADD !4 -X25 PVC 1,1 1111 FF 0
ADD !4 -X25 PVC 2,2 1111 FF 0
ADD !4 -X25 PVC 3,3 1111 FF 0
```

   These commands add permanent virtual circuits to HSS port 4 and associates logical channel number 1, 2 and 3 with the fake DTE address 1111, indicates Switching with protocol identifier FF, and establishes the user profile IS as 0.

2. Configure the -XSWitch XSWPVC parameter for logical channel numbers 1, 2, and 3 by entering:

```
ADD !4 -XSWitch XSWPVC 1111 1 128.102.100.100 2222 1
ADD !4 -XSWitch XSWPVC 1111 2 128.102.100.101 3333 1
ADD !4 -XSWitch XSWPVC 1111 3 128.102.100.103 4444 1
```

The first command establishes a tunnel with bridge/router B in the example configuration. The incoming HSS port is port 4. 1111 is the associated fake DTE address, the first 1 is the logical channel 1 on the source side, 128.102.100.100 is the target tunnel IP address (router B), 2222 is the target fake DTE address, and the final 1 is the logical channel number 1 at the target end (router B.)

The second and third commands establish similar settings for the other two routers in the example configuration.

Configuring the Remote Routers

The target ends of the tunnels need to be configured on the remote routers.

Configuring Remote Router B

To configure remote bridge/router B, follow these steps:

1. Configure the -X25 PVC by entering:

```
ADD !4 -X25 PVC 1,1 2222 FF 0
```

This command specifies port 4 as the HSS port, 1,1 indicates the pvc_range which is logical channel number 1 on the router B side, 2222 is the fake DTE address, FF is the protocol identifier indicating switching, and 0 is the user profile identifier.

2. Configure the -XSWitch service XSWPVC parameter by entering:

```
Add !128.102.100.102 -XSWitch XSWPVC 1111 1 !4 2222 1
```

This command establishes 128.102.100.102 as the incoming tunnel address, which is router A. 1111 is the source DTE address, which is router A, The first 1 indicates the logical channel number 1 on router A. The HSS port 4 is the outgoing HSS port on router B. 2222 is the fake DTE address and the last 1 is the destination logical channel number on router B.

Configuring Remote Router C

To configure router C, follow these steps:

1. Configure the -X25 PVC by entering:

```
ADD !4 -X25 PVC 1,1 3333 FF 0
```

This command specifies port 4 as the HSS port, 1,1 indicates the PVC range, which is logical channel number 1 on the router C side, 3333 is the fake DTE address, FF is the protocol identifier indicating switching, and 0 is the user profile identifier.

2. Configure the -XSWitch XSWPVC parameter by entering:

```
Add !128.102.100.102 -XSWitch XSWPVC 1111 2 !4 2222 1
```

This command establishes 128.102.100.102 as the incoming tunnel address, which is router A. 1111 is the source DTE address, which is router A. The 2 indicates the logical channel number 2 on router A. The HSS port 4 is the outgoing HSS port on router C. 3333 is the fake DTE address and the last 1 is the destination logical channel number on router C.

Configuring Remote Router D

To configure router D, follow these steps:

1 Configure the -X25 PVC parameter by entering:

```
ADD !4 -X25 PVC 1,1 4444 FF 0
```

This command specifies port 4 as the HSS port, 1,1 indicates the pvc_range which is logical channel number 1 on the router D side. 4444 is the fake DTE address, FF is the protocol identifier indicating switching, and 0 is the user profile identifier.

2 Configure the -XSWitch XSWPVC parameter by entering:

```
Add !128.102.100.102 -XSWitch XSWPVC 1111 3 !4 4444 1
```

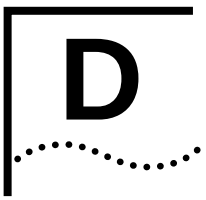
This command establishes 128.102.100.102 as the incoming tunnel address, which is router A. 1111 is the source DTE address which is router A. The 3 indicates the logical channel number 3 on router A. The HSS port 4 means the outgoing HSS port on router D. 4444 is the fake DTE address and the last 1 is the destination logical channel number on router D.

You may need to adjust several parameters based on how your network is configured. You may need to configure X.25, Level 2, and Level 3 parameters to match the values in the entered in this procedures. Refer to the values for the parameters in the PATH Service, the LAPB Service, the X25 Service, the PORT Service, and the PROFILE Service.

Switching Terms

The following terms are used in this chapter to explain switching:

tunneling service	A method of connecting peer iIternets that are not physically reachable with the X.25 Protocol. This is a generic service on NETBuilder II bridge/routers. Global switching interfaces with it to set up and maintain the tunnel between two entities over the Internet.
encapsulation	Conveying an X.25 packet within a TCP data packet so it can be forwarded through a TCP connection.
decapsulation	Extracting an X.25 packet encapsulated in a TCP data packet for forwarding through a locally attached X.25 WAN.
Local end tunnel	For tunnel mapping, one address must be an HSS port and the other must be an IP address. When the local- nd (source) is an HSS port the and the remote end (destination) is an IP address, the circuit is called a local end tunnel.
Remote-end tunnel	When the local end (source) is an IP address and the remote end is an HSS port, the tunnel is called a remote end tunnel.



INTERNET ADDRESSING

9.3 Release Notes, *Using NETBuilder Family Software*.

Place this update section at the front of Appendix D.

Make the following changes to this appendix:

Subnet Addressing

Subnet Address Format

Replace the note and paragraph that follows it in this section with the following corrected note and paragraph:

The host portion of an Internet address with the preceding definition cannot be defined as all 1 bits, but the subnet portion of an Internet address can be defined as all 1 bits.

In the preceding example, the subnet field can have any value between 0 and 63, and the host field can have any value between 1 and 1022 (all numbers are decimal). A typical class B Internet address that fits the requirements of the preceding example is the Internet address 128.5.61.100 with a subnet mask of 255.255.252.0.

Subnets: Example 1

Replace the existing example with the following:

The InterNIC assigns you Class B Internet address 128.001.000.000. You need to establish 256 subnets with each subnet capable of supporting 254 hosts. This is the simplest form of subnetting. The first and second octets of the IP address identify the network, the third octet identifies the subnet, and the fourth octet identifies a host on the subnet.

To solve this problem, follow these steps:

1 Convert the address assigned by the InterNIC to binary format.

For example:

128.001.000.000 = 10000000 00000001 00000000 00000000

The underlined binary digits represent the network portion of the Internet address assigned by the InterNIC.

2 Determine the number of binary digits you need to represent 256 subnets.

Eight binary digits are required to define 256 subnets ($2^8 = 256$). The binary values of all zeros (decimal value 0) and all ones (decimal value 255) can be used as subnets. The subnets are numbered 0 through 255. Table D-1 lists these subnets and their binary and decimal equivalents.

Table 46-1 Subnet Numbering for 256 Subnets

Subnet #	Binary	Decimal
0	00000000	0
1	00000001	1
2	00000010	2
-	--	-
254	11111110	254
255	11111111	255

3 Select the eight most significant bits of the host portion of the Internet address to define the subnets.

These bits are displayed in bold text:

128.001.000.000 = 10000000.00000001.**00000000**.00000000

4 Define a subnet mask so that all bits of the network and future subnet fields are set to 1, and all bits of the future host field are set to 0.

Network #: 10000000.00000001.**00000000**.00000000 = 128.001.000.000

Subnet Mask: 11111111.11111111.111111111.00000000 = 255.255.255.000

This subnet mask (255.255.255.000) must be configured on each host and defined for each router. Use the same subnet mask for devices on the same subnetted subnet that share the same Internet address.

Determine the subnet address for each host.

The 256 subnets have the following addresses:

Subnet #0: 10000000.00000001.**00000000**.00000000 = 128.001.000.000

Subnet #1: 10000000.00000001.**00000001**.00000000 = 128.001.001.000

Subnet #2: 10000000.00000001.**00000010**.00000000 = 128.001.002.000

Subnet #254: 10000000.00000001.**11111110**.00000000 = 128.001.254.000

Subnet #255: 10000000.00000001.**11111111**.00000000 = 128.001.255.000

The range of addresses that you can assign for subnet #1 are as follows:

Subnet #1: 10000000.00000001.**00000001**.00000000 = 128.001.001.000

Low Address: 10000000.00000001.**00000001**.00000001 = 128.001.001.001

High Address: 10000000.00000001.**00000001**.11111110 = 128.001.001.254

The range of addresses that you can assign for subnet #35 are as follows:

Subnet #35: 10000000.00000001.**00000001**.00000000 = 128.001.035.000

Low Address: 10000000.00000001.**00000001**.00000001 = 128.001.035.001

High Address: 10000000.00000001.**00000001**.11111110 = 128.001.035.254

The range of addresses that you can assign for subnet #129 are as follows:

Subnet #129: 10000000.00000001.**10000001**.00000000 = 128.001.129.000

Low Address: 10000000.00000001.**10000001**.00000001 = 128.001.129.001

High Address: 10000000.00000001.**10000001**.11111110 = 128.001.129.254

The range of addresses that you can assign for subnet #255 are as follows:

Subnet #255: 10000000.00000001.**11111111**.00000000 = 128.001.255.000

Low Address: 10000000.00000001.**11111111**.00000001 = 128.001.255.001

High Address: 10000000.00000001.**11111111**.11111110 = 128.001.255.254

5 Assign the Internet address to the bridge/router.

For example, if subnet #1 is connected to bridge/router port #1, you can enter the following command to assign the Internet address:

