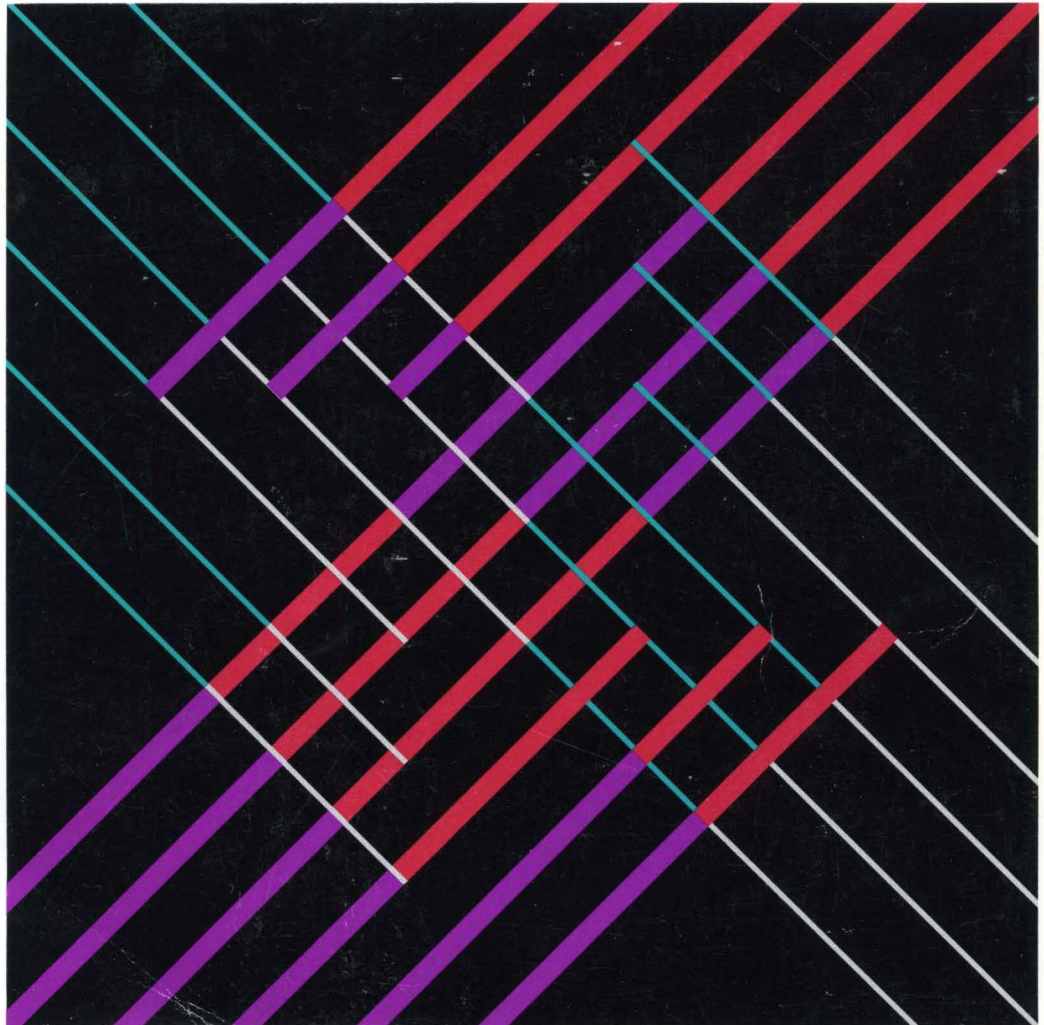


Multiprotocol Network Program

SC31-6692-01

**Operations and Problem Management**

Version 1 Release 3





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SC31-6692-01

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**Note**

Before using this document, read the general information under "Notices" on page xvii

**Second Edition (September 1994)**

This edition applies to:

Version 1, Release 3 of the IBM Multiprotocol Network Program  
Models 120, 125, 140, 145, 170, and 175 of the IBM 6611 Network Processor

and to all subsequent releases and modifications until otherwise indicated in new editions or technical newsletters. See the Summary of Changes for the changes made to this manual. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change. Make sure you are using the correct edition for the level of the product.

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# Contents

<b>Notices</b> .....	xvii
Trademarks .....	xvii
 <b>About This Book</b> .....	xix
Summary of Changes .....	xx
Who Should Use This Book .....	xxi
6611 Network Processor and Multiprotocol Network Program Information .....	xxii
Library Overview .....	xxiii
Library Ordering Information .....	xxiv
Obtaining Softcopy Information .....	xxv
 <b>Chapter 1. Using the System Manager</b> .....	1-1
About This Chapter .....	1-2
Introduction to System Manager .....	1-2
Using the System Manager Main Menu .....	1-2
Maps of the System Manager Menu Screens .....	1-3
Operations Menu Items .....	1-3
Problem Determination Menu Items .....	1-4
Configuration Menu Items .....	1-6
Software Installation and Maintenance Menu Items .....	1-6
Hardware Maintenance Menu Items .....	1-7
System Manager Help Menu Items .....	1-7
 <b>Chapter 2. System Manager Help</b> .....	2-1
About This Chapter .....	2-2
Understanding the System Manager Screens .....	2-2
Menu Screens .....	2-3
Selector Screens .....	2-6
Dialog Screens .....	2-7
Command Status Screens .....	2-8
Getting System Manager Help .....	2-10
Using the Function Keys in the System Manager .....	2-11
Selecting Choices from a List .....	2-14
Using the System Manager Log .....	2-14
Using the Fast-Path Environment .....	2-15
 <b>Chapter 3. Accessing the 6611</b> .....	3-1
About This Chapter .....	3-2
Accessing a Local 6611 .....	3-2
Accessing a Remote 6611 .....	3-2
Using an IP Network Connection .....	3-3
Using a Modem .....	3-12
Verifying a Link Connection .....	3-13
Logging In to a 6611 .....	3-13
User IDs and Passwords .....	3-15
Tasks Restricted to Controlling Users .....	3-16
 <b>Chapter 4. Operations</b> .....	4-1
About This Chapter .....	4-3
Using the 6611 Operations Facilities .....	4-4



Protocol and Interface Monitor . . . . .	4-4
Routing Information . . . . .	4-8
Remote Host Echo (Ping)/Route Trace . . . . .	4-18
Network Statistics . . . . .	4-22
ARP Table Management . . . . .	4-31
Port Filters . . . . .	4-36
Network Management Information . . . . .	4-37
File Systems . . . . .	4-40
File and Diskette Operations . . . . .	4-41
Login Information . . . . .	4-51
System Activity Report . . . . .	4-53
EIA 232 Serial Ports . . . . .	4-54
System Shutdown . . . . .	4-58
Date and Time . . . . .	4-61
Transferring Files . . . . .	4-62
File Names for Output in Transfer Directory . . . . .	4-62
 <b>Chapter 5. Problem Determination . . . . .</b>	 5-1
About This Chapter . . . . .	5-3
Process Information . . . . .	5-4
Processes . . . . .	5-4
Process Commands . . . . .	5-6
Process Information . . . . .	5-7
Process Status and Resource Utilization . . . . .	5-9
Processes by Protocol . . . . .	5-11
Process Table Information . . . . .	5-12
System Statistics . . . . .	5-14
Virtual Memory . . . . .	5-15
Input/Output (I/O) . . . . .	5-16
Memory Management . . . . .	5-18
Paging Space . . . . .	5-19
System Socket . . . . .	5-20
Active Internet Connection . . . . .	5-21
Three-Digit LED Display . . . . .	5-21
Error Logs and Reports . . . . .	5-22
Contents of an Error Record . . . . .	5-24
View an Error Report . . . . .	5-24
View Error Log Continuously . . . . .	5-27
View an Error Report for a Single Sequence Number . . . . .	5-28
Copy Error Log to Transfer Directory . . . . .	5-30
Clear the Error Log . . . . .	5-31
System Dump . . . . .	5-32
Start . . . . .	5-32
View Dump Information . . . . .	5-34
Copy to Diskette or Transfer Directory . . . . .	5-34
Format . . . . .	5-35
Extract Error Log Records . . . . .	5-36
Extract Trace Log Records . . . . .	5-37
Process and Protocol Dumps . . . . .	5-37
Start Nondisruptive . . . . .	5-38
View Nondisruptive . . . . .	5-39
Start Disruptive . . . . .	5-39
View Disruptive . . . . .	5-40
System Trace . . . . .	5-41

Start	5-42
Stop	5-43
Format	5-43
Protocol and Process Traces	5-45
Start	5-46
Stop	5-47
View	5-48
Status	5-49
Adapter Debug	5-50
Read Memory	5-51
View Registers	5-52
Start Line Trace	5-53
Dump Memory	5-54
Protocol Debug	5-54
Source Route Bridge Adapter Table	5-55
Network Management Subsystem Information	5-57
DLSw General Information	5-58
X.25 Traffic Monitor	5-59
Protocol Debug Collection Facility	5-59
Files Generated by the Protocol Debug Collection Facility	5-61
Concurrent Hardware Diagnostics	5-81
Running from a Direct-Attached ASCII Terminal	5-82
Running from a Modem-Attached ASCII Terminal	5-84
Running from a Workstation on the IP Network	5-85
 <b>Chapter 6. Configuration</b>	 6-1
About This Chapter	6-2
Configuring with the System Manager	6-2
Configuration Troubleshooting	6-3
Updating Configuration Parameters Overview	6-4
Configuration Objects	6-6
System Manager Configuration Utility	6-7
Initial Configuration Using a Diskette	6-11
Initial Configuration without Using a Diskette	6-11
Direct IP Connection	6-12
Modem Attachment	6-12
FTP Transfer Method	6-13
Minimal Configuration Using the System Manager	6-15
User IDs and Passwords	6-17
Apply Changes	6-20
Commit Changes	6-21
Reject Uncommitted Changes	6-22
Configuration Reports	6-22
Receive and Apply Configuration	6-24
Send Configuration	6-26
Reinstate a Saved Configuration	6-26
 <b>Chapter 7. Software Installation and Maintenance</b>	 7-1
About This Chapter	7-3
Software Updates	7-4
Transferring Software Updates	7-4
From a Diskette to an IBM 6611	7-5
From Tape to an IBM 6611	7-6
From Diskette to the RISC System/6000 Workstation	7-7

From Tape to the RISC System/6000 Workstation . . . . .	7-7
From a RISC System/6000 Workstation to a 6611 Using FTP . . . . .	7-8
From a RISC System/6000 Workstation to a 6611 Using Xmodem . . . . .	7-10
From a 6611 to a 6611 Using FTP . . . . .	7-11
Installing Software Updates . . . . .	7-14
Recommended Software Pre-Installation Actions . . . . .	7-19
Software Installation Procedure . . . . .	7-21
Receive Installation File(s) . . . . .	7-25
List Installation Files . . . . .	7-26
List All Problems Fixed by Software Updates . . . . .	7-27
Apply Software Updates . . . . .	7-27
Post Software Installation Functions . . . . .	7-28
Clean Up after a Failed Installation . . . . .	7-28
List All Applied but Not Committed Software . . . . .	7-29
Commit Applied Updates . . . . .	7-29
Reject Applied Updates . . . . .	7-31
View Software Vital Product Data . . . . .	7-32
Automating Software Installation and Maintenance Facility Functions . . . . .	7-37
Using Your Own Commands and Scripts . . . . .	7-38
Sample Noninteractive FTP Command . . . . .	7-38
Sample Rexec and Rsh Commands . . . . .	7-39
Using the 6611-Provided Commands and Scripts . . . . .	7-39
Using the .netrc File . . . . .	7-40
Installation States and Phases . . . . .	7-41
Using Control Files as Part of the Installation Process . . . . .	7-41
Sending Software Changes to One or Multiple 6611s . . . . .	7-47
MPNP Backup Restore Utility . . . . .	7-50
Hard Disk Formatting Operation . . . . .	7-50
Configuration Data . . . . .	7-50
Required Software and Hardware . . . . .	7-50
Creating Backup Tapes . . . . .	7-51
Backing Up the Hard Disk . . . . .	7-51
Restoring the Hard Disk . . . . .	7-53
Using Multiple Backup Tapes . . . . .	7-55
Tape Compatibility . . . . .	7-55
Error Messages . . . . .	7-55
Helpful Hints . . . . .	7-57
 <b>Chapter 8. Hardware Maintenance</b> . . . . .	 8-1
About This Chapter . . . . .	8-2
Hardware VPD Format . . . . .	8-3
Installed Devices . . . . .	8-4
Device Characteristics . . . . .	8-5
Hardware Vital Product Data . . . . .	8-6
Configuration Change VPD Update . . . . .	8-7
Serial Number . . . . .	8-8
Model Number . . . . .	8-9
 <b>Chapter 9. Fast-Path Environment</b> . . . . .	 9-1
About This Chapter . . . . .	9-3
Fast-Path Commands . . . . .	9-3
Syntax . . . . .	9-3
Notation . . . . .	9-3
Abbreviations . . . . .	9-4

Output	9-4
The Fast-Path Log	9-4
Fast-Path Environment Help	9-5
Global Help	9-5
Object-Specific Help	9-6
The More Facility	9-7
The Retrieve Key	9-8
AIX-Like Commands	9-8
Support of Older Command Format	9-9
Adapter Commands	9-11
Summary of Adapter Commands	9-12
AppleTalk Commands	9-13
Summary of AppleTalk Commands	9-16
APPN Commands	9-18
Summary of APPN Commands	9-24
Bridge Commands	9-25
Summary of Bridge Commands	9-34
Config Commands	9-36
Summary of Config Commands	9-38
DECnet Commands	9-39
Summary of DECnet Commands	9-46
Diskette Commands	9-48
Summary of Diskette Commands	9-49
DLSw Commands	9-50
Summary of DLSw Commands	9-57
Errorlog (Error) Commands	9-58
Summary of Error Commands	9-63
Files Commands	9-65
Summary of Files Commands	9-72
Framerelay Command	9-74
Summary of Framerelay Command	9-74
Hardware Commands	9-75
Summary of Hardware Commands	9-78
Hostname Commands	9-79
Summary of Hostname Commands	9-80
Interface Commands	9-81
Summary of Interface Commands	9-83
IP Commands	9-84
Summary of IP Commands	9-92
IPX Commands	9-94
Summary of IPX Commands	9-97
LED Commands	9-98
Summary of LED Commands	9-98
Nameserver Commands	9-99
Summary of Nameserver Commands	9-100
PPP Command	9-101
Summary of PPP Command	9-101
Process Commands	9-102
Summary of Process Commands	9-103
Remote Access Commands	9-104
Summary of the Remote Access Commands	9-107
Serialport Commands	9-108
Summary of Serialport Commands	9-108
SNMP Commands	9-109

Summary of SNMP Commands	9-111
Software Commands	9-112
Summary of Software Commands	9-121
System Commands	9-123
Summary of System Commands	9-131
Terminal Commands	9-133
Summary of Terminal Commands	9-133
Timeofday Commands	9-134
Summary of Timeofday Commands	9-134
Timeserver Commands	9-135
Summary of Timeserver Commands	9-136
User Commands	9-137
Summary of User Commands	9-139
VINES Commands	9-140
Summary of VINES Commands	9-144
XNS Commands	9-146
Summary of XNS Commands	9-149
X.25 Commands	9-150
Summary of X.25 Commands	9-151
 <b>Appendix A. Viewing and Modifying APPN COS Files</b>	 A-1
Fast-Path Command Options for APPN COS Files	A-2
Viewing the Contents of an APPN COS File	A-2
Modifying User-Defined TG Characteristics	A-3
Adding a Mode Name	A-3
Retrieving and Editing an APPN COS File	A-4
Editing a COS File	A-4
Verifying the Format of a COS File	A-9
Using Remote Shell Commands to Execute the Fast-Path Command Options	A-10
 <b>Appendix B. License Program Specification</b>	 B-1
Description	B-1
Specified Operating Environment	B-1
Machine Requirements	B-1
Programming Requirements	B-2
Licensed Program Materials Availability	B-2
Supplemental Terms	B-3
Testing Period	B-3
Installation/Location License	B-3
Usage License	B-3
Type/Duration of Program Services	B-3
Warranty	B-3
Additional Information	B-3

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## Abbreviations, Glossary, Bibliography, and Index

List of Abbreviations	X-3
Glossary	X-9
Bibliography	X-33

<b>IBM 6611 Network Processor and Multiprotocol Network Program</b>	
Publications . . . . .	X-33
Related IBM Product Publications . . . . .	X-33
Other Publications . . . . .	X-34
Internet Requests for Comments (RFCs) . . . . .	X-35
Obtaining RFCs . . . . .	X-35
RFCs Implemented by the IBM 6611 and the IBM Multiprotocol Network Program . . . . .	X-35
<b>Index . . . . .</b>	<b>X-39</b>



## Figures

0-1.	The 6611 Library . . . . .	xxii
1-1.	System Manager Main Menu . . . . .	1-2
2-1.	System Manager Help . . . . .	2-2
2-2.	System Manager Main Menu . . . . .	2-4
2-3.	Example of a Selector Screen . . . . .	2-6
2-4.	Example of a Dialog Screen . . . . .	2-7
2-5.	Example of a Command Status Screen . . . . .	2-9
2-6.	System Manager Main Menu . . . . .	2-11
3-1.	Remote Access Selector Screen . . . . .	3-3
4-1.	Operations Menu . . . . .	4-3
4-2.	Protocol and Interface Monitor Dialog Screen . . . . .	4-5
4-3.	Sample Protocol Monitor Output . . . . .	4-6
4-4.	Sample Interface Monitor Output . . . . .	4-7
4-5.	Routing Information Menu . . . . .	4-8
4-6.	Route Tables Selector Screen . . . . .	4-9
4-7.	Example of Route Table for IP . . . . .	4-10
4-8.	Example of Route Table for AppleTalk . . . . .	4-11
4-9.	AppleTalk Zone Output . . . . .	4-11
4-10.	VINES Neighbor Table Output . . . . .	4-13
4-11.	DLSw Partners Output . . . . .	4-13
4-12.	OSPF Routing Information Menu . . . . .	4-15
4-13.	Sample OSPF Interface Status Output . . . . .	4-15
4-14.	Sample OSPF Neighbors Output . . . . .	4-16
4-15.	Sample Link State Database Output . . . . .	4-17
4-16.	Sample OSPF General Information Output . . . . .	4-17
4-17.	Remote Host Echo(Ping)/Route Trace Selector Screen . . . . .	4-18
4-18.	Network Statistics Menu . . . . .	4-22
4-18.	Network Statistics Menu . . . . .	4-22
4-19.	Example of Connection Output . . . . .	4-23
4-20.	Sample Interface Utilization Output . . . . .	4-26
4-21.	Example of Packet Traffic Output . . . . .	4-27
4-22.	Example of Protocol Statistics Output . . . . .	4-28
4-23.	Bridge Statistics Menu . . . . .	4-30
4-24.	Example of Source Route Bridge Statistics Output . . . . .	4-31
4-25.	Address Resolution Protocol (ARP) Menu . . . . .	4-32
4-26.	Example of Filter Output for AppleTalk . . . . .	4-36
4-27.	Example of Network Management Information Output . . . . .	4-39
4-28.	Example of File Systems Output . . . . .	4-40
4-29.	File and Diskette Operations Menu . . . . .	4-41
4-30.	Viewing a Report in the Transfer Directory . . . . .	4-42
4-31.	Send Transfer Directory File Selector Screen . . . . .	4-44
4-32.	Viewing a Static Directory File . . . . .	4-48
4-33.	List of Files on DOS Diskette Example . . . . .	4-49
4-34.	List of Files on UNIX Diskette Example . . . . .	4-50
4-35.	Login Information Selector Screen . . . . .	4-51
4-36.	Example of Current Logged In Users Output . . . . .	4-52
4-37.	Example of Login User History Output . . . . .	4-52
4-38.	Example of System Activity Report Output . . . . .	4-54
4-39.	EIA 232 Serial Port Function Selector Screen . . . . .	4-55
4-40.	EIA 232 Serial Ports Selector Screen . . . . .	4-56



4-41.	Example of System Shutdown Messages	4-59
5-1.	Problem Determination Menu	5-3
5-2.	Process Information Menu	5-4
5-3.	Example of Processes Output	5-5
5-4.	Example of Process Commands Output	5-6
5-5.	Example of Process Information Output	5-8
5-6.	Example of Process Status and Resource Utilization Output	5-10
5-7.	Example of Processes by Protocol Output	5-11
5-8.	Example of Process Table Information Output	5-14
5-9.	System Statistics Menu	5-15
5-10.	Example of Virtual Memory Output	5-16
5-11.	Example of Input/Output Output	5-18
5-12.	Example of Memory Management Output	5-19
5-13.	Example of Paging Space Output	5-19
5-14.	Example of System Socket Output	5-20
5-15.	Example of Active Internet Connection Output	5-21
5-16.	Sample Output from Reading the 3-Digit Display	5-22
5-17.	Error Logs and Reports Menu	5-23
5-18.	Example of View an Error Report Output - Summary Style	5-27
5-19.	Example of View an Error Report for a Single Sequence Number (Software Error)	5-29
5-20.	Example of View an Error Report for a Single Sequence Number (Hardware Error)	5-30
5-21.	Example of Copy Error Log to Transfer Directory Output	5-31
5-22.	System Dump Menu	5-32
5-23.	Example of View Dump Information Output	5-34
5-24.	Example of System Dump Status Message	5-35
5-25.	Example of No Dump Available Message	5-35
5-26.	Example of a Partial Format Output	5-36
5-27.	Example of No Lost Error Records Message	5-36
5-28.	Example of No Lost Trace Records Message	5-37
5-29.	Process and Protocol Dumps Menu	5-38
5-30.	Example of Start Nondisruptive Dump Message	5-38
5-31.	Example of Start Disruptive Dump Message	5-40
5-32.	Example of View Disruptive Output	5-41
5-33.	System Trace Menu	5-42
5-34.	Example of Format Output	5-45
5-35.	Protocol and Process Traces Menu	5-46
5-36.	Example of Missing Trace File Message	5-49
5-37.	Sample Protocol and Process Trace Status Output	5-50
5-38.	Adapter Debug Menu	5-51
5-39.	Example of Read Memory Output	5-52
5-40.	Example of View Registers Output	5-53
5-41.	Example of Start Line Trace Message	5-53
5-42.	Example of Adapter Dump Message	5-54
5-43.	Protocol Debug Menu	5-55
5-44.	Example of Source Route Bridge Adapter Table Output	5-55
5-45.	Example of Network Management Subsystem Information Output	5-57
5-46.	Example of DLSw Message Queue Output	5-58
5-47.	Diagnostic Operating Instructions Screen	5-82
5-48.	FUNCTION SELECTION Screen	5-83
5-49.	Diagnostic Mode Selection Screen	5-83
5-50.	Example of Diagnostic Selection Screen in the Diagnostics Program	5-84
6-1.	Configuration Menu	6-2

6-2.	System Configuration Information Screen . . . . .	6-5
6-3.	Warning Screen for the Configuration Menu Item . . . . .	6-7
6-4.	System Manager Configuration Utility Menu . . . . .	6-8
6-5.	Select Parameter Level Selector Screen . . . . .	6-9
6-6.	Sample Adapter Slot Number Selector Screen . . . . .	6-9
6-7.	Sample Adapter Port Number Selector Screen . . . . .	6-10
6-8.	User IDs and Passwords Menu . . . . .	6-18
6-9.	Summary Configuration Report Example . . . . .	6-23
6-10.	Part of a Detailed Configuration Report Example . . . . .	6-24
6-11.	Import Method Selector Screen . . . . .	6-25
7-1.	Software Installation and Maintenance Menu . . . . .	7-3
7-2.	Sample List of Installation Files in Transfer Directory . . . . .	7-22
7-3.	Sample List of Problems Fixed by Software Updates . . . . .	7-23
7-4.	Software Update Installation Output . . . . .	7-24
7-5.	System Restart Messages . . . . .	7-25
7-6.	Example of List Installation Files Output . . . . .	7-27
7-7.	Example of List of Applied But Not Committed Software Output . . . . .	7-30
7-8.	Sample List of History Information for Software Components . . . . .	7-33
7-9.	List Software Updates Sample Output . . . . .	7-34
7-10.	Sample Output of Prerequisite Information for Software Component . . . . .	7-35
7-11.	Sample Output of Dependents Information for Software Component . . . . .	7-36
7-12.	Sample Output of Product ID Information for Software Component . . . . .	7-37
7-13.	Example of a Control File . . . . .	7-44
7-14.	Output of Remote Installation Command (Verbose) . . . . .	7-46
7-15.	Output of Remote Installation Command (without Verbose) . . . . .	7-47
7-16.	Network with Multiple Client 6611s and RISC System/6000 Server . . . . .	7-48
8-1.	Hardware Maintenance Menu . . . . .	8-2
8-2.	Example of Installed Devices Output . . . . .	8-5
8-3.	Example of Device Characteristics Output . . . . .	8-6
8-4.	Example of Displaying Hardware VPD (Most Common Format) . . . . .	8-6
8-5.	Example of Hardware Vital Product Data (Extended Output) . . . . .	8-7
8-6.	Example of Configuration Change VPD Update Output . . . . .	8-8
9-1.	Command Syntax for Object-Oriented Fast-Path Commands . . . . .	9-3
A-1.	Sample APPN COS File (#INTER) . . . . .	A-5
A-2.	Sample Remote Shell Commands . . . . .	A-10

## Tables

0-1.	6611 Adapter Names	xxi
0-2.	Release 3 Library	xxiii
1-1.	Operations Menu Map	1-3
1-2.	Problem Determination Menu Map	1-5
1-3.	Configuration Menu Map	1-6
1-4.	Software Installation and Maintenance Menu Map	1-7
1-5.	Hardware Maintenance Menu Map	1-7
1-6.	System Manager Help Menu Map	1-7
2-1.	System Manager Function Keys	2-12
4-1.	Adapter Interface Name Table	4-7
4-2.	Output File Names not Generated from System Manager	4-62
4-3.	Trace Log Files That Are Automatically Pruned	4-63
4-4.	Output File Names for Removed Files	4-64
4-5.	Output File Names Generated from Problem Determination Menu Items	4-64
4-6.	Output File Names Generated from Configuration Menu Items	4-66
4-7.	Output File Names Generated from Software Installation and Maintenance Facility Menu Items	4-66
5-1.	Internal Adapter Name Table	5-50
5-2.	Protocol Debug File Names - AppleTalk	5-62
5-3.	Additional System Files - AppleTalk	5-63
5-4.	Protocol Debug File Names - APPN	5-63
5-5.	Additional System Files - APPN	5-64
5-6.	Protocol Debug File Names - DECnet	5-64
5-7.	Additional System Files - DECnet	5-65
5-8.	Protocol Debug File Names - DLSw	5-65
5-9.	Additional System Files - DLSw	5-66
5-10.	Protocol Debug File Names - Frame Relay	5-66
5-11.	Additional System Files - Frame Relay	5-67
5-12.	Protocol Debug File Names - Interface	5-68
5-13.	Additional System Files - Interface	5-68
5-14.	Protocol Debug File Names - IP	5-69
5-15.	Additional System Files - IP	5-69
5-16.	Protocol Debug File Names - IPX	5-70
5-17.	Additional System Files - IPX	5-70
5-18.	Protocol Debug File Names - LAN Bridge	5-71
5-19.	Additional System Files - LAN Bridge	5-71
5-20.	Protocol Debug File Names - PPP	5-72
5-21.	Additional System Files - PPP	5-72
5-22.	Protocol Debug File Names - SNMP	5-73
5-23.	Additional System Files - SNMP	5-73
5-24.	Protocol Debug File Names - Source Route Bridge	5-74
5-25.	Additional System Files - Source Route Bridge	5-74
5-26.	Protocol Debug File Names - System	5-75
5-27.	Protocol Debug File Names - Translational Bridge	5-76
5-28.	Additional System Files - Translational Bridge	5-76
5-29.	Protocol Debug File Names - Transparent Bridge	5-77
5-30.	Additional System Files - Transparent Bridge	5-77
5-31.	Protocol Debug File Names - VINES	5-78
5-32.	Additional System Files - VINES	5-79

	5-33.	Protocol Debug File Names - XNS	5-79
	5-34.	Additional System Files - XNS	5-80
	5-35.	Protocol Debug File Names - X.25	5-80
	5-36.	Additional System Files - X.25	5-80
	6-1.	APPN Configuration Objects Accessible Via System Manager	6-6
	7-1.	Example of PTFs and Size Requirements	7-16
	7-2.	Options for the Option Keyword	7-43
	9-1.	More Facility Basic Functions	9-7
	9-2.	More Facility Search Functions	9-7
	9-3.	Retrieve Key Functions	9-8
	9-4.	AIX-Like Commands and Their Fast-Path Command Equivalents	9-9
	9-5.	Abbreviations for Adapter Commands	9-11
	9-6.	Summary of Adapter Commands	9-12
	9-7.	Abbreviations for AppleTalk Commands	9-13
	9-8.	Summary of AppleTalk Commands	9-16
	9-9.	Abbreviations for APPN Commands	9-18
	9-10.	Summary of APPN Commands	9-24
	9-11.	Abbreviations for Bridge Commands	9-26
	9-12.	Summary of Bridge Commands	9-34
	9-13.	Abbreviations for Config Commands	9-36
	9-14.	Summary of Config Commands	9-38
	9-15.	Abbreviations for DECnet Commands	9-39
	9-16.	Summary of DECnet Commands	9-46
	9-17.	Abbreviations for Diskette Commands	9-48
	9-18.	Summary of Diskette Commands	9-49
	9-19.	Abbreviations for DLSw Commands	9-50
	9-20.	Summary of DLSw Commands	9-57
	9-21.	Abbreviations for Errorlog Commands	9-58
	9-22.	Summary of Error Commands	9-63
	9-23.	Abbreviations for Files Commands	9-65
	9-24.	Summary of Files Commands	9-72
	9-25.	Abbreviations for Framelay Command	9-74
	9-26.	Summary of Framelay Command	9-74
	9-27.	Abbreviations for Hardware Commands	9-75
	9-28.	Summary of Hardware Commands	9-78
	9-29.	Abbreviations for Hostname Commands	9-79
	9-30.	Summary of Hostname Commands	9-80
	9-31.	Abbreviations for Interface Commands	9-81
	9-32.	Summary of Interface Commands	9-83
	9-33.	Abbreviations for IP Commands	9-85
	9-34.	Summary of IP Commands	9-92
	9-35.	Abbreviations for IPX Commands	9-94
	9-36.	Summary of IPX Commands	9-97
	9-37.	Abbreviations for LED Commands	9-98
	9-38.	Summary of LED Commands	9-98
	9-39.	Abbreviations for Nameserver Commands	9-99
	9-40.	Summary of Nameserver Commands	9-100
	9-41.	Abbreviations for PPP Command	9-101
	9-42.	Summary of the PPP Command	9-101
	9-43.	Abbreviations for Process Commands	9-102
	9-44.	Summary of Process Commands	9-103
	9-45.	Summary of Remote Access Commands	9-107
	9-46.	Abbreviations for Serialport Commands	9-108
	9-47.	Summary of Serialport Commands	9-108

9-48.	Abbreviations for SNMP Commands . . . . .	9-109
9-49.	Summary of SNMP Commands . . . . .	9-111
9-50.	Abbreviations for Software Commands . . . . .	9-113
9-51.	Summary of Software Commands . . . . .	9-121
9-52.	Abbreviations for System Commands . . . . .	9-124
9-53.	Summary of System Commands . . . . .	9-131
9-54.	Abbreviations for Terminal Commands . . . . .	9-133
9-55.	Summary of Terminal Commands . . . . .	9-133
9-56.	Abbreviations for Timeofday Commands . . . . .	9-134
9-57.	Summary of Timeofday Commands . . . . .	9-134
9-58.	Abbreviations for Timeserver Commands . . . . .	9-135
9-59.	Summary of Timeserver Commands . . . . .	9-136
9-60.	Abbreviations for User Commands . . . . .	9-137
9-61.	Summary of User Commands . . . . .	9-139
9-62.	Abbreviations for VINES Commands . . . . .	9-140
9-63.	Summary of VINES Commands . . . . .	9-144
9-64.	Abbreviations for XNS Commands . . . . .	9-146
9-65.	Summary of XNS Commands . . . . .	9-149
9-66.	Abbreviations for X.25 Commands . . . . .	9-150
9-67.	Summary of X.25 Commands . . . . .	9-151
A-1.	Architected COS and Mode Names . . . . .	A-2
A-2.	TG Characteristics . . . . .	A-7
A-3.	Effective Capacity Representations . . . . .	A-8

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80386	Intel Corporation

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## About This Book

This book describes how to use the IBM\* System Manager component of the Multiprotocol Network Program Version 1 Release 3. The Multiprotocol Network Program (5648-016) is the operating system that provides the bridging and routing functions for the IBM 6611 Network Processor (6611). The Multiprotocol Network Program is preloaded on the disk of the 6611. There are three components of the Multiprotocol Network Program:

- The base operating system performs routing and bridging, and supports the Simple Network Management Protocol (SNMP) network manager agent.
- The IBM Multiprotocol Network Program Configuration Program (*Configuration Program*) allows you to customize the 6611 functions and how the 6611 communicates with the network.
- The IBM Multiprotocol Network Program System Manager (*System Manager*) is a user interface that performs operation and system management tasks.

The *Operations and Problem Management* is comprised of the following information:

- **Chapter 1** provides an introduction to System Manager and shows an hierarchical flow of the System Manager panels.
- **Chapter 2** explains the different screen types, and contains information on understanding and working with the System Manager screens, and on using System Manager helps. This chapter also includes a description of the System Manager log and how to use it.
- **Chapter 3** explains how to access the 6611 locally and remotely and describes the access commands that are supported by the 6611.
- **Chapter 4** explains the operating tasks that can be performed using the System Manager. Examples of these tasks include performing file and diskette operations and requesting network statistical information.
- **Chapter 5** provides information on running system diagnostics. It includes instructions for obtaining traces, dumps, and performance data that you may need to generate for the IBM service personnel.
- **Chapter 6** explains how to use the System Manager to perform configuration.
- **Chapter 7** explains how to install software changes on the 6611 using the System Manager. It discusses how to initiate remote installation to one or multiple 6611s from a single control point. It also contains information about software vital product data.
- **Chapter 8** provides information about hardware vital product data.
- **Chapter 9** describes the commands available in the fast-path environment. It also explains the fast-path environment, the structure of the commands, and how to obtain help for the commands.
- **Appendix B** provides the License Program Specification (LPS) for the IBM Multiprotocol Network Program.
- A list of abbreviations, a glossary, a bibliography, and an index follow the appendixes.



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## Summary of Changes

Since the first edition of the *IBM Multiprotocol Network Program Operations and Problem Management* was published, technical changes include, but are not limited to:

- Fast-path command equivalents for the **Clear the Error Log** menu item
- Menu item equivalents for these fast-path commands:
  - **files (transfer) checksum**
  - **files (transfer) compress**
  - **files (transfer) uncompress**
  - **files system view**
  - **hardware model update**
  - **hardware serial update**
- Limited access to AIX\* commands
- New functions supported through both System Manager and the fast-path environment:
  - Display the protocol trace status
  - List the processes that protocols are running
  - Report network statistics on the transparent bridge protocol and the transparent bridge spanning tree
  - Send IP echo requests continuously from the 6611 to a remote node
  - Provide support for translational bridge protocol with:
    - Translational bridge network statistics
    - Translational bridge spanning tree network statistics
    - Translational bridge spanning tree trace
  - Display transparent bridge filter information
  - Display source route bridge filter information
- New functions supported only through the fast-path environment:
  - View or modify APPN class-of-service (COS) files
  - Send IPX echo requests
  - Turn DLSw negative cache parameter to on or off
  - Turn DLSw TCP delay parameter to on or off
- New adapter support
- Protocol debug information collection facility

Technical changes are marked with revision bars (I) in the left margin of the page.

This edition contains miscellaneous corrections and clarifications of information that appeared in the first edition of the *Multiprotocol Network Program IBM Multiprotocol Network Program Operations and Problem Management*.

For the sake of brevity, we will refer to equivalent adapters by one generic name. Table 0-1 lists the adapters supported by each model of the 6611 and the generic name used in this publication.

Table 0-1. 6611 Adapter Names

Shortened Name	Full Adapter Name	
	Model 120 and Model 125	Model 140, Model 145, Model 170, and Model 175
token-ring network 16/4 adapter	6611-A25 1-Port Token-Ring Network 16/4 Adapter	6611-A47 1-Port Token-Ring Network 16/4 Adapter
	6611-A25 2-Port Token-Ring Network 16/4 Adapter	6611-A47 2-Port Token-Ring Network 16/4 Adapter
Ethernet adapter	6611-A25 1-Port Ethernet Adapter	6611-A47 1-Port Ethernet Adapter
		6611-A47 2-Port Ethernet Adapter
serial adapter	6611-A25 2-Port Multi-Interface Serial Adapter	6611-A47 2-Port Multi-Interface Serial Adapter
	6611-A25 4-Port Multi-Interface Serial Adapter	6611-A47 2-Port Multi-Interface Serial Adapter
serial/token-ring combination adapter	6611-A25 Multi-Interface Serial/Token-Ring Combination Adapter	6611-A47 Multi-Interface Serial/Token-Ring Combination Adapter
serial/Ethernet combination adapter	6611-A25 Multi-Interface Serial/Ethernet Combination Adapter	6611-A47 Multi-Interface Serial/Ethernet Combination Adapter
SDLC adapter	6611 4-Port SDLC Adapter	6611 4-Port SDLC Adapter
X.25 adapter	6611 X.25 Adapter	6611 X.25 Adapter

## Who Should Use This Book

This book is intended for the customer who will operate and manage the 6611. The users include the network planner, system programmer, network administrator, and network operator.

# 6611 Network Processor and Multiprotocol Network Program Information

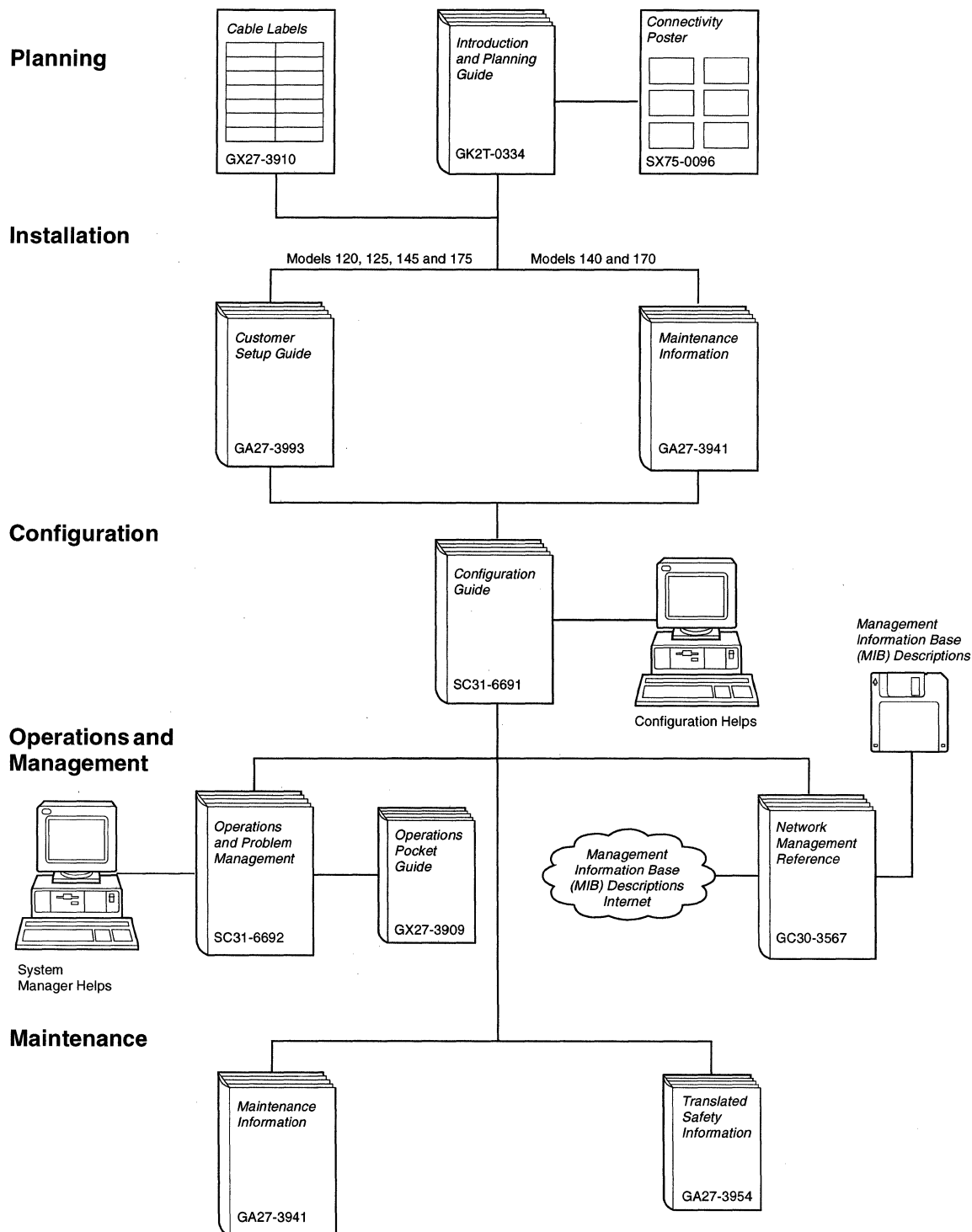


Figure 0-1. The 6611 Library

## Library Overview

Table 0-2 shows the IBM 6611 Network Processor and the IBM Multiprotocol Network Program library, arranged according to tasks.

Table 0-2 (Page 1 of 2). Release 3 Library

### Planning

GK2T-0334	<p><i>IBM 6611 Network Processor Introduction and Planning Guide</i></p> <p>Part I of this book provides information needed to understand the functions of the 6611, how to order it, and how to plan and to prepare for its installation. Part II is an overview of networking concepts and designs. Part III is a protocol reference that includes details about each of the protocols that the 6611 supports. The <i>IBM 6611 Network Processor Connectivity</i> poster is packaged with this book.</p>
SX75-0096	<p><i>IBM 6611 Network Processor Connectivity</i> poster</p> <p>This poster illustrates some of the connectivity options for Models 120, 125, 140, 145, 170 and 175.</p> <p><b>Note:</b> This poster is shipped with the <i>Introduction and Planning Guide</i> and can also be ordered separately.</p>
GX27-3910	<p><i>IBM 6611 Network Processor Cable Labels</i></p> <p>These labels, when completed, provide information about the:</p> <ul style="list-style-type: none"><li>• 6611 adapters and the network devices to which the cables will be connected</li><li>• Network to which the adapter will be attached</li><li>• Network management support, if any, for that network</li></ul> <p><b>Note:</b> In previous releases, the cable labels had been included in the <i>Introduction and Planning Guide</i>; you can now order them separately.</p>

### Installation and Maintenance

GA27-3993	<p><i>IBM 6611 Network Processor Customer Setup Guide</i></p> <p>This book, shipped with Models 120, 125, 145, and 175, explains how to:</p> <ul style="list-style-type: none"><li>• Prepare each model for installation</li><li>• Install each model</li><li>• Verify the successful installation of each model</li><li>• Install the available features for each model</li><li>• Setup an ASCII terminal and a modem so that they can communicate with the 6611</li><li>• Perform an orderly shutdown of the 6611</li></ul> <p><b>Note:</b> GA88-6199 is the Japanese version of this book.</p>
GA27-3941	<p><i>IBM 6611 Network Processor Maintenance Information</i></p> <p>This book provides maintenance information for Models 120, 125, 140, 145, 170 and 175. It also provides installation instructions for Models 140 and 170. It shows how to remove and replace field replaceable units and it identifies adapters and cables that are used with the 6611.</p>

Table 0-2 (Page 2 of 2). Release 3 Library

GA27-3954

*IBM 6611 Network Processor Translated Safety Information*

This book provides translations for caution and danger notices and other safety information found in the *IBM 6611 Network Processor Maintenance Information* and the *IBM 6611 Network Processor Customer Setup Guide*.

### **Configuration**

SC31-6691

*IBM Multiprotocol Network Program Configuration Guide*

This book explains how to install and use the Configuration Program. It also provides instructions, examples, and scenarios that enable you to customize your 6611 configuration.

### **Operations and Management**

SC31-6692

*IBM Multiprotocol Network Program Operations and Problem Management*

This book describes how to use the System Manager component of the IBM Multiprotocol Network Management Program to perform these tasks:

- Operate the 6611 and monitor its status
- Perform software problem determination
- Install and maintain software
- Maintain hardware
- Use System Manager helps, including the fast-path
- Use the fast-path commands

GX27-3909

*IBM 6611 Network Processor Operations Pocket Guide*

This book shows how to operate the 6611 and explains error and status codes. It provides brief descriptions of the System Manager menus and fast-path commands.

GC30-3567

*IBM 6611 Network Processor Network Management Reference*

This book provides:

- Information on the network management facilities provided by the IBM 6611.
- A high-level overview of the Simple Network Management Protocol (SNMP) as well as complete descriptions of the SNMP traps and SNA alerts supported.
- A description of how the IBM LAN Network Manager manages token-ring networks that are remotely or locally attached to the IBM 6611.

The *IBM Multiprotocol Network Program MIB Diskette* is packaged with this book.

## **Library Ordering Information**

All IBM 6611 publications can be ordered separately.

These publications are shipped with the IBM 6611:

*IBM 6611 Network Processor Customer Setup Guide* (shipped with Models 120, 125, 145, and 175)

*IBM 6611 Network Processor Maintenance Information*

*IBM 6611 Network Processor Operations Pocket Guide*

*IBM 6611 Network Processor Translated Safety Information*

These publications are shipped with the IBM Multiprotocol Network Configuration Program:

*IBM Multiprotocol Network Program Configuration Guide*

*IBM Multiprotocol Network Program Operations and Problem Management*

*IBM 6611 Network Processor Introduction and Planning Guide*

The *IBM Multiprotocol Network Program MIB Diskette* is packaged with the *IBM 6611 Network Processor Network Management Reference*. The MIBs are also available over the Internet. Internet retrieval instructions are included in the *IBM 6611 Network Processor Network Management Reference*.

## Obtaining Softcopy Information

Softcopy BookManager\* READ library information will be available for many of the IBM 6611 publications on the *IBM Networking Systems Softcopy Collection Kit*. To place a single order for the CD-ROM, use form number SK2T-6012. To place a single order for the 3480 cartridge, use form number SK2T-6013.

Yearly subscriptions for the *IBM Networking Systems Softcopy Collection Kit*, product number 5636-PUB, are available through your branch office representative. Order feature code 2003 and media code 5003 for CD-ROM format. Order feature code 2004 and media code 5004 for 3480 cartridge format.

**Note:** The *Customer Setup Guide*, *Maintenance Information*, *Translated Safety Information*, *Connectivity* poster, and *Cable Labels* are not available in softcopy format.



---

## Chapter 1. Using the System Manager

About This Chapter . . . . .	1-2
Introduction to System Manager . . . . .	1-2
Using the System Manager Main Menu . . . . .	1-2
Maps of the System Manager Menu Screens . . . . .	1-3
Operations Menu Items . . . . .	1-3
Problem Determination Menu Items . . . . .	1-4
Configuration Menu Items . . . . .	1-6
Software Installation and Maintenance Menu Items . . . . .	1-6
Hardware Maintenance Menu Items . . . . .	1-7
System Manager Help Menu Items . . . . .	1-7



---

## About This Chapter

This chapter describes what System Manager is and provides a hierarchical flow of the System Manager menus.

---

## Introduction to System Manager

The IBM Multiprotocol Network Program System Manager (*System Manager*) is a menu-driven user interface that is designed to simplify system management and operation tasks. The System Manager supports tasks for performing change management, network management, and problem determination, and many system operations. System Manager is invoked automatically whenever you access the 6611. For more information about accessing the 6611, see Chapter 3.

---

## Using the System Manager Main Menu

Figure 1-1 shows the main menu of System Manager. Each menu item represents one area of operations available through System Manager. Use the up and down arrows to highlight your selection and the Enter key to register your selection. If you are on a System Manager screen other than the main menu, you may press **F10 (Esc+0)** to return to the System Manager main menu.

```
IBM 6611                               hostname
                                     System Manager

Move cursor to desired item and press Enter.

Operations
Problem Determination

Configuration
Software Installation and Maintenance
Hardware Maintenance

System Manager Help

F1=Help      F2=Redraw Screen  F3=Fast Path  F4=SysID
F10=Logoff   Esc+L= Turn Log On
```

Figure 1-1. System Manager Main Menu

To go to the fast-path environment from System Manager, press **F3 (Esc+3)** on the main menu. To go to the System Manager from the fast-path environment, type **exit** or **quit** at the fast-path environment prompt and press **Enter**. See “Using the Fast-Path Environment” on page 2-15 for more information about using commands in the fast-path environment.

Press **F10 (Esc+0)** from the System Manager main menu to exit (or logoff from) the System Manager. When you access the 6611 through the S1 or S2 serial port locally or using a modem, you exit to the login prompt by pressing **F10 (Esc+0)**.

When you access the 6611 using the **telnet** or **rlogin** command, your remote connection is closed. To return to the System Manager, you are required to issue the **telnet** or **rlogin** command again. For more information about how to access the System Manager, see Chapter 3.

Another way to exit the System Manager is to press **Ctrl+C**. This takes you to the fast-path command environment.

**Note:** You cannot return to the System Manager when you enter the fast-path environment by this method. If you enter **exit**, you are logged out of the 6611.

Refer to “Using the Function Keys in the System Manager” on page 2-11 for explanations of System Manager function key designations.

## Maps of the System Manager Menu Screens

Table 1-1 through Table 1-6 on page 1-7 show the navigation of the System Manager screens. Use these tables as references to locate System Manager task information.

There is a table for each of the System Manager main menu items. Where applicable, the choices available on a lower-level menu are shown. A page reference for more information is given for each item.

## Operations Menu Items

For operations tasks, see Chapter 4 for details.

Table 1-1 (Page 1 of 2). Operations Menu Map

Operations menu item	Items on next menu	Page reference
Protocol and Interface Monitor		4-4
Routing Information	Route Tables	4-9
	AppleTalk** Zones Information Table	4-11
	VINES** Neighbor Table	4-12
	DLSw Partners	4-13
	DECnet** Routing Information	4-13
	OSPF Routing Information	4-14
Remote Host Echo (Ping)/Route Trace		4-18
Network Statistics	Connection	4-22
	Interface Status	4-23
	Interface Utilization Monitor	4-25
	Packet Traffic	4-26
	Protocol	4-27
	Bridge	4-29

Table 1-1 (Page 2 of 2). Operations Menu Map

Operations menu item	Items on next menu	Page reference
ARP Table Management	View IP ARP Table	4-32
	Add IP ARP Entry	4-33
	Delete IP ARP Entry by Hardware Address	4-34
	Delete IP ARP Entry by Host Name	4-33
	Delete All IP ARP Entries	4-34
	View AppleTalk ARP Table	4-35
Filters		4-36
Network Management Information (MIBs)		4-37
File Systems		4-40
File and Diskette Operations	View Transfer Directory File	4-42
	Rename Transfer Directory File	4-43
	Delete Transfer Directory Files	4-43
	Send Transfer Directory File	4-43
	Receive Transfer Directory File	4-45
	Checksum Transfer Directory Files	4-46
	Compress/Uncompress Transfer Directory Files	4-46
	Scan Transfer Directory Files	4-46
	Clear Log Files	4-47
	View Static Directory File	4-47
	Send Static Directory File	4-48
	List Diskette Files	4-49
	Format Diskette	4-50
Remote Access to Other Nodes		3-2
Login Information		4-51
System Activity Report		4-53
EIA 232 Serial Ports		4-54
System Shutdown		4-58
Date and Time		4-61

## Problem Determination Menu Items

For problem determination tasks, see Chapter 5 for details.

Table 1-2 (Page 1 of 2). Problem Determination Menu Map

Problem Determination menu item	Items on next menu	Page reference
<b>Process Information</b>	<b>Processes</b>	5-4
	<b>Process Commands</b>	5-6
	<b>Process Information</b>	5-7
	<b>Process Status and Resource Utilization</b>	5-9
	<b>Processes by Protocol</b>	5-11
	<b>Process Table Information</b>	5-12
<b>System Statistics</b>	<b>Virtual Memory</b>	5-15
	<b>Input/Output</b>	5-16
	<b>Memory Management</b>	5-18
	<b>Paging Space</b>	5-19
	<b>System Socket</b>	5-20
	<b>Active Internet Connection</b>	5-21
<b>Three-Digit LED Display</b>		5-21
<b>Error Logs and Reports</b>	<b>View an Error Report</b>	5-24
	<b>View Error Log Continuously</b>	5-27
	<b>View an Error Report for a Single Sequence Number</b>	5-28
	<b>Copy Error Log to Transfer Directory</b>	5-30
	<b>Clear the Error Log</b>	5-31
<b>System Dump</b>	<b>Start</b>	5-32
	<b>View Dump Information</b>	5-34
	<b>Copy to Diskette or Transfer Directory</b>	5-34
	<b>Format</b>	5-35
	<b>Extract Error Log Records</b>	5-36
	<b>Extract Trace Log Records</b>	5-37
<b>Protocol and Process Dumps</b>	<b>Start Nondisruptive</b>	5-38
	<b>View Nondisruptive</b>	5-39
	<b>Start Disruptive</b>	5-39
	<b>View Disruptive</b>	5-40
<b>System Trace</b>	<b>Start</b>	5-42
	<b>Stop</b>	5-43
	<b>Format</b>	5-43
<b>Protocol and Process Traces</b>	<b>Start</b>	5-46
	<b>Stop</b>	5-47
	<b>View</b>	5-48
	<b>Status</b>	5-49

Table 1-2 (Page 2 of 2). Problem Determination Menu Map

Problem Determination menu item	Items on next menu	Page reference
Adapter Debug	Read Memory	5-51
	View Registers	5-52
	Start Line Trace	5-53
	Dump Memory	5-54
Protocol Debug	Source Route Bridge Adapter Table	5-55
	Network Management Subsystem Information	5-57
	DLSw General Information	5-58
	Protocol Debug Collection	5-59
	X.25 Traffic Monitor	5-59
Concurrent Hardware Diagnostics		5-81

## Configuration Menu Items

For configuration tasks, see Chapter 6 for details.

Table 1-3. Configuration Menu Map

Configuration menu item	Items on next menu	Page reference
System Manager Configuration Utility		6-7
User IDs and Passwords	List All Users	6-18
	Add a User	6-18
	Delete a User	6-19
	Change User Password	6-19
	Change Your Password	6-20
Apply Changes		6-20
Commit Changes		6-21
Reject Uncommitted Changes		6-22
Configuration Reports		6-22
Receive and Apply Configuration		6-24
Send Configuration		6-26
Reinstate a Saved Configuration		6-26

## Software Installation and Maintenance Menu Items

For software installation and maintenance tasks, see Chapter 7 on page 7-1 for details.

Table 1-4. Software Installation and Maintenance Menu Map

Software Installation and Maintenance menu item	Items on next menu	Page reference
Receive Installation File(s)		7-25
List Installation Files		7-26
List All Problems Fixed by Software Updates		7-27
Apply Software Updates		7-27
Clean up After a Failed Installation		7-28
List All Applied but Not Committed Software		7-29
Commit Applied Updates		7-29
Reject Applied Updates		7-31
View Software Vital Product Data		7-32

## Hardware Maintenance Menu Items

For hardware maintenance tasks, see Chapter 8 on page 8-1 for details.

Table 1-5. Hardware Maintenance Menu Map

Hardware Maintenance menu item	Items on next menu	Page reference
Installed Devices		8-4
Device Characteristics		8-5
Hardware Vital Product Data		8-6
Configuration Change VPD Update		8-7
Serial Number		8-8
Model Number		8-9

## System Manager Help Menu Items

For System Manager help information, see Chapter 2 on page 2-1.

Table 1-6. System Manager Help Menu Map

System Manager Help menu item	Items on next menu	Page reference
Menu Screens		2-3
Selector Screens		2-6
Dialog Screens		2-7
Command Status Screens		2-8
Function Keys		2-11
Selecting Choices from a List		2-14
Fast Path		2-15



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## Chapter 2. System Manager Help

About This Chapter	2-2
Understanding the System Manager Screens	2-2
Menu Screens	2-3
Selector Screens	2-6
Dialog Screens	2-7
Command Status Screens	2-8
Getting System Manager Help	2-10
Contextual Help	2-10
General Help	2-10
Using the Function Keys in the System Manager	2-11
Selecting Choices from a List	2-14
Using the System Manager Log	2-14
Using the Fast-Path Environment	2-15



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## About This Chapter

This chapter describes the different screen types within the System Manager and the different types of help that are available throughout the System Manager. It includes help for the fast-path environment, using the fast-path log, and how to execute the fast-path command environment. Figure 2-1 shows the System Manager Help menu.

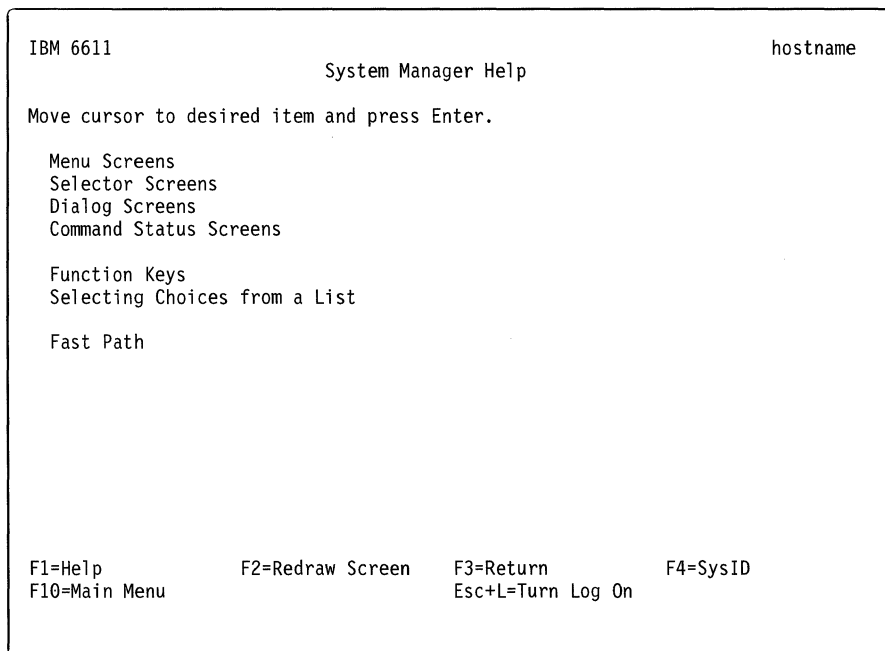


Figure 2-1. System Manager Help

Refer to the following for information about the individual menu items:

- "Menu Screens" on page 2-3.
- "Selector Screens" on page 2-6.
- "Dialog Screens" on page 2-7.
- "Command Status Screens" on page 2-8.
- "Using the Function Keys in the System Manager" on page 2-11.
- "Selecting Choices from a List" on page 2-14.
- "Using the Fast-Path Environment" on page 2-15.

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## Understanding the System Manager Screens

The System Manager has these four major types of screens:

- Menu screens
- Selector screens
- Dialog screens
- Command status screens

Other supporting screens in the System Manager include:

#### **Contextual help screens**

Describe specific help information for a given field. On menu screens, the help information describes the task that the menu item performs. On selector screens, the help information describes the list of items to select. On dialog screens, the help information gives instructions for data entry in a field. On command status screens, the help information describes the function performed and the output provided. To get help, position the cursor beside the item on which help is desired and press **F1 (Esc+1)**.

#### **General help screens**

Contain help information either for the entire System Manager or for a specific screen type. General help for the entire System Manager is invoked from the System Manager main menu, and from within each contextual help screen, information message screen, and error message screen. General help for screen types is available on pop-up list screens, field edit screens, and command status screens.

To get help, position the cursor beside the item on which help is desired and press **F1 (Esc+1)**.

#### **Information message screens**

Give status information when attempting to execute a task.

#### **Error message screens**

Identify problems that occur when attempting to execute a task.

#### **Pop-up list screens**

Appear when **F4 (Esc+4)** is pressed on an entry field of a dialog screen that contains a list of options that can be selected for the given dialog item. These dialog items contain a "+" on the right side of the screen.

#### **Field edit screens**

Appear when **F6 (Esc+6)** is pressed on a field of a dialog screen that can be edited.

For information about function keys and key sequences, see Table 2-1 on page 2-12.

## **Menu Screens**

Each menu screen has a list of items that can be selected to perform a specific task or group of tasks that are described by the menu item. In the top right corner of the menu screen, the host name that is associated with this 6611 appears, if configured. The host name is only updated when the user logs in. If the host name changes during the login session and you want the new name to appear on the screen, you need to exit the 6611 and log in again. The menu title appears on the second line of the menu screen.

Many menu paths lead to dialog screens, which provide a means of interactive dialog.

Figure 2-2 shows the main menu screen of the System Manager.

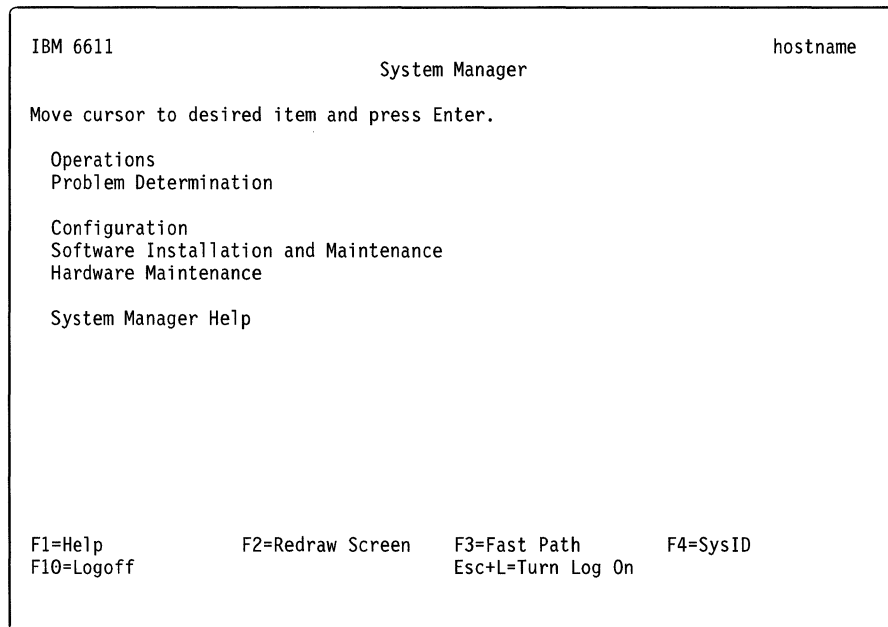


Figure 2-2. System Manager Main Menu

To select a menu item, move the cursor beside that menu item and press **Enter**. With some terminal types, the selected menu item is shown in reverse video. One of the following screens appears:

- Another menu screen
- A command status screen
- A selector screen
- A dialog screen

From each of the menu screens, press **F4 (Esc+4)**, labeled SysID, to view high-level system configuration information. This information can be viewed only when it is configured. The configuration information includes:

- Host name

The host name must be configured using either the Configuration Program or the System Manager. (Using the Configuration Program rather than System Manager is *highly recommended*.)

- Model number

The model number is added to the hardware vital product data during the manufacturing process. If you replace your hard disk, it may be necessary to update the hardware vital product data with the model number.

You can update the model number with the System Manager function, **Model Number** from the Hardware Maintenance menu, or with the fast-path command:

```
hardware model update model_number
```

- Serial number

The serial number is added to the hardware vital product data during the manufacturing process. If you replace your hard disk, it may be necessary to update the hardware vital product data with the serial number.

You can update the serial number with the System Manager function, **Serial Number** from the Hardware Maintenance menu, or with the fast-path command:

```
hardware serial update serial_number
```

- Configuration name

The configuration name is the name of the configuration currently running in the IBM 6611. If the current configuration was sent from the Configuration Program, this name is the one that was specified when you saved the configuration. If the current configuration was updated last with the System Manager, the name has the format: localhost(userid) date time. The userid is the user name that was used to update the current configuration at the date and time specified. Any configuration change made from the System Manager must be applied or committed for it to become the current configuration.

Refer to Chapter 6 for details on using the System Manager for updating configuration parameters. It is *highly* recommended that you use the Configuration Program for all your configuration needs, except for setting user IDs and passwords.

- Configuration status

The System Manager configuration status presented is from the perspective of the user who has pressed **F4 (Esc+4)=SysID** to view this information. The configuration status can be:

current: all configuration changes made from the user ID that you are logged into have been committed. However, there may be unapplied or applied configuration changes made from a different user ID. If another user has some applied (but not committed) changes, the configuration name will have the localhost format. The user ID will contain the name of the user who has applied, but not committed, the last configuration changes. The only way to determine if there are unapplied configuration changes is to login with each controlling user ID and press **F4 (Esc+4)=SysID** to view its configuration status.

applied: the user ID that you are logged into has some applied, but not committed, configuration changes.

unapplied: the user ID that you are logged into has some unapplied configuration changes. These changes are unnamed. Thus, the configuration name is not associated with these changes.

partially applied: the user ID that you are logged into has some applied and unapplied configuration changes.

- Adapter slot list

A list of the adapter slots and the type of adapter contained in each slot is displayed along with the adapter and interface names associated with the adapter.

When viewing the System Configuration Information screen, press **Enter** to return to the System Manager menu screen.

## Selector Screens

A selector screen displays a list of options from which a selection must be made to complete the task. This screen appears between menu screens and dialog or command status screens throughout the System Manager.

Figure 2-3 is an example of a selector screen in the System Manager.

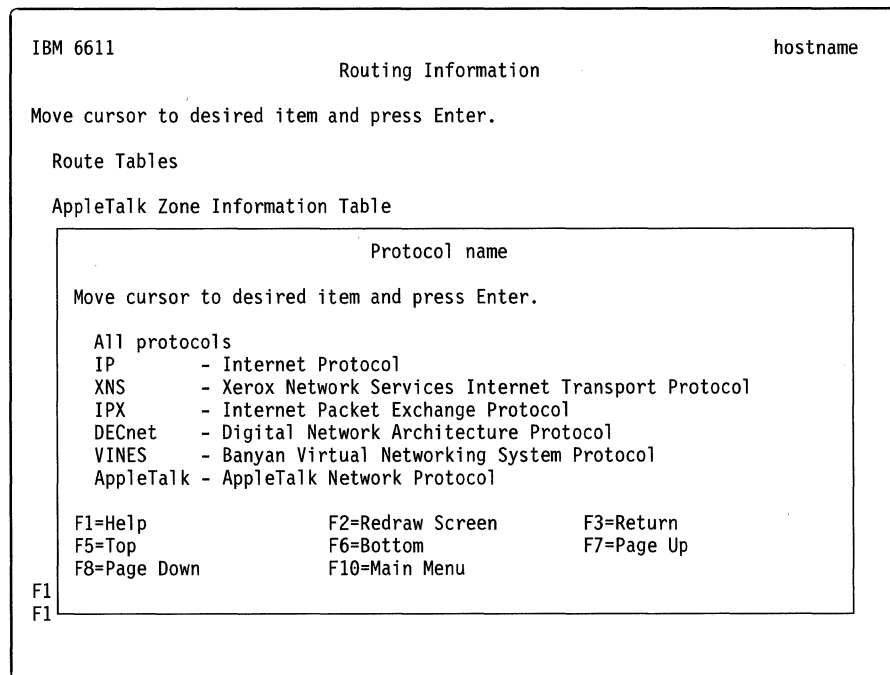


Figure 2-3. Example of a Selector Screen

To select an option on a selector screen, use the up and down arrow keys to place the cursor beside the item in the selection list.

For lists that are too long to be displayed on one screen, the following indications appear at the top or bottom of the list:

[TOP] Indicates the top of the list

[BOTTOM] Indicates the bottom of the list

[MORE...nn] Indicates that nn items in the list are not displayed on the screen.

Place the cursor on the item to be selected and press **Enter** to select the item. One of the following screens appears:

- Another selector screen
- A command status screen
- A dialog screen

Contextual help is available for the group of items on the selection list.

For information about function keys and key sequences, see Table 2-1 on page 2-12.

## Dialog Screens

In a dialog, you provide details about the task you selected. Values are placed into the entry fields on the dialog screen by selecting an item from an *option ring*, from a pop-up list, or by typing in the value for dialog items that do not have a list.

In the top right corner of the menu screen, the host name that is associated with this 6611 appears, if configured. The host name is only updated when the user logs in. If the host name changes during the login session and you want the new name to appear on the screen, you need to exit the 6611 and log in again.

Figure 2-4 is an example of a dialog screen in the System Manager.

IBM 6611                      Issue IP Echo (Ping) to Any IP Node                      hostname

Type or select values in entry fields.  
Press Enter after making all desired changes.

[Entry Fields]

\* Host name or IP address                      [ ]

\* Packet size                      [64]                      #

\* Number of echoes                      [3]                      #

F1=Help                      F2=Redraw Screen                      F3=Return                      F4=List  
F5=Undo                      F6=Edit                      F7=Page Up                      F8=Page Down  
F10=Main Menu                      Esc+L=Turn Log On

Figure 2-4. Example of a Dialog Screen

To select a dialog item, use the up and down arrow keys to move the cursor to the entry field.

The following symbols indicate the various types of entry fields on the dialog screens:

Symbol	Meaning
[ ]	Indicates an entry field
< >	Indicates more text to the left or right of the visible entry field. Use the right and left arrow keys to scroll the field.

The following symbols appear at the left side of the screen:

Symbol	Meaning
*	Indicates that this dialog item requires a value.

The following symbols appear at the right side of the screen:

Symbol	Meaning
+	<p>Indicates that a list of choices or an option ring is available. A list of choices is a pop-up list with the selections available for a particular entry field. An option ring allows you to tab through each selection available for a particular entry field.</p> <p>Press <b>F4 (Esc+4)</b> to display the list of choices. You will see a screen of your option list. Use the up and down arrow keys to place the cursor on an option in the list that you want to select. Press <b>Enter</b> to select the option for a single selection list when one choice is allowed. Press <b>F9 (Esc+9)</b> to select items for a multiple selection list and press <b>Enter</b> to indicate all choices that are selected. When an option ring is available, the entry field is not enclosed in brackets in most instances. Press <b>Tab</b> to display and make a selection from the option ring. For an explanation of option rings, single and multiple selection lists, refer to "Selecting Choices from a List" on page 2-14.</p>
#	Indicates that a numeric value must be supplied.
X	Indicates that a hexadecimal value must be supplied.

When dialog items are too long to be displayed on one screen:

[TOP]	Indicates the top of the list of dialog items.
[BOTTOM]	Indicates the bottom of the list of dialog items.
[MORE...nn]	Indicates that nn dialog items are not displayed on the screen.

Contextual help is available for each entry field on the dialog screen.

For information about function keys or key sequences, see Table 2-1 on page 2-12.