```
SETDefault !1 -IP NETaddr = 128.001.001.001 255.255.255.000
```

Subnets: Example 2 Replace the existing example with the following:

The InterNIC assigns you a Class B Internet address of 128.001.000.000. You need to establish four subnets with each subnet capable of supporting up to 16,381 hosts.

To solve this problem, follow these steps:

1 Convert the address assigned by the InterNIC to binary format:

For example:

128.001.000.000 = 10000000.00000001.00000000.00000000

The underlined binary digits represent the network portion of the Internet address assigned by InterNIC.

2 Determine the number of binary digits you need to represent four subnets.

Two binary digits are required to define 4 subnets ($2^2 = 4$). The binary values of all zeros (decimal value 0) and all ones (decimal value 255) can be used as subnets. For example, the four subnets you select to use can be numbered 0 through 3 and you can select the two most significant bits of the host portion of the Internet address. Table D-2 shows subnet numbers 0 through 3 and their binary and decimal equivalents. The two most significant bits selected are shown in bold.

Subnet #	Binary	Decimal
0	**00**000000	000
1	**01**000000	064
2	**10**000000	128
3	**11**000000	192

3 Select the two most significant bits of the host portion of the Internet address to define the subnets.

These bits are displayed in bold text:

128.001.000.000 = 10000000.00000001.**00**000000.00000000

4 Define a subnet mask so that all bits of the network and future subnet fields are set to 1, and all bits of the future host are set to 0.

Network #:10000000.00000001.**00**000000.00000000 = 128.001.000.000

Subnet Mask: 11111111.11111111.**11**000000.00000000 = 255.255.192.000

This subnet mask (255.255.192.000) must be configured on each host and defined for each router. Use the same subnet mask for devices on the same subnetted subnet that share the same Internet address.

5 Determine the subnet address for each host.

The four subnets have the following addresses:

Subnet #0: 10000000.00000001.**00**000000.00000000 = 128.001.000.000

Subnet #1: 10000000.00000001.**01**000000.00000000 = 128.001.064.000

Subnet #2: 10000000.00000001.**10**000000.00000000 = 128.001.128.000

Subnet #3: 10000000.00000001.**11**000000.00000000 = 128.001.192.000

The range of addresses that you can assign for subnet #0 are as follows:

Subnet #0: 10000000.00000001.**00**000000.00000000 = 128.001.000.000

Low Address: 10000000.00000001.**00**000000.00000001 = 128.001.000.001

High Address: 10000000.00000001.**00**111111.11111110 = 128.001.063.254

The range of addresses that you can assign for subnet #1 are as follows:

Subnet #1: 10000000.00000001.**01**000000.00000000 = 128.001.064.000

Low Address: 10000000.00000001.**01**000000.00000001 = 128.001.064.001

High Address: 10000000.00000001.**01**111111.11111110 = 128.001.127.254

The range of addresses that you can assign for subnet #2 are as follows:

Subnet #2: 10000000.00000001.**10**000000.00000000 = 128.001.128.000

Low Address: 10000000.00000001.**10**000000.00000001 = 128.001.128.001

High Address: 10000000.00000001.**10**111111.11111110 = 128.001.191.254

The range of addresses that you can assign for subnet #3 are as follows:

Subnet #3: 10000000.00000001.**11**000000.00000000 = 128.001.192.000

Low Address: 10000000.00000001.**11**000000.00000001 = 128.001.192.001

High Address: 10000000.00000001.**11**111111.11111110 = 128.001.255.254

6 Assign the Internet address to the bridge/router.

For example, if subnet #1 is connected to bridge/router port #2, you can enter the following command to assign the Internet address:

```
SETDefault !2 -IP NETaddr = 128.001.064.001 255.255.192.000
```

Subnets: Example 3

Replace step 2 for this example with the following:

The InterNIC assigns you a Class B Internet address of 128.001.000.000. You need to establish 8 subnets with each subnet capable of supporting up to 8,190 hosts.

To solve this problem, follow these steps:

1 Convert the address assigned by the InterNIC to binary format:

For example:

128.001.000.000 = 10000000.00000001.00000000.00000000

The underlined binary digits represent the network portion of the Internet address assigned by InterNIC.

2 Determine the number of binary digits you need to represent six subnets.

Three binary digits are required to define 8 subnets ($2^3 = 8$). The binary values of all zeros (decimal value 0) and all ones (decimal value 255) can be used as subnets. For example, the 8 subnets can be numbered 0 through 7 and you can select the three most significant bits of the host portion of the Internet address to define the subnets. Table D-3 lists the subnets 0 through 7 and their binary and decimal equivalents. The three most significant bits are shown in bold.

Table 46-2 Subnet Numbering for Eight Subnets

Subnet #	Binary	Decimal
0	**000**00000	000
1	**001**00000	032
2	**010**00000	064
3	**011**00000	096
4	**100**00000	128
5	**101**00000	160
6	**110**00000	192
7	**111**00000	224

3 Select the three most significant bits of the host portion of the Internet address to define the subnets.

These bits are displayed in bold text:

128.001.000.000 = 10000000.00000001.**000**00000.00000000

4 Define a subnet mask so that all bits of the network and future subnet fields are set to 1, and all bits of the future host are set to 0.

Network #:10000000.00000001.**000**00000.00000000 = 128.001.000.000

Subnet Mask: 11111111.11111111.**111**00000.00000000 = 255.255.224.000

This subnet mask (255.255.224.000) must be configured on each host and defined for each router. You should use the same subnet mask for devices on the same subnetted subnet that share the same Internet address.

5 Determine the subnet address for each host.

The eight subnets have the following addresses:

Subnet #0: 10000000.00000001.**000**00000.00000000 = 128.001.000.000

Subnet #1: 10000000.00000001.**001**00001.00000000 = 128.001.032.000

Subnet #2: 10000000.00000001.**010**00010.00000000 = 128.001.064.000

Subnet #3: 10000000.00000001.**011**11110.00000000 = 128.001.096.000

Subnet #4: 10000000.00000001.**100**11111.00000000 = 128.001.128.000

Subnet #5: 10000000.00000001.**101**11111.00000000 = 128.001.160.000

Subnet #6: 10000000.00000001.**110**11111.00000000 = 128.001.192.000

Subnet #7: 10000000.00000001.**111**11111.00000000 = 128.001.224.000

The range of addresses that you can assign for subnet #3 are as follows:

Subnet #3: 10000000.00000001.**011**00001.00000000 = 128.001.096.000

Low Address: 10000000.00000001.**011**00001.00000001 = 128.001.096.001

High Address: 10000000.00000001.**011**00001.11111110 = 128.001.127.254

The range of addresses that you can assign for subnet #5 are as follows:

Subnet #5: 10000000.00000001.**101**00001.00000000 = 128.001.160.000

Low Address: 10000000.00000001.**101**00001.00000001 = 128.001.160.001

High Address: 10000000.00000001.**101**00001.11111110 = 128.001.191.254

6 Assign the Internet address to the bridge/router.

For example, if subnet #3 is connected to bridge/router port #1, you can enter the following command to assign the Internet address:

```
SETDefault !1 -IP NETaddr = 128.001.096.001 255.255.224.000
```

DLSw, APPN and BSC Host Configuration Examples

9.3 Release Notes, *Using NETBuilder Family Software*

Place this new appendix after Appendix Q.

This appendix provides examples of how to configure hosts or front end processors to map to NETBuilder bridge/router DLSw, APPN, and BSC configurations.

All host displays in this appendix are copyrights of IBM Corporation.

DLSw Host Examples

This section provides sample host configurations for configuring DLSw between a host and a NETBuilder bridge/router.

Example 1: Configuring a 3745 Host with Dual TIC to Support BAN

This example shows how to configure a host to support Boundary Access Node (BAN) Frame Relay to a NETBuilder bridge/router.

The following is the configuration required on the 3745 host:

```
************************************************        00010000
*    MEMBER CREATED FOR DUAL TIC 3745 TESTING  *       *00020000
************************************************        00030000
SWFRBAN1 VBUILD TYPE=SWNET,MAXGRP=5,MAXNO=5             00040000
*                                                       00050000
PUFRB91         PUADDR=01,                             X00060000
                    DISCNT=NO,                         X00070000
                    IDBLK=05D,                         X00080000
                    IDNUM=B9001,                       X00090000
                    MAXDATA=512,                       X00100000
                    MAXOUT=7,                          X00110000
                    MAXPATH=2,                         X00120000
                    DLOGMOD=SNX32702,                  X00130000
                    PACING=0,                          X00140000
                    PASSLIM=7,                         X00150000
                    PUTYPE=2,                          X00160000
                    SSCPFM=USSSCS,                     X00170000
                    USSTAB=USSTEST,                    X00180000
                    VPACING=0                           00190000
    LU FR9102LULOCADDR=2                                00200000
    LUFR9103 LULOCADDR=3                                00210000
    LUFR9104 LULOCADDR=4                                00220000
    LUFR9105 LULOCADDR=5                                00230000
*                                                       00240000
PUFRB92         PUADDR=01,                             X00250000
                    DISCNT=NO,                         X00260000
                    IDBLK=05D                          X00270000
                    IDNUM=B9002,                       X00280000
                    MAXDATA=512,                       X00290000
```

```
                        MAXOUT=7,                              X00300000
                        MAXPATH=1,                             X00310000
                        DLOGMOD=SNX32702,                      X00320000
                        PACING=0,                              X00330000
                        PASSLIM=7,                             X00340000
                        PUTYPE=2,                              X00350000
                        SSCPFM=USSSCS,                         X00360000
                        USSTAB=USSTEST,                        X00370000
                        VPACING=0                               00380000
  LUFR9202      LULOCADDR=2                                     00390000
  LUFR9203      LULOCADDR=3                                     00400000
  LUFR9204      LULOCADDR=4                                     00410000
  LUFR9205      LULOCADDR=5                                     00420000
*                                                               00430000
PUFRB93         PUADDR=01,                                     X00440000
                        DISCNT=NO,                             X00450000
                        IDBLK=05D,                             X00460000
                        IDNUM=B9003,                           X00470000
                        MAXDATA=512,                           X00480000
                        MAXOUT=7,                              X00490000
                        MAXPATH=1,                             X00500000
                        DLOGMOD=SNX32702,                      X00510000
                        PACING=0,                              X00520000
                        PASSLIM=7,                             X00530000
                        PUTYPE=2                               X00540000
                        SSCPFM=USSSCS,                         X00550000
                        USSTAB=USSTEST,                        X00560000
                        VPACING=0                               00570000
  LUFR9302      LU LOCADDR=2                                    00580000
  LUFR9303      LU LOCADDR=3                                    00590000
  LUFR9304      LU LOCADDR=4                                    00600000
  LUFR9305      LU                                              00610000
*                                                               00620000
PUFRB94         PUADDR=01,                                     X00630000
                        DISCNT=NO,                             X00640000
                        IDBLK=05D,                             X00650000
                        IDNUM=B9004,                           X00660000
                        MAXDATA=512,                           X00670000
                        MAXOUT=7,                              X00680000
                        MAXPATH=1,                             X00690000
                        DLOGMOD=SNX32702,                      X00700000
                        PACING=0,                              X00710000
                        PASSLIM=7,                             X00720000
                        PUTYPE=2,                              X00730000
                        SSCPFM=USSSCS,                         X00740000
                        USSTAB=USSTEST,                        X00750000
                        VPACING=0                               00760000
  LUFR9402      LU LOCADDR=2                                    00770000
  LUFR9403      LU LOCADDR=3                                    00780000
  LUFR9404      LU LOCADDR=4                                    00790000
  LUFR9405      LULOCADDR=5                                     00800000
*                                                               00810000
PUFRB95         PUADDR=01,                                     X00820000
                        DISCNT=NO,                             X00830000
                        IDBLK=05D,                             X00840000
```

```
                    IDNUM=B9005,                              X00850000
                    MAXDATA=512,                              X00860000
                    MAXOUT=7,                                 X00870000
                    MAXPATH=1,                                X00880000
                    DLOGMOD=SNX32702,                         X00890000
                    PACING=0,                                 X00900000
                    PASSLIM=7,                                X00910000
                    PUTYPE=2,                                 X00920000
                    SSCPFM=USSSCS,                            X00930000
                    USSTAB=USSTEST,                           X00940000
                    VPACING=0                                  00950000
  LUFR9592      LU LOCADDR=2                                   00960000
  LUFR9593      LU LOCADDR=3                                   00970000
  LUFR9594      LU LOCADDR=4                                   00980000
  LUFR9595      LU LOCADDR=5                                   00990000
*                                                              01000000
```

Example 2: Configuring a Host to Support BAN Frame Relay Between a Host and a Bridge/Router

This example shows how to configure a host to support BAN Frame Relay directly to a NETBuilder bridge/router.

The following is the configuration on the NETBuilder bridge/router:

```
========== -DLSW BoundAccessNode parameter menu (Level 3)==========
   1  - Add
   2  - Delete
Select (1-2) ... <CR> to Exit ====> 1
Enter !<port> (mandatory) => 1

   ADD !<Vport> BoundAccessNode <ban dlci mac addr> [<bni mac addr>]

   ADD !V1 BoundAccessNode 4FFF00000000
```

The following is the configuration required on the host (entries underlined in the host example map directly to the configuration required on the NETBuilder bridge/router):

```
************************************************             00010000
*    SWITCHED MAJOR NODE FOR BAN FRAME RELAY   *             00020000
************************************************             00030000
**                                  **                       00040000
SNAFRBAN    VBUILD TYPE=SWNET,MAXGRP=1,MAXNO=6               00050000
*                                                            00060000
PUFRBAN1    PUADDR=01, IDBLK=05D,IDNUM=00099, 21             X00070000
                MAXPATH=3,MAXDATA=1024,PUTYPE=2              X00080003
                IRETRY=NO,DISCNT=NO,ISTATUS=ACTIVE           X00090000
                MAXOUT=7,PASSLIM=7                           X00100000
                USSTAB=USSTEST                                00110000
BANPTH1     PATHDLCADDR=(1,C,FRELAY),DLC TYPE IS FRAME-RELAY X00120002
            DLCADDR=(2,D,02),     PORT#OF PHY LN (PORTADD)   X00130006
            DLCADDR=(3,D,8)       SAP OF FRAME-RELAY DEVICE  X00140001
            DLCADDR=(5,X,4FFF00000000),DEST MAC ADDR FOR BAN X00160002
            GID=1,PID=1                                      X00170000
            GRPN=G1-FRLG0                                     00180000
BANPTH2     PATHDLC ADDR+(1,C,FRELAY,DLC TYPE IS FRAME-RELAY X00190002
            DLCADDR=(2,D,03), PORT#OF PHYS LN (PORTADD)      X00200006
            DLCADDR=(3,D,8),  SAP OF FRAME-RELAY DEVICE      X00210002
```

```
            DLCADDR=(4,X,20), DLCI OF FRAME-RELAY PVC          X00220002
            DLCADDR=(5,X,4FFF00000000),DEST MAC ADDR FOR BAN   X00230002
            GID=1.PID=2                                        X00240005
            GRPNM=G10FRLG0                                      00320002
**A0488L21 LU LOCADDR=00,DLOGMOD=DSIL6MOD,MODETAB=AMODETAB      00330000
LUFRBA11 LU LOCADDR=01,DLOGMOD=SNX32702                         00340000
LUFRBA12 LU LOCADDR=02,DLOGMOD=SNZ32702                         00350000
LUFRBA13 LU LOCADDR=03,DLOGMOD=SNX32702                         00360000
LUFRBA14 LU LOCADDR=04,DLOGMOD=SNX32702                         00370000
*                                                               00380000
```

The values you enter on the bridge/router in this example for the <fep mac> <fep sap> syntax come from the DLCADDR parameter in the switched major node for the Frame Relay connection. This defines the token ring interface on the FEP.

Example 3: Configuring a Host to Support BNN Frame Relay Between a Host and a Bridge/Router

This example shows how to configure a host to support Boundary Network Node (BNN) Frame Relay to a NETBuilder bridge/router.

The following is the configuration on the NETBuilder bridge/router:

```
====================== SHow -DLSW FradMap ========================
No FradMap Configured
============= -DLSW FradMap parameter menu (Level 3)==============
   1  - Add
   2  - Delete
Select (1-2) ... <CR> to Exit ====> 1
Enter !<port> (mandatory) => 1
   Add !<port> FradMap <src mac> <src sap> <fep mac> <fep sap> <dlci>
    <code point>
   Add !1 FradMap 4FFF00000000 04 400011600000 04 10 82
```

The following is the configuration required on the host (entries underlined in the host example map directly to the configuration required on the NETBuilder bridge/router):

```
*********************************************************  00010000
* 6/14/96 MEMBER FOR FRAME RELAY BNN  ON L1020 OF N10   *  00020000
*       IT'S USED TO CONNECT OS/2 AT 4TH FLOOR             00021000
*********************************************************  00030000
SWFRFRAD   VBUILD TYPE=SWNET,MAXGRP=2,MAXNO=2               00040000
*                                                           00050000
PUFRF05F   PU ADDR=01,                                     X00060000
              DISCNT=NO,                                   X00070000
              IDBLK=05D,                                   X00080001
              IDNUM=B005F,                                 X00090000
              MAXDATA=512,                                 X00100000
              MAXOUT=7,                                    X00110000
              MAXPATH=2,                                   X00120000
              DLOGMOD=SNX32702,                            X00130000
              PACING=0,                                    X00140000
              PASSLIM=7,                                   X00150000
              PUTYPE=2,                                    X00160000
              SSCPFM=USSSCS,                               X00170000
              USSTAB=USSTEST,                              X00180000
              VPACING=0                                     00190000
LUFR05F2   LU LOCADDR=2                                     00193000
```

```
LUFR05F3   LU LOCADDR=3                                          00194000
LUFR05F4   LU LOCADDR=4                                          00195000
LUFR05F5   LU LOCADDR=5                                          00196000
*                                                                00197000
*TFRF05F PATH DLCADDR=(1,C,FRELAY),                             X00197105
*            DLCADDR=(2,D,02),PORTADDR ON PHYSICAL LINE         X00197205
*            DLCADDR=(3,D,4), REMOTE SAP                        X00197305
*            DLCADDR=(4,X,99),DLCI #                            X00197405
*            GID=1,PID=1,                                       X00197505
*            GRPNM=G10FRLG1                                      00197605
* ADD NEXT LINE FOR BAN TYPE1 TO BE INITIATED BY HOST *          00197702
* TFRF05F PATH DIALNO=02040020AF00B3C1,GRPNM=G10FRLG1            00197804
*****************************************************            00197902
*      SWITCHED MAJOR NODE FOR FRAME RELAY          *            00198002
*****************************************************            00199002
```

APPN Host Configurations

This section provides examples showing how to configure APPN with hosts in certain situations.

Example 4: Defining an Adjacent Link Station for a TIC to a Host

This example shows how you would define an adjacent link station for a token ring interface card (TIC) connection to a host in the APPN Service. The interface in this example is for a 3745 front-end processor (FEP).

```
====================== SHow -APPN AdjLinkSta ======================
---------------------Adjacent Link Stations----------------------
PortLinkname  BTU type Media addr  SAP CPName        ID      TG prof
CAHE
!0  LINK0000 2048 NN  n100040607FF8 04 US3COMHQ.APPN1
00000000         CAHE
!0  LINK0001 2048 NN  n100040080EA3 04 US3COMHQ.APPN4
00000000         CAHE

============ -APPN AdjLinkSta parameter menu (Level 3)============
   1  - Add
   2  - Delete
Select (1-2) ... <CR> to Exit ====> 1
Enter !<port> (mandatory) => 1
Add !<port> AdjLinkSta <type>(NN|EN|Learn) <max_btu_size>(99-8912)
   [[Cmac|Ncmac] dest media addr] [Sap=<num>]
   [CPName=<[netid.]cpname>] [Nodeid=<ID>] [LinkName=<name>]
   [TGprof=<name>] [CPSess=(Yes|No)] [AutoStart=(Yes|No)]
   [HPR=(Yes|No)] [ErrorRecovery=(Yes|No)]

Add !1 AdjLinkSta NN 2048 N100040607FF8 Sap=04 CPName=US3COMHQ.APPN1
   CPSess=Yes AutoStart=Yes HPR=Yes ErrorRecovery=No
```

The following is an abbreviated example of the corresponding host configuration:

```
                    OPTIONS NEWDEFN=(YES,ECHO,SUPP),USERGEN=(FNMNDFGN)
*********************************************************************
*  3COM MVS HOST TO SA 12 PHYSICAL COMMUNICATION CONTROL UNIT       *
*********************************************************************
*  CHANGE HISTORY:                                                  *
*  MM/DD/YY (XXX):                                                  *
*********************************************************************
```

```
*************************************************************************
*   LINE CONFIGURATION FOR 3745-130                                     *
*                                                                       *
*    PORT ADDR      LIC TYPE     USAGE DESCRIPTION        USER          *
*    -------------  -----------  ----------------------  -------------  *
*                                                                       *
*    1088           TIC          TOKEN RING BACKBONE      ENGINEERING   *
*    1089           TIC          TOKEN RING BACKBONE      ENGINEERING   *
*    1090           TIC          TOKEN RING BACKBONE      ENGINEERING   *
*    1091           TIC          TOKEN RING BACKBONE      ENGINEERING   *
*                                                                       *
*************************************************************************

PCU0112         PCCU AUTODMP=NO     DUMP INTERVENTION REQUIRED            *
                AUTOIPL=NO,         IPL INTERVENTION REQUIRED             *
                AUTOSYN=YES,        SYNCHRONIZE NCP NAME WITH VTAM        *
                BACKUP=YES,         OTHER VTAM HOSTS MAY ACQ RESOURCES    *
                CUADDR=340,         NCP NATIVE SUBCHANNEL ADDRESS ON MVS  *
                CDUMPDS=SCANDUMP,   COMM SCANNER DUMP DDNAME FOR VM/VTAM  *
                DELAY=.1,           VTAM WRITE DELAY                      *
                DUMPDS=NCPDUMP,     NCP DUMP DDNAME FOR VM/VTAM           *
                GWCTL=SHR,          SHARE LU-LU SETUP W/OTHER GWSSCP'S    *
                MDUMPDS=MOSSDUMP,   MOSS DUMP DDNAME FOR VM/VTAM          *
                MAXDATA=4224,       LARGEST DATA RECORD PLUS CTL HDRS     *
                NETID=US3COMHQ,     THIS NCP WITHIN US3COMHQ NATIVE NET   *
                OWNER=HOST3COM,     3COM MVS/ESA HOST AT SA 1             *
                SUBAREA=01,         3COM MVS/ESA DOMAIN SA NO.            *
                VFYLM=YES           DON'T RELOAD NCP IF ALREADY LOADED    *
*                                                                       *
N12NCP          BUILDSUBAREA=12,    NCP 3745 SUBAREA                      *
                ADDSESS=64,         PERIPHERAL NODE SESSION SCB'S         *
                AUXADDR=8,          ADDED ADDR'S EACH PARALLEL SESS PLU   *
                BFRS=240,           NCP BUFFER SIZE                       *
                ENABLTO=6.0,        SECS WAIT FOR DSR TIMEOUT             *
                LOADLIB=LOADLIB,    DDNAME FROM WHICH VTAM SELECTS NCP    *
                LTRACE=2,           MAX CONCURRENT LINE TRACES            *
                MAXSESS=12,         MAX LU-LU FOR BOUNDARY NODE LUS       *
                MAXSSCP=2,          MAX SSCP-NCP SESSIONS                 *
                MAXSUBA=63,         MAX SUBAREA CHANGED FOR SNI           *
                MODEL=3745-170,     COMM CNTRL MACHINE TYPE               *
                NAMTAB=512,         # NETWORKS + SSCP'S + 2.1 NODES       *
                NETID=US3COMHQ,     3COM WORLD HEADQUARTERS SNA NETWORK   *
                NEWNAME=N12V01,     NCP NAME - LESS THAN 7 DIGITS         *
                NPA=YES,            ENABLE NET PERF ANALYZER              *
                NUMHSAS=6,          NUMBER OF VR'S ENDING IN THIS NCP     *
                PATHEXT=12,         EXTRA TRANSIT ROUTING TABLE ENTRIES   *
                SESSACC=NO,         NO SESSION ACCOUNTING BECAUSE         *
                SLODOWN=12,         BUFFER THRESHOLD BELOW WHICH SLOWS    *
                TRANSFR=18,         MAX BUFFERS PER PIU (SUPPORT 4K PIU)  *
                TYPSYS=MVS,         GENERATED UNDER AN MVS HOST           *
                TYPGEN=NCP,         CHANNEL ATTACHED NCP                  *
                T1TIMER=(2.5,8.0),  TOKEN-RING LOGICAL LINK REPLY TIMEOUT *
                T2TIMER=(0.5,1.5),  TOKEN-RING LOGICAL LINK ACK TIMERS    *
                USGTIER=4,          4 LSS, 1 HSS, 1TRA, 2 CA'S            *
```