## Command Status Screens

The command associated with a selected task is invoked when you press **Enter** on a:

- Dialog screen
- Selector screen
- Menu screen that does not lead to a dialog screen

A command status screen is displayed as a result of issuing most commands. While the command is executing, the Command: running message is displayed in the upper left side of the screen. The function key designations are not displayed. As the output is formatted for the screen, a Processing data ... message is displayed at the bottom the screen. When the command completes, the Command: OK message or Command: failed message is displayed in the upper left side of the screen. The first screen of the output is displayed on the screen and the function key designations appear at the bottom of the screen.

In the upper right corner of the menu screen, the host name that is associated with this 6611 appears, if configured. The host name is only updated when the user logs in. If the host name changes during the login session and you want the new name to appear on the screen, you need to exit the 6611 and log in again.

Press **F1 (Esc+1)** for contextual help describing the function just performed and the output produced.

Figure 2-5 is an example of a command status screen in the System Manager.

```

IBM 6611                                COMMAND STATUS                                hostname
Command: OK                            stdout: yes                            stderr: no
Function name: Protocol Interface Statistics
Fast Path: [at | dec | ip | ipx | vines | xcs] stat (view) -intf "intf"

-----

[TOP]
ip:
    ocIpForwarding = 1
    ocIpDefaultTTL = 255
    ocIpInReceives = 87
    ocIpInHdrErrors = 0
    ocIps_toosmall = 0
    ocIps_badver = 0
    ocIps_badhlen = 0
    ocIps_badsum = 0
    ocIps_badlen = 0
    ocIps_tooshort = 0
    ocIps_badttl = 0
[MORE...27]

F1=Help          F2=Refresh Data    F3=Return        F5=Top
F6=Bottom        F7=Page Up         F8=Page Down     F10=Main Menu

```

Figure 2-5. Example of a Command Status Screen

When the output cannot be displayed on one screen:

- [TOP] Indicates the top of the list
- [BOTTOM] Indicates the bottom of the list
- [MORE...nn] Indicates that nn items of the list are not displayed on the screen.

For information about function keys or key sequences, see Table 2-1 on page 2-12.

With some commands, the command status screen is not used for output. The System Manager clears the screen and gives control of the screen to the command being invoked. When the command finishes, control is returned to the System Manager. This is used mainly in situations requiring interactive dialog between you and the command being issued (for example, changing passwords).

There are also situations when the System Manager gives control of the screen to the command being invoked and then exits. (Examples of these situations are for configuration changes or when issuing a system dump.) When the command is completed, System Manager does not regain control of the screen. Therefore, you will have to log in again to the 6611 to restart System Manager.



Whenever this situation occurs, you will see an

ARE YOU SURE?

message. You are given a chance to cancel the command which would cause System Manager to exit.

## Getting System Manager Help

Help is available for System Manager screens. The type of help displayed is determined by the cursor location when you request help or by the task you are doing when you request help.

### Contextual Help

Contextual help is available for dialog entry fields, selector screens, menu items, and command status screens. To get contextual help, position the cursor on the entry field, list item, or menu item and press **F1 (Esc+1)**.

On dialog screens, the help information gives instructions for data entry in a field. On selector screens, the help information describes the list of items to select. On menu screens, the help information describes the task that the menu item performs. On command status screens, the help information describes the function performed and the output produced.

### General Help

General help is available for the entire System Manager interface. This general help describes how to use the System Manager and the different screen types. This help is invoked from the System Manager main menu and from each of the contextual help screens, information screens, and error message screens. To access this general help from the contextual help screen, the information message screen, and the error message screen, press **F1 (Esc+1)**.

There are three ways of obtaining general System Manager help from the main menu, as shown in Figure 2-6 on page 2-11:

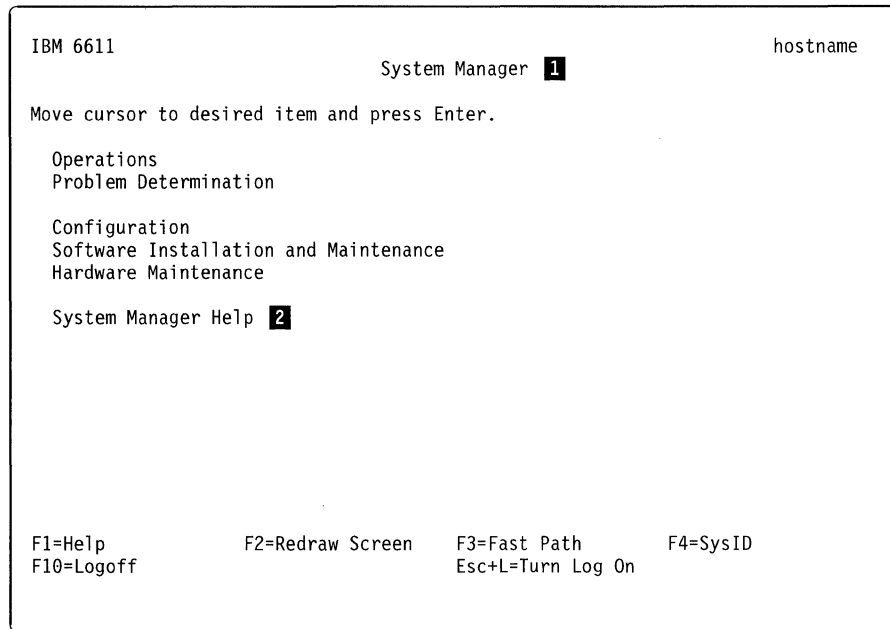


Figure 2-6. System Manager Main Menu

- Position the cursor on the title of the System Manager main menu, **1**, and press **F1 (Esc+1)**.
- Position the cursor on the System Manager Help menu item, **2**, and press **F1 (Esc+1)**.
- Position the cursor on the System Manager Help menu item, **2**, and press **Enter**. There is another menu from which you can select from one of five general help topics. See Figure 2-1 on page 2-2.

To access general help on a dialog entry field, press **F4 (Esc+4)** to bring up a pop-up list. To get help, press **F1 (Esc+1)** while viewing the list of choices.

To access general help on the field edit screen, press **F6 (Esc+6)** on a dialog entry field. To get this help, press **F1 (Esc+1)** while viewing the field edit screen.

## Using the Function Keys in the System Manager

In the System Manager, function key designations appear at the bottom of the screens. Only the function keys that are valid for the specific screen type are displayed. Table 2-1 describes these function keys.

The key sequences function according to the way the first key functions. All keys are designated by a plus sign (+) separating the keys.

- If the first key is the Esc key, it is pressed and released. The second key is pressed shortly after the Esc key.
- If the first key is the Ctrl or Shift key, it is pressed and held down while the second key is pressed.

**Note:** The following functions are valid only when your keyboard has not been remapped.

Table 2-1 (Page 1 of 2). System Manager Function Keys

Function Key	Meaning	Description
F1 or Esc+1	Help	Gives more information about the item selected. In some areas of the System Manager, you can move to the next level for more information.
F2 or Esc+2 menu, dialog, and selector screens	Redraw Screen	Redraws the screen. Use if the console messages overwrite the screen.
F2 or Esc+2 command status screens	Refresh Data	Reexecutes the function described by the Function name.
F3 or Esc+3	Return	From the main menu, F3 (Esc+3) will take you to the fast-path command environment.  From other screens, F3 (Esc+3) returns one level to the previous screen.
F4 or Esc+4 dialog screens	List	Presents a list of possible choices for an entry field. A scrollable pop-up list is displayed.
F4 or Esc+4 menu screens	SysID	Displays a screen with high-level system configuration parameters, such as host name, serial number, model number, and configuration file name.
F5 or Esc+5 dialog screens	Undo	Resets the entry field to the original setting.
F5 or Esc+5 selector and command status screens	Top	Scrolls to the top of the list or command output.
F6 or Esc+6 dialog screens	Edit	Allows editing of an entry field. Use this key if a larger entry field is needed.
F6 or Esc+6 selector and command status screens	Bottom	Scrolls to the bottom of the list or command output.
F7 or Esc+7	Page Up	Scrolls to the previous page.
F8 or Esc+8	Page Down	Scrolls to the next page.
F9 or Esc+9	Select	Makes individual selections on multiple selection lists.
F10 or Esc+0 on Main Menu	Logoff	Exits the System Manager. Log in again to return.
F10 or Esc+0 on other screens	Main Menu	Returns to the System Manager Main Menu.
Enter	Do	Performs the selected function.
Ctrl+C	Interrupt	When used on System Manager continuous display output screens, exits the command. When used on other System Manager screens, exits System Manager into the fast-path environment. If a file is viewed from the fast-path environment using the More Facility, it exits the file. Refer to "The More Facility" on page 9-7 for more information.
Home or Esc+<	Top	Scroll to the top of the command output.

*Table 2-1 (Page 2 of 2). System Manager Function Keys*

<b>Function Key</b>	<b>Meaning</b>	<b>Description</b>
End or Esc+>	Bottom	Scroll to the bottom of the command output.
Esc+L	Turn log on or off	It serves as a toggle switch for the System Manager log. If the System Manager log is off, this turns the log on. If the System Manager log is already on, this turns the log off.
Page Up or Esc+V	Page up	Scrolls backward to the previous page.
Page Down or Ctrl+V	Page down	Scrolls forward to the next page.
Tab	Forward the list of options	Moves forward through a list of choices associated with a dialog item. A list of choices is denoted by a plus (+) symbol located to the right of the entry field and the absence of brackets ( [ ] ) surrounding the entry value.
Arrow keys	Moves the cursor up one line or down one line	Scrolls through the information. Moves between entry fields on dialog screens. Moves the cursor beside menu items on the menu screens.
Backspace	Delete character	Deletes the character at the left of the screen.

## Selecting Choices from a List

In the System Manager, you can make selections from one of three types of lists:

### Single selection lists:

Appear on selector screens.

Are available with most dialog items when you use the list option, F4 (Esc+4). Are denoted by the plus (+) symbol on a dialog screen.

### Multiple selection lists:

Appear with a few dialog items when you use the list option, F4 (Esc+4).

When multiple selection lists are available, the select option, F9 (Esc+9), is available on the selector screen.

### Option rings:

Appear on some dialog items.

Are denoted by the plus (+) symbol and the absence of brackets surrounding the entry field.

To select an item from a single selection list:

1. Move the cursor to the correct item.
2. Press **Enter** to select the item.

To select more than one item from a multiple selection list:

1. Move the cursor to the first item to be selected.
2. Press **F9 (Esc+9)** to select the individual item. Press **F9 (Esc+9)** a second time to undo the selection.
3. Continue selecting until all desired items are highlighted.
4. Press **Enter** to confirm choices.

To select an item from an option ring:

1. Press **Tab** to move forward through the list of choices.
2. Press **Shift+Tab** key sequence to move backward through the list of choices.
3. Press **Enter** to select the item.

---

## Using the System Manager Log

The Multiprotocol Network Program maintains a System Manager log which began with Version 1 Release 2. Output is always directed to the screen, if it is less than 512 K bytes long. (If it is longer than 512 K bytes, you can view it from the fast-path environment.) You can select to have the output of all functions that are directed to the screen to also be sent to a single log file in the transfer directory.

To request that output be sent to the log, you must turn on the log. This is done by pressing the **Esc+L** keys. This key combination serves as a toggle switch. The key description at the bottom of each menu reminds you of the log's status. A statement of **Turn Log On** means the log is off. **Turn Log Off** means the log is currently turned on.

Output is appended to the log file. It does not overwrite information that is already there.

There can be a separate System Manager log for each user ID. The System Manager log name has the form:

`sysman.log.userid`

where `userid` is the user who is logged into the System Manager. Each System Manager log is monitored when a user logs into the System Manager.

If the file is longer than 512 K bytes, it is renamed to:

`sysman.log.userid.old`

A new log is created when data is directed to the log. The previous `sysman.log.userid.old` is overlaid.

---

## Using the Fast-Path Environment

The fast-path environment is a *command line interface* that enables you to execute most of the same functions provided in the System Manager screens. The fast-path environment uses commands to execute 6611 functions without having to navigate through the System Manager screens to perform the tasks.

### Fast-Path Command(s)

Throughout this manual, this box is used to show command alternatives to System Manager menu paths. Where applicable, this command equivalent is shown under the set of menu steps needed to complete a task.

For almost any command, the `-log` option can also be specified, although it is not shown in the examples. This will send command output to the fast-path log.

For each command, the long form is given. Defaults and abbreviations can be specified. Refer to Chapter 9 on page 9-1 for command details and a description of command syntax, or the *IBM 6611 Network Processor Operations Pocket Guide* for a summary.

**Note:** The fast-path commands perform error checking on most, but not all, of the entered parameters.

Refer to Chapter 9 on page 9-1 for:

- General information about the commands (such as output)
- Executing commands
- Use of the fast-path log
- Use of global and object-specific fast-path help
- Use of the More facility to view help text
- Details on the commands themselves

The commands can be used in the fast-path environment, with the `rexec` or `rsh` command, or in `rsh` scripts. Information on the commands needed to execute the tasks in this book are listed under Chapter 9. For more information on the commands, use the fast-path help provided with System Manager.



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## Chapter 3. Accessing the 6611

About This Chapter . . . . .	3-2
Accessing a Local 6611 . . . . .	3-2
Accessing a Remote 6611 . . . . .	3-2
Using an IP Network Connection . . . . .	3-3
Using Telnet . . . . .	3-4
Remote IP Station to a 6611 . . . . .	3-4
6611 to Any IP Station . . . . .	3-6
Using Remote Login . . . . .	3-6
Remote IP Station to a 6611 . . . . .	3-7
6611 to Any IP Station . . . . .	3-7
Using Rlogin for Extended Modem Connection . . . . .	3-8
Using Remote Execution . . . . .	3-9
Using Remote Shell . . . . .	3-10
Remote IP Station to a 6611 . . . . .	3-11
6611 to Another 6611 . . . . .	3-11
Comparing REXEC and RSH . . . . .	3-11
Using a Modem . . . . .	3-12
Verifying a Link Connection . . . . .	3-13
Logging In to a 6611 . . . . .	3-13
User IDs and Passwords . . . . .	3-15
Tasks Restricted to Controlling Users . . . . .	3-16



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## About This Chapter

This chapter describes the methods used to access the 6611. The 6611 can be accessed locally and remotely through either of the EIA 232 serial ports, S1 and S2 (labeled S1 and S2 on the Model 120 and Model 170, and labeled Serial 1 and Serial 2 on the Model 140).

Unless specific reference is made to the Model 140, the EIA 232 serial ports are referred to as S1 and S2 throughout.

Users who configure the S2 serial port to support network management of the Cylink\*\* 4201 cannot use the S2 serial port for local or remote access to the 6611 as described in Chapter 3 on page 3-1. See the *IBM Multiprotocol Network Program Configuration Guide* for information on configuring Cylink. For more information on accessing the 6611, including terminal attachment, see the *IBM 6611 Network Processor Introduction and Planning Guide*.

---

## Accessing a Local 6611

Local access to the 6611 is needed only in isolated situations, such as to replace hardware components or to replace remote service when there is no modem access and the 6611 cannot be reached through the IP network.

Most service procedures require an ASCII terminal (or terminal emulating an ASCII device). For local access, it is attached to the 6611 through one of the EIA 232 serial ports. Attaching the terminal does not disrupt the operation of the 6611.

When the terminal is connected to the serial port, the login screen appears. Enter a configured user ID and password. After password verification, a prompt for the terminal type appears. After the correct terminal type is entered, control is passed to the System Manager. See the *IBM 6611 Network Processor Introduction and Planning Guide* for more information about the supported ASCII terminal types. Refer to "Logging In to a 6611" on page 3-13 for more information about logging into the 6611.

---

## Accessing a Remote 6611

Remote access is the method both you and IBM service personnel use to access the 6611 most of the time. All management and operation tasks can be performed over the IP network connection from your network management station. Access by modem is the best for IBM service personnel.

If IBM service personnel are given access to the 6611, you do not need to know how to issue dumps and traces or retrieve problem, performance, or configuration information. IBM service personnel can perform all the problem determination tasks and gather all the data they need.

## Using an IP Network Connection

Using the IP network, the following TCP/IP remote access commands can access the 6611:

- Telnet (**telnet**)
- Remote login (**rlogin**)
- File Transfer Protocol (**ftp**)
- Remote shell (**rsh**)
- Remote execution (**rexec**)

When you use each of these commands depends on the specific situation and location at which the command is being issued. If you are located at an IP node on your IP network that is not a 6611, you can issue any of the commands listed above to your 6611, provided the IP node supports the command. The same commands can also be issued from the System Manager or from the fast-path environment of any 6611 to another 6611 with the exception of **rexec**. Rexec is no longer valid *from* a 6611. Each of the above commands, except **rsh** and **rexec**, can be issued from the System Manager or from the fast-path environment of a 6611 to another node on the IP network that is not a 6611.

In the remainder of this chapter, each of the remote access commands is discussed in detail with explanations of how they are issued to and from a 6611. There are fast-path commands that are used with the **rsh** and **rexec** remote access commands. You may refer to Chapter 9 or use online help from the fast-path environment to get detailed information on the commands.

When you use the System Manager to execute these remote access commands, there is a specific menu item for the telnet, rlogin, and rsh functions that are accessed from the Operations menu, called the Remote Access to Other Nodes menu. See Figure 3-1 for the functions available on the Remote Access to Other Nodes selector screen.

```
IBM 6611                                     hostname
                                           Operations
Move cursor to desired item and press Enter.

Protocol and Interface Monitor
Routing Information
Remote Host Echo/Route Trace
Network Statistics
ARP Table Management
Filters
Network Management Information (MIBs)

Access method
Move cursor to desired item and press Enter.

telnet
rlogin - Remote Login
rsh - Remote Shell

F1=Help          F2=Redraw Screen    F3=Return
F5=Top           F6=Bottom          F7=Page Up
F8=Page Down    F10=Main Menu

F1
F1
```

Figure 3-1. Remote Access Selector Screen

## Using Telnet

Telnet is the most widely used method for one node on an IP network to reach another node. A user at a remote station can log in and interactively execute multiple commands at the destination station. Both IP stations must support Telnet for the session to be established. When a Telnet session is established to a 6611, all the same tasks can be performed with the remote session as with the local attachment of the ASCII terminal to the EIA 232 serial ports.

Two Telnet session initiation procedures are outlined below:

- From a remote IP station to access a 6611
- From one 6611 to access any other IP station (including another 6611)

**Remote IP Station to a 6611:** The 6611 can be accessed from any station on the IP network using Telnet. The Telnet protocol requires you to know the host name or IP address, a user ID, and a password configured for the 6611. User IDs and passwords must be configured using the Configuration Program, by a controlling user using the System Manager, or a fast-path environment command. Refer to “Logging In to a 6611” on page 3-13 for more information about 6611 users.

The following steps show the details of a Telnet session’s initiation from a remote station to a 6611. You must have the host name registered with the name server for the host name to be recognized, or the host name can be mapped to its IP address in the 6611 using the Configuration Tool or the fast-path command **hostname map add host\_name IP\_address**. What you are expected to input from the remote station is provided under “**Type in**”. What you should expect to find displayed on the screen is provided under “**Output displayed**”.

**Type in:**

**telnet hostname**

The IP address of the 6611 can be used in the place of the host name.

**Output displayed:**

Trying...

Connected to hostname.domainname.

Escape character is '^T'.

```
6611 telnet (hostname)
```

Multiprotocol Network Program

Welcome to the System Manager

(c) Copyrights by IBM and by others 1992, 1994

```
hostname Login:
```

Type in:

**userid**

**Output displayed:**

userid's password:

**Type in:** (Enter the password. It will not be displayed.)

**Output displayed:**

The current terminal type is [sun].  
Press the ENTER key to accept this value or  
type NO to see a list of supported terminals.

Type in:

**no**

**Output displayed:**

SUPPORTED TERMINALS				
-----				
1. ibm3101	2. ibm3151	3. ibm3161	4. ibm3162	5. ibm3163
6. ibm3164	7. sun	8. vt100	9. vt320	10. vt330
11. vt340	12. hft	13. vt100-am		

Type the number corresponding to your choice:

**Type in:**

12 (for example)

**Output displayed:** The main menu of the System Manager.

The last four steps can be eliminated if the remote station and the 6611 negotiate the correct terminal type. At the completion of the login process, control is passed to the System Manager. If you exit the System Manager using **F10 (Esc+0)** from the System Manager main menu, the remote connection is closed. To access the System Manager again, you are required to reenter the **telnet** command.

Refer to Chapter 1 and Chapter 2 for details about using the System Manager. If you want to execute 6611 functions that require controlling user privileges, you must log in with a controlling user ID. For more information about controlling user privileges, refer to "Tasks Restricted to Controlling Users" on page 3-16.

**6611 to Any IP Station:** A Telnet session can also be initiated from the 6611. This is accomplished with the System Manager or a fast-path environment command.

To initiate a Telnet session from a 6611 to another IP station using the System Manager:

1. Select **Operations** on the System Manager main menu.
2. Select **Remote Access to Other Nodes** on the next menu.
3. Select **telnet** on the selector screen.

A dialog screen appears requesting the host name or IP address of the remote IP station being accessed. After entering the host name, you are prompted for a user ID and password defined in the remote IP node. When you enter the password correctly, control is passed to the login environment of the remote station.

To initiate a Telnet session from the fast-path environment to another IP station, type:

```
telnet dest_host_name
```

where *dest\_host\_name* is the host name or IP address of the remote station. After issuing that command, you are prompted for a user ID and password defined in the remote IP node. When the password is entered correctly, control is passed to the login environment of the remote station.

## Using Remote Login

There is an alternate method for one node on an IP network to reach another node on the IP network. It is called remote login, or rlogin. Using remote login, as with Telnet, a user at a station remote from another station can log in and interactively execute multiple commands at that station. Both stations must support rlogin to use this method. When a remote login session is established with a 6611, all the same tasks can be performed from the remote session as with the local attachment of the ASCII terminal to the EIA 232 serial ports.

Two rlogin session initiation procedures are outlined below:

- From a remote IP station to access a 6611
- From a 6611 to access any other IP station (including another 6611).

**Remote IP Station to a 6611:** The 6611 can be accessed from any station on the IP network using the **rlogin** command, provided the station supports rlogin. The remote login requires you to know the host name or IP address and a user ID and password configured for the 6611. User IDs and passwords must be configured using the Configuration Program, or by a controlling user using the System Manager. Refer to “Logging In to a 6611” on page 3-13 for more information about 6611 users.

The following steps show the details of a remote login session initiation from a remote station to a 6611. What you are expected to input from the remote station is provided under “**Type in**”. What you should expect to find displayed on the screen is provided under “**Output displayed**”.

**Type in:**

**rlogin hostname (or IP address) -8 -l 6611\_userid**

The **-8** instructs the **rlogin** command to use eight bit communication for data transfer. This is necessary when data is transferred over multiple nodes.

The **-l** tells the **rlogin** command that the user ID follows.

**Output displayed:**

userid’s Password:

**Type in:** (Enter the password. It will not be displayed.)

**Output displayed:**

The current terminal type is [sun]. Press the ENTER key to accept this value or type NO to see a list of supported terminals.

**Type in:**

no

**Output displayed:**

SUPPORTED TERMINALS				
-----				
1. ibm3101	2. ibm3151	3. ibm3161	4. ibm3162	5. ibm3163
6. ibm3164	7. sun	8. vt100	9. vt320	10. vt330
11. vt340	12. hft	13. vt100-am		

Type the number corresponding to your choice:

**Type in:**

12 (for example)

**Output displayed:** The main menu of the System Manager.

At the completion of the login process, control is passed to the System Manager. If you exit the System Manager using **F10 (Esc+0)** from the System Manager main menu, the remote connection is closed. To access the System Manager again, you must reenter the **rlogin** command.

**6611 to Any IP Station:** You can also initiate a remote login from the 6611. This is accomplished with the System Manager or a fast-path command.

To issue the **rlogin** command from a 6611 to another IP station on the same IP network using the System Manager:

1. Select **Operations** on the System Manager main menu.
2. Select **Remote Access to Other Nodes** on the next menu.
3. Select **rlogin-Remote login** on the selector screen.

A dialog screen appears requesting:

- Host name (or IP address) of the remote IP node
- User name (ID)

After you have completed these required fields, you are prompted for the password of the user ID given in the dialog. When you enter the password correctly, control is passed to the login environment of the remote station. If the remote IP station is another 6611, control is passed to the 6611's System Manager.

To initiate a remote login session from the fast-path environment to another IP station, type:

**rlogin hostname userid**

Where:

- hostname is the host name or IP address of the remote station
- userid is any configured user in the 6611 specified by the host name

After issuing that command, you are prompted for the password of the user ID. When you enter the password correctly, control is passed to the login environment of the remote station.

### Using Rlogin for Extended Modem Connection

There are more IP stations supporting telnet than rlogin. The 6611 supports both methods. It is recommended that you use telnet for most of your remote session needs. However, the following scenario shows a particular situation in which an rlogin session is needed because a telnet session cannot work.

Scenario: A file needs to be transferred from one 6611 (referred to as 6611 A) to a station with an ASCII terminal that is modem-attached to another 6611 (6611 B).

Procedure:

1. The user at the ASCII terminal initiates the call to 6611 B and logs in to the 6611, specifying user ID, password, and terminal type when prompted.
2. From the System Manager main menu of 6611 B that is displayed automatically at login completion:
  - a. Select **Operations** on the System Manager main menu.
  - b. Select **Remote Access to Other Nodes** on the next menu.
  - c. Select **rlogin-Remote login** on the selector screen.
3. A dialog screen appears on which the user types in the host name and a user ID at the 6611 A.
4. The user enters the password when prompted and control passes to the System Manager of the 6611 A.

5. From the System Manager main menu on IBM 6611 A:
  - a. Select **Operations** on the System Manager main menu.
  - b. Select **File and Diskette Operations** on the next menu.
  - c. Select **Send Transfer Directory File** on the next menu.
  - d. Select **modem connected host** on the selector screen.
  - e. Supply the name of the file to send to the remote host on the next selector screen.
6. Return to the remote host connected to IBM 6611 B to receive the selected transferred file.

If in Step 2 on page 3-8, you prefer to use Telnet instead of rlogin, the transfer cannot be made directly to the ASCII terminal. A technical difference between Telnet and rlogin is that rlogin allows data transfer across many nodes, but Telnet does not. This is the only situation in which rlogin is preferred over Telnet. Refer to "Transferring Files" on page 4-62 for further details on file transfer.

### Using Remote Execution

With the **telnet** and **rlogin** commands, you can have access to the full function of a 6611. However, there are scenarios when this is not needed. If you only need to execute a single command at a remote 6611, you can use **rexec**. To use the **rexec** command, it must be supported by the IP station issuing the command.

The 6611 supports the **rexec** command with a large number of commands. The commands and the parameters needed to execute them are listed under Chapter 9. They are summarized in the *IBM 6611 Network Processor Operations Pocket Guide*. Refer to "Using the Fast-Path Environment" for general information on using these commands, which are also supported in the fast-path environment. You may use online help from the fast-path environment to get detailed information on the commands. Most functions that can be performed from the System Manager can also be performed using the **rexec** command and the fast-path commands without logging into the 6611.

Each **rexec** command can execute one fast-path command at the 6611 to which the command is directed. The output from the fast-path command is displayed at the station that issued the **rexec** command. The station that issues the command can be any station on the same IP network as the 6611 to which the command is sent that supports remote execution.

Remote execution requires you to know the host name or IP address and a user ID and password configured for the 6611. User IDs and passwords must be configured using the Configuration Program or by a controlling user using the System Manager or a fast-path environment command. If you want to execute commands that require controlling user privileges, you are required to specify a controlling user ID when prompted. For more information about the commands that require controlling user privileges, refer to "Logging In to a 6611" on page 3-13.

The **rexec** command can be issued to the 6611 from a remote IP station. The following steps show the details of a remote execution scenario from a remote station to a 6611. Your input from the remote station is provided under "**Type in**". The output that you should expect to see on the screen is provided under "**Output displayed**".

**Type in:**



**rexec hostname command-object subobject action -option parameters**

The IP address of the 6611 can be used in place of the host name.

**Output displayed:**

Name (hostname:local\_userid):

**Type in:**

remote\_userid

**Output displayed:**

Password (hostname:remote\_userid):

**Type in:** (Enter the password. It will not be displayed.)

**Output displayed:** Command output follows, if any.

Many of the commands place the command output in the transfer directory of the 6611 to which the command is directed. If these commands are issued from an RSH or REXEC environment, the **rsh** or **rexec** commands should be followed by an **ftp** to retrieve the output file. Refer to "Transferring Files" for information on using **ftp**.

## Using Remote Shell

The remote shell (**rsh**) command can be used in a similar way to the **rexec** command. To use the **rsh** command, it must be supported by the IP station issuing the command. The 6611 supports the **rsh** command with a large number of commands. The commands and the parameters needed to execute them are listed under Chapter 9. They are summarized in the *IBM 6611 Network Processor Operations Pocket Guide*. Refer to "Using the Fast-Path Environment" for general information on using the commands. You may use online help from the fast-path environment to get detailed information on the commands. Most functions that can be performed from the System Manager can also be performed with **rsh** and the fast-path command without logging in to the 6611.

The **rsh** command executes fast-path commands one at a time at the 6611 to which the command is directed. The output from the command is displayed at the station at which the **rsh** command is issued. The station that issues the command can be any station on the same IP network as the 6611 to which the command is sent.

As with the **rexec** command, **rsh** requires you to know the host name or IP address, and a user ID and password configured for the 6611. If you want to execute 6611 functions that require controlling user privileges, you must specify a controlling user ID. For more information about the commands that require controlling user privileges, refer to "Logging In to a 6611" on page 3-13.

Two **rsh** command procedures are outlined below:

- From a remote IP station to access a 6611
- From a 6611 to access another 6611

**Remote IP Station to a 6611:** A typical situation for using a **rsh** command is within a script. A typical **rsh** command for the script is entered as follows:

**rsh hostname -l userid passwd object subobject action -option parameters**

Where:

- Hostname is the host name of the 6611 to which the command is sent. The IP address of the 6611 can be used in place of the host name.
- Userid is a user ID defined at the 6611 to which the command is sent.
- Passwd is the password for the user ID.
- Object subobject ... represent one of the supported commands.

The output of the command is displayed at the station issuing the **rsh** command.

**6611 to Another 6611:** To issue an **rsh** command from a 6611 to another 6611:

1. Select **Operations** on the System Manager main menu.
2. Select **Remote Access to Other Nodes** on the next menu.
3. Select **rsh-Remote Shell** on the selector screen.

A dialog screen appears requesting:

- Host name or IP address of the 6611
- User name
- Password
- Command
- Parameters for the command

Each of these fields can be edited using **F6 (Esc+6)**. A pop-up edit screen is displayed with a long line on which to type the input. This is especially helpful when typing in a long command.

## Comparing REXEC and RSH

Remote execution and remote shell perform the same tasks using the fast-path commands. The main difference is in how you issue the commands. When the **rsh** command is sent to the 6611, you are not prompted for the user ID and password. The user ID and password must be typed on the command line. This allows the **rsh** command and fast-path commands to be combined in a user-written script containing more than one **rsh** command with or without the **ftp** command. This allows you to perform several functions while only issuing one script.

IBM suggests that you use the **rexec** command when you need to execute a 6611 command outside of a user-written script. This is because the password is not displayed as it is typed in after the prompt. With the **rsh** command, the password must be typed on the command line with the password in full view. If the screen output is saved, the password is also visible in the saved data.

Some of the commands place the command output in the transfer directory of the 6611 to which the command is directed. If these commands are issued from an RSH or REXEC environment, the **rsh** or **rexec** commands should be followed by an **ftp** command to retrieve the output file. Refer to "Transferring Files" on page 4-62 for further details on using **ftp**.

The fast-path log option on commands is not available in the RSH or REXEC environments.

## Using a Modem

Remote access to the 6611 can also be reached through a modem that is connected to an EIA 232 serial port. The modem should be 2400 baud and compatible with the Attention (AT) Command Set. When the terminal is connected through the modem to the port, a login procedure is initiated. You are asked to supply the terminal type you are using immediately after login verification. After you have supplied the correct terminal type, the main menu of the System Manager is displayed.

When a connection is made using a modem, it is possible for you to access any 6611 on the IP network using the network connection commands (**telnet**, **rlogin**, **rsh**, and **ftp**). You can have full remote modem access to any 6611 on the network using only one modem connection. For most purposes, the single modem can be attached to an IP workstation instead of a 6611 as long as the station supports **rlogin**.

When the modem connection is established, the call must be initiated from a station that is not a 6611. The 6611 does *not* support connection initiation. It can only receive the switched call.

There are three tasks you may need to perform to set up the modem connection physically:

1. Plug the modem into one of the EIA 232 serial ports.
2. If necessary, change the line speed (baud rate) of the serial port for a modem connection.

The S1 or Serial 1 serial port is initially configured with a baud rate of 9600 bps.

The S2 or Serial 2 serial port is initially configured for use with a modem with a baud rate of 2400 bps.

You can change the baud rate of the serial port with the Configuration Program or from the fast-path environment. To change the baud rate of the serial port using a fast-path command, use:

```
serialport baud set -s1 baud_rate  
serialport baud set -s2 baud_rate
```

Use online help from the fast-path environment for more details about this command.

3. Enable auto-answer mode for the modem.

The method for enabling auto-answer mode for the modem you purchased depends on the modem. Some modems may contain a physical switch for this function. Others require an AT command to be sent to the modem over the EIA 232 serial port. Please read the documentation that accompanies the modem to see which method to use.

Refer to "EIA 232 Serial Ports" on page 4-54 for information using the EIA serial ports to send AT commands.

To establish a modem connection, you initiate the call from a remote station that supports CALLOUT. If you want to transfer files, this station must also support the Xmodem Protocol. Xmodem is available with many communication packages for personal computers and workstations and is used to access the 6611's

asynchronous serial line. Read the documentation sent with the communication package to understand the details of establishing the connection.

To establish a connection, you are required to know the telephone numbers and serial line parameters of the phone line of the modem you are calling. Refer to "Transferring Files between a RISC System/6000 and a 6611" on page 4-70 for information about the procedure for transferring files from a RISC System/6000 workstation using a modem connection.

When the connection to the 6611 is established, you are prompted for a user ID and password that have previously been configured for the 6611 on the receiving end of the switched connection. Refer to "Logging In to a 6611" for further discussion about the login procedure.

To access a 6611 that is on the IP network but not equipped with a modem, it is necessary to establish an rlogin session between the 6611 that needs to be accessed and the IP station on the network equipped with the modem. The remote login is initiated from the 6611 or another IP node in the network equipped with the modem. If a node other than a 6611 has the modem, it must support rlogin and Xmodem commands for transferring files. Refer to "Using Remote Login" on page 3-6 for details of the remote login procedure.

---

## Verifying a Link Connection

You may need to determine if you can reach another node in your network. These protocols provide an echo facility that you can use to verify connection to another node:

- IP
- AppleTalk
- XNS
- VINES
- IPX\*\*

In addition, the IP protocol has a route trace facility. For information on using the echo facilities with the various protocols, or using the route trace facility, refer to "Remote Host Echo (Ping)/Route Trace" on page 4-18.

---

## Logging In to a 6611

If you are local or remote and using a network connection or a modem connection, the login procedure for the 6611 is the same. You are prompted for a user ID, password, and terminal type. The login scenario for remote access using the Telnet command is found in "Using Telnet" on page 3-4. The login scenario for remote access using the rlogin command is found in "Using Remote Login" on page 3-6.

The following steps show the details of the login procedure from a terminal connected to the S1 or S2 serial port, either directly or through a modem. Your input from the ASCII terminal is provided under "**Type in**". The output that you should expect to see displayed on the screen is provided under "**Output displayed**".

**Output displayed:**

[illegible]

```
(c)Copyrights by IBM and by others 1992, 1994
hostname Login:
```

**Type in:**

**userid**

**Output displayed:**

userid's password

**Type in:** (Enter the password. It will not be displayed.)

**Output displayed:**

The current terminal type is [vt100].  
Press the ENTER key to accept this value or  
type NO to see a list of supported terminals.

**Type in:**

**no**

### Output displayed:

```
                                SUPPORTED TERMINALS
                                -----
1. ibm3101      2. ibm3151      3. ibm3161      4. ibm3162      5. ibm3163
6. ibm3164      7. sun          8. vt100       9. vt320       10. vt330
11. vt340      12. hft         13. vt100-am
```

Type the number corresponding to your choice:

### Type in:

6 (for example)

**Output displayed:** The main menu of the System Manager.

When logging in through the EIA 232 serial ports, the terminal type chosen on the previous login is presented as the default type. It is assumed that the terminal type used for this connection is normally the same from login to login.

At the completion of the login process, control is passed to the System Manager. If you exit the System Manager using **F10 (Esc+0)** from the System Manager main menu, you will return to the login prompt.

## User IDs and Passwords

To log into the 6611, you are required to have a user ID and password. There are two classes of users:

- Controlling

Controlling users have access to and can perform all System Manager functions.

- Viewing

Viewing users have limited access to System Manager functions.

You can configure multiple controlling and viewing users. Up to 10 users, either controlling or viewing, can be logged into the 6611 simultaneously. However, IBM recommends that you only allow up to five users at one time to improve system performance.

User IDs and passwords are defined using either the Configuration Program, the System Manager, or commands in the fast-path environment. Both the user ID and the password must be defined together.

Two default user IDs are preconfigured with the 6611:

- ibm6611c—a controlling user ID
- ibm6611v—a viewing user ID

The password for each user ID is the user ID itself. The default user IDs are to be used during initial configuration of the 6611, if performed using the System Manager. Refer to “Initial Configuration without Using a Diskette” on page 6-11 for details about using the System Manager for initial configuration.

**IBM recommends that you delete these user IDs or change the passwords immediately after receiving the 6611.** Refer to “User IDs and Passwords” on page 6-17 for details of setting user IDs and passwords.

## Tasks Restricted to Controlling Users

Many of the System Manager functions require controlling user privileges. If you attempt to execute a System Manager function from a viewing user ID that requires controlling user privileges, you will receive a message similar to the one shown here:

Only a controlling user can perform this function.

The following list shows all the functions that only a controlling user can perform. Each of the menu items is listed under the main menu item under which it appears. Menu items are listed as they appear on System Manager menu screens, except for the text within parentheses. This text is added to provide context for the functions.

- Operations
  - Protocol and Interface Monitor
  - Add IP ARP Entry
  - Delete IP ARP Entry by Host Name
  - Delete IP ARP Entry by Hardware Address
  - Delete All IP ARP Entries
  - Rename Transfer Directory File
  - Delete Transfer Directory Files
  - Compress/Uncompress Transfer Directory Files
  - Clear Log File
  - Login Information
  - System Activity Report
  - EIA/232 Serial Ports
  - System Shutdown
  - Date and Time
- Problem Determination
  - Process Table Information
  - Virtual Memory (System Statistics)
  - Input/Output (System Statistics)
  - Three-Digit LED Display
  - Clear the Error Log
  - Start (System Dump)
  - View Dump Information (System Dump)
  - Copy to Diskette or Transfer Directory (System Dump)
  - Format (System Dump)
  - Extract Error Log Records
  - Extract Trace Log Records
  - Start Nondisruptive (Process Dumps—IP, VINES, APPN\*)
  - Start Disruptive (Process Dumps)
  - Start (System Trace)
  - Stop (System Trace)
  - Start (Process Traces)
  - Stop (Process Traces)
  - Read Memory (Adapter Debug)
  - View Registers (Adapter Debug)
  - Start Line Trace (Adapter Debug)
  - Dump Memory (Adapter Debug)
  - DLSw General Information (Protocol Debug)
  - X.25 Traffic Monitor (Protocol Debug)

- |                   – Protocol Debug Collection Facility (Protocol Debug)
- Concurrent Hardware Diagnostics
- Configuration
  - |                   – System Manager Configuration Utility
  - List All User IDs
  - Add a User ID
  - Delete a User ID
  - Change Any Password
  - Change Your Password
  - Apply Changes
  - Commit Changes
  - Reject Uncommitted Changes
  - Receive and Apply Configuration
  - Reinstate a Saved Configuration
- Software Installation and Maintenance
  - Receive Installation File(s)
  - List Installation Files
  - List All Problems Fixed by Software Updates
  - Apply Software Updates
  - Clean Up after a Failed Installation
  - List All Applied but Not Committed Software
  - Commit Applied Updates
  - Reject Applied Updates
- Hardware Maintenance
  - |                   – Configuration Change VPD Update
  - |                   – Serial Number
  - |                   – Model Number





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## Chapter 4. Operations

About This Chapter	4-3
Using the 6611 Operations Facilities	4-4
Protocol and Interface Monitor	4-4
Routing Information	4-8
Route Tables	4-9
AppleTalk Zone Information Table	4-11
VINES Neighbor Tables	4-12
DLSw Partners	4-13
DECnet Routing Information	4-13
OSPF Routing Information	4-14
Remote Host Echo (Ping)/Route Trace	4-18
IP Echo (ping)	4-19
IP Echo (ping) - continuous	4-19
AppleTalk Echo	4-20
XNS Echo	4-20
VINES ICP Echo	4-21
IP Route Trace	4-21
Network Statistics	4-22
Connection	4-22
Interface Status	4-23
Interface Utilization Monitor	4-25
Packet Traffic	4-26
Protocol	4-27
Bridge	4-29
ARP Table Management	4-31
View IP ARP Table	4-32
Add IP ARP Entry	4-33
Delete IP ARP Entry by Host Name	4-33
Delete IP ARP Entry by Hardware Address	4-34
Delete All IP ARP Entries	4-34
View AppleTalk ARP Table	4-35
Port Filters	4-36
Network Management Information	4-37
File Systems	4-40
File and Diskette Operations	4-41
Transfer Directory Files	4-41
View Transfer Directory File	4-42
Rename Transfer Directory File	4-43
Delete Transfer Directory Files	4-43
Send Transfer Directory File	4-43
Receive Transfer Directory File	4-45
Checksums	4-46
Compress/Uncompress Transfer Directory Files	4-46
Scan Transfer Directory Files	4-46
Clear Log File	4-47
Static Directory Files	4-47
View Static Directory File	4-47
Send Static Directory File	4-48
List DOS Diskette Files	4-49
Format Diskette	4-50

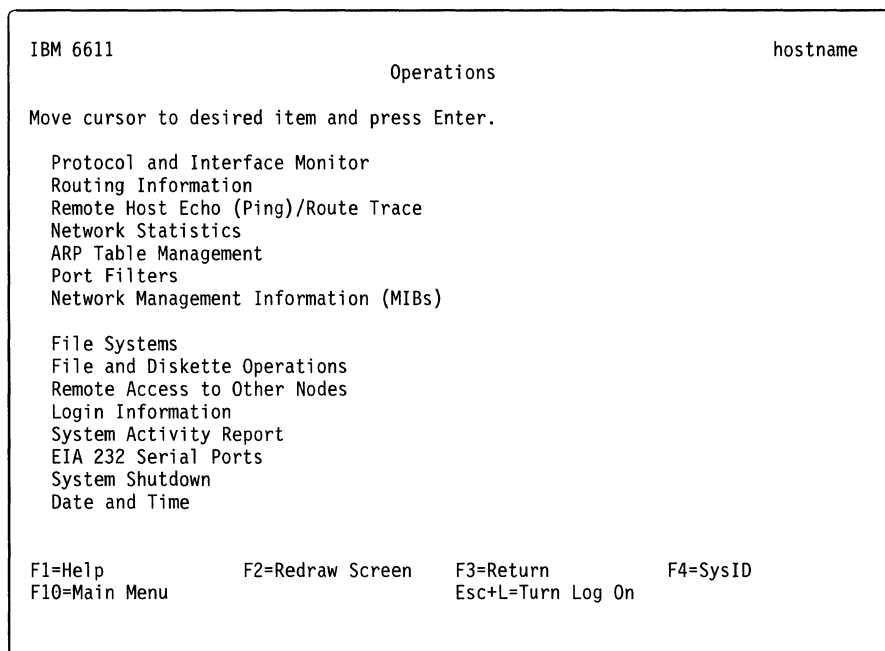
	Login Information . . . . .	4-51
	Currently Logged In Users . . . . .	4-51
	Login History . . . . .	4-52
	System Activity Report . . . . .	4-53
	EIA 232 Serial Ports . . . . .	4-54
	Initialize Modem . . . . .	4-55
	Send Modem Commands . . . . .	4-57
	Enable Login . . . . .	4-57
	System Shutdown . . . . .	4-58
	Date and Time . . . . .	4-61
	Transferring Files . . . . .	4-62
	File Names for Output in Transfer Directory . . . . .	4-62
	Trace Log Files . . . . .	4-63
	Automatic Pruning Of The Transfer Directory . . . . .	4-63
	Using the File Transfer Protocol . . . . .	4-67
	Using the Xmodem Protocol . . . . .	4-69
	Transferring Files between a RISC System/6000 and a 6611 . . . . .	4-70
	Transferring Files to Diskette . . . . .	4-72

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## About This Chapter

This chapter provides information about logging into the 6611 and about using the Operations facilities provided by the System Manager. Operations tasks may be selected from the Operations menu. Tasks are presented so that those that may have to be done more often are at the top of the list.

Figure 4-1 shows the Operations menu.



*Figure 4-1. Operations Menu*

Refer to the following for information about the individual menu items:

- "Protocol and Interface Monitor" on page 4-4
- "Routing Information" on page 4-8
- "Remote Host Echo (Ping)/Route Trace" on page 4-18
- "Network Statistics" on page 4-22
- "ARP Table Management" on page 4-31
- "Port Filters" on page 4-36
- "Network Management Information" on page 4-37
- "File Systems" on page 4-40
- "File and Diskette Operations" on page 4-41
- "Login Information" on page 4-51
- "System Activity Report" on page 4-53
- "EIA 232 Serial Ports" on page 4-54
- "System Shutdown" on page 4-58
- "Date and Time" on page 4-61

---

## Using the 6611 Operations Facilities

To gather the operations data, select **Operations** from the System Manager main menu, and the menu in Figure 4-1 on page 4-3 is displayed.

Making selections from the Operations menu lets you gather information about the performance of many of the components in the 6611, including:

- Main operating system
- Running user processes
- Installed adapters
- Configured protocols
- Hard disks
- Network, as viewed from both the adapters and the main system

The Simple Network Management Protocol (SNMP) Management Information Base (MIB) variables can also be viewed from this menu.

Most output is displayed on the screen if it is less than 512 kilobytes long. If it is more than 512 K bytes, you can view it from the fast-path environment.

Output can also be sent to the System Manager log in the transfer directory. To start this, you must turn the log on (**Esc+L**). When the notation at the bottom of each System Manager menu shows **Esc+L=Turn Log Off**, the log is on.

When the output is placed in the transfer directory, it can be sent to a diskette or transferred to a remote node. When the remote node is attached through the Internet Protocol (IP) network, the output must be sent using the File Transfer Protocol (FTP). When the 6611 is accessed using a modem, the output must be sent using the Xmodem Protocol.

## Protocol and Interface Monitor

The protocol and interface monitor displays the number of packets sent and received for each protocol or installed adapter. The monitor periodically updates the packet traffic information screen until you press **Ctrl+C** to stop it.

To monitor protocol or interface packet traffic using the System Manager:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.
3. Select **Protocol and Interface Monitor** from the next menu.

Figure 4-2 on page 4-5 shows the dialog screen that appears.

IBM 6611	Protocol and Interface Monitor	hostname
Type or select values in entry fields. Press Enter after making all desired changes.		
* Number of seconds between displays	[60]	[Entry Fields] #
* Display protocols or interfaces?	protocols	+
This is a continuous display.		
F1=Help F5=Undo F10=Main Menu	F2=Redraw Screen F6=Edit	F3=Return F7=Page Up Esc+L=Turn Log On
F4=List F8=Page Down		

Figure 4-2. Protocol and Interface Monitor Dialog Screen

4. Enter the number of seconds between information updates on the output screen. The number of seconds has a minimum value of 10 and a maximum value of 60. The default is 60 seconds. IBM recommends you accept the default to minimize the monitor's use of system resources.
  5. Select **protocols** or **interfaces** to determine where to monitor packet throughput. The default is **protocols**.
  6. Press **Enter** to start monitoring packet traffic.
- Figure 4-3 on page 4-6 shows an example of the output produced when you select **protocols**.

PACKET TRAFFIC INFORMATION FOR PROTOCOLS							
Protocol	rcv	xmt	Status	Protocol	rcv	xmt	Status
ip	1135	330	up				
tcp	261	226	up				
udp	802	99	up				
snmp	59	50	up				
ppp	4	23	up				
decnet	0	0	down				
dls	0	0	down				
FmRl	0	0	down				
Brdg	0	0	down				
ipx	0	0	down				
xns	0	0	down				
APPN	0	0	down				
AppTk	0	0	down				
TBrdg	0	0	down				
Vines	0	0	down				

Press Ctrl+C to return to System Manager

Figure 4-3. Sample Protocol Monitor Output

The output contains these fields:

**Protocol** Name of the protocol

**rcv** Number of packets received

**xmt** Number of packets transmitted

**Status** Protocol status

If the status is up, the protocol is enabled and running. If the status is down, the protocol is either not enabled or has stopped.

Figure 4-4 on page 4-7 shows an example of the output produced when you select **interfaces**.

PACKET TRAFFIC INFORMATION FOR INTERFACES							
Interface	rcv	xmt	Status	Interface	rcv	xmt	Status
lo0	386	386	up				
tk0	13592	146	up				
do0	0	0	down				
do1	0	0	down				
do2	4	36	up				
ct0	0	0	down				

Press Ctrl+C to return to System Manager

Figure 4-4. Sample Interface Monitor Output

The output contains these fields:

**Interface** Interface name.

Refer to Table 4-1 for a description of the possible interface names. The monitor only lists installed adapters.

**rcv** Number of packets received

**xmt** Number of packets transmitted

**Status** Interface status.

If the status is up, the interface is installed and configured. If the status is down, the interface is physically installed but not configured.

7. Press **Ctrl+C** to end this command.

Table 4-1 (Page 1 of 2). Adapter Interface Name Table

Interface Name	Adapter or Interface
tk#	1-port token-ring network 16/4 adapter
to?	2-port serial adapter
te#	1-port Ethernet adapter
xt%	X.25 adapter
mpq&	SDLC adapter
ce+	Serial or Ethernet interface on the serial/Ethernet combination adapter
ct+	Serial or token-ring interface on the serial/token-ring combination adapter
de?	2-port Ethernet adapter



Table 4-1 (Page 2 of 2). Adapter Interface Name Table

Interface Name	Adapter or Interface
do @	4-port serial adapter
dt ?	2-port token-ring network 16/4 adapter
lo \$	Internal wrap test network interface, loopback
<b>Legend:</b>	
#	A number from 0 to 6
?	A number from 0 to 13
%	A number from 0 to 3
&	A number from 0 to 23
\$	Either 0 or 1
+	A number from 0 to 20
@	A number from 0 to 27

#### Fast-Path Command(s)

**system statistics monitor [(-protocol)l-interface] number\_seconds**

## Routing Information

From the Routing Information menu (as shown in Figure 4-5), you can display the route table and request specific routing information on supported protocols. You can also display the complete route table or only the portion pertaining to a specific protocol. You can access the Routing Information menu from the Operations menu of the System Manager.

IBM 6611

Routing Information

hostname

Move cursor to desired item and press Enter.

Route Tables

AppleTalk Zone Information Table  
VINES Neighbor Tables  
DLSw Partners  
DECnet Routing Information  
OSPF Routing Information

F1=Help  
F10=Main Menu

F2=Redraw Screen

F3=Return  
Esc+L=Turn Log On

F4=SysID

Figure 4-5. Routing Information Menu

The following sections explain how to accomplish the tasks presented on the Routing Information menu using the System Manager.

## Route Tables

The route tables contain the routes for lists of valid paths through which hosts or a network can communicate with other hosts in that network. Route tables are supported for most of the configured protocols in the 6611.

To view a route table using System Manager:

1. Select **Operations** on the main System Manager menu.
2. Select **Routing Information** on the next menu.
3. Select **Route Tables** on the next menu.
4. Select a protocol or All protocols from the selector screen (refer to Figure 4-6).  
The supported protocols are:
  - IP
  - XNS\*\*
  - IPX
  - DECnet
  - VINES
  - AppleTalk
5. A COMMAND STATUS screen will display the output. The display format indicates the available routes and their states.

IBM 6611

Routing Information

hostname

Move cursor to desired item and press Enter.

Route Tables

AppleTalk Zone Information Table

Protocol name

Move cursor to desired item and press Enter.

All protocols

IP - Internet Protocol

XNS - Xerox Network Services Internet Transport Protocol

IPX - Internet Packet Exchange Protocol

DECnet - Digital Network Architecture Protocol

VINES - Banyan Virtual Networking System Protocol

AppleTalk - AppleTalk Network Protocol

F1=Help	F2=Redraw Screen	F3=Return
F5=Top	F6=Bottom	F7=Page Up
F8=Page Down	F10=Main Menu	

F1

F1

Figure 4-6. Route Tables Selector Screen

#### Fast-Path Command(s)

```
system routes view {-log}
ip routes view -system
xns routes view -system
ipx routes view -system
decnet routes view -system
vines routes view -system
appletalk routes view -system
```

For IP, IPX, XNS, VINES, and DECnet, each route consists of a destination host or network and a gateway to use when forwarding packets. Direct routes are created for each interface attached to the local host. These routing tables contain the fields:

**Destination** Provides the IP address or host name at the end of the route.

**Gateway** Provides the address of the outgoing interface.

**Flags** Shows the state of the route:

U Up  
H The route is to a host rather than to a network.  
G The route is to a gateway. (This is an indirect route.)  
D The route was created dynamically by a redirect.  
M The route has been modified by a redirect.  
L The link-level address is present in the route entry.

**Refcnt** Gives the current number of active uses for the route.  
Connection-oriented protocols hold on to a single route for the duration of a connection, while connectionless protocols obtain a route while sending to the same destination.

**Use** Provides a count of the number of packets sent using that route.

**Interface** Indicates the network interfaces used for the route. Refer to Table 4-1 on page 4-7 for a description of the interface names used to identify the adapters.

Figure 4-7 shows an example of an IP route table.

Routes for the Internet Protocol Family:						
Destination	Gateway	Flags	Refcnt	Use	Interface	
1.1.1	1.1.1.4	U	2	18172	tk0	
9.67	1.1.1.2	UG	0	14519	tk0	
127	127.0.0.1	U	0	0	lo0	
127.0.0.1	127.0.0.1	UH	5	80900	lo0	
224.0.0.9	127.0.0.1	UH	0	0	lo0	

Figure 4-7. Example of Route Table for IP

For AppleTalk, the route tree contains one entry for each network that the 6611. Each entry is composed of these fields:

<b>Network</b>	Identifies the destination network
<b>Hop Cnt</b>	Distance to the destination network, measure in hops
<b>Next Net.Next Hop</b>	Node address of the next router in the path to the destination network
<b>Interface</b>	Indicates the network interfaces used for the route Refer to Table 4-1 on page 4-7 for a description of the interface names used to identify the adapters.
<b>Rte State</b>	Identifies the current state of the route, either good, suspect, or bad

Route Tree for AppleTalk:

Network	Hop Cnt	Next Net.Next Hop	Interface	Rte State
5	1	0	tk0	good
31-36	3	11	do1	good
84	2	11	do1	good

Total number of AppleTalk networks: 8

Figure 4-8. Example of Route Table for AppleTalk

### AppleTalk Zone Information Table

An AppleTalk zone is an administrative grouping of networks. This table lists the zone name and ranges of network addresses contained within each AppleTalk zone.

To view AppleTalk zone information using the System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **Routing Information** from the next menu.
3. Select **AppleTalk Zone Information Table** from the next menu.
4. A COMMAND STATUS screen will display with the table information. An example of the output for an AppleTalk zone table is in Figure 4-9.

#### Fast-Path Command(s)

**appletalk zones view**

```
Zone: myZone contains these nets:
1234-1245 1255-1267 1300-1399 1450-1455 1460-1465
1477-1477
Zone: herZone contains these nets:
222-225 5-6
```

Total number of zones: 2

Figure 4-9. AppleTalk Zone Output

## VINES Neighbor Tables

This table contains information on neighboring VINES nodes.

In some cases, neighboring VINES nodes may go off-line or change their VINES network numbers, and the 6611 might not be aware of changes. If this occurs, you must manually delete the obsolete neighbors' entries from the 6611 VINES neighbor table by using System Manager.

Using System Manager to delete the obsolete addresses is necessary only if the Enable periodic full routing updates parameter is not enabled on the 6611 interface to which the VINES neighbors are connected. If the Enable periodic full routing updates parameter is enabled, then the 6611 will automatically remove these addresses after not hearing from them after approximately six minutes.

To view VINES neighbor table information using the System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **Routing Information** from the next menu.
3. Select **VINES Neighbor Tables** from the next menu.
4. Select one of these choices from the selector screen:
  - **view system**—to view the entire VINES neighbor table
  - **view interface**—to view the VINES neighbor table entries pertaining to a specified interface  
  
Refer to Table 4-1 on page 4-7 for a description of the interface names used to identify the adapters.
  - **delete entry**—to delete an entry from the VINES neighbor table
5. A COMMAND STATUS screen displays the VINES neighbor table information.  
An example of the output is in Figure 4-10 on page 4-13.

### Fast-Path Command(s)

```
vines neighbors view -all
vines neighbors view interface
vines neighbors delete net_number
```

The VINES neighbor table contains these fields:

<b>Network ID</b>	A 4-byte hexadecimal network ID.
<b>Intf</b>	Indicates the network interface used for the route. Refer to Table 4-1 on page 4-7 for a description of the interface names used to identify the adapters.
<b>Link address</b>	For an interface (Intf) value of:  tk# or te# Indicates the MAC address of the network interface to? Indicates the DLCI address of the network interface
<b>Metric</b>	Displays the value assigned by VINES to select the best route.
<b>TTL</b>	Shows the time left, in seconds, before the route is aged out.
<b>Flags</b>	Shows the state of the route:

U Up  
P Permanent  
C Change  
R Redirect  
S Suppress

**RI** Routing information (Token-Ring specific information)

Network ID	Intf	Link address	Metric	TTL	Flags
3080abab:0001	te0	08005a13209c	2	360	U
0027d089:0001	te0	10025a8229f7	2	360	U
0027d389:0001	tk0	10035a8229f7	2	360	U
RI=9000:2000:2000:1000:2300					
00274089:0001	tk0	10045a8229f7	2	360	U

Figure 4-10. VINES Neighbor Table Output

### DLSw Partners

Select this option to view the DLSw partners' addresses and the state of the connections. To get a list of the DLSw partners, and the connection state to the partners:

1. Select **Operations** from the System Manager main menu.
2. Select **Routing Information** from the next menu.
3. Select **DLSw Partners** from the next menu.
4. A COMMAND STATUS screen will display the DLSw partner connection state information. An example of the output is in Figure 4-11.

#### Fast-Path Command(s)

**dls w partners view**

DLSw PARTNER	CONNECTION STATE
*.*	LISTEN
125.5.5.1.2065	ESTABLISHED
125.5.5.1.2067	ESTABLISHED

Figure 4-11. DLSw Partners Output

### DECnet Routing Information

This selection lets you view DECnet routing data base members. You may view a whole member, starting with the first entry, or choose a starting point entry.

To view DECnet routing information using the System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **Routing Information** from the next menu.

3. Select **DECnet Routing Information** from the next menu.
4. Select the data structure option you want from the selector screen.

The data structures are defined as follows:

<b>hop matrix</b>	path length from the 6611 to the destination address.
<b>cost matrix</b>	path cost from the 6611 to the destination address.
<b>minimum hop vector</b>	path length of the least cost path from the 6611 to the destination address.
<b>minimum cost vector</b>	path cost of the least cost path from the 6611 to the destination address.
<b>area hop matrix</b>	path length from the 6611 to the destination area.
<b>area cost matrix</b>	path cost from the 6611 to the destination area.
<b>area minimum hop vector</b>	path length of the least cost path from the 6611 to the destination area.
<b>area minimum cost vector</b>	path cost of the least cost path from the 6611 to the destination area.
<b>reach vector</b>	whether the destination address is reachable.
<b>area reach vector</b>	whether the destination area is reachable.
<b>output adjacency vector</b>	identifies adjacency (next node) on which to forward packets to the destination address.
<b>area output adjacency vector</b>	identifies adjacency on which to forward packets to the destination area.
<b>adjacency vector</b>	supplies information on each adjacency.
<b>circuit vector</b>	supplies information on each circuit (interface).
<b>executor information</b>	supplies global DECnet information.

Depending on your selection, you will get a dialog screen on which to supply information, such as the number of entries to display, and which entry with which to start. (The defaults depend on the information selected.)

#### Fast-Path Command(s)

**decnet routes view -route\_info**  
plus appropriate option and parameters

## OSPF Routing Information

To view OSPF routing information using the System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **Routing Information** from the next menu.
3. Select **OSPF Routing Information** from the next menu.
4. Select the type of routing information from the next menu. Refer to Figure 4-12 for the OSPF Routing Information menu.

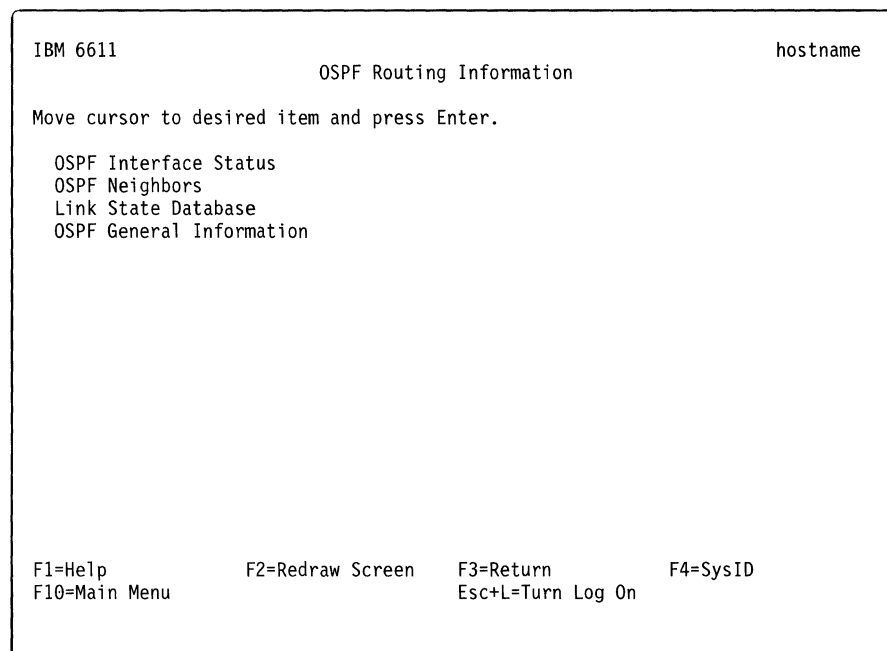


Figure 4-12. OSPF Routing Information Menu

5. A COMMAND STATUS screen will display the output.

#### Fast-Path Command(s)

```
ip ospf view [(-neighbors) | -interface | -lsdb | -general_info] IP_address
```

An example of the output for OSPF interface status is in Figure 4-13.

Area	IP Address	Type	State	Pri	DR	BDR
0.0.0.0	211.7.192.202	Bcast	DR	1	211.7.192.202	0.0.0.0
0.0.0.0	211.7.192.227	PtoP	P To P	0	0.0.0.0	0.0.0.0
0.0.0.0	211.7.192.230	PtoP	P To P	0	0.0.0.0	0.0.0.0

Figure 4-13. Sample OSPF Interface Status Output

The output contains these fields:

**Area** OSPF area ID for this 6611

**IP Address** Interface IP address

#### Type (interface)

- Bcast: Broadcast or point-to-point
- PtoP: Point-to-point
- NBMA: Non-Broadcast multi-access

#### State (interface)

- Down: The interface is down
- Loopbck: The interface used for loopback
- Waiting: The interface is waiting



- P to P: The interface is point-to-point
- DR: Designated router
- DR Othr: The interface is eligible to be the designated router
- Bckup DR: Backup designated router

**Pri (priority)** 0 means the neighbor router is not the designated router

1-255 means the designated router is the one with the highest number.

**DR** The IP address of the current designated router

**BDR** The IP address of backup designated router

An example of the output for OSPF neighbors is in Figure 4-14 .

---

Router Id	Nbr IP Addr	State	Pri
-----			
211.7.192.158	211.7.192.226	Full	0
211.7.192.81	211.7.192.231	Full	0

---

*Figure 4-14. Sample OSPF Neighbors Output*

The output contains these fields:

**Router ID** The neighbor's router ID. There is a unique ID for each router equal to one of its IP addresses.

**Neighbor IP address** The IP address of the neighbor's interface that is directly attached.

**Neighbor state**

- Down: The neighbor is unreachable
- Attempt: Attempting to communicate with the neighbor
- Init: One-way communication is established with the neighbor
- 2 Way: Two-way communication is established with the neighbor
- Exch Start: Starting to exchange OSPF databases with the neighbor
- Exchange: Exchanging OSPF databases with the neighbor
- Loading: Exchanging OSPF databases with the neighbor
- Full: 6611 and neighbor databases are synchronized

**Neighbor interface priority**

0 means the neighbor router is not the designated router.

1 - 255 means the designated router is the one with the highest number.

An example of the output for link state database is in Figure 4-15 on page 4-17.

Area	LSType	Link ID	Adv Rtr	Age	Sequence
0.0.0.0	Router	211.7.192.50	211.7.192.50	743	80000280
0.0.0.0	Router	211.7.192.81	211.7.192.81	863	8000005B
0.0.0.0	Router	211.7.192.97	211.7.192.97	1161	80000A31
0.0.0.0	Router	211.7.192.101	211.7.192.101	819	8000151F
0.0.0.0	Router	211.7.192.138	211.7.192.138	259	800002BD
0.0.0.0	Router	211.7.192.158	211.7.192.158	325	80000240
0.0.0.0	Router	211.7.192.179	211.7.192.179	327	8000028A
0.0.0.0	Router	211.7.192.202	211.7.192.202	231	80000238
0.0.0.0	Net	211.7.192.101	211.7.192.101	1364	800003CD

Figure 4-15. Sample Link State Database Output

The output contains these fields:

<b>Area</b>	OSPF area ID for this 6611
<b>LSType</b>	The type of link state advertisement for the advertising node: <ul style="list-style-type: none"> <li>• Router: The advertisement is for another OSPF router</li> <li>• Network: The advertisement is for a network</li> <li>• SumNet: The summary advertisement of a network in another area</li> <li>• SumASB: The summary advertisement of an autonomous system border (ASB) router</li> <li>• ASE: The advertisement of an autonomous system external router</li> </ul>
<b>Link ID</b>	The interface IP address forwarding advertisement
<b>Adv Rtr</b>	The router ID of the router that originated the link state advertisement
<b>Age</b>	Elapsed time in seconds since the advertisement was originated
<b>Sequence</b>	The version of the advertisement from the originator

An example of the output for OSPF general information is in Figure 4-16 .

RouterId:	211.7.192.202	Version:	2
AdminStatus:	enabled	External LSA Count:	2
Area Border Router:	false	External LSA Checksum:	0x190c0
AS Border Router:	false		
TOS Support:	false		

Figure 4-16. Sample OSPF General Information Output

The output contains these fields:

<b>RouterId</b>	A unique ID for each router equal to one of its IP addresses.
<b>AdminStatus</b>	Enabled: OSPF is enabled Disabled: OSPF is disabled
<b>Version</b>	The version of OSPF code

<b>Area Border Router</b>	True: The 6611 is an area border router
	False: The 6611 is not an area border router
<b>AS Border Router</b>	True: The 6611 is an autonomous system border Router
	False: The 6611 is not an autonomous system border Router
<b>TOS Support</b>	True: 6611s support type of service
	False: 6611s do not support type of service
<b>External LSA Count</b>	The number of external link state advertisements
<b>External LSA Checksum</b>	Database checksum of the external link state advertisements

## Remote Host Echo (Ping)/Route Trace

The echo facilities send ECHO\_REQUESTS to obtain ECHO\_RESPONSES from the destination nodes. They are useful to:

- Determine the status of the network and various remote stations
- Track and isolate hardware and software problems
- Test, measure, and manage networks

If the station is operational and the station is on the network, it responds to the echo.

The echo commands calculate round-trip times and packet loss statistics, and display a brief summary upon completion. They complete after sending a specified number of echo requests. Echo requests can be issued from the System Manager or from the fast-path environment.

IBM 6611
Operations
hostname

Move cursor to desired item and press Enter.

Protocol and Interface Monitor  
Routing Information  
Remote Host Echo (Ping)/Route Trace

Type of request

Move cursor to desired item and press Enter.

IP Echo (ping)  
IP Echo (ping) - continuous  
AppleTalk Echo  
XNS Echo  
VINES ICP Echo  
IP Route Trace

F1=Help  
F5=Top  
F8=Page Down

F2=Redraw Screen  
F6=Bottom  
F10=Main Menu

F3=Return  
F7=Page Up

F1
F1

Figure 4-17. Remote Host Echo(Ping)/Route Trace Selector Screen

## IP Echo (ping)

To issue a discrete number of IP echo requests to another node:

1. Select **Operations** from the System Manager main menu.
2. Select **Remote Host Echo (Ping)/Route Trace** from the next menu.
3. Select **IP Echo (ping)** on the selector screen as shown in Figure 4-17 on page 4-18.
4. Enter the following information on the dialog screen:
  - Host name or IP address  
The destination IP node for the echo request packets
  - Packet size  
The number of bytes sent with each echo request. The default is **64**.
  - Number of echoes  
The number of echo requests sent to the destination. The default is **3**.
5. Press **Enter** to activate your request.
6. A COMMAND STATUS screen will display the output.

**Note:** The IP echo command is commonly known as *ping*. Full ping support is only provided in the fast-path environment.

### Fast-Path Command(s)

```
ip echo dest_host_name packet_size num_echoes
```

## IP Echo (ping) - continuous

To issue IP echo requests to another node continuously:

1. Select **Operations** from the System Manager main menu.
2. Select **Remote Host Echo (Ping)/Route Trace** from the next menu.
3. Select **IP Echo (ping) - continuous** on the selector screen as shown in Figure 4-17 on page 4-18.
4. Enter the following information on the dialog screen:
  - Host name or IP address  
The destination IP node
  - Packet size  
The number of bytes sent with each echo request. The default is **64**.
  - Echo interval  
The number of seconds the 6611 waits between sending echo request packets. The default is **2**.
5. Press **Enter** to activate your request.
6. Press **Ctrl+C** to end your request.

**Note:** The IP echo command is commonly known as *ping*. Full ping support is only provided in the fast-path environment.

**Fast-Path Command(s)**

```
ip echo -continuous dest_host_name packet_size num_echoes
```

## AppleTalk Echo

To issue AppleTalk echo requests to another node:

1. Select **Operations** from the System Manager main menu.
2. Select **Remote Host Echo (Ping)/Route Trace** from the next menu.
3. Select **AppleTalk Echo** on the selector screen as shown in Figure 4-17 on page 4-18.
4. Enter the following information on the dialog screen:
  - AppleTalk network id  
Unique for each AppleTalk network address
  - AppleTalk node id  
Unique for each AppleTalk network address
  - Number of echoes  
The number of echo requests sent to the destination. The default is **3**.
5. Press **Enter** to activate your request.
6. A COMMAND STATUS screen will display the output.