```
               VERSION=V7R3,                                                  *
               VRPOOL=(16,4),                                                 *
               VRTIMER0=(60,0,0),                                             *
               VRTIMER1=(60,0,0),                                             *
               VRTIMER2=(60,0,0)                                              *
*
*********************************************************************************
*     TOKEN RING DEFINITIONS
*********************************************************************************
G12TRP00 GROUP ECLTYPE=(PHYSICAL,PERIPHERAL),                                 *
               TYPE=NCP                                                       *
               DIAL=NO,                                                       *
               LNCTL=SDLC,                                                    *
               MAXPU=1,                                                       *
               NPACOLL=(YES,EXTENDED), NPA COLLECTION OPTION                  *
               PUTYPE=1,                                                      *
               PUDR=NO,                                                       *
               LEVEL2=ECLNARL2,                                               *
               LEVEL3=ECLNARL3,                                               *
               LEVEL5=NCP,                                                    *
               TIMER=(ECLNART1,,ECLNART2,ECLNART3),                           *
               XIO=(ECLNARXL,ECLNARXS,ECLNARXI,ECLNARXK),                     *
               USERID=(5668854,ECLRBDT,NORECMS,,ECLNMVT),                     *
               SPEED=9600,                                                    *
               COMPTAD=YES,                                                   *
               COMPSWP=YES,                                                   *
               COMPOWN=YES                                                    *
L12TIC01 LINE  ADDRESS=(1088,FULL),                                           *
               LOCADD=400011600000,                                           *
               MAXPU=1,                                                       *
               PORTADD=0,                                                     *
               MAXTSL=2042,                                                   *
               RCVBUFC=4095,                                                  *
               ADAPTER=TIC2,                                                  *
               TRSPEED=16,                                                    *
               UACB=(X$P1AX,X$P1AR)                                           *
P12TIC01 PU ADDR=01,                                                          *
               INNPORT=YES,                                                   *
               ANS=CONT                                                       *
*                                                                             *
```

Note the following about this example:

- The MAXDATA parameter in the PCCU0112 definition sets the maximum data size for connecting to a 37 x 5 front-end processor as an adjacent link station. The MAXDATA parameter on the host maps to the <max_BTU_size> value set using the -APPN AdjLinkSta parameter on the NETBuilder bridge/router.
- The NETID parameter in the PCCU0112 definition is where you obtain the network ID required to connect to an APPN network.
- The TRANSFR parameter in the N12NCP definition maps to the SendWindow value set for both the -APPN SdlcAdjLinkSta and -APPN DlurLinkSta parameters. The window size only applies when the link station supports SDLC.
- The LOCADD parameter from the L12TIC01 line address is the MAC address used for the adjacent link station definition of a front-end processor.

Example 5: Defining a Host as an SDLC Link Station

This example shows how to define an adjacent SDLC link station in the APPN Service. This is a generic-type SDLC node that does not have any dependent LUs that require DLUr. The host definition in this example is for a Type 2 PU (PU2). This is for an OS/2 workstation attached using SDLC (doing SDLC conversion), while defining the LUs as independent.

The following is the configuration on the NETBuilder bridge/router:

```
==================== SHow -APPN SdlcAdjLinkSta ====================
--------------------SDLC Adjacent Link Stations--------------------
No SDLC Adjacent Link Station Configured
========= -APPN SdlcAdjLinkSta parameter menu (Level 3)===========
   1  - Add
   2  - Delete
Select (1-2) ... <CR> to Exit ====> 1
Enter !<port> (mandatory) => 1
Add !<port> SdlcAdjLinkSta <type>(NN|EN|Learn)
   <max_btu_size>(99-8912) <station addr>(Hex 1-FE)
   [CPName=<[netid.]cpname>] [Nodeid=<ID>] [LinkName=<name>]
   [TGprof=<name>] [CPSess=(Yes|No)] [AutoStart=(Yes|No)]
   [HPR=(Yes|No)] [SendWindow=<num>] [ContactTimer=<num>] [NoRsp-
   Timer=<num>] [NoRsptimRetry=<num>]

Add !1 SdlcAdjLinkSta NN 2057 01 CPName=P10TRCP2 LinkName=G10TRL02
   CPSess=Yes AutoStart=Yes HPR=Yes SendWindow=7
```

The following is the configuration required on the host (entries underlined in the host example map directly to the configuration required on the NETBuilder bridge/router):

```
*************************************************** * 00010000
* THIS MEMBER CONTAINS VTAM SWITCHED NODE DEFINITIONS  * 00020000
* FOR TPNS TOKEN RING TESTING                         * 00030000
*                                                     * 00040000
* LIBRARY: NET.VTAMLST                                * 00050000
* MEMBER:  SWCPPU21                                   * 00060005
*                                                     * 00070000
* CHANGE HISTORY:                                     * 00080000
* 08/16/95 (LDT):  TEST TOKEN RING SCRIPT             * 00090000
***************************************************   00091000
SWCPPU21 VBUILD TYPE=SWNET,MAXGRP=4,MAXNO=20           00092018
*                                                      00093000
P10TRPU1 PU ADDR=01,                                  X00094009
               CONNTYPE=L                             X00094102
               EN,
               CPNAME=P10TRCP1,                       X00094313
               DISCNT=NO,                             X00095000
               DYNLU=YES,                             X00095302
               IDBLK=999,                             X00096000
               IDNUM=0100                             X00097000
               1,
               MAX-                                   X00098000
               DATA=265,
               MAXOUT=7,                              X00099000
               MAXPATH=1,                             X00100000
               NETID=US3COMHQ,                        X00110002
```

```
              PACING=7,                                          X00120000
              PASSLIM=7,                                         X00130000
              PUTYPE=2,                                          X00140000
              SSCPFM=USSSCS,                                     X00150000
              USSTAB=ISTINCDT,                                   X00160000
              VPACING=7                                           00170000
       PATH                                                       00180019
DIALNO=0104400037451088,GRPNM=G10TRL01
SLUDEI1 LU LOCADDR=01,DLOGMOD=SNX32702                            00190019
SLUDEI2 LU LOCADDR=02,DLOGMOD=SNX32702                            00191019
SLUDEFR LU LOCADDR=03,MODETAB=TPNS-                               00192021
MTAB,DLOGMOD=FTPPS
SLUDEFS LULOCADDR=04,MODETAB=TPNS-                                00193021
MTAB,DLOGMOD=FTPSS
*                                                                 00200000
P10TRPU2 PUADDR=01,                                              X00210009
              CONNTYPE=APPN,                                     X00220002
              CPCP=YES,                                          X00220102
              CPNAME=P10TRCP2,                                   X00220213
              DISCNT=NO,                                         X00221002
              DYNLU=YES,                                         X00223002
              IDBLK=999,                                         X00230000
              IDNUM=0100                                         X00240000
              2,
              MAX-                                               X00250016
              DATA=2057,
              MAXOUT=7,                                          X00260000
              MAXPATH=1,                                         X00270000
              NETID=US3COMHQ,                                    X00271002
              PACING=7,                                          X00290000
              PASSLIM=7,                                         X00300000
              PUTYPE=2,                                          X00310000
              VPACING=7                                           00340000
              PATH                                                00341019
              DIALNO=0104400037451089,GRPNM=G10TRL02
*                                                                 00370000
```

Note the following about this example:

- The setting for the NETBuilder <max_btu_size> value must match that of the MAXDATA parameter in the PU definition (see the definition for P10TRPU2).
- The CPName value entered on the NETBuilder bridge/router must match that of the CPNAME= PARAMETER in the PU definition (see the definition for P10TRPU2). The CP name used is not fully qualified, and as a result, the default NETID of the bridge/router will be used.
- The LinkName entered on the NETBuilder bridge/router in this examples comes from the GRPNM parameter in the PU definition (see the definition for P10TRPU2).
- The SendWindow value entered on the NETBuilder is taken from the MAXOUT / PACING / PASSLIM parameters in the PU definition (see the definition for P10TRPU2).

Example 6: Mapping an SDLC DLUr Link Station to a Host SDLC PU Definition

This example shows how to map an SDLC DLUR link station in the APPN service to a host definition of an SDLC PU. The host definition in this example is for a Type 2 PU (PU2). This is for a workstation attached using SDLC (doing SDLC conversion).

The following is the configuration on the NETBuilder bridge/router:

```
================== SHow -APPN SdlcDlurLinkSta =====================
----------------------SDLC Dlur Link Stations----------------------
No SDLC Dlur Link Station Configured
========= -APPN SdlcDlurLinkSta parameter menu (Level 3)==========
   1  - Add
   2  - Delete
Select (1-2) ... <CR> to Exit ====> 1
Enter !<port> (mandatory) => 1

Add !<port> SdlcDlurLinkSta <max_btu_size>(265-8912) <station
   addr>(Hex 1-FE) <dspu name> [Nodeid=<ID>] [LinkName=<name>]
   [Dlus=<[netid.]name>] [Backup=<[netid.]name>] [TGprof=<name>]
   [AutoStart=(Yes|No)] [PU2=(Yes|No)] [HPR=(Yes|No)] [SendWin-
   dow=<num>] [ContactTimer=<num>] [NoRspTimer=<num>] [NoRsptimRe-
   try=<num>]

Add !1 SdlcDlurLinkSta 265 01 P10TRPU1 LinkName=G10TRL01
   Dlus=US3COMHQ.HOST3COM Backup=US3COMHQ.VTAM9370 AutoStart=No
   PU2=Yes HPR=No SendWindow=7
```

The following is the configuration required on the host:

```
SWCPPU21 VBUILD TYPE=SWNET,MAXGRP=4,MAXNO=20          00092018
*                                                     00093000
P10TRPU1 PUADDR=01,                                  X00094009
                  CONNTYPE=LEN,                      X00094102
                  CPNAME=P10TRCP1,                   X00094313
                  DISCNT=NO,                         X00095000
                  DYNLU=YES,                         X00095302
                  IDBLK=999,                         X00096000
                  IDNUM=01001,                       X00097000
                  MAXDATA=265,                       X00098000
                  MAXOUT=7,                          X00099000
                  MAXPATH=1,                         X00100000
                  NETID=US3COMHQ,                    X00110002
                  PACING=7,                          X00120000
                  PASSLIM=7,                         X00130000
                  PUTYPE=2,                          X00140000
                  SSCPFM=USSSCS,                     X00150000
                  USSTAB=ISTINCDT,                   X00160000
                  VPACING=7                           00170000
    PATH DIALNO=0104400037451088,GRPNM=G10TRL01       00180019
SLUDEI1 LU LOCADDR=01,DLOGMOD=SNX32702                00190019
SLUDEI2 LU LOCADDR=02,DLOGMOD=SNX32702                00191019
SLUDEFR LULOCADDR=03,MODETAB=TPNSMTAB,DLOGMOD=FTPPS   00192021
SLUDEFS LULOCADDR=04,MODETAB=TPNSMTAB,DLOGMOD=FTPSS   00193021
*                                                     00200000
```

Note the following about this example:

- The <dspu name> entered on the NETBuilder bridge/router comes from the PUNAME from the PU definition.
- The Dlus value entered on the NETBuilder bridge/router comes from the SSCP-NAME=HOST3COM that is in the VTAM start options (ATCSTRxx).
- The Backup value entered on the NETBuilder bridge/router comes from the same parameter in the other backup VTAM.
- The HPR=No value entered on the NETBuilder bridge/router indicates that the NETBuilder does notintend to use the HPR with this link station.

Example 7: Mapping a Default DLUs to the VTAM Start Options

This example shows how to map a dependent LU server (DLUs) (VTAM) in the APPN Service to the start options for that VTAM. By setting the default DLUs and configuring the corresponding VTAM start options, you will configure the defaults necessary for the VTAM host to start an APPN session with the NETBuilder bridge/router.

The following is the configuration on the NETBuilder bridge/router:

```
=================== SHow -APPN DlurDefaults ======================
-------------------------DLUR Defaults----------------------------
DLUS name = US3COMHQ.HOST3COM  Backup name =
========= -APPN DlurDefaults parameter menu (Level 3)=============
   SetD       DlurDefaults   = [Dlus=<[netid.]name|UNdef>]
[Backup=<[netid.]nam]
   SetD       DlurDefaults   = Dlus=USCOMHQ.HOST3COM
```

The following is the configuration required on the host:

```
SSCPID=01,NOPROMPT,                                X00010000
CONFIG=01,MAXSUBA=63,SUPP=NOSUP,                   X00020002
HOSTSA=1,                                          X00030007
SSCPNAME=HOST3COM,                                 X00040001
NETID=US3COMHQ,                                    X00050000
APPNCOS=NONE,                                      X00050106
BN=YES,BNDYN=FULL,                                 X00051003
CDSERVR=YES,                                       X00052003
CONNTYPE=APPN,                                     X00053003
CPCP=YES,                                          X00054003
DYNADJCP=YES,                                      X00055003
DYNPU=YES,                                         X00055035
DYNLU=YES,                                         X00055109
INITDB=NONE,                                       X00056003
IOINT=600,                                         X00056110
NCPBUFSZ=2048,                                     X00056211
NODETYPE=NN,                                       X00057003
SONLIM=(40,30),                                    X00058018
SORDER=APPN,                                       X00058118
TNSTAT,NOCNSL,TIME=15,                             X00059012
IOBUF=(1500,1016,18,,12,20),                       X00060018
BSBUF=(600,,14)                                     00061017
```

Note the following about this example:

- The Dlus value entered on the NETBuilder bridge/router maps to the SSCP-NAME=HOST3COM entry in the VTAM start options menu.

- The Backup value entered on the NETBuilder bridge/router comes from the same parameter entered on another VTAM uses as a backup.
- The DYNLU=YES entry in the VTAM start options indicate that LUs do not have to be predefined with DLUr.
- The DYNADJCP=YES entry in the VTAM start options indicates support for dynamic adjacent CPs, meaning that new NETBuilder bridge/router network nodes can be added to the network without statically configuring them as adjacent link stations on VTAM. IS THIS CORRECT?
- The SORDER=APPN entry in the VTAM start options indicates that the VTAM host will serve requests from APPN networks before other types of networks.

Example 8: Defining an LU Directory Entry

This example definition shows how to define a LU directory entry in the APPN Service. Use this configuration to explicitly define an SNA resource location, to avoid the search process, and to only perform a locate.

The following is the configuration on the NETBuilder bridge/router:

```
==================== SHow -APPN DirectoryEntry ====================
-------------------------Directory Entry--------------------------
No Directory Entry Configured
========= -APPN DirectoryEntry parameter menu (Level 3)===========
   1  - Add
   2  - Delete
Select (1-2) ... <CR> to Exit ====> 1

Add DirectoryEntry <[netid.]resource name><type>
   (LU|EN|NN|Wild)[[netid.]parent_name parent_type(EN|NN)]
   [[netid.]grandp]
Add DirectoryEntry US3COMHQ.LUJOHN12 LU US3COMHQ.GORILLA EN
```

The following is the configuration required on the host:

```
000200 *           THIS MEMBER CONTAINS VTAM SWITCHED MAJOR NODE          *
000300 *           STATEMENTS FOR DLUR FOR JOHN SMITH                     *
000400 *                                                                  *
000500 *          CHANGE HISTORY:                                         *
000600 *          06/26/96 (JSS): DEFINED PUNAMES TO JOHNPU1              *
000706********************************************************************
000707           SWDLUR  VBUILD TYPE=SWNET,MAXGRP=2,MAXNO=2,MAXDLUR=10
000708 * 3174C APPN DLUR
000709   JOHNPU1  PU ADDR=01,                                             X
000710           ANS=CONT,                                               X
000711           DLOGMOD=SNX32702,                                       X
000720           DISCNT=NO,                                              X
000730           DYNLU=YES,                                              X
000740           IDBLK=017,                                              X
000750           IDNUM=9079D,                                            X
000760           IRETRY=YES,                                             X
000770           ISTATUS=ACTIVE,                                         X
000780           MAXDATA=521,                                            X
000790           MAXOUT=7,                                               X
000800           MAXPATH=2,                                              X
000900           PACING=0,                                               X
001000           PASSLIM=7,                                              X
```

```
001100            SSCPFM=USSSCS,                                    X
001200            USSTAB=USSTEST,                                   X
001300            VPACING=0
001400 JOHN1PT  PATH PID=1,                                         X
001500            DLURNAME=GORILLA,                                 X
001600            DLCADDR=(1,C,INTPU),                              X
001700            DLCADDR=(2,X,0179079D)
001800 LUJOHN12 LU LOCADDR=2
001900 LUJOHN13 LU LOCADDR=3
002000 LUJOHN14 LU LOCADDR=4
002100 LUJOHN15 LU LOCADDR=5
002101 *
```

Example 9: Mapping an SNA COS to a Specific Transmission Priority

This is an example of mapping an SNA class of service (COS) to a particular transmission priority in the APPN Service. This allows you to obtain granularity in your path costs in an APPN network.

The following is the configuration on the NETBuilder bridge/router:

```
====================== SHow -APPN COSNodeRow ======================
=========== -APPN COSNodeRow parameter menu (Level 3)=============
   1  - Add
   2  - Delete
Select (1-2) ... <CR> to Exit ====> 1

Add COSNodeRow <cos name> <weight>(0-255) [Conges-
   tion=min(Yes|No),max(Yes|No)] [Resistance=min,max]
Add COSNodeRow #INTER 30 C=N,N  R=0,31
```

- The following is the configuration required on the host (entries underlined in the host example map directly to the configuration required on the NETBuilder bridge/router):

```
173000    #INTER  APPNCOS PRIORITY=HIGH     transmission priority
174000            LINEROW  WEIGHT=30,       line row weight              *
174500              NUMBER=1,               line row number              *
175000              UPARM1=(0,255),         user defined char 1          *
175500              UPARM2=(0,255),         user defined char 2          *
176000              UPARM3=(0,255),         user defined char 3          *
176500              CAPACITY=(4M,MAXIMUM),  line speed                   *
177000              COSTTIME=(0,0),         cost per connect time        *
177500              COSTBYTE=(0,0),         cost per byte transmitted    *
178000              PDELAY=(MINIMUM,NEGLIGIB),propagation delay          *
178500              SECURITY=(UNSECURE,MAXIMUM) security level for TG
179000            NODEROW  NUMBER=1,        node row number              *
179500              WEIGHT=30,              node row weight              *
180000              CONGEST=(LOW,LOW),      congestion                   *
180500              ROUTERES=(0,31)         route addition resistance
181000            LINEROW  WEIGHT=60,       line row weight              *
181500              NUMBER=2,               line row number              *
182000              UPARM1=(0,255),         user defined char 1          *
182000              UPARM1=(0,255),         user defined char 1          *
182500              UPARM2=(0,255),         user defined char 2          *
183000              UPARM3=(0,255),         user defined char 3          *
183500              CAPACITY=(56000,MAXIMUM),line speed                  *
184000              COSTTIME=(0,0),         cost per connect time        *
```

```
184500              COSTBYTE=(0,0),         cost per byte transmitted     *
185000              PDELAY=(MINIMUM,TERRESTR),propagation delay           *
185500              SECURITY=(UNSECURE,MAXIMUM) security level for TG
186000            NODEROW  NUMBER=2,        node row number               *
186500              WEIGHT=10,              node row weight               *
187000              CONGEST=(LOW,LOW),      congestion                    *
187500              ROUTERES=(0,63)         route addition resistance
```

Note the following about this example:

- This is not a complete ISTCOSxx (class of service) table.
- The Congestion value on the NETBuilder bridge/router maps to the CONGEST= parameter of the LINEROW statement.
- The Resistance value on the NETBuilder bridge/router maps to the ROUTERES= parameter of the node row statement.

Example 10: Mapping an SNA COS to the APPN Service

This example shows how to map an SNA COS definition to the APPN Service.

The following is the configuration on the NETBuilder bridge/router:

```
==================== SHow -APPN ConfigCOS ======================
============ -APPN ConfigCOS parameter menu (Level 3)=============
   1  - Add
   2  - Delete
Select (1-2) ... <CR> to Exit ====> 1
Add ConfigCOS <cos name> <transmit priority> [SNA defined COS name]
Add ConfigCOS COS A LOW #BATCH
```

The following is the configuration required on the host:

```
*****************************************************                 00002500
*                                                               *     00005000
* MEMBER NAME:COSAPPN                                           *     00007500
*                                                               *     00010000
* Descriptive name:IBM-Supplied APPN Class of Service Definitions *     00012500
*                                                               *     00015000
* STATUS: ACF/VTAM VERSION 4 RELEASE 2                          *     00018490
*                                                               *     00020000
* COPYRIGHT: LICENSED MATERIALS - PROPERTY OF IBM               *     00022500
*                                                               *     00025000
* 5695-117 (C) COPYRIGHT IBM CORP. 1992.                        *     00027500
* ALL RIGHTS RESERVED.                                          *     00030000
*                                                               *     00032500
*U.S. GOVERNMENT USERS RESTRICTED RIGHTS -                      *     00035000
* USE, DUPLICATION OR DISCLOSURE RESTRICTED BY                  *     00037500
* GSA ADP SCHEDULE CONTRACT WITH IBM CORP.                      *     00040000
*                                                               *     00042500
* SEE COPYRIGHT INSTRUCTIONS.                                   *     00045000
*****************************************************                 00047500
.
.
.
#BATCH APPNCOSPRIORITY=LOW                  transmission priority      28800000
                  LINEROW WEIGHT=30,        line row weight           *28900000
                    NUMBER=1,               line row number           *28950000
```

```
  UPARM1=(0,255),          user defined char 1              *29000000
  UPARM2=(0,255),          user defined char 2              *29050000
  UPARM3=(0,255),          user defined char 3              *29100000
  CAPACITY=(56000,MAXIMUM),line speed                       *29150000
  COSTTIME=(0,0),          cost per connect time            *29200000
  COSTBYTE=(0,0),          cost per byte transmitted        *29250000
  PDELAY=(MINIMUM,MAXIMUM), propagation delay               *29300000
  SECURITY=(UNSECURE,MAXIMUM) security level for TG          29350000
NODEROW  NUMBER=1,         node row number                  *29400000
  WEIGHT=5,                node row weight                  *29450000
  CONGEST=(LOW,LOW),       congestion                       *29500000
  ROUTERES=(0,31)          route addition resistance        *29550000
LINEROW  WEIGHT=60,        line row weight                  *29600000
  NUMBER=2,                line row number                  *29650000
  UPARM1=(0,255),          user defined char 1              *29700000
  UPARM2=(0,255),          user defined char 2              *29750000
  UPARM3=(0,255),          user defined char 3              *29800000
  CAPACITY=(19200,MAXIMUM),line speed                       *29850000
  COSTTIME=(0,0),          cost per connect time            *29900000
  COSTBYTE=(0,0),          cost per byte transmitted        *29950000
  PDELAY=(MINIMUM,MAXIMUM),propagation delay                *30000000
  SECURITY=(UNSECURE,MAXIMUM) security level for TG          30050000
NODEROW  NUMBER=2,         node row number                  *30100000
  WEIGHT=10,               node row weight                  *30150000
  CONGEST=(LOW,LOW),       congestion                       *30200000
  ROUTERES=(0,63)          route addition resistance         30250000
```

Note the following about this example:

- This is not a complete ISTCOSxx (class of service) table.
- The <cos name> value entered on the NETBuilder bridge/router refers to a local name that is mapped to an entry in ISTCOSxx.
- The SNA-defined COS name value entered on the NETBuilder bridge/router refers to the name of the COS entry (in this case the #BATCH statement from the ISTCOSxx table in VTAMLST on the host).

BSC Host Example

This section provides a sample host configuration for configuring BSC between a host and a NETBuilder bridge/router.

The following is the configuration on the NETBuilder bridge/router:

```
===================== SHow -BSC CONFiguration =====================
------------------------BSC Configuration--------------------------
!4    Control        = Disable
!4    Role           = Primary
Port CU_Name CU_Addr Local_Mac   Remote_Mac   Local_Sap Remote_Sap
4    P12021 1(0xC1) 400000003271 400011600000 0x4        0x4

!P12021      CUCONTrol     = Disable
```

The configuration required on the host is shown below (entries underlined in the host example map directly to the configuration required on the NETBuilder bridge/router). Note the following about the BSC host configuration:

- You must specify that NCP will use the general polling procedure for this station and you must specify the polling characters to be assigned to the control unit of the station. If you omit GPOLL, devices must be polled individually.
- GPOLL is required if this CLUSTER definition statement represents an IBM 3271. For the ADDR keyword of each TERMINAL definition statement that defines a 2980, code the addressing characters assigned to that 2980. Because 2980s cannot be individually polled, the GPOLL keyword is not valid.