**Fast-Path Command(s)**

```
appletalk echo dest_network_id dest_node_id number_echoes
```

## XNS Echo

To issue XNS echo requests to another node:

1. Select **Operations** from the System Manager main menu.
2. Select **Remote Host Echo (Ping)/Route Trace** from the next menu.
3. Select **XNS Echo** on the selector screen as shown in Figure 4-17 on page 4-18.
4. Enter the following information on the dialog screen:
  - XNS network address  
This must be four hexadecimal bytes.
  - XNS host address  
This must be six hexadecimal bytes.
  - Packet size (Any value from 1 to 100)  
This is the number of bytes sent with each echo request. The default is **64**.
  - Number of echoes (Any value from 1 to 1000)  
The number of echo requests sent to the destination. The default is **3**.
5. Press **Enter** to activate your request.

6. A COMMAND STATUS screen will display the output.

**Fast-Path Command(s)**

```
xns echo dest_net_num dest_host_addr packet_size num_echoes
```

## VINES ICP Echo

To issue VINES ICP echo requests to another node:

1. Select **Operations** from the System Manager main menu.
2. Select **Remote Host Echo (Ping)/Route Trace** from the next menu.
3. Select **VINES ICP Echo** on the selector screen as shown in Figure 4-17 on page 4-18.
4. Enter the following information on the dialog screen:
  - VINES network number  
The destination node for the echo request. This must be 4 hexadecimal bytes.
  - Packet size (Any value from 1 to 100)  
This is the number of bytes sent with each echo request. The default is **64**.
  - Number of echoes (Any value from 1 to 1000)  
The number of echo requests sent to the destination. The default is **3**.
5. Press **Enter** to activate your request.
6. A COMMAND STATUS screen will display the output.

**Fast-Path Command(s)**

```
vines echo dest_net_num packet_size num_echoes
```

## IP Route Trace

To issue an IP route trace:

1. Select **Operations** from the System Manager main menu.
2. Select **Remote Host Echo (Ping)/Route Trace** from the next menu.
3. Select **IP Route Trace** on the selector screen as shown in Figure 4-17 on page 4-18.
4. Enter the following information on the dialog screen:
  - Destination host name or IP address
  - Source host name or IP address
  - Packet size (Any value from 1 to 2048)  
This is the number of bytes sent with each echo request. The default is **40**.
  - Number of queries (Any value from 1 to 1000)  
The default is **3**.
  - Maximum number of hops (Any value from 1 to 255)

The default is **30**.

5. Press **Enter** to activate your request.

6. A COMMAND STATUS screen will display the output.

#### Fast-Path Command(s)

```
ip routes trace dest_host_name packet_size num_queries maximum_hops
source_host_name
```

## Network Statistics

The system network connection statistics list the:

- Maximum transmission unit (MTU)
- Inbound packets and errors
- Outbound packets and errors

Figure 4-18 shows the Network Statistics menu, which is accessed by the Operations menu.

IBM 6611hostname

Network Statistics

Move cursor to desired item and press Enter.

Connection  
Interface Status  
Interface Utilization Monitor  
Packet Traffic  
Protocol  
Bridge

F1=Help  
F10=Main Menu

F2=Redraw Screen

F3=Return  
Esc+L=Turn Log On

F4=SysID

Figure 4-18. Network Statistics Menu

### Connection

To view connection statistics using the System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **Network Statistics** on the next menu.
3. Select **Connection** on the next menu.

4. A COMMAND STATUS screen will display the output. An example of the output is in Figure 4-19 on page 4-23.

If you receive an asterisk (\*) beside any of the listed interface names, this is an indication that the adapter or port is not enabled.

Fast-Path Command(s)	
system connections view	

Name	Mtu	Network	Address	Ipkts	Ierrs	Opkts	Oerrs	Coll
lo0	1536	<Link>		39457	0	39457	0	0
lo0	1536	127.0.0.1	127.0.0.1	39457	0	39457	0	0
to0	1500	<Link>		2235	0	2233	0	0
to0	1500	none	none	2235	0	2233	0	0
to1	1500	<Link>		2235	0	2233	0	0
to1	1500	none	none	2235	0	2233	0	0
tk0	1492	<Link>		18005	0	19343	0	0
tk0	1492	1.1.1	1.1.1.1	18005	0	19343	0	0
tk0	1484	vn:30800001H	1H	18005	0	19343	0	0

Figure 4-19. Example of Connection Output

The output in Figure 4-19 contains these fields:

<b>Name</b>	Interface name
<b>Mtu</b>	Represents the maximum transmission unit.
<b>Ipkts</b>	Represents input packets.
<b>Ierrs</b>	Represents input errors.
<b>Opkts</b>	Represents output packets.
<b>Oerrs</b>	Represents output errors.
<b>Coll</b>	Represents collisions.

## Interface Status

Select **Interface Status** to view detailed information about a specified active interface in the 6611. Part of the output you will receive is protocol-specific.

1. Select **Operations** from the System Manager main menu.
2. Select **Network Statistics** on the next menu.
3. Select **Interface Status** on the next menu.
4. Select an interface name from the selector screen. Refer to Table 4-1 on page 4-7 for a description of the interface names used to identify the adapters.
5. You will see the output on a command status screen.

Fast-Path Command(s)	
interface state view <i>interface</i>	

An example of the generic output received is:

```
te0: flags=1c0063<UP,BROADCAST,NOTRAILERS,RUNNING,MULTICAST,DEEP>
```

where the hexadecimal flags are defined as:



PKTCHG	0x80000000	- Packet charges imposed
WAN	0x40000000	- WAN interface
NOECHO	0x02000000	- Receives echo packets
DEEP_ENABLE	0x00100000	- Deep adapter enabled
DEEP	0x00080000	- Adapter is deep (card-to-card)
MULTICAST	0x00040000	- For oncard IP Multicast code
DCD	0x00020000	- DCD is raised
DO_HW_LOOPBACK	0x00010000	- Force loopback through hardware
ALLCAST	0x00008000	- Global broadcast
SNAP	0x00002000	- Receive all ns packets
BRIDGE	0x00001000	- Receive all bridge packets
SIMPLEX	0x00000800	- Cannot hear own transmissions
OACTIVE	0x00000400	- Transmission is in progress
ALLMULTI	0x00000200	- Receive all multicast packets
PROMISC	0x00000100	- Receive all packets
NOARP	0x00000080	- No address resolution protocol
RUNNING	0x00000040	- Resources allocated
NOTRAILERS	0x00000020	- Do not use trailers
POINTOPOINT	0x00000010	- Point-to-point link
LOOPBACK	0x00000008	- Loopback network
DEBUG	0x00000004	- Turn on debugging
BROADCAST	0x00000002	- Broadcast address valid
UP	0x00000001	- Interface is up

A sample of IP-specific output is:

```
inet 145.1.1.3 netmask 0xffffffff broadcast 145.1.1.255
```

The IP-specific output includes the IP address, network mask, and broadcast address.

A sample of VINES-specific output is:

```
vines 30800533H.1H --> 0.1H
```

The VINES-specific output includes the VINES network number, host number, and the destination address, if configured.

A sample of DECnet-specific output is:

```
decnet 1.367 netmask 0xfc00 broadcast 63.1023
```

The DECnet-specific output includes DECnet network address, network mask, and broadcast address.

A sample of AppleTalk-specific output is:

```
at 666-666 666.6 zone: greenzone hop weight: 1
at cnfg flags=5<ATUP,NBPFLT>
at oper flags=1<UP>
address filters: 1-299 7000-7999
additional zones: bluezone

remote port: 4450-4499
zone: brownzone
address filters: 6000-6999
```

On the first line, the AppleTalk-specific output includes the AppleTalk network number range, AppleTalk network ID, default zone name, and hop weight. The second line gives configuration flags defined as :

ATUP	AppleTalk is currently enabled for routing
ATDOWN	AppleTalk is currently disabled for routing
ADR	AppleTalk address needs to be sent to the adapter (FR ports)
CHKSUM	The port is configured to generate checksum in outgoing packets
CNSD	The port is configured as nonseed
DDACK	Waiting for AppleTalk daemon to acknowledge port restart
DLYNBP	NBP Broadcast optimization enabled
DSACK	Waiting for system daemon to acknowledge port restart
FRUP	Serial adapter has enabled frame relay port
NBPFLT	Security filter based on resource names enabled
TRT	Trusted port
ZNFLT	Security filter based on zone names enabled

The third line of the AppleTalk-specific output gives operation flags defined as:

DOWN	The port is currently in down state and is not routing
DAD	Duplicate address indication received
NAD	Probing for and acquiring AppleTalk address
NSD	Nonseed port
NZL	Nonseed port waiting for zone information from seed router
UP	The port is currently in up state and is routing

Additional AppleTalk information includes:

address filters	List of network range port filters
additional zones	List of any additional zone names
remote port	Network range for remote network configured as a selected network configured to control import of routing information.
zone	List of zones in selected network.
address filters	List of address filters in selected network.

## Interface Utilization Monitor

Select **Interface Utilization Monitor** to determine the data rate of each of the active interfaces, and the percentage that each is being used.

To view interface utilization information:

1. Select **Operations** from the System Manager main menu.
2. Select **Network Statistics** from the next menu.
3. Select **Interface Utilization Monitor** from the next menu.
4. Select or type the line speed information on the dialog screen for X.25, if appropriate. (The dialog screen will only display if an X.25 adapter is present.)
5. A single-screen adapter interface monitor reports the current data rate of the interface in bits per second, and the percentage of the line capacity being used.

Figure 4-20 on page 4-26 shows an example of the output. Refer to Table 4-1 on page 4-7 for a description of the interface names.

Interface	Bits/Sec	Percent
to0	2867	0.02
to1	503	0.45
tk0	998	1.66
te0	4672	5.67
xt0	255	34.45

Figure 4-20. Sample Interface Utilization Output

The screen is continually updated every 15 seconds until you choose to stop it. Press **Ctrl+C** to stop the screen updates and to end the command.

### Packet Traffic

The main operating system keeps counters on various network parameters for the adapter interfaces. The statistics for packet counts are gathered here. They are displayed on the screen every few seconds, depending on the interval value.

To view packet traffic statistics using the System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **Network Statistics** on the next menu.
3. Select **Packet Traffic** on the next menu.
4. Select the location of the packet traffic you want to view.
  - Select **system** to view packet traffic from the system card perspective.
  - Select **interface** to view packet traffic from the peer-capable adapter perspective.
5. Select an interface name from the selector screen. Refer to Table 4-1 on page 4-7 for a description of the interface names.
6. Enter the number of seconds between displays on the dialog screen. The default is 2.
7. Press **Ctrl+C** to end this command.
8. Press **Enter** to return to System Manager.

#### Fast-Path Command(s)

```
system statistics view -traffic interface number_seconds
interface statistics view -traffic interface number_seconds
```

Figure 4-21 on page 4-27 shows an example of system packet traffic output.

input (te0)		output			input (Total)		output		
packets	errs	packets	errs	colls	packets	errs	packets	errs	colls
208	0	208	0	0	11428	0	11411	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0

Figure 4-21. Example of Packet Traffic Output

The output contains the fields:

**Errs**                Represents errors.  
**Coll**               Represents collisions.

## Protocol

The adapter protocol statistics list the protocol statistics kept on the specified adapter for the specified protocol.

To view protocol statistics using the System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **Network Statistics** on the next menu.
3. Select **Protocol** on the next menu.
4. Select the protocol for which you want to view protocol statistics from the next selector screen. The protocols supported are:
  - IP
  - IPX
  - XNS
  - DECnet
  - VINES
  - AppleTalk
5. For any of the protocols *except* DECnet or AppleTalk, select the location of the statistics you want to view.
  - Select **system** to view protocol statistics from the system card perspective.
  - Select **interface** to view protocol statistics from the peer-capable adapter perspective.

If you selected **interface**, or if you selected DECnet or AppleTalk from Step 4, select the adapter interface name for the adapter containing the protocol statistics you want to view from the selector screen.

6. A COMMAND STATUS screen will display the output. An example of the protocol output for the Internet protocol is in Figure 4-22 on page 4-28. In the example, *icmp* is Internet Control Message Protocol. Refer to Table 4-1 on page 4-7 for a description of the interface names used to identify the adapters.

#### Fast-Path Command(s)

```
appletalk statistics view interface
decnet statistics view interface
ip statistics view -system
ip statistics view interface
ipx statistics view interface
ipx statistics view -system
vines statistics view interface
vines statistics view -system
xns statistics view interface
xns statistics view -system
```

```
ip:
    ocIpForwarding = 1
    ocIpDefaultTTL = 255
    ocIpInReceives = 0
    ocIpInHdrErrors = 0
    ocIps_toosmall = 0
    ocIps_badver = 0
    ocIps_badhlen = 0
    ocIps_badsum = 0
    ocIps_badlen = 0
    ocIps_tooshort = 0
    ocIps_badttl = 0
    ocIpInAddrErrors = 0
    ocIpForwDatagrams = 0
    ocIpInUnknownProtos = 0
    ocIpInDiscards = 0
    ocIpInDelivers = 0
    ocIpOutRequests = 0
    ocIpOutDiscards = 0
    ocIpOutNoRoutes = 0
    ocIpReasmTimeout = 0
    ocIpReasmReqds = 0
    ocIpReasmOKs = 0
    ocIpReasmFails = 0
    ocIpFragOKs = 0
    ocIpFragFails = 0
    ocIpFragCreates = 0
    ocIpRoutingDiscards = 0
icmp:
    ocIcmpInMsgs = 0
    ocIcmpInErrors = 0
    ocicps_tooshort = 0
    ocicps_badlen = 0
    ocicps_checksum = 0
    ocIcmpOutMsgs = 0
    ocIcmpOutErrors = 0
    ocicps_squelched = 0
    Output histogram:
    Input histogram:
```

Figure 4-22. Example of Protocol Statistics Output

## Bridge

Bridge statistics are gathered for:

- LAN bridge
- Source route bridge
- Transparent bridge
- Translational bridge

The bridge statistics display counters for various network parameters kept on the peer-capable adapters. These are useful for solving problems with the bridge protocol. They are displayed on the screen every few seconds, depending on the interval value.

To view bridge statistics using System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **Network Statistics** on the next menu.
3. Select **Bridge** on the next menu.
4. Select the type of bridging statistics you want to view. Your choices are:
  - LAN bridge system
  - LAN bridge interface
  - LAN bridge internal protocol frame
  - Source route bridge
  - Source route bridge spanning tree
  - Source route bridge spanning tree frame relay
  - Transparent bridge
  - Transparent bridge spanning tree
  - Transparent bridge spanning tree frame relay
  - Translational bridge spanning tree
  - Translational bridge spanning tree frame relay

Figure 4-23 on page 4-30 shows the selector screen.

IBM 6611	Bridge	hostname
Move cursor to desired item and press Enter.		
LAN Bridge System Statistics LAN Bridge Interface Statistics LAN Bridge Internal Protocol Frame Statistics  Source Route Bridge Statistics Source Route Bridge Spanning Tree Statistics Source Route Bridge Spanning Tree Frame Relay Statistics  Transparent Bridge Statistics Transparent Bridge Spanning Tree Statistics Transparent Bridge Spanning Tree Frame Relay Statistics  Translational Bridge Spanning Tree Statistics Translational Bridge Spanning Tree Frame Relay Statistics		
F1=Help	F2=Redraw Screen	F3=Return
F10=Main Menu		F4=SysID
	Esc+L=Turn Log On	

Figure 4-23. Bridge Statistics Menu

5. Select the interface name from the next selector screen. Refer to Table 4-1 on page 4-7 for a description of the interface name used to identify the adapters.
6. Enter the number of seconds between displays on the dialog screen. The default is 2.  
  
Press **F1 (Esc+1)** for help on the dialog screen title to view a description of the output for the particular type of bridge statistics.
7. Press **Ctrl+C** to end this command.  
  
If you choose an adapter interface that is not enabled for bridging, there is no output displayed with this command. However, you still need to press **Ctrl+C** to end the command.
8. Press **Enter** to return to System Manager.

### Fast-Path Command(s)

For LAN bridge:

```
bridge lb view -statistics interface number_seconds
bridge lb view -internal_frames interface number_seconds
```

For source route bridge:

```
bridge srb view -statistics interface number_seconds
bridge srb view -statistics -spt interface number_seconds
bridge srb view -statistics -sptfr port_index number_seconds
```

For transparent bridge:

```
bridge tb view -statistics interface number_seconds
bridge tb view -statistics -spt interface number_seconds
bridge tb view -statistics -sptfr port_index number_seconds
```

For translational bridge:

```
bridge tlb view -statistics -spt interface number_seconds
bridge tlb view -statistics -sptfr port_index number_seconds
```

Figure 4-24 shows an example of bridge output for source route bridge statistics, as shown in these fields:

<b>iSPEC</b>	Specifically routed frames received
<b>oSPEC</b>	Specifically routed frames sent
<b>iARB</b>	All route broadcasts received
<b>oARB</b>	All route broadcasts sent
<b>iSRB</b>	Single route broadcasts and non-broadcasts received
<b>oSRB</b>	Single route broadcasts and non-broadcasts sent
<b>MTU</b>	Discarded frames due to oversize
<b>Dups</b>	Duplicated ring numbers in route indicator frame
<b>Mismatch</b>	Ring number mismatches

iSPEC	oSPEC	iARB	oARB	iSRB	oSRB	MTU	Dups	Mismatch
9	18	9	9	0	0	0	0	0
1	2	2	2	0	0	0	0	0
0	0	0	0	0	0	0	0	0

Figure 4-24. Example of Source Route Bridge Statistics Output

## ARP Table Management

The Address Resolution Protocol (ARP) translates unique IP addresses into unique hardware addresses. Tables on the peer-capable adapters store the mapping of the hardware address to its host name or IP address. You can view the tables, and add or delete entries from the tables. Tables may be IP or AppleTalk ARP tables.

Figure 4-25 on page 4-32 displays the ARP Table Management menu.



```

IBM 6611                                     hostname
                                ARP Table Management

Move cursor to desired item and press Enter.

View IP ARP Table
Add IP ARP Entry
Delete IP ARP Entry by Host Name
Delete IP ARP Entry by Hardware Address
Delete All IP ARP Entries

View AppleTalk ARP Table


F1=Help      F2=Redraw Screen  F3=Return    F4=SysID
F10=Main Menu Esc+L=Turn Log On

```

Figure 4-25. Address Resolution Protocol (ARP) Menu

## View IP ARP Table

To view IP ARP entries using the System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **ARP Table Management** from the next menu.
3. Select **View IP ARP Table** from the next menu.
4. Select the adapter interface from the selector screen. Refer to Table 4-1 on page 4-7 for a description of the interface names used
5. A COMMAND STATUS screen will display a copy of all of the current entries in the IP ARP table.

The format for the table entries is as follows:

hostname (IP address) at HWaddress [HWtype]

An example of an ARP table is shown below:

```

666.8 at 10:0:5a:a8:a5:5 [802.3] permanent timer: 0
444.4 at 11:0:6a:a7:11:3 [802.3] permanent timer: 0

```

### Fast-Path Command(s)

```
ip arp view interface
```

## Add IP ARP Entry

To add an IP ARP entry using the System Manager:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.
3. Select **ARP Table Management** from the next menu.
4. Select **Add IP ARP Entry** from the next menu.
5. Enter this information or select the appropriate values in the dialog screen and press **Enter**:

### Host name or IP Address

Specify the remote host being added. If the host name is not known, you can use its IP address. The format for an IP address is *nnn.nnn.nnn.nnn* where *nnn* can be any decimal number from 1 to 255.

### Hardware address

Specify the address of the adapter in use for the ARP entry action being performed. The format for a hardware address is *nn:nn:nn:nn:nn:nn* where *nn* can be any hexadecimal number from X'0' to X'FF'.

### Is this entry temporary or permanent?

Select whether the system ARP table entry is permanent or temporary. Temporary entries are removed when the table fills up. Permanent entries are only removed if the system is restarted. The default is permanent.

### Do you want to publish this entry?

Select whether this 6611 system should act as an ARP server and respond to requests for the host name being added, even though the host address does not exist on this particular 6611. This 6611 responds to translation requests for the host name, if the entry is published. The default is no.

6. A COMMAND STATUS screen will display a message specifying the added entry. For example:

Entry lorax (17.17.17.3) was added to the system ARP table.

### Fast-Path Command(s)

```
ip arp add -permanent -nopublish host_name hw_address interface
ip arp add -permanent -publish host_name hw_address interface
ip arp add -temporary -nopublish host_name hw_address interface
ip arp add -temporary -publish host_name hw_address interface
```

## Delete IP ARP Entry by Host Name

To delete an IP ARP entry with a host name using the System Manager:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.
3. Select **ARP Table Management** from the next menu.
4. Select **Delete IP ARP Entry by Host Name** from the next menu.

5. Select the adapter interface name from the selector screen. to identify the adapters.
6. Specify the remote host name of the entry to be deleted on the dialog screen and press **Enter**. You can use the IP address of the remote host, if the host name is not known. The format for an IP address is *nnn.nnn.nnn.nnn* where *nnn* can be any decimal number from 1 to 255.
7. You receive a COMMAND STATUS screen displaying a message regarding the delete entry. For example:  
     jack (36.24.36.2) deleted  
     The entry in the adapter interface ARP table is deleted for the specified host name or IP address.

**Fast-Path Command(s)**

```
ip arp delete -host_name host_name interface
```

### Delete IP ARP Entry by Hardware Address

To delete an IP ARP entry with a hardware address using the System Manager:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.
3. Select **ARP Table Management** from the next menu.
4. Select **Delete IP ARP Entry by Hardware Address** from the next menu.
5. Select the adapter interface name from the selector screen. Refer to Table 4-1 on page 4-7 for a description of the interface names used to identify the adapters.
6. Enter the hardware address of the entry to be deleted on the dialog screen and press **Enter**. The format for a hardware address is *nn:nn:nn:nn:nn:nn* where *nn* can be any hexadecimal number from X'0' to X'FF'.
7. A COMMAND STATUS screen will display a message regarding the delete entry. For example:  
     10:0:5a:c8:0:5a (36.24.36.2) deleted  
     The entry in the adapter interface ARP table is deleted for the specified hardware address.

**Fast-Path Command(s)**

```
ip arp delete -hwaddress hw_address interface
```

### Delete All IP ARP Entries

This function clears out the IP ARP table for a specific network interface.

To clear an adapter ARP table using the System Manager:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.

3. Select **ARP Table Management** from the next menu.
4. Select **Delete All IP ARP Entries** from the next menu.
5. Select the adapter interface name from the selector screen. Refer to Table 4-1 on page 4-7 for a description of the interface names used to identify the adapters.
6. A COMMAND STATUS screen will display a message stating that the ARP table for the specified adapter is cleared.

#### Fast-Path Command(s)

```
ip arp delete -all interface
```

### View AppleTalk ARP Table

The AppleTalk ARP (AARP) translates AppleTalk addresses into hardware addresses. The AARP table only exists on the peer-capable adapter. To view this table and its entries using the System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **ARP Table Management** from the next menu.
3. Select **View AppleTalk ARP Table** from the next menu.
4. Select one or more interfaces names from the selector screen. Refer to Table 4-1 on page 4-7 for a description of the interface names used to identify the adapters.
5. Press **Enter** after making all selections.
6. A COMMAND STATUS screen will display a copy of all of the current entries in each of the interface's AARP table.

The format for the table entries is as follows:

```
network_number.nodeID at HWaddress [HWtype] Status EntryAge
```

- The HWtype includes [802.3] Ethernet, [802.5] token-ring, and [T1] serial interfaces.
- The AARP status indicators are in\_use, permanent, need\_AARP, did\_AARP, and new\_entry.
- The EntryAge is represented in seconds, where the low values represents recently used entries and high timer values represent old entries.

An example of an AARP table is shown below:

```
666.8 at 10:0:5a:a8:a5:5 [802.3] permanent timer: 0
444.4 at 11:0:6a:a7:11:3 [802.3] permanent timer: 0
```

#### Fast-Path Command(s)

```
appletalk arp view -interface interface
```

## Port Filters

The filter information lists the configured filters for the specified protocol.

To view filter information using the System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **Port Filters** on the next menu.
3. Select the protocol for which you want to view filter information from the selector screen. The supported protocols are:
  - IP
  - IPX
  - XNS
  - VINES
  - DECnet
  - AppleTalk
  - Source route bridge
  - Transparent bridge
4. Select the interface name for which you want to view adapter interface statistical data from the selector screen. If you select **VINES**, you have the additional choice of selecting either VINES RouTing Update Protocol (RTP) filters or the VINES interface filters. Refer to Table 4-1 on page 4-7 for a description of the interface names used to identify the adapters.
5. A COMMAND STATUS screen will display the output. An example of the output for AppleTalk is in Figure 4-26.

If you choose an adapter interface that is not enabled for the chosen protocol, no output is displayed with this command.

### Fast-Path Command(s)

```
ip filters view interface
decnet filters view interface
ipx filters view interface
xns filters view interface
vines filters view interface
vines filters view -RTP
appletalk filters view interface
bridge srb view -filter interface
bridge tb view -filter interface
```

AppleTalk Network Number Filter Data:

		Fltr				Filtered_Packets	
Flt	FilterRange	Type	Intf	Slot	Port	InBound	OutBound
1	1 - 10	PERMIT	to0	4	1	0	0

Figure 4-26. Example of Filter Output for AppleTalk

The field descriptions for the AppleTalk filter output are:

<b>Flt</b>	Filter number
<b>FilterRange</b>	Filter Range
<b>Fltr Type</b>	Filter Type: <ul style="list-style-type: none"> <li>• Permit—Allow data to flow through the filter</li> <li>• Deny—Do not allow data to flow through the filter</li> </ul>
<b>Intf</b>	Interface Name on which filter resides
<b>Slot</b>	Slot number of interface
<b>Port</b>	Port number of interface
<b>Filtered_Packets InBound</b>	Number of filtered packets, inbound
<b>Filtered_Packets OutBound</b>	Number of filtered packets, outbound

## Network Management Information

The Simple Network Management Protocol (SNMP) network management data that is gathered for all the adapters and the base operating system can be viewed. The output you receive is based on the Management Information Base (MIB) variable that you select and the type of request.

To view network management information using the System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **Network Management Information (MIBs)** from the next menu.
3. Select a MIB module to be viewed from the list in the selector screen.

A management information base (MIB) module is a collection of MIB variables relating to a common management area. The module defines each of the MIB variables, providing their syntax, numeric names, and textual names. The MIB module you select will be used to interpret the MIB variable name you provide. You provide the MIB variable name in the MIB variable being requested entry field on the next dialog screen.

MIB modules are provided for standard MIBs as well as many vendor specific MIBs.

**Note:** If you are querying an IBM 6611, select **IBM\_6611 Complete MIB**. This is the default.

4. Enter or select values for the dialog items that follow:

**Type of request.**

The following requests are supported:

**dump**

Requests the value of the specified MIB variable and all of its objects. This request allows you to query MIB variables without knowledge of each instance present. By specifying the first object in the MIB (in the MIB variable being requested entry field), the dump request lets you query the entire MIB.

Dump is the default for type of request.

**next**

Requests the value of the MIB variable following the specified variable. Like the dump request, the next request makes it possible to query MIB variables without knowledge of the instance qualifiers.

**get**

Requests the value of the specified MIB variable. You must specify the exact instance (in the MIB variable being requested entry field) of the variable you are querying. For example, if you want to query the sysDescr variable in MIB-II, you must specify sysDescr.0. It is often easier to use a dump request for the entire table and then sort through the resulting data until you find the data for which you are looking.

Press **Tab** to select either **dump**, **next**, or **get**.

**Community name to be used with query**

This entry field specifies the community name to be used with the query. Each node supporting SNMP is configured with specific communities from which it will accept SNMP commands. A community is a pairing of a community name and an IP address. You must provide a community name that the node you are querying will accept from the address that is issuing the SNMP command. If this value is not specified, a community name of public is used.

**Name of host to be queried**

This entry field specifies the host name or the IP address of the host to be queried for MIB information. If this field is left blank, the MIB information is obtained from this IBM 6611. If you specify a host name, the host name must be mapped to an IP address in this IBM 6611 or be translated to one by a name server. You cannot specify an IP address that is associated with the local end of an Serial Adapter or a V.35/V.36 Serial Adapter. In order to obtain MIB information from a remote host, there must be an IP route to that host. The IP address format is *nnn.nnn.nnn.nnn*, where *nnn* can be any decimal number from 1 to 255.

**MIB variable being requested**

There are two methods for specifying the MIB variable to be queried:

- a. If you know the name of the desired MIB variable, type it in the entry field. If you have selected **get** as the type of request, you will use this method.

The variable is specified in Variable.Instance format.

**Variable:**

Specifies the name in text format or numeric format of a specific MIB variable as defined in the specified MIB module. If the type of request is next or dump, the Variable parameter can be a MIB group.

**Instance:**

Specifies the instance qualifier for the MIB Variable parameter. The Instance parameter is required if the request is get. The Instance parameter is optional, if the request is next or dump.

- b. Press **F4 (Esc+4)** to get a list of all the MIB variables available for the selected MIB module. A very long list is displayed. The list contains only variable groups without instance qualifiers. Press **Enter** to select the desired MIB variable.

Internet is the default for MIB variable being requested.

Figure 4-27 shows an example of network management information output.

---

```
ifNumber.0 = 6
ifIndex.1 = 1
ifIndex.2 = 2
ifIndex.3 = 3
ifIndex.4 = 4
ifIndex.5 = 5
ifIndex.6 = 6
ifDescr.1 = "lo0; Software Loopback"
ifDescr.2 = "te0; enty0; IBM 6611 Ethernet Network Interface"
ifDescr.3 = "te1; enty1; IBM 6611 Ethernet Network Interface"
ifDescr.4 = "tk0; trty0; IBM 6611 Token-Ring Network Interface"
ifDescr.5 = "te2; enty2; IBM 6611 Ethernet Network Interface"
ifDescr.6 = "to0; t1ty0; IBM 6611 Serial Network Interface"
ifType.1 = softwareLoopback(24)
ifType.2 = ethernet-csmacd(6)
ifType.3 = ethernet-csmacd(6)
ifType.4 = iso88025-tokenRing(9)
ifType.5 = ethernet-csmacd(6)
ifType.6 = t1-carrier(18)
ifMtu.1 = 1536
ifMtu.2 = 1500
ifMtu.3 = 1500
ifMtu.4 = 1500
ifMtu.5 = 1500
ifMtu.6 = 1500
```

---

*Figure 4-27 (Part 1 of 2). Example of Network Management Information Output*



---

```

ifSpeed.1 = 0
ifSpeed.2 = 10000000
ifSpeed.3 = 10000000
ifSpeed.4 = 4000000
ifSpeed.5 = 10000000
ifSpeed.6 = 0
ifPhysAddress.1 =
ifPhysAddress.2 = 08:00:5a:13:22:4d
ifPhysAddress.3 = 08:00:5a:13:20:29
ifPhysAddress.4 = 08:00:5a:13:00:6a
ifPhysAddress.5 = 08:00:5a:13:22:18
ifPhysAddress.6 =

```

---

Figure 4-27 (Part 2 of 2). Example of Network Management Information Output

For additional network management information, refer to the *IBM 6611 Network Processor Network Management Reference*.

## File Systems

The File Systems function allows you to view the used and available space on the 6611 file systems. If the usage for the /tmp directory exceeds 75%, you should delete files from the transfer directory. Refer to “File Names for Output in Transfer Directory” on page 4-62 for more information about deleting files from the transfer directory.

To view the storage usage on the file systems:

1. Select **Operations** from the System Manager main menu.
2. Select **File Systems** from the next menu.
3. A COMMAND STATUS screen displays the output.

### Fast-Path Command(s)

**files system view**

Figure 4-28 shows an example of the output.

---

Filesystem	Total KB	free	%used	iused	%iused	Mounted on
/dev/hd4	8192	2272	72%	731	35%	/
/dev/hd9var	4096	1716	58%	114	11%	/var
/dev/hd2	405504	130384	67%	17521	17%	/usr
/dev/hd3	8192	5840	28%	56	2%	/tmp
/dev/hd1	106496	23776	77%	946	3%	/home

---

Figure 4-28. Example of File Systems Output

The field descriptions for file systems output are:

**Filesystem** Name of the file system

**Total KB** Total number of kilobytes allocated to the file system

**free** Number of kilobytes currently available

	<b>%used</b>	Percentage of kilobytes currently used
	<b>iused</b>	Number of inodes used
	<b>%iused</b>	Percentage of inodes used
	<b>Mounted on</b>	Directory name where file system is mounted

## File and Diskette Operations

The File and Diskette Operations menu (Figure 4-29) allows you to perform several tasks involving the manipulation of files.

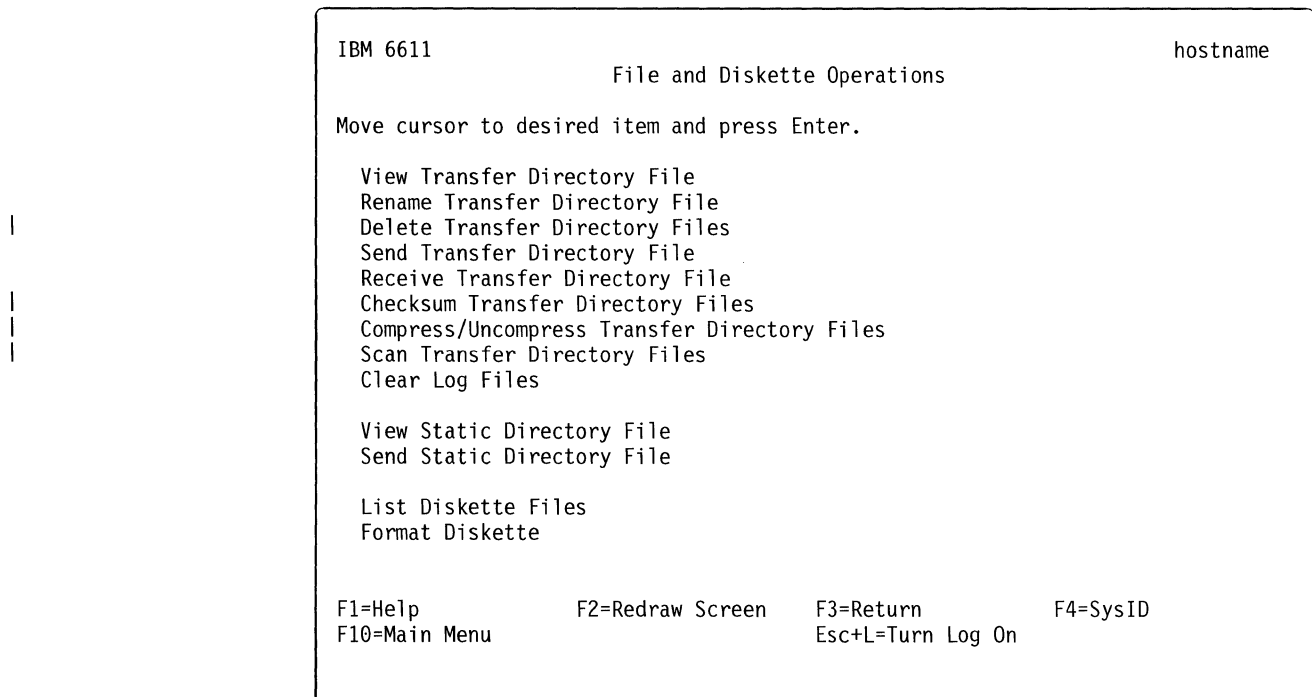


Figure 4-29. File and Diskette Operations Menu

### Transfer Directory Files

A file transferred into the 6611 is placed in the transfer directory. A file that needs to be transferred out of the 6611 must be in either the transfer directory or the static directory.

You can view, rename, delete, and transfer the files in the transfer directory. Only a controlling user can rename or delete files in the transfer directory. The static directory holds special files placed there by system components that allow the files to be viewed or transferred out of the 6611, but do not allow them to be deleted or renamed.

A few files in the transfer directory are trace logs that can grow. Most of these are not started by System Manager commands. Do not erase these files, unless you are instructed to do so by IBM service personnel.

There is a detailed discussion about the transfer directory files in “File Names for Output in Transfer Directory” on page 4-62. If you notice some files in the transfer

directory which are not listed in the tables in that section, contact IBM service personnel.

### View Transfer Directory File

You may use System Manager to view files in the transfer directory. For example, you may want to view transfer directory files before performing a system back up so as to decide if you can delete them or not.

To view the files in the transfer directory using the System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **File and Diskette Operations** from the next menu screen.
3. Select **View Transfer Directory File** from the next menu to view the contents of a selected file in the transfer directory.
4. Select the file to view on the selector screen. At the top of the screen, the amount of space available in the transfer directory is displayed.
5. A COMMAND STATUS screen displays the contents of the file you selected to view. Refer to Figure 4-30 for an example of viewing a summary configuration report in the transfer directory.

---

Command: OK                      stdout: yes                      stderr: no

Before command completion, additional instructions may appear below.

[TOP]

Summary Configuration Report

IBM 6611 '6611host' on Mon Jul 13 14:09:57 1992

IBM 6611 Host Name: 6611host

IBM 6611 Domain name:

System contact:

System name:

System location:

Slot 1 contains a 6611 X.25 Adapter

Slot 2 contains a 6611 Ethernet Adapter

[MORE...46]

---

Figure 4-30. Viewing a Report in the Transfer Directory

**Fast-Path Command(s)**

**files transfer view *file\_name***

## Rename Transfer Directory File

To rename a file in the transfer directory using System Manager:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.
3. Select **File and Diskette Operations** from the next menu.
4. Select **Rename Transfer Directory File** from the next menu.
5. Select the file to rename on the selector screen.
6. Enter the new name of the file on the next dialog screen.
7. A COMMAND STATUS screen displays the following message:  
File, *old\_file\_name*, in the transfer directory has been renamed to *new\_file\_name*.

### Fast-Path Command(s)

```
files transfer rename file_name new_file_name
```

## Delete Transfer Directory Files

You may use System Manager to delete files in the transfer directory. You may want to delete long, unnecessary files (such as dumps) before performing a system backup so as to save time.

To delete a file in the transfer directory using the System Manager:

1. Log in using a controlling user ID.
  2. Select **Operations** from the System Manager main menu.
  3. Select **File and Diskette Operations** from the next menu.
  4. Select **Delete Transfer Directory Files** from the next menu.
  5. Select the files to delete on the selector screen. Press **F9 (Esc+9)** to select the files to delete. Press **Enter** to register the selections.
- A COMMAND STATUS screen will display the following message:
- Files *file\_name* deleted from the transfer directory

### Fast-Path Command(s)

```
files transfer delete file_name  
files transfer delete -all
```

If you need to transfer files to or from the transfer directory, refer to “Transferring Files” on page 4-62.

## Send Transfer Directory File

To transfer a file out of the transfer directory using System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **File and Diskette Operations** from the next menu.
3. Select **Send Transfer Directory File** from the next menu.

4. Select the file destination on the selector screen as shown in Figure 4-31 on page 4-44.

IBM 6611

File and Diskette Operations

hostname

Move cursor to desired item and press Enter.

View Transfer Directory File

Rename Transfer Directory File

Send Transfer Directory File

Receive Transfer Directory File

Delete Transfer Directory Files

File destination

Move cursor to desired item and press Enter.

remote host via FTP

modem connected host

DOS diskette

UNIX diskette

F1=Help

F5=Top

F8=Page Down

F2=Redraw Screen

F6=Bottom

F10=Main Menu

F3=Return

F7=Page Up

F1

F1

Figure 4-31. Send Transfer Directory File Selector Screen

If you select **remote host via FTP**, you must specify the host name or IP address of where to send the file on the dialog screen. You will then be entered into an interactive FTP dialog. Refer to “Using the File Transfer Protocol” on page 4-67 for information on using FTP and for an example of an interactive dialog. You will be prompted for a user ID and password configured at the remote node and for the name of the file to send.

**Note:** To do a send, you would specify **put "file\_name"** in the interactive dialog.

**Fast-Path Command(s)**

**files transfer send -ftp host\_name**

If you select **modem connected host**, you must specify the file to transfer. You may do this either on a dialog screen or on a pop-up list screen after pressing **F4 (Esc+4)** to bring up a list of files.

**Fast-Path Command(s)**

**files transfer send -modem file\_name**

If you select **DOS diskette**, you must specify both the file to transfer (in the transfer directory) and the name of the file as it will be on the DOS diskette. You may choose the file to transfer on a pop-up list screen after pressing **F4 (Esc+4)** to bring up a list of files, or enter the file name on the dialog screen.

**Fast-Path Command(s)**

**files transfer send -dos file\_name DOS\_file\_name**

If you select **UNIX diskette**, you must specify both the file to transfer (in the transfer directory) and whether the archive type will be create or append. You may choose the file to transfer on a pop-up list screen after pressing **F4 (Esc+4)** to bring up a list of files, or enter the file name on the dialog screen. Create places a file on a UNIX\*\* diskette so that it overwrites existing files already on the diskette. Append adds a file to the existing files on the UNIX diskette.

— **Fast-Path Command(s)** —

```
files transfer send -unix -create file_name
files transfer send -unix -append file_name
```

5. A COMMAND STATUS screen will display the following message:

Files file\_name sent from the transfer directory

### Receive Transfer Directory File

To receive a file into the transfer directory using System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **File and Diskette Operations** from the next menu.
3. Select **Receive Transfer Directory File** from the next menu.
4. Select the file source on the next selector screen.

When you select **remote host via FTP**, you must specify the host name or IP address of where to receive the file on the dialog screen. You will then be entered into an interactive FTP dialog. Refer to "Using the File Transfer Protocol" on page 4-67 for information on using FTP and for an example of an interactive dialog. You will be prompted for a user ID and password configured at the remote node and for the name of the file to receive.

**Note:** To do a receive, you would specify **get "file\_name"** in the interactive dialog.

— **Fast-Path Command(s)** —

```
files transfer receive -ftp host_name
```

When you select **modem connected host**, you must specify the file to be received. Type the file name on the entry field of the dialog screen.

— **Fast-Path Command(s)** —

```
files transfer receive -modem file_name
```

When you select **DOS diskette**, you must specify both the file to receive (in the transfer directory) and the name of the file on the DOS diskette. Type the file names on the appropriate entry fields of the dialog screen.

— **Fast-Path Command(s)** —

```
files transfer receive -dos file_name DOS_file_name
```

When you select **UNIX diskette**, you must specify the file or files to be received. Press **F9 (Esc+9)** to select the files. The default is all.

#### Fast-Path Command(s)

```
files transfer receive -unix file_name  
files transfer receive -unix -all
```

5. A COMMAND STATUS screen displays the following message:

Files file\_name received from the transfer directory

### Checksums

To perform checksums on transfer directory files:

1. Select **Operations** from the System Manager main menu.
2. Select **File and Diskette Operations** from the next menu.
3. Select **✓** from the next menu.
4. Select the files to checksum on the selector screen using **F9 (Esc+9)**. Press **Enter** to register the selections.

#### Fast-Path Command(s)

```
files transfer checksum {-log} file_name
```

### Compress/Uncompress Transfer Directory Files

To compress or uncompress transfer directory files:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.
3. Select **File and Diskette Operations** from the next menu.
4. Select **Compress/Uncompress Transfer Directory Files** from the next menu.
5. Select the files to compress or uncompress on the selector screen using **F9 (Esc+9)**. Press **Enter** to register the selections.

Any file name with the suffix **.Z** is compressed. System Manager uncompresses the files you select and removes the suffixes.

Otherwise, System Manager compresses the files you select and adds the **.Z** suffix to the file names.

#### Fast-Path Command(s)

```
files transfer compress file_name  
files transfer uncompress file_name
```

### Scan Transfer Directory Files

To scan transfer directory files for a specific pattern:

1. Select **Operations** from the System Manager main menu.
2. Select **File and Diskette Operations** from the next menu.
3. Select **Scan Transfer Directory Files** from the next menu.
4. Enter the **Pattern** on the dialog screen.

5. Select which files to scan on the dialog screen.
  - a. Press **F4 (Esc+4)** to list the files.
  - b. Press **F9 (Esc+9)** to select one or more files in the list.
  - c. Press **Enter** to register your selections.
6. Press **Enter** to begin the scan.
7. A COMMAND STATUS screen will display the output.

#### Fast-Path Command(s)

```
files transfer scan pattern file_names  
files transfer scan -all pattern
```

### Clear Log File

This function lets you erase the contents of the System Manager and fast-path log files. These files are also pruned at login time if they are larger than 512 K bytes. Refer to “Using the System Manager Log” on page 2-14 for a detailed discussion about the System Manager log. Refer to “The Fast-Path Log” on page 9-4 for a detailed discussion of the fast-path log.

To clear a System Manager log file using System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **File and Diskette Operations** from the next menu.
3. Select **Clear Log File** from the next menu.
4. Select a file name on the selector screen.
5. Press **Enter** to make your selection.
6. A COMMAND STATUS screen will display a message when the log file is cleared.

### Static Directory Files

A file that needs to be transferred out of the 6611 must be in either the transfer directory or the static directory. You can view, rename, delete and transfer the files in the transfer directory. The static directory holds special files placed there by system components that allow the files to be viewed or transferred out of the 6611, but do not allow them to be deleted or renamed.

### View Static Directory File

To view files in the static directory:

1. Select **Operations** from the System Manager main menu.
2. Select **File and Diskette Operations** from the next menu.
3. Select **View Static Directory File** from the next menu. A selector screen appears listing all of the files in the static directory.
4. Select the file name that you want to view.
5. A COMMAND STATUS screen displays the contents of the file you selected to view. Refer to Figure 4-32 on page 4-48 for an example of viewing a file from the static directory.



---

Before command completion, additional instructions may appear below.

[TOP]

IBM 6611 NETWORK MANAGEMENT

---

This file contains information regarding network management of the IBM 6611 Network Processor running the IBM Multiprotocol Network Program Version 1.1.

DOCUMENTATION

---

[MORE...106]

---

Figure 4-32. Viewing a Static Directory File

**Fast-Path Command(s)**

**files static view** *file\_name*

### Send Static Directory File

To transfer a file out of the static directory using the System Manager:

1. Select **Operations** from the System Manager main menu.
2. Select **File and Diskette Operations** from the next menu.
3. Select **Send Static Directory File** from the next menu.
4. Select the file destination from the selector screen.

When you select **remote host via FTP**, you must supply the host name or IP address. You will then enter into an interactive FTP dialog. Refer to "Using the File Transfer Protocol" on page 4-67 for information on using FTP and for an example of an interactive dialog. You will be prompted for a user ID and password configured at the remote node and for the name of the file to send.

**Note:** To do a send, you would specify **put** *file\_name* in the interactive dialog.

**Fast-Path Command(s)**

**files static send -ftp** *host\_name*

When you select **modem connected host**, you must state the file to transfer. You may do this either on the dialog screen or on the pop-up list screen after pressing **F4 (Esc+4)** for a list.

**Fast-Path Command(s)**

**files static send -modem** *file\_name*

When you select **DOS diskette**, you must specify both the file to transfer (in the static directory) and the name of the file as it exists on the DOS diskette. You may choose the file to transfer on a pop-up list screen after pressing **F4 (Esc+4)** for a list of files, or on the dialog screen.

**Fast-Path Command(s)**

**files static send -dos** *file\_name DOS\_file\_name*

When you select **UNIX diskette**, you must specify both the file to transfer (in the static directory) and whether the archive type is create or append. You may choose the file to transfer on a pop-up list screen after pressing **F4 (Esc+4)** for a list of files, or on the dialog screen. Create places a file on a UNIX diskette so that it overlays existing files already on the diskette. Append adds a file to the existing files on the UNIX diskette.

**Fast-Path Command(s)**

**files static send -unix -create** *file\_name*  
**files static send -unix -append** *file\_name*

5. A COMMAND STATUS screen displays the file you selected to send.

If you need to transfer a file out of the static directory, refer to “Transferring Files” on page 4-62.

## List DOS Diskette Files

To list the files on a diskette:

1. Place the diskette in the 6611 diskette drive.
2. Select **Operations** from the System Manager main menu.
3. Select **File and Diskette Operations** from the next menu.
4. Select **List DOS Diskette Files** from the next menu.
5. Select **DOS** or **UNIX** from the selector screen.
6. A COMMAND STATUS screen displays the files on the diskette. Figure 4-33 shows output for a DOS diskette.

---

```
SCM_CONF.RPT
CONFIG
PS.STA
VPD.LST
PD_ERROR.LOG
CONF.SH
TRBUG1.ERR
TRBUG7.ERR
SCM.RPT
IOSTAT.TXT
Free space: 680960 bytes
```

---

Figure 4-33. List of Files on DOS Diskette Example

Figure 4-34 on page 4-50 shows output for a UNIX diskette.

---

```
-rw-rw-rw-  0 0      734 Apr 23 18:06:20 1992 ps_io.stat
-rw-rw-rw-  0 0     1124 Apr 23 18:06:22 1992 ps_vm.stat
```

---

*Figure 4-34. List of Files on UNIX Diskette Example*

If the diskette is not in the 6611 diskette drive, you will see an error message on the COMMAND STATUS screen.

#### Fast-Path Command(s)

```
files diskette list -dos
files diskette list -unix
```

### Format Diskette

To format a diskette:

1. Place the diskette in the 6611 diskette drive.
2. Select **Operations** from the System Manager main menu.
3. Select **File and Diskette Operations** from the next menu.
4. Select **Format Diskette** from the next menu.
5. Select the type of diskette on the selector screen from these choices:

```
DOS high
DOS low
UNIX high
UNIX low
```

High is 1.4M bytes; low is 720K bytes.

6. An information message screen displays requesting you to confirm your decision to format the diskette.
7. A COMMAND STATUS screen displays the following message when formatting a DOS diskette:

```
Formatting ... Format Complete
  1457664 bytes total disk space
  1457664 bytes available on disk
Format another (Y/N)?
```

Answer either **Y** or **N**.

A COMMAND STATUS screen displays the following message when formatting a UNIX diskette:

```
Formatting UNIX Diskette
Press Ctrl+C to stop
Formatting: 2 side(s), 80 trl/side, 18 sect/trk
Format completed
Completed formatting UNIX diskette
```

#### Fast-Path Command(s)

```
diskette dos format -high
diskette dos format -low
diskette unix format -high
diskette unix format -low
```

## Login Information

Through System Manager, you may obtain login information such as who is logged into the system, when they logged in, and how long they have been logged on.

Figure 4-35 shows the Login Information selector screen.

```
IBM 6611                               hostname
                                     Operations
Move cursor to desired item and press Enter.

Protocol and Interface Monitor
Routing Information
Remote Host Echo(Ping)/Route Trace
Network Statistics
Address Resolution Protocol (ARP)
Port Filters
Network Management Information (MIBs)

Login information
Move cursor to desired item and press Enter.

current logged in users
login history

F1=Help          F2=Redraw Screen    F3=Return
F5=Top           F6=Bottom        F7=Page Up
F8=Page Down     F10=Main Menu

F1
F1
```

Figure 4-35. Login Information Selector Screen

## Currently Logged In Users

To obtain a list of all users currently logged into System Manager:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.
3. Select **Login Information** from the next menu.
4. Select **current logged in users** from the selector screen (refer to Figure 4-35).
5. A COMMAND STATUS screen will display the output. Figure 4-36 on page 4-52 shows an example of the output.

#### Fast-Path Command(s)

```
user id view -logged_in
```

User	Terminal	Login Time	Host	Type
ibm6611c	pts/1	Mar 31 11:09	9.67.250.2	controlling
ibm6611v	pts/2	Mar 31 11:30	9.67.84.23	viewing

Figure 4-36. Example of Current Logged In Users Output

The output contains these fields:

<b>User</b>	User ID
<b>Terminal</b>	Line on which user is logged on
<b>Login Time</b>	When the user logged on
<b>Host</b>	Name of the host from which the user is telnetting
<b>Type</b>	Whether the user is a controlling or viewing user

### Login History

To obtain the login history of one or more users:

1. Log in using a controlling user ID.
  2. Select **Operations** from the System Manager main menu.
  3. Select **Login Information** from the next menu.
  4. Select **login history** from the selector screen (refer to Figure 4-35 on page 4-51).
  5. Enter the following information on the dialog screen:
    - Number of lines to display
    - User ID to display
    - Terminal to display
- If you leave the entry fields blank, System Manager assumes a default of **all**.
6. A COMMAND STATUS screen will display the output. Figure 4-37 shows an example of the output.

#### Fast-Path Command(s)

**user id view -history**

User	Terminal	Host	Login Time	Duration
ibm6611c	ftp	relayer	Thu Mar 31 11:06	still logged in
ibm6611c	pts/1	1.1.1.2	Thu Mar 31 07:09 - 07:13	(00:03)
ibm6611c	pts/1	1.1.1.2	Thu Mar 31 06:13 - 07:04	(00:51)
ibm6611c	ftp	relayer	Wed Mar 30 11:25 - 14:43	(03:18)
ibm6611c	ftp	relayer	Tue Mar 29 15:38 - 10:30	(18:52)
ibm6611c	ftp	relayer	Tue Mar 29 15:10 - 15:38	(00:27)
ibm6611c	pts/2	1.1.1.2	Tue Mar 29 14:31 - 06:20	(15:49)
ibm6611c	ftp	relayer	Tue Mar 29 14:19 - 15:10	(00:51)
ibm6611c	pts/1	1.1.1.2	Tue Mar 29 14:07 - 14:16	(00:09)

Figure 4-37. Example of Login User History Output

The output contains these fields:

<b>User</b>	User ID of who is logging in
<b>Terminal</b>	Line on which user is logged on
<b>Host</b>	Name of the host from which the user is telnetting
<b>Login time</b>	When the user logged on
<b>Duration</b>	Logout time and duration of user session. The reason why the user was forced off the system is also shown.

## System Activity Report

The system activity report gets the contents of selected cumulative activity counters in the operating system. The accounting system, based on the values in the Number and Interval parameters, writes information the specified number of times at the specified intervals in seconds. There are many system activity functions about which to report.

To view the system activity report using the System Manager:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.
3. Select **System Activity Report** from the next menu.
4. On the dialog screen, specify the entry fields as follows:

### Interval length of each system activity sampling

Type an interval length in seconds.

The recommended value is between 1 and 5. The default is 2.

### Number of sampling intervals

Type the number of intervals.

The recommended value is between 1 and 5. The default is 4.

Press **Tab** to select either **yes** or **no** on the dialog screen to turn on or off each of the following report options:

- Report all activities listed below?
- Use of file access system routines?
- Buffer activity for transfers, accesses, and cache hit ratios?
- System calls?
- System activity?
- Message and semaphore activities?
- Average queue length while occupied, and percentage of time occupied?
- Paging statistics?
- CPU activity?
- Status of text, process, i-node, and file tables?
- System switching activity?
- TTY device activity?

### Fast-Path Command(s)

**system statistics view -activity**

Figure 4-38 on page 4-54 shows an example of System Activity Report output. For additional information on the output column headings, see online help for each option on the dialog screen. Press **F1 (Esc+1)** for help.

**%usr** Percent of CPU cycles consumed by the user

**%sys** Percent of CPU cycles consumed by system processes

**%wio** Percent of time spent waiting for I/O devices

**%idle** Percent of time not used

---

IBM 6611 mprII 2 3 000009133000 04/23/92

17:49:24

CPU Activity

%usr	%sys	%wio	%idle
6	9	1	83

17:49:27

CPU Activity

%usr	%sys	%wio	%idle
2	15	0	83

CPU Activity

%usr	%sys	%wio	%idle
Average 4	12	1	83

---

Figure 4-38. Example of System Activity Report Output

## EIA 232 Serial Ports

The EIA 232 serial ports connect the 6611 to a terminal either directly or over a modem. This menu option configures either the S1 or S2 port for use with a terminal.

Users who configure the S2 serial port to support network management of the Cylink\*\* 4201 cannot use the S2 serial port for local or remote access to the 6611 as described in Chapter 3 on page 3-1. See the *IBM Multiprotocol Network Program Configuration Guide* for information on configuring Cylink. For more information on accessing the 6611, refer to Chapter 3.

The 6611 supports modem configuration using the Attention (AT) command set, which allows the 6611 to control a modem operating in asynchronous mode. Refer to the manufacturer's documentation for the modem you are using for more information.

Figure 4-39 on page 4-55 shows the EIA 232 Serial Port function selector screen.

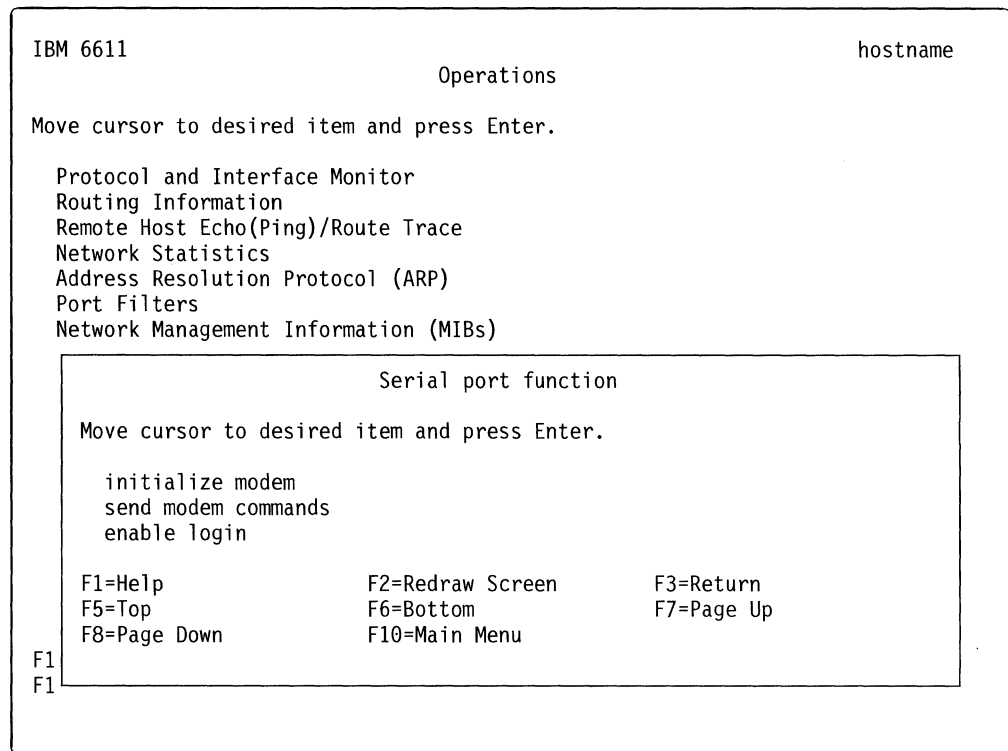


Figure 4-39. EIA 232 Serial Port Function Selector Screen

## Initialize Modem

To send an AT command to initialize the modem configuration:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.
3. Select **EIA 232 Serial Ports** from the next menu.
4. Select **initialize modem** on the selector screen.
5. Select the EIA 232 serial port on the selector screen. Refer to Figure 4-40 on page 4-56 for the serial port selector screen. Your choices are:
  - **S1**—For terminal or modem attachment.  
If you select S1, you must set the baud rate:
    - 2400 bps (normally set for modem-attached terminals)
    - 9600 bps (normally set for direct-attached terminals)
  - **S2**—For terminal or modem attachment *only* if S2 is not configured for network management Cylink.



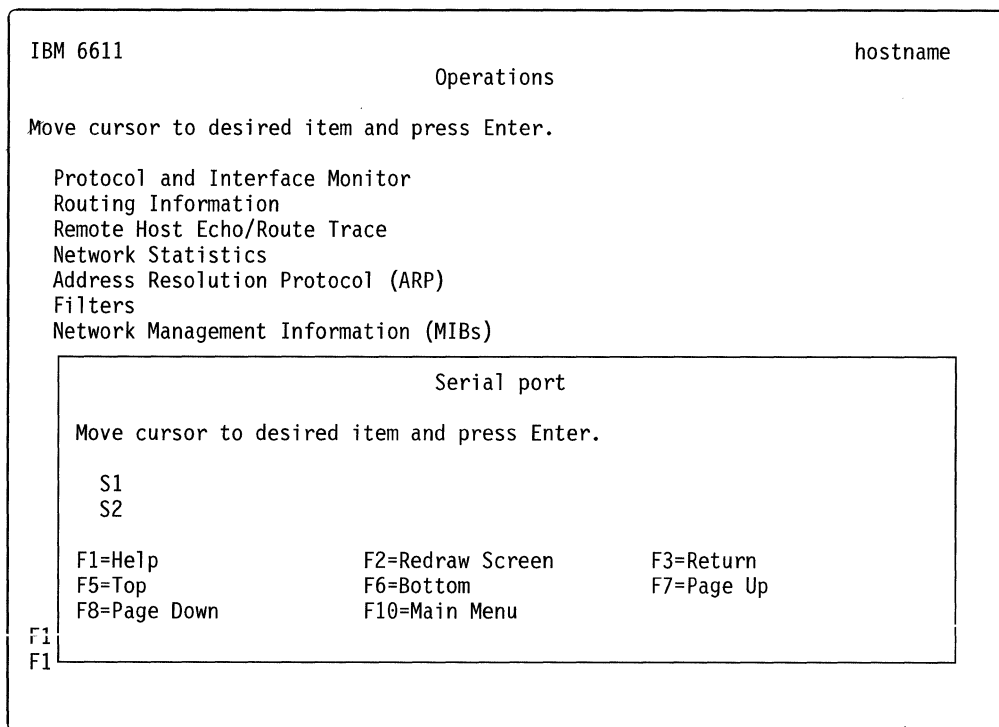


Figure 4-40. EIA 232 Serial Ports Selector Screen

6. Enter the AT initialization command on the dialog screen. The default AT command is **ATqv0&c1&d2sO=1**.

7. Press **Enter** to send the command.

You will receive a message that the port is being initialized. This takes several seconds.

You will be asked if you want to send additional AT commands. To send additional AT commands:

1. Press **Y** (yes) and then press **Enter**.
2. Type in the next AT command to send.
3. Press **Enter** to send the command.
4. Repeat this procedure until you have sent all additional AT commands.

When you have finished sending AT commands, press **N** (no) and then press **Enter**.

#### Fast-Path Command(s)

**serialport modem set -s1 AT\_command(s)**  
**serialport modem set -s2 AT\_command(s)**

To set the baud rate:

**serialport baud set -s1 baud\_rate**  
**serialport baud set -s2 baud\_rate**

## Send Modem Commands

To send an AT command to a modem:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.
3. Select **EIA 232 Serial Ports** from the next menu.
4. Select **send modem commands** on the selector screen.
5. Select the EIA 232 serial port on the selector screen. Refer to Figure 4-40 on page 4-56 for the serial port selector screen. Your choices are:

- **S1**—For terminal or modem attachment.

If you select S1, you must set the baud rate:

2400 bps (normally set for modem-attached terminals)

9600 bps (normally set for direct-attached terminals)

- **S2**—For terminal or modem attachment *only* if S2 is not configured for network management Cylink

You will receive a message that the port is being initialized. This takes several seconds.

6. Press **Y** (yes) when asked if you want to send additional AT commands.
7. Press **Enter**.
8. Type in an AT command.
9. Press **Enter** to send the command.

System Manager will continue to ask if you want to send additional AT commands until you press **N** (no).

### Fast-Path Command(s)

```
serialport modem set -s1 AT_command(s)
serialport modem set -s2 AT_command(s)
```

To set the baud rate:

```
serialport baud set -s1 baud_rate
serialport baud set -s2 baud_rate
```

## Enable Login

To enable the selected serial port for login:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.
3. Select **EIA 232 Serial Ports** from the next menu.
4. Select **enable login** on the selector screen.
5. Select the EIA 232 serial port on the selector screen. Refer to Figure 4-40 on page 4-56 for the serial port selector screen. Your choices are:

- **S1**—For terminal or modem attachment.

If you select S1, you must set the baud rate:

2400 bps (normally set for modem-attached terminals)

9600 bps (normally set for direct-attached terminals)

- **S2**—For terminal or modem attachment *only* if S2 is not configured for network management Cylink.

6. A COMMAND STATUS screen will display any output.

#### Fast-Path Command(s)

**serialport modem set -s1** *AT\_command(s)*

**serialport modem set -s2** *AT\_command(s)*

To set the baud rate:

**serialport baud set -s1** *baud\_rate*

**serialport baud set -s2** *baud\_rate*

## System Shutdown

There are times when it is necessary to stop the operation of the 6611. Do not stop operations by turning the power switch to **Off (O)**. There is a special process to shut down the 6611 that performs all necessary cleanup operations. The shutdown process stops all operations in the base operating system, including all routes needing to access the main system and all user sessions. This process does not stop the operation of the peer-capable adapters, just their communication with the main operating system. After the system has been stopped, you can power off the IBM 6611. Turning off the power is the only method of stopping the peer-capable adapters.

**Note:** Do not attempt to restart the system or turn off the 6611 before the shutdown completion message is displayed. Otherwise, file system damage can result.

Only a controlling user can shut down the 6611.

Before beginning the shutdown, you will receive a message including the number of minutes before the system is shut down. There is a series of messages displayed during the shutdown process. These messages vary slightly depending on whether you are connected over an EIA 232 serial port or a remote network connection, such as Telnet, and whether or not you asked to restart the system immediately after shutdown. You receive the following messages over a direct connection without the restart option specified.

---

SHUTDOWN PROGRAM  
Sun Nov 14 18:07:50 1993

Broadcast message from ibm6611c on tty ...

PLEASE LOG OFF NOW !!!

System maintenance in progress.  
All processes will be terminated in 3 minutes.

Broadcast message from ibm6611c on tty ...

THE SYSTEM IS BEING BROUGHT DOWN NOW

Wait for '...Halt complete ...' before stopping.  
Process accounting has stopped.  
Error reporting has stopped.  
Stopping NFS/NIS Daemons  
The Subsystem or Group, nfsd, is currently inoperative.  
The Subsystem or Group, biod, is currently inoperative.  
The Subsystem or Group, rpc.lockd, currently inoperative.  
The Subsystem or Group, rpc.statd, currently inoperative.  
The Subsystem or Group, rpc.mountd, currently inoperative.  
The Subsystem or Group, yppasswdd, currently inoperative.  
The Subsystem or Group, ypupdated, currently inoperative.  
All processes currently running will now be terminated.  
Halt complete ...

---

*Figure 4-41. Example of System Shutdown Messages*

The last two lines are not displayed if the system shutdown command is issued from a remote user over a Telnet session.

To stop the 6611 from the System Manager:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.
3. Select **System Shutdown** from the next menu.
4. From the dialog screen, select **yes** or **no** to indicate whether or not you want to restart the system after the shutdown. Enter the elapsed time, in minutes, when the system should begin to shut down. The default is one minute.

**Fast-Path Command(s)**

**system stop [(-restart)|-norestart] -minutes *number\_minutes***  
**system stop [(-restart)|-norestart] -time *time***

5. You receive the following two messages warning you of the results of shutting down your 6611:

ARE YOU SURE?

Executing this command will shut down your IBM 6611, stopping all the protocols and processes including the current System Manager session. Performing this function requires controlling user privileges. If you are a viewing user, you will be logged out from this IBM 6611.

Press Enter to shutdown the IBM 6611.  
Press F3 (Esc+3) to cancel and return to the System Manager.

F1=Help                      F2=Redraw Screen      F3=Return  
F10=Main Menu

INFORMATION MESSAGE

NOTE: This command needs to be run outside of the System Manager. Therefore the System Manager will exit immediately before running this command.

Press Enter to proceed with the command.

Press F3 (Esc+3) to cancel and return to the System Manager.

F1=Help                      F2=Redraw Screen      F3=Return  
F10=Main Menu

To continue with the system shutdown, press **Enter**.

You can start the 6611 two ways:

- Using the power switch
- Using the Reset push button.

To start the 6611:

1. Set the key mode switch to **Normal**.
2. Start the 6611, by setting the power switch to **On (I)**.

When you set the power switch to **On (I)**, the power-on light comes on and the 6611 starts a power-on self-test (POST). During the POST, numbers are displayed on the 3-digit display.

3. If the power-on light does not come on, check the power cord that is located at the back of the 6611 to ensure that it is plugged into a grounded electrical wall outlet. If this does not solve the problem, contact IBM service personnel.

To restart a 6611, when the 6611 is powered on:

1. Set the key mode switch to **Normal**.
2. Press the **Reset** push button causing the 6611 to reset and restart the system.

**Note:** If the 6611 has a flashing **888** on the 3-digit display, pressing the Reset button displays additional codes or diagnostic messages. When this happens, turn the power switch to **Off (O)** for one minute, then turn it to **On (I)** again to start the 6611.

**Note:** Perform a controlled shutdown of System Manager before pressing the **Reset** push button or turning off the 6611. Doing either of these without first performing the shutdown could result in damage to the system files.

## Date and Time

You can change or view the date and time from this menu item. When changing the date and time, the changes do not become effective for any user until they log out and log back into the 6611.

IBM recommends that you use this function to synchronize the time on any 6611s participating in:

- The automatic installation of software updates from a central point. Refer to "Automating Software Installation and Maintenance Facility Functions" on page 7-37 for details.
- The distribution of configurations across the network. Refer to the *Configuration Guide* for details.

To change the date and time:

1. Log in using a controlling user ID.
2. Select **Operations** from the System Manager main menu.
3. Select **Date and Time** from the next menu.
4. Select **yes** or **no** to answer the question "Do you want to change the time zone?" on the resulting screen.  
If you select **no**, go to step 7.
5. Answer the daylight savings time question from the selector screen. Select **yes** if the time zone goes on daylight savings time, or **no** if it does not.
6. Select the correct time zone from the next selector screen.
7. On the dialog screen, enter the new time and date. The accepted values are:

Year	00–99
Month	01–12
Day	01–31
Hour	00–23
Minutes	00–59
Seconds	00–59
8. A COMMAND STATUS screen appears with the new date and time and a message. For example:

Fri Apr 24 09:30:20 1992

Now exit System Manager and then re-enter so that any changes to date, time, and time zone will be reflected in your current session.

#### Fast-Path Command(s)

**timeofday set** *date-time*  
where *date-time* is in the form "YYMMDDhhmm.ss"

After changing the time from the System Manager or the fast-path environment, log out and log back in again if you want the changed time to reflect your current session, and so you can view the changed time.

---

## Transferring Files

You can transfer files to and from the 6611 using:

- FTP
- Xmodem Protocol
- Diskettes (DOS or UNIX)

A file transferred into the 6611 is placed in the transfer directory. A file that needs to be transferred out of the 6611 must be in either the transfer directory or the static directory.

You can view, rename, delete, and transfer the files in the transfer directory. Most of the files are in ASCII format. A few of the files are in binary format. None of the files are in EBCDIC. You can determine which files are binary because the files appear as a memory dump when they are browsed. The static directory holds files placed there by system components that allow the files to be viewed or transferred out of the 6611, but do not allow them to be deleted or renamed.