```
*************************************************************                00010000
*  FROM 'SYS1.VTAMLST(N12V02)' NCP FOR BSC TESTING                           00020000
*  MVSRDO USED TO DO TESTING OF BSC TRANSPORT                                00021000
*************************************************************                00022000
*   BSC 3780 DEFINITIONS                                                     01230000
*************************************************************                01240000
*                                                                            01250000
G12BSC1  GROUP     LNCTL=BSC,          BSC PROTOCOL                    *
                   CLOCKNG=EXT,        EXTERNALLY CLOCKED MODEMS         *
                   CODE=EBCDIC,        TRANSMISSION CODE                *
                   CU=2701,            EMULATE 2701   ** EP MODE **      *
                   DIAL=NO,            LEASED LINES                    *
                   DIRECTN=INOUT,      NCP WIL SEND AND RECEIVE          *
                   DLOGMOD=D4B32782,   NON-SNA 3270 24 X                *
                   DUPLEX=FULL,        RTS ACTIVE WHEN NCP RCV OR XMT    *
                   ETRATIO=30,         3.0 % ERROR TO TRANSMISSION RATIO  *
                   ISTATUS=ACTIVE,     ACTIVATE ALL RESOURCES            *
                   REPLYTO=3,          WAIT TIME FOR RESPONSE            *
                   USSTAB=USSTEST      UNFORMATTED SESSION SERVICES TABLE
*                                                                            01390000
*************************************************************************    01400000
*  PORT 00 BSC                                                  *           01410000
*                                                               *           01420000
*************************************************************************    01430000
*                                                                            01440000
L1200    LINE ADDRESS=(000,42-0),    PORT ZERO ON UNIT=242             *
                  USE=EP,            INITALLY OPERATING IN EP MODE       *
                  SPEED=9600,                                          *
                  NEWSYNC=NO
*                                                                            01490000
T1200140 TERMINAL TERM=3780
*                                                                            01520000
*************************************************************************    01530000
*  PORT 01 BSC                                                  *           01540000
*                                                               *           01550000
*************************************************************************    01560000
*                                                                            01570000
L1201    LINE ADDRESS=(001,43-0),    PORT ZERO ON UNIT=243             *
                  USE=EP,            INITALLY OPERATING IN EP MODE       *
                  SPEED=19200,                                         *
                  NEWSYNC=NO
*                                                                            01620000
T1201140 TERMINAL TERM=3780
*                                                                            01650000
*************************************************************************    01660000
*   BSC 3270 DEFINITIONS                                        *           01670000
*************************************************************************    01680000
```

```
*                                                                              01690000
G12BSC2  GROUP     LNCTL=BSC,          BSC PROTOCOL                        *
                   CLOCKNG=EXT,        EXTERNALLY CLOCKED MODEMS             *
                   CODE=EBCDIC,        TRANSMISSION CODE                    *
                   CU=2701,            EMULATE 2701   ** EP MODE **          *
                   CUTYPE=3271,        BSC CONTROLLER  ** EP MODE **         *
                   DIAL=NO,            LEASED LINES                        *
                   DIRECTN=INOUT,      NCP WILL SEND AND RECEIVE             *
                   DLOGMOD=D4B32782,   NON-SNA 3270 24 X 80                 *
                   DUPLEX=FULL,        RTS ACTIVE WHEN NCP RCV OR XMT        *
                   ETRATIO=30,         3.0 % ERROR TO TRANSMISSION RATIO      *
                   ISTATUS=ACTIVE,     ACTIVATE ALL RESOURCES                *
                   NPACOLL=YES,        NPA COLLECTION OPTION                 *
                   PAUSE=0,            SRVC ORDER TBL POLL CYCLE PAUSE        *
                   POLIMIT=(10,QUEUE)  ACCEPT 10 NACKS MAX                  *
                   POLLED=YES,         POLLED DEVICES                       *
                   REPLYTO=3,          WAIT TIME FOR RESPONSE                *
                   SERVLIM=50,         SERVICE ORDER TABLE NORMAL SCAN LIMIT *
                   USSTAB=USSTEST      UNFORMATTED SESSION SERVICES TABLE
*                                                                              01880000
****************************************************************************** 01890000
*  PORT 02 BSC                                                          *      01900000
*                                                                       *      01910000
****************************************************************************** 01920000
*                                                                              01930000
L1202     LINE ADDRESS=(002,44-0),     PORT ZERO ON UNIT=244                *
                   USE=NCP,            INITALLY OPERATING IN NCP MODE        *
                   SPEED=9600,                                              *
                   NEWSYNC=NO
*------------------------------------------------------------------------------* 01980000
* LINE 02 (PORT 02) - CU 1:                                          *         01990000
*    4 TERMS SUPPORTING TYPE 2 COMPATIBLE SESSIONS                        *    02000000
*------------------------------------------------------------------------------* 02010000
P12021   CLUSTER CUTYPE=3271,          CONTROLLER RESPONDS TO THIS POLL     *
                   GPOLL=40407F7F      CONTROLLER RESPONDS TO GENERAL POLL
T1202140 TERMINAL TERM=3277,ADDR=60604040,POLL=40404040
T12021C1 TERMINAL TERM=3277,ADDR=6060C1C1,POLL=4040C1C1
T12021C2 TERMINAL TERM=3277,ADDR=6060C2C2,POLL=4040C2C2
T12021C3 TERMINAL TERM=3277,ADDR=6060C3C3,POLL=4040C3C3
*                                                                              02080000
```

REFERENCE FOR NETBUILDER FAMILY SOFTWARE UPDATE PAGES

This section includes update pages with changes and additions to *Reference for NETBuilder Family Software* Version 9.3.

Place the update pages at the front of each specified chapter.

12 BGP SERVICE PARAMETERS

9.3 Release Notes, *Reference for NETBuilder Family Software*

Place this update section at the front of Chapter 12.

InteriorPolicy

Replace this section with the following updated information:

Syntax

```
ADD -BGP InteriorPolicy <NetfilterID> <Permit | Deny> [ExType1 |
  ExType2]
DELete -BGP InteriorPolicy [<NetfilterID> [Permit | Deny]] | All
SHow -BGP InteriorPolicy [<filterid>]
```

Default No default. If no policy is configured, all interior or intra-AS routes are imported into BGP, except for OSPF Type1 and Type2 External routes.

Description The InteriorPolicy parameter specifies a network or a range of networks that can be imported into BGP from an Interior Gateway Protocol (IGP) such as Routing Information Protocol (RIP), or Open Shortest Path First (OSPF), including directly connected networks and statically configured routes.

The filter ID used is an ID of a filter defined by the ADD NetworkFilter command. An operation specified with the filter ID indicates if this route should or should not be imported into the BGP Routing Table from the IGP Routing Table.

You must specify the policy as either all "permit" filters or all "deny" filters. All policies in a particular direction (in/out) must either be permit or deny. A mix of permit and deny policies causes ambiguity and the entire policy list is ignored.

Use the ExType1 and ExType2 parameters to control importing of OSPF Type1 and Type2 External routes into the BGP table. In order to import OSPF External routes into BGP, a matching BGP interior policy must be configured. If ExType1 or ExType2 is specified, this interior policy will apply only to matching OSPF External routes.

For all IGP routes except OSPF External routes, when you define a set of permit policies, only those networks that do not match the same interior policy are discarded (or not advertised through BGP). Similarly, when all the policies in a given direction are deny policies, only those routes that match the interior policy are discarded and all others are allowed. OSPF External routes which do not match any of the permit or deny interior policies are always discarded.