## File Names for Output in Transfer Directory

There are various areas in the System Manager and in the fast-path environment where data is generated. The data is sent to the screen in most instances. Large outputs, such as dumps or traces, are sent to files in the transfer directory. In each of the cases where the output is directed to the transfer directory, the file name is set by the 6611. You can find these file names in the tables starting with Table 4-3 on page 4-63 through Table 4-6 on page 4-66. You can find other files not created or used by System Manager processes in Table 4-2.

There is also a System Manager log and a fast-path log for gathering data together in one file. Refer to "Using the System Manager Log" on page 2-14 for a detailed discussion about the System Manager log. Refer to "The Fast-Path Log" on page 9-4 for a detailed discussion about the fast-path log.

*Table 4-2. Output File Names not Generated from System Manager*

---

#### File name in transfer directory

---

pd\_lcpd.log  
console  
mail

You should delete unneeded files that you create from the transfer directory in a timely manner to prevent the transfer directory from becoming full.

## Trace Log Files

A few files in the transfer directory are trace logs. The size of these files can increase. Most of these are not started by System Manager commands. Do not erase these files, unless you are instructed to do so by IBM service personnel.

These trace log files all have a limit. When these files reach their size limit, a pruning process copies them into a file with the same name and an extension of `mondisk.2` appended to the end. The pruning process zeros the original file and the trace continues to write into the file. The trace file with the `mondisk.2` extension contains the earliest trace data. You can find the file names for these pruned files in Table 4-3.

*Table 4-3. Trace Log Files That Are Automatically Pruned*

File name in transfer directory	Upper limit (kilobytes)
<code>console</code>	10
<code>mail</code>	10
<code>pd_appletalk.trc</code>	100
<code>pd_dnarouted.log</code>	160
<code>pd_lcpd.log</code>	100
<code>pd_pppsysmond.log</code>	100
<code>pd_sr-sptree</code>	100
<code>pd_sr-sptree.conf</code>	500
<code>pd_srtb-sptree</code>	100
<code>pd_srtb-sptree.conf</code>	500
<code>pd_swap.monproc.out</code>	200
<code>pd_sysmon.trc</code>	500
<code>pd_tb-sptree</code>	100
<code>pd_tb-sptree.conf</code>	500
<code>pd_vines.trc</code>	100
<code>pd_x25d.out</code>	10

For example, the limit of the system monitor trace log is 500 Kb. The output of the trace is written into `pd_sysmon.trc`. When `pd_sysmon.trc` reaches 500 Kb, the pruning process copies the trace files into `pd_sysmon.trc.mondisk.2` overlaying the existing data in that file. The `pd_sysmon.trc` file is zeroed and tracing continues.

## Automatic Pruning Of The Transfer Directory

The pruning process monitors the file system of the transfer directory. When it becomes 97% full, it removes certain files from the transfer directory that have been targeted for removal. These targeted files include the System Manager log, all generated reports, statistics, vital product data, and dumps and most problem determination output. A wildcard character, the asterisk (\*), is used to locate the files to remove. You can find the file names for these removed files in Table 4-4 on page 4-64.



Table 4-4. Output File Names for Removed Files

**File name groupings**

pd\_r66d.log\*  
 pd\_rs960d.log\*  
 pd\_snmpd.log\*  
 pd\_t960logd.log\*  
 pd\_t1d.log\*  
 pd\_trapd.log\*  
 pd\_dlsd.\*  
 pd\_pppd.log\*  
 pd\_cfgd.log\*  
 sysman.trace  
 config.report.\*  
 vpd\_\*  
 pd\_config\*  
 pd\_bsap\*  
 pd\_err\*  
 pd\_tra\*  
 config.src\*  
 \*.route\*  
 pd\_dump\*  
 core\*  
 \*.bak  
 \*.regs  
 \*.dram  
 \*.sram  
 \*.prom  
 \*.read  
 \*.report  
 \*.errmsgs  
 \*dump  
 \*.linetrace  
 \*.mondisk.2

If this removal does not reduce the file system of the transfer directory to below 97%, the pruning process removes all the files in the transfer directory that are over 2 days old, except for the special trace files. The pruning process continues to prune these trace files. If this additional removal does not reduce the file system of the transfer directory to below 97%, the pruning process removes all the files in the transfer directory regardless of how long they have existed, except for the special trace files that the pruning process continues to prune.

The pruning process does not remove any software installation packages that are in the transfer directory. These should be removed by the Software Installation and Maintenance Facility after the software is installed.

Most of the data generated in System Manager or in the fast-path environment is for problem solving and the contents of the files are analyzed only by IBM service personnel. This book does not explain the content of most of these files, except for the error report. Refer to "Contents of an Error Record" on page 5-24 for details about reading an error report.

Table 4-5 (Page 1 of 3). Output File Names Generated from Problem Determination Menu Items

Problem Determination Menu Item	Items on Next Menu	File Names in Transfer Directory
Error Logs and Reports	Copy Error Log to Transfer Directory	pd_error.log

Table 4-5 (Page 2 of 3). Output File Names Generated from Problem Determination Menu Items

Problem Determination Menu Item	Items on Next Menu	File Names in Transfer Directory
System Dump	Start	pd_system.dump
	Copy to Diskette or Transfer Directory	pd_system.dump
	Format	pd_system.fdump
Process and Protocol Dumps	Start Nondisruptive	pd_ip.dump.# ps_ipxd.tables pd_dls.dump pd_route_vines.dump pd_dump.APPN.d#
	Start Disruptive	pd_dump.*
System Trace	Start	trcfile
	Format	pd_trace.report
Process and Protocol Traces	Start	pd_appletalk.trc pd_appn.trc pd_bnbmast* pd_bnbrifh* pd_bnpmanp* pd_bnpxipt* pd_dnarouted.trc pd_dls.trc pd_ip.trc* pd_ipxd.RIP pd_ipxd.SAP pd_pppsysmond.log pd_sr-sptree pd_sr-sptree.conf pd_sysmon.trc* pd_tb-sptree pd_tb-sptree.conf pd_vines.trc pd_XNSrouted.RIP pd_x25d.out* trcfile (APPN, DLSw)

Table 4-5 (Page 3 of 3). Output File Names Generated from Problem Determination Menu Items

Problem Determination Menu Item	Items on Next Menu	File Names in Transfer Directory
Protocol Debug	AppleTalk Debug Information	pd_hostname.appletalk.debug
	APPN Debug Information	pd_hostname.appn.debug
	DECnet Debug Information	pd_hostname.decnet.debug
	DLSw Debug Information	pd_hostname.dls.debug
	IP Debug Information	pd_hostname.ip.debug
	IPX Debug Information	pd_hostname.ipx.debug
	LAN Bridge Debug Information	pd_hostname.lb.debug
	PPP Debug Information	pd_hostname.ppp.debug
	SNMP Debug Information	pd_hostname.snmp.debug
	Source Route Bridge Debug Information	pd_hostname.srb.debug
	Translational Bridge Debug Information	pd_hostname.tlb.debug
	Transparent Bridge Debug Information	pd_hostname.tb.debug
	VINES Debug Information	pd_hostname.vines.debug
	XNS Debug Information	pd_hostname.xns.debug
	X.25 Debug Information	pd_hostname.x25.debug

**Note:**

1. *nnnn* is the sequence number
2. This file name is assigned if you do not specify a different file name.

Table 4-6. Output File Names Generated from Configuration Menu Items

Configuration menu item	Items on next menu	File names in transfer directory
Configuration Reports		config.report.brief config.report.detail

Table 4-7. Output File Names Generated from Software Installation and Maintenance Facility Menu Items

Software Installation menu item	Items on next menu	File names in transfer directory
Apply Software Components		pd_prereq.chk.# pd_space.chk.#
Apply Software Updates		pd_prereq.chk.# pd_space.chk.#

## Using the File Transfer Protocol

FTP allows file transfer between a 6611 and another IP node (for example, to another 6611). The 6611 can issue and receive FTP requests. To transfer files using FTP, specify some or all of the following information in response to prompts:

- Host name or IP address of the IP node that is sending or receiving the file
- User ID and password of a user at the remote IP node
- File name to be transferred
- Type of transfer (get or put)
- Type of file (binary or ASCII)

You can use only a limited number of FTP subcommands when you issue **ftp** from a remote IP host to the 6611. The commands are as follows:

<b>get</b>	Sends a file from the 6611 to the remote IP host.
<b>mget</b>	Sends multiple files from the 6611 to the remote IP host.
<b>put</b>	Copies a file from the remote IP host to the 6611.
<b>mput</b>	Copies multiple files from the remote IP host to the 6611.
<b>cd /static</b>	Changes the current directory to the static directory. To transfer files from the static directory, the current directory must be the static directory.
<b>cd /transfer</b>	Changes the current directory to the transfer directory. To transfer files to or from the transfer directory, the current directory must be the transfer directory.
<b>ls</b>	Lists the files in the current directory, either the transfer directory or the static directory.

If a file is to be transferred into a remote IP node that is *not* a 6611, the file is added (put) in the home directory for the specified user ID. If a file is to be retrieved from the remote IP node, it is retrieved (get) from the home directory of the remote IP node. If a file is to be transferred to a 6611, it is placed in the transfer directory. If a file is to be transferred from a 6611, it is taken from either the transfer directory or the static directory.

There are two versions of FTP used by the 6611:

**Single line version** All options specified first. This is used *only* in 6611 shell scripts. Only the get and put FTP subcommands are correct with the single line version.

**Interactive version** FTP initiated with only the host name; all other information is prompted.

With the interactive version, used with System Manager and in the fast-path environment, a typical scenario is:

- Select **Operations** from the System Manager main menu.
- Select **File and Diskette Operations** from the next menu.
- Select either **Send Transfer Directory File**, **Receive Transfer Directory File**, or **Send Static Directory File** from the next menu.
- Select **remote host via FTP** from the selector screen.
- Enter the **Host name** on the dialog screen.

You are then entered into an interactive dialog with FTP.

**Output displayed:**

```
Trying to connect to hostname
Once successfully connected, you may send a file
from the transfer directory by typing
    put <file_name>
at the ftp prompt
```

```
To quit an FTP session and return to System Manager
Type 'quit' at the ftp prompt
```

```
Press Any Key to Continue ..
```

**Type in:** Press any key

**Output displayed:**

```
Connected to hostname.
220 hostname ftp server (Version 4.1 Date) ready.
Name (hostname: local_userid):
```

**Type in:**

```
Name (hostname: local_userid): remote_userid
```

**Output displayed:**

```
331 Password required for remote_userid.
Password:
```

**Type in:** (Enter the password. It will not be displayed.)

**Output displayed:**

```
230 User remote_userid logged in.  
ftp>
```

**Type in:**

```
ftp> put file_name
```

**Output displayed:**

```
200 PORT command successful.  
150 Opening ASCII mode data connection for file_name.  
226 Transfer complete.  
13029 bytes sent in 0.07388 seconds (172.2 Kbytes/s)  
ftp>
```

**Type in:**

```
ftp> quit
```

**Output displayed:**

```
221 Goodbye.
```

The numbers associated with the FTP messages are standard message numbers for this protocol. They have no significance other than to identify the message.

**Fast-Path Command(s)**

```
files transfer send -ftp host_name  
files static send -ftp host_name  
files transfer receive -ftp host_name
```

## Using the Xmodem Protocol

The Xmodem Protocol is an 8-bit transfer protocol that can detect data transmission errors and then retransmit the data. The station that sends the data waits until the remote station sends a signal that it is ready to receive data. When the remote station gets the data, it returns an acknowledgment to the sender. Sending and receiving files with the Xmodem command are complementary operations. One system must be set to send while the other is set to receive. To interrupt the Xmodem file transfer, press **Ctrl+X**.

To transfer files between a 6611 and a local workstation via Xmodem:

1. Establish the connection between the local workstation and the 6611 with the attached modem. Refer to the documentation about the Xmodem Protocol in the manual supplied with the communications package for the exact syntax.
2. A login prompt appears. You are requested to type in a user ID and password.
3. If the file transfer is between a 6611 that is not equipped with the modem and the workstation from which the telephone connection was made, then an RLOGIN network connection is needed from the 6611 or other IP node equipped with the modem and the 6611 from which or to which the file is to be transferred. Refer to "Using Remote Login" on page 3-6 for details about establishing a remote login connection.

4. When the login has completed to the 6611 needing a file transfer, you are in the System Manager. There are several menu items pertaining to transferring files via modem access. Use the System Manager menus to find the menu item relating to the file transfer needed.
5. Select the file name you want to transfer. The 6611 issues the message:  
     Sending (Receiving) file file\_name via Xmodem  
     You can return to local machine and begin file transmission.
6. Return to the local machine (the one that initiated the telephone call) using the key sequence defined by the communication program that supports the Xmodem Protocol.
7. Receive or send the file, and wait until the file transfer completes.
8. When the file has been transferred, return to the 6611 by reconnecting using the communication program.

**Transferring Files between a RISC System/6000 and a 6611:** To establish a remote login session between a RISC System/6000\* workstation and the 6611 using a modem, use the Asynchronous Terminal Emulation (ATE) program located on the RISC System/6000 workstation. The ATE program allows you to establish a connection between the RISC System/6000 workstation and the 6611. The workstation acts as a terminal connected to the 6611. Using ATE, you can run commands on the 6611 and send and receive files using Xmodem.

The ATE program is menu driven and uses subcommands. The RISC System/6000 ATE program has a dialing directory feature that is a list of up to 20 frequently dialed phone numbers. The dialing directory contains the telephone number and other connection information such as baud rate, parity, and the name of the host at the other end of the connection. The **directory** subcommand allows you to display the telephone numbers and select the one you need to connect to the system you are calling, instead of entering the phone number with the connect subcommand. The **send** subcommand is used to send files from the RISC System/6000 workstation to the 6611. The **receive** subcommand is used to receive files from the 6611 to the RISC System/6000 workstation. The subcommands are entered from the appropriate menu by typing in the first letter of the subcommand followed by the command parameters.

Use the following scenarios to connect to the 6611, and send or receive files from the RISC System/6000 workstation. To send a file from 6611 to RISC System/6000 workstation:

1. To start the ATE program, type **ate** on the command line of the RISC System/6000 workstation.
2. The ATE Unconnected Main Menu is displayed. Using the ATE menus, set the following values:
 

<b>Terminal type</b>	VT100**
<b>Line speed</b>	2400 bps
<b>Transfer Protocol</b>	Xmodem
3. From this menu, specify either the **connect** or **directory** subcommand to connect to the 6611.
  - For the connect subcommand, type **c telephone\_number**.
  - For the directory subcommand, type **d**.

A list of remote station names and phone numbers appears. Select the one corresponding to the 6611 which needs a file transfer.

4. The remote connection is made. Enter this login information when prompted:
  - User ID
  - Password
  - Terminal type
5. You are automatically placed in the System Manager. Find the menu item you want to use to transfer the file to the RISC System/6000 workstation or go to the fast-path environment and enter the following command primitive to send a file from either the transfer or static directory.

**Fast-Path Command(s)**

```
files transfer send -modem file_name
files static send -modem file_name
```

6. Press **Ctrl+V** (main menu key) at the RISC System/6000 workstation to return to ATE. The ATE Connected Main Menu is displayed.
7. Type the receive subcommand as follows: **r file\_name**. The **receive** subcommand instructs the workstation to receive the file from the remote 6611.
8. After transferring the file, the ATE program displays the Connected Main Menu.

To receive a file at the 6611 from the RISC System/6000 workstation:

1. To start the ATE program, type **ate** on the command line of the RISC System/6000 workstation.
2. From this menu, specify either the **connect** or **directory** subcommand to connect to the 6611.
  - For the connect subcommand, type **c telephone\_number**.
  - For the directory subcommand, type **d**.

A list of remote station names and phone numbers appears. Select the one corresponding to the 6611 needing a file transfer.

3. The remote connection is made. Enter this login information when prompted:
  - User ID
  - Password
  - Terminal type
4. You are automatically placed in the System Manager. Find the menu item you want to use to transfer the file from the RISC System/6000 workstation or go to the fast-path environment and enter the following command primitive to receive a file from the current directory of the RISC System/6000 into the transfer directory of the 6611.

**Fast-Path Command(s)**

```
files transfer receive -modem file_name
```

5. Press **Ctrl+V** (main menu key) at the RISC System/6000 workstation to return to ATE on the workstation. The ATE Connected Main Menu is displayed.
6. To issue the **send** subcommand, type: **s file\_name**. The send subcommand instructs the workstation to send the file to the remote 6611.



7. After transferring the file, the ATE program displays the Connected Main Menu.

### **Transferring Files to Diskette**

In many cases, it is not possible to transfer files remotely. Specifically, large files, such as a system dump or a trace report, cannot be transferred remotely. The needed information can be provided to IBM service personnel on a diskette.

The System Manager supports transferring the data on a diskette in either DOS or UNIX format. However, a file transferred to a DOS diskette must be small enough to fit on a single diskette. There is a System Manager menu sequence for transferring the system dump to diskettes. Refer to "Copy to Diskette or Transfer Directory" on page 5-34 for details.

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## Chapter 5. Problem Determination

About This Chapter	5-3
Process Information	5-4
Processes	5-4
Process Commands	5-6
Process Information	5-7
Process Status and Resource Utilization	5-9
Processes by Protocol	5-11
Process Table Information	5-12
System Statistics	5-14
Virtual Memory	5-15
Input/Output (I/O)	5-16
Memory Management	5-18
Paging Space	5-19
System Socket	5-20
Active Internet Connection	5-21
Three-Digit LED Display	5-21
Error Logs and Reports	5-22
Contents of an Error Record	5-24
View an Error Report	5-24
View Error Log Continuously	5-27
View an Error Report for a Single Sequence Number	5-28
Copy Error Log to Transfer Directory	5-30
Clear the Error Log	5-31
System Dump	5-32
Start	5-32
View Dump Information	5-34
Copy to Diskette or Transfer Directory	5-34
Format	5-35
Extract Error Log Records	5-36
Extract Trace Log Records	5-37
Process and Protocol Dumps	5-37
Start Nondisruptive	5-38
View Nondisruptive	5-39
Start Disruptive	5-39
View Disruptive	5-40
System Trace	5-41
Start	5-42
Stop	5-43
Format	5-43
Protocol and Process Traces	5-45
Start	5-46
Stop	5-47
View	5-48
Status	5-49
Adapter Debug	5-50
Read Memory	5-51
View Registers	5-52
Start Line Trace	5-53
Dump Memory	5-54
Protocol Debug	5-54

Source Route Bridge Adapter Table . . . . .	5-55
Network Management Subsystem Information . . . . .	5-57
DLSw General Information . . . . .	5-58
X.25 Traffic Monitor . . . . .	5-59
Protocol Debug Collection Facility . . . . .	5-59
Starting Protocol Traces . . . . .	5-59
Collecting Protocol Debug Information . . . . .	5-60
Files Generated by the Protocol Debug Collection Facility . . . . .	5-61
AppleTalk . . . . .	5-62
APPN . . . . .	5-63
DECnet . . . . .	5-64
DLSw . . . . .	5-65
Frame Relay . . . . .	5-66
Interface . . . . .	5-68
IP . . . . .	5-68
IPX . . . . .	5-70
LAN Bridge . . . . .	5-71
PPP . . . . .	5-72
SNMP . . . . .	5-73
Source Route Bridge . . . . .	5-74
System . . . . .	5-75
Translational Bridge . . . . .	5-75
Transparent Bridge . . . . .	5-77
VINES . . . . .	5-78
XNS . . . . .	5-79
X.25 . . . . .	5-80
Concurrent Hardware Diagnostics . . . . .	5-81
Running from a Direct-Attached ASCII Terminal . . . . .	5-82
Running from a Modem-Attached ASCII Terminal . . . . .	5-84
Running from a Workstation on the IP Network . . . . .	5-85

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## About This Chapter

This chapter provides information about how to use the Problem Determination facilities provided by the System Manager and information about how to run system diagnostics.

The performance data generated is designed to be used for problem determination by IBM service personnel. If IBM service personnel are not given remote access to this 6611 for problem determination, you may be asked to retrieve some of this performance data. This book does not explain or interpret the details of the operations data.

Figure 5-1 shows the Problem Determination menu screen, which you reach by selecting **Problem Determination** on the System Manager main menu.

```
IBM 6611                                     hostname
                                     Problem Determination

Move cursor to desired item and press Enter.

Process Information
System Statistics

Three-Digit LED Display
Error Logs and Reports

System Dump
Process and Protocol Dumps
System Trace
Protocol and Process Traces
Adapter Debug
Protocol Debug

Concurrent Hardware Diagnostics

F1=Help          F2=Redraw screen    F3=Return        F4=SysID
F10=Main Menu    Esc+L=Turn Log On
```

*Figure 5-1. Problem Determination Menu*

Refer to the following for information about the individual menu items:

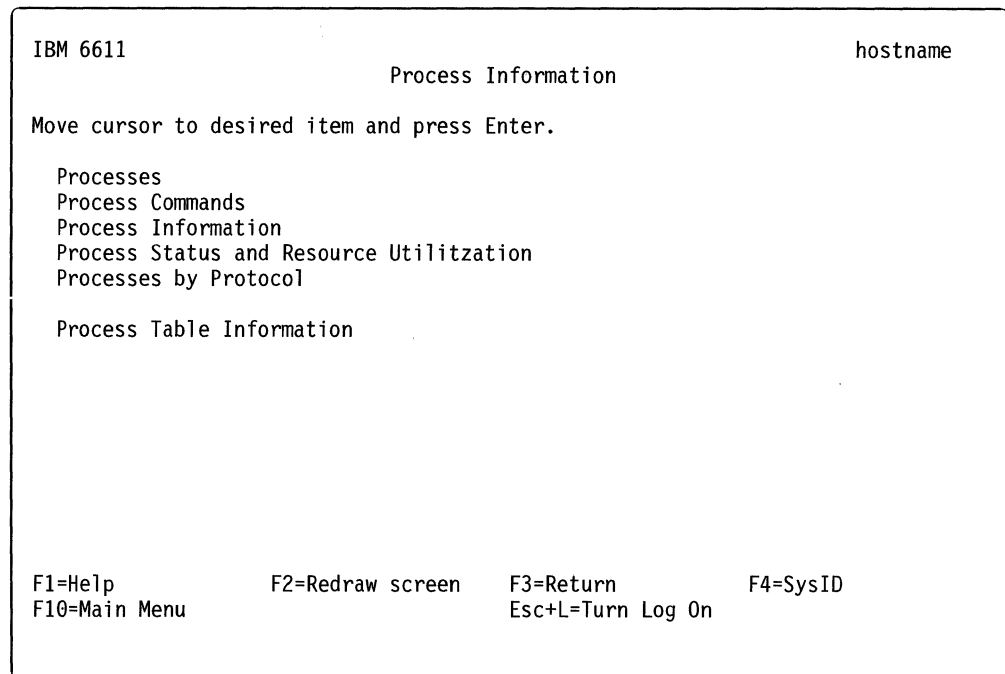
- “Process Information” on page 5-4
- “System Statistics” on page 5-14
- “Three-Digit LED Display” on page 5-21
- “Error Logs and Reports” on page 5-22
- “System Dump” on page 5-32
- “Process and Protocol Dumps” on page 5-37
- “System Trace” on page 5-41
- “Protocol and Process Traces” on page 5-45
- “Adapter Debug” on page 5-50
- “Protocol Debug” on page 5-54
- “Concurrent Hardware Diagnostics” on page 5-81

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## Process Information

The user processes that are running in the 6611 have various pieces of statistical information that you can view. This information can be useful for debugging problems with the user processes or with the performance of the operating system. The Process Information menu provides five different options for how you can view the process information to get the full range of statistics.

Figure 5-2 shows the Process Information menu screen.



```
IBM 6611                                     hostname
                                     Process Information

Move cursor to desired item and press Enter.

Processes
Process Commands
Process Information
Process Status and Resource Utilitization
Processes by Protocol

Process Table Information

F1=Help      F2=Redraw screen  F3=Return    F4=SysID
F10=Main Menu Esc+L=Turn Log On
```

Figure 5-2. Process Information Menu

## Processes

To use the System Manager to list the running processes:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Process Information** from the next menu.
3. Select **Processes** on the next menu.
4. A COMMAND STATUS screen displays the output, as shown in Figure 5-3 on page 5-5. The output is sorted alphabetically by process name.

The field descriptions for the processes output (see Figure 5-3 on page 5-5) are:

<b>PID</b>	The process ID of the process.
<b>USER</b>	The user name of the process owner.
<b>COMMAND</b>	The command name used to represent the process.

### Fast-Path Command(s)

#### process list

PID	USER	COMMAND
7692	root	DNArouted
7182	root	XNSrouted
11379	root	analyst
5905	root	atd
5720	root	cfgerr
4429	root	cron
6676	root	dlsinit
3104	root	errdemon
9750	root	gated
6928	root	gatedcfgd
4939	root	inetd
1	root	init
8973	root	ipxd
12667	root	lanread
12152	root	lanwrite
5205	root	mondisk
1289	root	monintr
9224	root	monproc
10873	root	nb_timer
7947	root	protocfgd
14881	root	ps
5467	root	rt66cfgd
6236	root	scram
4153	root	scsid
8202	root	smux.cfgd
11041	root	smux.r66d
10272	root	snmpd
8467	root	sptree
1594	root	srcmstr
0	root	swapper
1822	root	syncd
3909	root	syslogd
13807	root	sysman
6493	root	t960logd
12509	root	telnetd
2638	root	uprintfd
7439	root	vinesd
11636	root	wandaemon
9493	root	x25d

Figure 5-3. Example of Processes Output

## Process Commands

To use the System Manager to list the full process command names and parameters for all running user processes:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Process Information** on the next menu.
3. Select **Process Commands** on the next menu.
4. A COMMAND STATUS screen displays the output, as shown in Figure 5-4.  
The output is sorted in ascending order by process ID (PID).

The field descriptions for the process commands output (see Figure 5-4) are:

**PID**                    The process ID of the process.

**COMMAND**           The full command name and parameters used to start the process.

Fast-Path Command(s)

process list -commands

```
PID COMMAND
0 swapper
1 /etc/init
514 kproc
1289 /etc/monintr
1594 /etc/srcmstr
1822 /etc/syncd 60
2638 /etc/uprintfd
2875 /etc/sysmon
3104 /usr/lib/errdemon
3665 /etc/getty /dev/tty1
3909 /etc/syslogd
4153 /etc/scsid
4429 /etc/cron
4688 /etc/getty /dev/tty0
4939 /etc/inetd
5205 /etc/mondisk
5467 /etc/rt66cfgd
5720 /etc/cfgerr
5905 /etc/atd
6236 /etc/scram -s
6493 /etc/t960logd
6676 /usr/lpp/dls/dlsinit -c
6928 /etc/gatedcfgd
```

Figure 5-4. Example of Process Commands Output

## Process Information

To use the System Manager to view process information, including priority, size, and address of processes:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Process Information** on the next menu.
3. Select **Process Information** on the next menu.
4. A COMMAND STATUS screen displays the output, as shown in Figure 5-5 on page 5-8. The output is sorted alphabetically by process command name (CMD).

### Fast-Path Command(s)

```
process list -detail
```

The field descriptions for the process information output (see Figure 5-5 on page 5-8 for an example) are:

<b>F</b>	Flags, which are octal and additive and have the following meanings:  <b>01</b> In core <b>02</b> System process <b>04</b> Locked in core <b>10</b> Waiting for a page default, or forking <b>20</b> Being traced by another process <b>40</b> Another tracing flag <b>100</b> Process has shared text
<b>S</b>	State of the process:  <b>0</b> Nonexistent <b>S</b> Sleeping <b>W</b> Waiting <b>R</b> Running <b>I</b> Intermediate <b>Z</b> Canceled <b>T</b> Stopped <b>K</b> Available system process <b>X</b> Growing
<b>UID</b>	User ID of the process owner
<b>PID</b>	Process ID of the process
<b>PPID</b>	Process ID of the parent process
<b>C</b>	Processor utilization for scheduling
<b>PRI</b>	Priority of the process; higher numbers mean lower priority
<b>NI</b>	Nice value; the priority of the process
<b>ADDR</b>	Segment number of the process stack, if it is a normal process. The address of the preprocess data area, if it is a system process.
<b>SZ</b>	Size (in 1024 byte units) of the core image of the process



**WCHAN** Event for which the process is waiting or sleeping; if blank, the process is running.

**TTY** Controlling workstation for the process:

- Process is not associated with a workstation
- ? Controlling workstation is unknown

**Number** Serial port number minus 1; 0 for S1 and 1 for S2.

**TIME** Total execution time for the process

**CMD** Command name of the process

	F	S	UID	PID	PPID	C	PRI	NI	ADDR	SZ	WCHAN	TTY	TIME	CMD
	260801	S	0	7692	2875	0	60	20	783	760		-	2:07	DNAroute
	260801	S	0	7182	2875	0	60	20	f87	140		-	0:18	XNSroute
	240801	S	0	11379	6676	0	58	18	37db	80	12cfd48	-	0:00	analyst
	260801	S	0	5905	2875	0	60	20	1b8d	168		-	1:42	atd
	260801	S	0	5720	2875	0	60	20	1128	52		-	0:00	cfgerr
	240801	S	0	4429	1	0	60	20	f07	140	58220a4	-	0:00	cron
	240801	S	0	6676	2875	0	60	20	2b95	100		-	0:00	dlsinit
	42801	S	0	3104	1	0	60	20	ec7	256	bc58	-	0:00	errdemon
	262801	S	0	9750	2875	0	60	20	3198	600		-	0:34	gated
	260801	S	0	6928	2875	0	60	20	178b	72		-	0:00	gatedcfg
	260801	S	0	4939	1594	0	60	20	3eff	168		-	0:00	inetd
	202803	S	0	1	0	4	62	20	804	144		-	0:39	init
	260801	S	0	8973	2875	0	60	20	b85	164		-	0:26	ipxd
	260801	S	0	12667	12152	0	60	20	21f0	76		-	0:05	lanread
	240801	S	0	12152	1	0	60	20	de6	84	12cfe2c	-	0:00	lanwrite
	240c01	S	0	5205	2875	1	60	20	723	152		-	0:35	mondisk
	240c01	S	0	1289	2875	1	60	20	357a	104		-	0:07	monintr
	240c01	S	0	9224	2875	0	60	20	2974	140		-	5:08	monproc
	240801	S	0	10873	11379	0	58	18	7e3	72	58e6cd8	-	0:53	nb_timer
	260801	S	0	7947	2875	0	60	20	180	692		-	0:01	protocfg
	200001	R	0	14970	15202	9	64	20	3258	96		pts/1	0:00	ps
	260801	S	0	5467	2875	0	60	20	152a	424		-	0:02	rt66cfgd
	260801	S	0	6236	2875	2	61	20	2f37	300		-	3:45	scram
	240801	S	0	4153	1	0	60	20	34da	48	54e2dd8	-	0:00	scsid
	260801	S	0	8202	2875	0	60	20	3b7d	248		-	0:00	smux.cfg
	260801	S	0	11041	2875	0	60	20	35ba	988		-	0:01	smux.r66
	260801	S	0	10272	2875	0	60	20	3f7f	400		-	0:01	snmpd
	260801	S	0	8467	2875	1	60	20	2592	304		-	4:10	sptree
	260801	S	0	8722	2875	0	60	20	1f8f	288		-	2:32	sptree
	260801	S	0	1594	1	0	60	20	e0	176		-	0:00	srcmstr
	b03	S	0	0	0	120	16	--	1008	8		-	0:29	swapper
	240801	S	0	1822	1	0	60	20	3abd	48	58e1698	-	0:06	syncd
	260801	S	0	3909	1594	0	60	20	2cf6	124		-	0:00	syslogd
	260801	S	0	2875	1	0	60	20	4e2	1364		-	0:18	sysmon
	240801	S	0	6493	2875	0	60	20	393c	56	1f92e4	-	0:00	t960logd
	260801	S	0	7439	2875	0	60	20	1389	132		-	0:05	vinesd
	260801	S	0	11636	6676	0	60	20	3dde	100		-	0:00	wandaemo
	240801	S	0	9493	2875	0	60	20	2d96	76	1f9354	-	0:00	x25d

Figure 5-5. Example of Process Information Output

## Process Status and Resource Utilization

To use the System Manager to view process table information:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Process Information** on the next menu.
3. Select **Process Status and Resource Utilization** on the next menu.
4. A COMMAND STATUS screen displays the output, as shown in Figure 5-6 on page 5-10. The output is sorted in ascending order by process ID (PID).

### Fast-Path Command(s)

```
process list -status
```

The field descriptions for the process status output (refer to Figure 5-6 on page 5-10 for an example) are:

<b>PID</b>	Process ID of the process
<b>TTY</b>	Controlling workstation for the process:  - Process is not associated with a workstation ? Controlling workstation is unknown  <b>Number</b> Serial port number minus 1; 0 for S1 and 1 for S2
<b>STAT</b>	State of the process:  <b>O</b> Nonexistent <b>S</b> Sleeping <b>W</b> Waiting <b>R</b> Running <b>I</b> Intermediate <b>Z</b> Canceled <b>T</b> Stopped <b>K</b> Available system process <b>X</b> Growing
<b>TIME</b>	Total execution time for the process
<b>PGIN</b>	Number of disk I/Os resulting from references by the process to pages not loaded in core
<b>SIZE</b>	Virtual size of the data section of the process (in 1kilobyte units)
<b>RSS</b>	Real memory (resident set) size of the process (in 1kilobyte units)
<b>LIM</b>	Soft limit on memory (in KB) the process can use before failing. If no limit has been specified, it is shown as xx. If the limit is set to the system limit, a value of UNLIM is displayed.
<b>TSIZ</b>	Size of text (shared program) image
<b>TRS</b>	Size of resident (real memory) set of text
<b>%CPU</b>	Elapsed CPU utilization of the process since it was started. This is a cumulative value. Because the time base over which this is computed varies, it is possible for the sum of all %CPU fields to exceed 100%.

**%MEM** Percentage of real memory used by this process

**COMMAND** Full command name and its parameters. This field is truncated to 10 characters.

PID	TTY	STAT	TIME	PGIN	SIZE	RSS	LIM	TSIZ	TRS	%CPU	%MEM	COMMAND
0	-	S	0:29	6	8	8	xx	0	0	0.1	0.0	swapper
1	-	S	0:39	50	144	140	xx	21	24	0.1	1.0	/etc/init
514	-	R	862:00	0	12	8	xx	0	0	0.0	0.0	kp roc
771	-	S	1:40	0	16	16	xx	0	0	0.0	0.0	kproc
1028	-	S	0:00	3	16	16	xx	0	0	0.0	0.0	kproc
1289	-	S	0:07	32	104	120	xx	33	32	0.0	1.0	/etc/monintr
1594	-	S	0:00	12	176	12	xx	21	0	0.0	0.0	/etc/srcmstr
1822	-	S	0:06	15	48	28	xx	1	4	0.0	0.0	/etc/syncd 60
2147	-	S	0:00	0	16	8	xx	0	0	0.0	0.0	kproc
2638	-	S	0:00	2	36	12	xx	4	0	0.0	0.0	/etc/uprintfd
2875	-	S	0:18	255	1364	424	xx	130	84	0.0	2.0	/etc/sysmon
3104	-	S	0:00	64	256	76	xx	39	28	0.0	0.0	/usr/lib/errdemon
3480	-	S	0:00	0	16	8	xx	0	0	0.0	0.0	kproc
3665	?	S	0:00	12	204	68	xx	38	56	0.0	0.0	/etc/getty /dev/ttyi
3909	-	S	0:00	32	124	68	32768	16	24	0.0	0.0	/etc/syslogd
4153	-	S	0:00	4	48	28	xx	1	4	0.0	0.0	/etc/scsid
4429	-	S	0:08	52	140	88	xx	24	28	0.0	0.0	/etc/cron
4688	?	S	0:00	13	208	68	xx	38	56	0.0	0.0	/etc/getty /dev/tty0
4939	-	S	0:00	52	168	172	32768	26	32	0.0	1.0	/etc/inetd
5205	-	S	0:35	30	152	140	xx	12	12	0.1	1.0	/etc/mondisk
5467	-	S	0:02	126	424	216	xx	206	80	0.0	1.0	/etc/rt66cfgd
5720	-	S	0:00	3	52	12	xx	6	0	0.0	0.0	/etc/cfgerr
5905	-	S	1:42	35	168	152	xx	86	52	0.2	1.0	/etc/atd
6236	-	S	3:45	55	300	140	xx	113	52	0.4	1.0	/etc/scram -s
6493	-	S	0:00	3	56	12	xx	7	0	0.0	0.0	/etc/t960logd
6676	-	S	0:00	30	100	12	xx	41	0	0.0	0.0	/usr/lpp/dls/dlsinit -c
6928	-	S	0:00	11	72	12	xx	33	0	0.0	0.0	/etc/gatedcfgd
7182	-	S	0:18	16	140	92	xx	33	32	0.0	0.0	/etc/XNSrouted -S
7439	-	S	0:05	51	132	104	xx	82	56	0.0	0.0	/etc/vinesd -S
7692	-	S	2:07	191	760	692	xx	251	112	0.2	3.0	/etc/DNArouted
7947	-	S	0:01	23	692	12	xx	83	0	0.0	0.0	/etc/protocfgd
8202	-	S	0:00	84	248	48	xx	79	16	0.0	0.0	/usr/sbin/smux.cfgd
8467	-	S	4:10	21	304	144	xx	84	44	0.5	1.0	/etc/sr-sptree
8722	-	S	2:32	19	288	128	xx	84	44	0.3	1.0	/etc/tb-sptree
8973	-	S	0:26	28	164	128	xx	62	52	0.0	1.0	/etc/ipxd -S
9224	-	S	5:08	38	140	116	xx	39	24	0.6	0.0	/etc/monproc
												-s/testbin/swap.monproc -r30
9493	-	S	0:00	5	76	12	xx	6	0	0.0	0.0	/etc/x25d -d
9750	-	S	0:34	226	600	556	xx	712	152	0.1	2.0	/etc/gated -N

Figure 5-6. Example of Process Status and Resource Utilization Output

## Processes by Protocol

To use the System Manager to list the running protocols and their associated processes:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Process Information** on the next menu.
3. Select **Processes by Protocol** on the next menu.
4. A COMMAND STATUS screen displays the output, as shown in Figure 5-7.

### Fast-Path Command(s)

```
process list -protocol
```

Protocol	Process_name	ID	Parent	%CPU	ELAPSED	TIME	VSZ
TCP/IP	inetd	1672	3191	0.0	1-05:10:00	00:00:00	188
	telnetd	13640	1672	0.0	09:24	00:00:00	196
	gated	7823	3960	0.1	1-03:44:32	00:00:59	608
AppleTalk	atd	9945	3960	0.2	59:18	00:00:06	184
DECnet	DNArouted	7277	1960	0.5	1-03:44:40	00:07:47	772
IPX	ipxd	9582	3960	0.0	1-03:44:40	00:00:46	176
VINES	vinesd	8560	3960	0.0	1-03:44:40	00:00:10	148
XNS	XNSrouted	8815	3960	0.0	1-03:44:40	00:00:34	156
System	init	1	0	0.1	1-05:11:24	00:01:22	252
	sysmon	3960	1	0.0	1-05:10:09	00:00:20	1412
	syncd	1797	1	0.0	1-05:10:23	00:00:17	64
	srcmstr	3191	1	0.0	1-05:10:09	00:00:00	192
	cron	5258	1	0.0	1-05:10:00	00:00:22	152
SNMP	snmpd	11388	3960	0.0	1-03:44:27	00:00:06	424

Figure 5-7. Example of Processes by Protocol Output

The field descriptions for the output are:

**Protocol** The protocol or software component to which this process belongs

**Process\_name** The name of the process

**ID** The process identifier (PID)

**Parent** The process identifier of the parent process (PPID)

**%CPU** CPU utilization of the process

Because the time base over which this is computed varies it is possible for the sum of all %CPU fields to exceed 100%.

**ELAPSED** Elapsed time since the process started

**TIME** The cumulative CPU time for the process

**VSZ** Indicates the size, in kilobytes, of the process in virtual memory as a decimal integer.

## Process Table Information

The process table maintains statistics on system variables, paging information, and file table information. Only a controlling user can invoke the function to view this information.

To use the System Manager to view process table information:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **Process Information** on the next menu.
4. Select **Process Table Information** on the next menu.

5. On the dialog screen, press **Tab** to select either **yes** or **no** to turn on or off each of the following process table options:

- Display process table?
- Display entries in the process table?
- Display file table?
- Display system variables?
- Display i-node information?
- Display paging information?

The defaults are *yes* for all of the above.

6. A **COMMAND STATUS** screen displays the output. Figure 5-8 on page 5-14 shows an example of process table information output.

**Fast-Path Command(s)**

**process table view**

The field descriptions for the process table output are:

**SLT** Slot number in process table

**ST** Process state:

- s - sleeping
- r - running
- t - stopped
- i - idle
- z - zombie

**PID** Process ID

**PPID** Parent process ID

**PGRP** Parent group ID

**UID** User ID

**EUID** Effective user ID

**PRI** Process priority; the lower the number, the higher the priority

**CPU** CPU utilization; the amount of time in ticks used by the process

**EVENT** The location in storage of an event being waited for by a sleeping process

**NAME** The name of the process

---

SYSTEM VARS:

buffers 20  
files 456  
e\_files 456  
procs 131071  
e\_procs 48  
clists 16384  
maxproc 40  
iostats 1  
locks 200  
e\_locks 8522048

SLT	ST	PID	PPID	PGRP	UID	EUID	PRI	CPU	EVENT	NAME
0	s	0	0	0	0	0	16	120		swapper
FLAGS: swapped_in no_swap fixed_pri kproc wake/sig										
1	s	1	0	0	0	0	60	1		init
FLAGS: swapped_in no_swap wake/sig locks										
2	r	202	0	0	0	0	127	120		wait
FLAGS: swapped_in no_swap fixed_pri kproc										
6	s	61c	1	61c	0	0	60	0		sysmon
FLAGS: swapped_in wake/sig										
18	s	1229	61c	61c	0	0	60	0		mondisk

---

Figure 5-8. Example of Process Table Information Output

---

## System Statistics

System network statistics are those network parameters that are gathered by the base operating system, as opposed to the peer-capable adapters. Some packets are forwarded by the adapters bypassing the base operating system. Select this option to view various system-related statistics.

Figure 5-9 on page 5-15 shows the System Statistics menu screen.

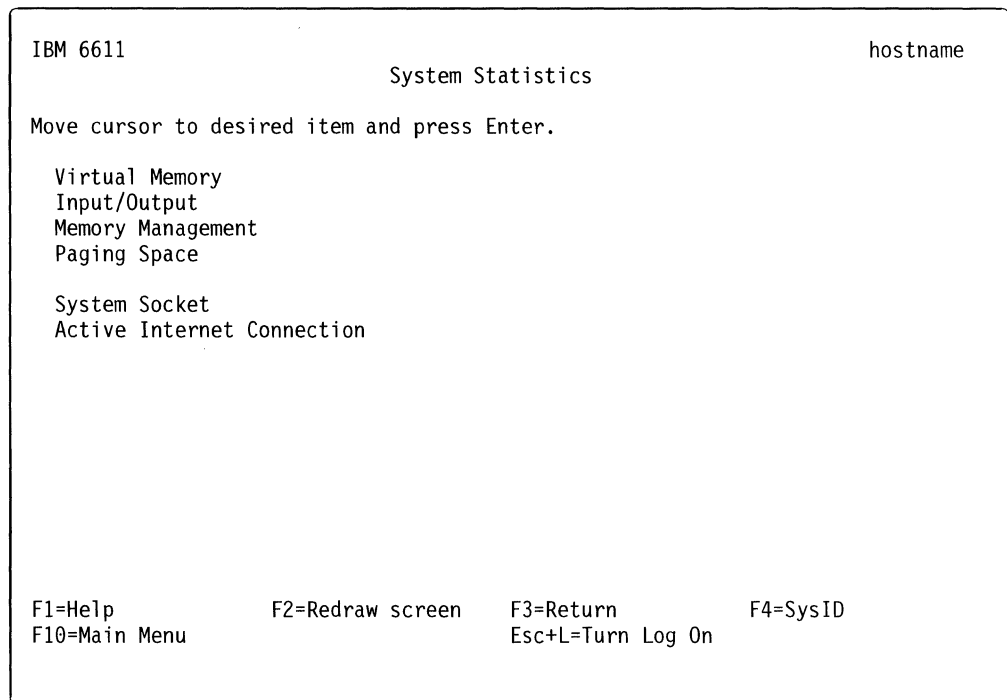


Figure 5-9. System Statistics Menu

## Virtual Memory

This option provides statistics about processes, virtual memory, disks, and CPU activity.

To use the System Manager to view virtual memory statistics:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **System Statistics** on the next menu.
4. Select **Virtual Memory** on the next menu.
5. Enter values for **Seconds between samples** and **Number of samples** on the dialog screen.

**Seconds between samples** Specifies the amount of time between reports.

The first report contains statistics from the time the system started. Subsequent reports contain statistics collected from the end of the last interval that was reported.

**Number of samples**

Specifies the number of reports. If the Number of samples parameter is 1, the task generates a single report that contains a summary of the virtual memory activity since the system was started, then exits.

6. A COMMAND STATUS screen displays the statistical output, as shown in Figure 5-10 on page 5-16.



### Fast-Path Command(s)

```
system statistics view -virtual_memory number_seconds number_samples
```

The field descriptions for the virtual memory output (see Figure 5-10 for an example) are:

<b>procs</b>	Number of processes in various states:	
	<b>r</b>	In the run queue
	<b>b</b>	In pager wait (awaiting resource, awaiting input/output)
<b>memory</b>	Virtual and real memory usage:	
	<b>avm</b>	Active virtual pages
	<b>fre</b>	Size of free list
<b>page</b>	Page activity and page fault information:	
	<b>re</b>	Pager input/output list
	<b>pi</b>	Pages paged in from paging space
	<b>po</b>	Pages paged out to paging space
	<b>fr</b>	Pages freed (page replacement)
	<b>sr</b>	Pages scanned by page replacement algorithm
	<b>cy</b>	Clock cycles by page replacement algorithm
<b>faults</b>	Trap and interrupt rate averages per second over sampling interval:	
	<b>in</b>	Device interrupts
	<b>sy</b>	Subroutines
	<b>cs</b>	CPU context switch
<b>cpu</b>	Breakdown of percentage usage of CPU time:	
	<b>us</b>	User time
	<b>sy</b>	System time
	<b>id</b>	CPU idle time
	<b>wa</b>	CPU cycles to determine that the current process is in wait and there is pending input/output

procs		memory		page						faults			cpu			
r	b	avm	fre	re	pi	po	fr	sr	cy	in	sy	cs	us	sy	id	wa
0	0	5441	91	0	0	0	0	0	0	111	69	22	1	1	97	1
0	0	5441	91	0	0	0	0	0	0	212	277	166	4	5	91	0

Figure 5-10. Example of Virtual Memory Output

## Input/Output (I/O)

This task is performed to monitor system input and output device loading. It generates statistical reports for the terminal and disk devices.

The first report generated by this menu item provides statistics concerning the time since the system was started. Each subsequent report contains statistics collected since the previous report. All statistics are reported each time this task is invoked.

To use the System Manager to view I/O statistics:

1. Log in with a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **System Statistics** on the next menu.
4. Select **Input/Output** on the next menu.
5. Enter values for the **Seconds between samples** and **Number of samples** on the dialog screen.

**Seconds between samples** Specifies the amount of time between reports.

The first report contains statistics from the time the system started. Subsequent reports contain statistics collected from the end of the last interval that was reported.

**Number of samples** Specifies the number of reports. If the Number of samples parameter is 1, the task generates a single report that contains a summary of the virtual memory activity since the system was started, then exits.

6. A COMMAND STATUS screen displays the I/O output, as shown in Figure 5-11 on page 5-18.

**Fast-Path Command(s)**

**system statistics view -input\_output *number\_seconds number\_samples***

The field descriptions for input/output output (see Figure 5-11 on page 5-18 for an example) are:

<b>tin</b>	Number of characters per second received from all terminals on the system
<b>tout</b>	Number of characters per second output to all terminals on the system
<b>% user</b>	Percentage of time system has spent in user mode
<b>% sys</b>	Percentage of time system has spent in system mode
<b>% idle</b>	Percentage of time system has spent in idle state
<b>% iowait</b>	Percentage of time system has spent in wait state
<b>% tm_act</b>	Percentage of time disk was active
<b>Kbps</b>	Kilobytes transferred per second
<b>tps</b>	Number of transfers per second
<b>mmps</b>	Average seek time
<b>Kb_read</b>	Number of kilobytes read during interval reported
<b>Kb_wrtn</b>	Number of kilobytes written during interval reported

---

tty:	tin	tout	cpu:	% user	% sys	% idle	% iowait
	0.0	3.1		0.5	1.1	97.1	1.2
Disks:	% tm_act	Kbps	tps	msps	Kb_read	Kb_wrtn	
hdisk0	1.3	2.2	0.5		26912	215638	
hdisk1	0.1	0.2	0.0		3447	18368	
tty:	tin	tout	cpu:	% user	% sys	% idle	% iowait
	0.0	142.8		3.5	4.0	92.5	0.0
Disks:	% tm_act	Kbps	tps	msps	Kb_read	Kb_wrtn	
hdisk0	0.0	0.0	0.0		0	0	
hdisk1	0.0	0.0	0.0		0	0	

---

Figure 5-11. Example of Input/Output Output

## Memory Management

Use the Memory Management menu item to view memory management statistics that are reported by the base operating system. These statistics show memory management information related to the network interfaces.

To use the System Manager to view memory management information:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **System Statistics** on the next menu.
3. Select **Memory Management** on the next menu.
4. A COMMAND STATUS screen displays the output. See Figure 5-12 on page 5-19 for an example of memory management output. *Mbufs* represents memory buffers.

### Fast-Path Command(s)

```
system statistics view -memory_management
```

---

```

540 mbufs in use:
    35 mbufs allocated to data
    12 mbufs allocated to packet headers
    204 mbufs allocated to socket structures
    233 mbufs allocated to protocol control blocks
    20 mbufs allocated to routing table entries
    33 mbufs allocated to socket names and addresses
    3 mbufs allocated to interface addresses
    1 mbufs allocated to <mbuf type 17>

32/74 mapped pages in use
431 Kbytes allocated to network (61% in use)
0 requests for memory denied
0 requests for memory delayed
0 calls to protocol drain routines

```

---

Figure 5-12. Example of Memory Management Output

## Paging Space

Use the Paging Space menu item to view the characteristics of paging spaces. Characteristics displayed in the output are:

- Paging space name
- Physical volume name
- Volume-group name
- Size
- Percentage of paging space used
- Indication of whether paging space is active or inactive
- Indication of whether paging space is set to automatic or not
- Paging space type; *lv* is logical volume

To use the System Manager to view paging space information:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **System Statistics** on the next menu.
3. Select **Paging Space** on the next menu.
4. A COMMAND STATUS screen displays the output.

See Figure 5-13 for an example of paging space output.

### Fast-Path Command(s)

```
system statistics view -paging_space
```

---

Function name: Paging Space

Page Space	Physical Volume	Volume Group	Size	%Used	Active	Auto	Type
hd61	hdisk1	rootvg	16MB	81	yes	yes	lv
hd6	hdisk0	rootvg	32MB	63	yes	yes	lv

---

Figure 5-13. Example of Paging Space Output

# System Socket

To use the System Manager to view system socket information that is reported by the base operating system:

- 1. Select **Problem Determination** from the System Manager main menu.
- 2. Select **System Statistics** on the next menu.
- 3. Select **System Socket** on the next menu.
- 4. A COMMAND STATUS screen displays the output.

Fast-Path Command(s)

system statistics view -socket\_info

The field descriptions for the system socket output (see Figure 5-14 for an example) are:

<b>SADR/PCB</b>	System address of the protocol control block
<b>Type</b>	Socket type
<b>Recv-Q</b>	Receive queue size
<b>Send-Q</b>	Send queue size
<b>Inode</b>	Disk inode associated with the socket
<b>Conn</b>	Control block of a connected socket
<b>Refs</b>	Referencing socket linked list
<b>Nextref</b>	Pointer to socket referencing linked list

Active UNIX domain sockets							
SADR/PCB	Type	Recv-Q	Send-Q	Inode	Conn	Refs	Nextref
54f0a14	stream	0	0	5840928	0	0	0 /tmp/sysmon.action
54f0b14							
54f0c14	stream	0	0	0	54ef114	0	0
54ef514							
54e3014	dgram	0	0	5840108	0	0	0 /dev/SRC
54f0014							
54f0d14	stream	0	0	0	54ef514	0	0
54ef114							
54ee114	stream	0	0	0	54ee414	0	0
54ee214							
54ef414	stream	0	0	0	54ef714	0	0
54ef014							
54ee314	stream	0	0	0	54ee214	0	0
54ee414							
54ef314	dgram	0	0	5840a60	0	0	0 /dev/.SRC-unix/SRCEigCnm
54f0e14							
54eea14	stream	0	0	0	54eed14	0	0

Figure 5-14. Example of System Socket Output

## Active Internet Connection

These statistics show active Internet connection information that is reported by the base operating system.

To use the System Manager to view active Internet connection information:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **System Statistics** on the next menu.
3. Select **Active Internet Connection** on the next menu.
4. A COMMAND STATUS screen displays the output. See Figure 5-15 for an example.

### Fast-Path Command(s)

**system connections view**

The field descriptions for the active internet connection output (see Figure 5-15) are:

<b>PCB/ADDR</b>	Protocol control block address
<b>Proto</b>	Protocol name
<b>Recv-Q</b>	Receive queue size
<b>Send-Q</b>	Send queue size
<b>Local Address</b>	Local address
<b>Foreign Address</b>	Remote address
<b>(state)</b>	Connection state status

### Active Internet connections

PCB/ADDR	Proto	Recv-Q	Send-Q	Local Address	Foreign Address	(state)
5548714	tcp	0	0	1.1.1.1.23	1.1.1.2.1639	ESTABLISHED
5548b14	tcp	0	0	1.1.1.1.23	1.1.1.2.1638	ESTABLISHED
5548d14	tcp	0	0	127.0.0.1.199	127.0.0.1.1025	ESTABLISHED
5551514	tcp	0	0	127.0.0.1.1025	127.0.0.1.199	ESTABLISHED
5553d14	tcp	0	0	127.0.0.1.199	127.0.0.1.1024	ESTABLISHED
5552614	tcp	0	0	127.0.0.1.1024	127.0.0.1.199	ESTABLISHED

Figure 5-15. Example of Active Internet Connection Output

## Three-Digit LED Display

There is a 3-digit light-emitting diode (LED) display on the operator panel of the 6611 that displays error and status codes at various times during 6611 operation. The value displayed can be read remotely from the 6611 using the System Manager.

For more information about error and status codes, refer to the *IBM Multiprotocol Network Program Operations Pocket Guide*.

To use the System Manager to retrieve error or status codes which appear on the 3-digit LED display:

1. Log in using a controlling user ID.
2. Select **Problem Determination** on the System Manager main menu.
3. Select **Three-Digit LED Display** from the next menu.
4. A COMMAND STATUS screen displays the error or status code along with its meaning and user response.

If an error or status code is currently not displayed on the 3-digit display, you will see the message:

The 3-digit display is blank.

#### Fast-Path Command(s)

**led view**

Figure 5-16 shows an example of the display output when you read the 3-digit display using the System Manager.

Code: 10c

Message: The system monitor process cannot access the adapter installed in slot 1 because of a problem with:

System code that communicates with the adapter  
Adapter microcode  
Adapter hardware

User Response: For a suspected software problem, check the error log to determine a software problem.

For a suspected hardware problem:

Execute adapter diagnostic tests  
Check the adapter for correct installation  
Check the adapter for defects

Figure 5-16. Sample Output from Reading the 3-Digit Display

## Error Logs and Reports

The Multiprotocol Network Program uses an error log to record activities that occur on the base operating system and the peer-capable adapters. Some of the recorded errors are sent as traps to the 6611 SNMP Trap Facility to communicate error information to you and to IBM service personnel.

Most of the activities recorded in the error log are error conditions. A subset of the errors recorded are classified as *alerts*. Alerts are events that require a user response, for example:

<b>Error:</b>	Adapter disabled
<b>Probable Cause:</b>	Hardware failure

**User Response:** Call service personnel

Alerts are converted to SNMP traps and transmitted to the network management station, if one exists. The trap data presented at the SNMP network management station tells you the action to perform. In some cases, you receive error notification on the 3-digit display of the 6611.

If IBM NetView\* for AIX is used as the SNMP network manager, all traps can be converted to alerts and forwarded to NetView. Refer to the *IBM 6611 Network Processor Network Management Reference* for more information about using an SNMP network manager and traps.

**Warning:** The error log has a capacity of 1 MB and wraps when it is filled. Generally, the entries in the error log should never be deleted. However, entries for specific hardware failures should be deleted after the hardware has been replaced. Otherwise, errors in the log from the failed hardware will continue to appear in error reports.

To use the System Manager to work with error logs and reports:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Error Logs and Reports** on the next menu.

Figure 5-17 shows the Error Logs and Reports menu.

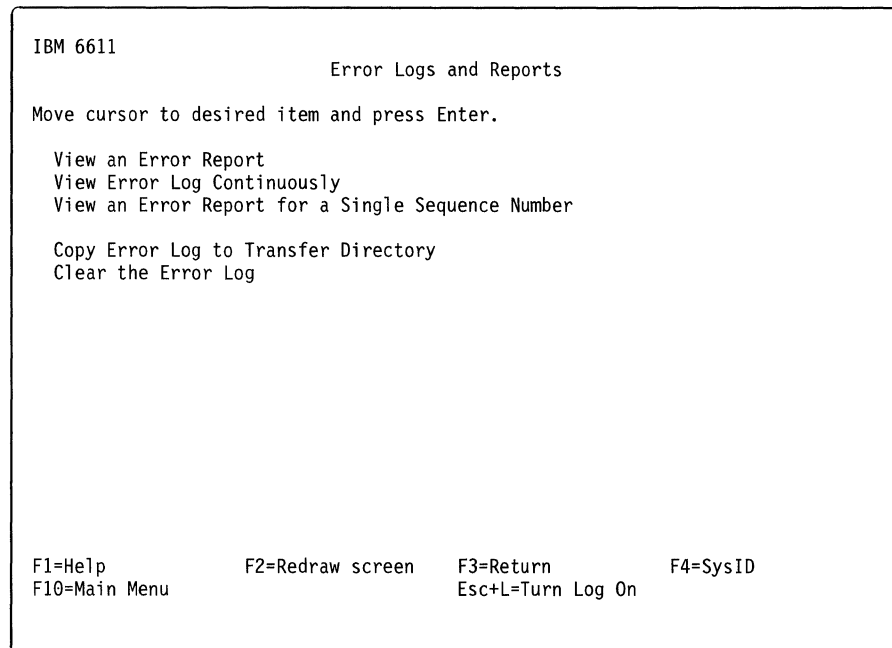


Figure 5-17. Error Logs and Reports Menu



## Contents of an Error Record

An error record contains the following information:

- Error label and error ID
- Date and time
- Sequence number
- Machine ID and node ID
- Error class (hardware [H], software [S], or operator [O])
- Resource name
- Resource class (hardware only)
- Vital product data (hardware only)
- Error type:
  - Permanent (PERM)      For conditions when the recovery is unsuccessful.
  - Performance (PERF)    For conditions that degrade performance of a component (hardware and software) below an acceptable level.
  - Impending (PEND)      For conditions that signify the loss of a component is threatened.
  - Temporary (TEMP)      For conditions when the recovery is successful. This error type is also used for non-error events.
  - Unknown (UNKN)        For conditions when the severity cannot be determined.
- Error descriptions contain messages indicating what caused the event and what action can be taken, if any. The four types of cause or action messages are:
  - Probable cause messages
  - Failure-related error cause or action messages
  - Installation-related cause or action messages
  - User-related cause or action messages

For each cause or action message, up to four message texts can be displayed. Of the four types of causes, the probable cause message and at least one of the remaining three types of cause messages is provided.

## View an Error Report

To use the System Manager to view an error report:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Error Logs and Reports** on the next menu.
3. Select **View an Error Report** on the next menu.
4. On the dialog screen:
  - a. Press **Tab** to select a style of error report, either **summary** or **detailed**.

The detailed report contains all the data in the error record in readable form. The summary report contains:

- Event ID value (ERROR\_ID)
- Time stamp (TIMESTAMP)
- Severity (T)
- Event class (CL)
- Resource name (RESOURCE\_NAME)
- Event description message (ERROR\_DESCRIPTION)

- b. Select values from the dialog screen to limit the scope of the error report. Use the default values in the dialog items to get a full report. If a null report is created, you have chosen a combination of options that are not found in the error log.

### Error classes

Press **F4 (Esc+4)** to list, **F9 (Esc+9)** to select, and **Enter** to record selections. If you type in your selections, you cannot use lowercase letters. Only the following uppercase letters are supported:

- H (hardware)
- S (software)
- O (operator)

The default is all.

### Error types

Press **F4 (Esc+4)** to list, **F9 (Esc+9)** to select, and **Enter** to record selections.

- PERM (permanent)
- TEMP (temporary)
- PERF (performance)
- PEND (impending)
- UNKN (unknown)

The default is all.

### Resource classes

Press **F4 (Esc+4)** to list, **F9 (Esc+9)** to select, and **Enter** to record selections from a hardware device class list. This field is only selected for hardware errors.

The default is all.

### Resource names

Press **F4 (Esc+4)** to list, **F9 (Esc+9)** to select, and **Enter** to record selections. For hardware errors, the resource name is a device name. For software errors, the resource name is the name of the failing executable resource.

### Error ID filter action

Press **Tab** to select **include** or **exclude**. The default is **include**.

### Error IDs on which to filter

Press **F4 (Esc+4)** to list, **F9 (Esc+9)** to select, and **Enter** to record selections. The default is all.

### Starting date and time

Type in **MMDDhhmmYY** format.

### Ending date and time

Type in **MMDDhhmmYY** format.

#### Fast-Path Command(s)

```
error report -detail start_date end_date
error report -summary start_date end_date
error report -error_ID [-detail-summary] error_ID start_date end_date
error report -hardware [-detail-summary] start_date end_date
error report -hw_resource [-detail-summary] hw_resource start_date end_date
error report -software [-detail-summary] start_date end_date
error report -sw_resource [-detail-summary] sw_resource start_date end_date
error report -operator [-detail-summary] start_date end_date
```

Figure 5-18 displays an example of summary style error report output.

ERROR_ID	TIMESTAMP	T	CL	RESOURCE_NAME	ERROR_DESCRIPTION
9DBCDEE	1203125991	T	O	errdemon	Error logging turned on
192AC071	1202161691	T	O	errdemon	Error logging turned off
FCA960CE	1120114691	T	S	tok0	EXCESSIVE TOKEN-RING ERRORS
C14C511C	1120113291	T	H	scsi0	ADAPTER ERROR
C14C511C	1120113291	T	H	scsi0	ADAPTER ERROR
74533D1A	1120113191	U	H	SYSIOS	LOSS OF ELECTRICAL POWER
9DBCDEE	1120113391	T	O	errdemon	Error logging turned on
74533D1A	1107094791	U	H	SYSIOS	LOSS OF ELECTRICAL POWER
C14C511C	1031070991	T	H	scsi0	ADAPTER ERROR
74533D1A	1031065091	U	H	SYSIOS	LOSS OF ELECTRICAL POWER
83F06558	0915220491	P	S	SYSPROC	SOFTWARE PROGRAM ABNORMALLY TERMINATED
AA8AB241	0914230491	T	O	OPERATOR	OPERATOR NOTIFICATION
9DBCDEE	0913556891	T	O	errdemon	Error logging turned on
192AC071	0912456791	T	O	errdemon	Error logging turned off

Figure 5-18. Example of View an Error Report Output - Summary Style

## View Error Log Continuously

To view the error log in real time:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Error Logs and Reports** on the next menu.
3. Select **View Error Log Continuously** on the next menu.

The output scrolls continuously on the screen as entries are made to the error log.

4. Press **Ctrl+C** to stop your request.

#### Fast-Path Command(s)

```
error report -continuous
```

## View an Error Report for a Single Sequence Number

Each error record contains a unique sequence number. This sequence number is sent to the network management station in the trap.

To use the System Manager to view a detailed error report for a single sequence number:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Error Logs and Reports** on the next menu.
3. Select **View an Error Report for a Single Sequence Number** on the next menu.
4. On the selector screen, select the sequence number from a list of all sequence numbers that are currently in the error log. The list can be long. Press **Enter** to execute.
5. A COMMAND STATUS screen displays the error report if it is less than 512 kilobytes. If the error report is greater than 512 kilobytes, it is sent to the transfer directory as `pd_error.report`. You can view it from the fast-path environment by issuing the command:

**files transfer view pd\_error.report**

**Fast-Path Command(s)**

**error report -sequence\_number *sequence\_number***

Figure 5-19 on page 5-29 shows an example of a software error report.

---

ERROR LABEL: SNMP\_05  
ERROR ID: 0FF3E351

Date/Time: Mon Nov 11 10:32:09  
Sequence Number: 74529  
Machine Id: 000000183000  
Node Id: whipl  
Error Class: S  
Error Type: PERM  
Resource Name: snmp

Error Description  
SOFTWARE PROGRAM ERROR

Probable Causes  
SOFTWARE PROGRAM

Failure Causes  
SOFTWARE PROGRAM

Recommended Actions  
CONTACT SERVICE REPRESENTATIVE  
REPORT THE FOLLOWING

Detail Data  
SYMPTOM CODE  
5549 smux.tld interface-snmp 192  
FILE NAME  
snmp.config  
REFERENCE CODE  
423

---

*Figure 5-19. Example of View an Error Report for a Single Sequence Number (Software Error)*

Figure 5-20 on page 5-30 shows an example of a hardware error report.

---

```

ERROR LABEL:      TOK_RCVRY_ENTER
ERROR ID:         0502F666

Date/Time:        Jun 19 22:29:51
Sequence Number:  6824
Machine ID:       123456789012
Node ID:          u2
Class:            H
Type:             TEMP
Resource Name:    tok0
Resource Class:   adapter
Resource Type:    tokenring
Location:         00-03
VPD:
    Network Address.....10005A4F35D2
    Display Message.....TOKEN RING
    EC Level.....A78976
    FRU Number.....022F9380
    Manufacturer.....VEN0809375
    Part Number.....074F4134
    Serial Number.....009683
    ROS Level and ID.....0000
    Loadable Microcode Level....00
Error Description
ADAPTER ERROR

Probable Causes
REMOTE CSMA/CD ADAPTER
LOCAL TOKEN-RING ADAPTER
ADAPTER HARDWARE
ADAPTER MICROCODE

Failure Causes
LOCAL TOKEN-RING ADAPTER INTERFACE
TOKEN-RING ADAPTER

    Recommended Actions
    CHECK CABLES AND THEIR CONNECTIONS
    WAIT THEN RETRY
    PERFORM PROBLEM DETERMINATION PROCEDURES

Detail Data
SENSE DATA
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000

```

---

*Figure 5-20. Example of View an Error Report for a Single Sequence Number (Hardware Error)*

## Copy Error Log to Transfer Directory

To use the System Manager to copy the error log to the transfer directory, so that you can retrieve the error log and generate reports:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Error Logs and Reports** on the next menu.

3. Select **Copy Error Log to Transfer Directory** on the next menu.

The error log is placed in the transfer directory as `pd_error.log`.

**Fast-Path Command(s)**

**error transfer -error\_log**

Figure 5-21 shows an example of the status message that you receive after the copy completes. There is no other output.

---

The error log was copied to `pd_error.log` in the transfer directory.

---

*Figure 5-21. Example of Copy Error Log to Transfer Directory Output*

## Clear the Error Log

The error log has a capacity of 1 MB and wraps when it is filled. Generally, the entries in the error log should never be deleted. However, entries for specific hardware failures should be deleted after the hardware is replaced. Otherwise, errors in the log from the failed hardware will continue to appear in error reports.

To use the System Manager to delete specific error log entries:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **Error Logs and Reports** on the next menu.
4. Select **Clear the Error Log** on the next menu.
5. Select appropriate days, resource classes, resource names, and error IDs from the dialog screen to limit deleting the entries for the failed hardware:

**Remove entries older than this number of days**

Supply the number of days.

**Remove entries for these resource classes**

Press **F4 (Esc+4)** to list, **F9 (Esc+9)** to select, and **Enter** to record the selections. Valid options are any resource class in the hardware device class list.

**Remove entries for these resource names**

Press **F4 (Esc+4)** to list, **F9 (Esc+9)** to select, and **Enter** to record the selections.

**Remove entries for these error IDs**

Press **F4 (Esc+4)** to list, **F9 (Esc+9)** to select, and **Enter** to record the selections.

6. A COMMAND STATUS screen appears, but no output is displayed from the Clear the Error Log menu item.



#### Fast-Path Command(s)

```
error clear number_of_days
error clear -error_ID error_ID number_of_days
error clear -hardware number_of_days
error clear -hw_resource hw_resource number_of_days
error clear -operator number_of_days
error clear -software number_of_days
error clear -sw_resource sw_resource number_of_days
```

## System Dump

Use System Dump to dump the base operating code of a 6611. Only a controlling user can issue dump requests. Figure 5-22 shows the System Dump menu.

```
IBM 6611                                     hostname
                                     System Dump
Move cursor to desired item and press Enter.

Start
View Dump Information
Copy to Diskette or Transfer Directory
Format

Extract Error Log Records
Extract Trace Log Records

F1=Help      F2=Redraw screen  F3=Return    F4=SysID
F10=Main Menu Esc+L=Turn Log On
```

Figure 5-22. System Dump Menu

## Start

To use the System Manager to start a system dump to the dump device, */dev/hd7*:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **System Dump** on the next menu.
4. Select **Start** on the next menu.

You receive the following ARE YOU SURE? message warning you of the results of the 6611 dump:

ARE YOU SURE?

Executing this command will shut down your IBM 6611, stopping all the protocols and processes including the current System Manager session. Performing this function requires controlling user privileges. If you are a viewing user, you will be logged out from this IBM 6611. Press the Reset button to restart the 6611 when the dump completes.

Press Enter to start the system dump.  
Press F3 (Esc+3) to cancel and return to the System Manager.

F1=Help                      F2=Redraw Screen    F3=Return  
F10=Main Menu

5. Press **Enter** to continue the 6611 dump:

You receive the following INFORMATION MESSAGE stating that your System Manager session is stopped:

INFORMATION MESSAGE

NOTE: This command needs to be run outside of the System Manager. The System Manager will exit immediately before running this command.

Press Enter to proceed with the command.

Press F3 (Esc+3) to cancel and return to the System Manager.

F1=Help                      F2=Redraw Screen    F3=Return  
F10=Main Menu

6. Press **Enter** to start the dump process.

0c2 is displayed in the 3-digit display on the 6611 during the dump process.  
0c0 is displayed when the dump is complete.

7. Press **Reset** push button to restart the 6611.

**Fast-Path Command(s)**

**system dump**

## View Dump Information

The 6611 dump device, `/dev/hd7`, stores the last system dump taken. Certain statistical information about the last dump is also kept, such as the date and time of the last dump, the number of blocks written, and the completion status.

To use the System Manager to view previous system dump information:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **System Dump** on the next menu.
4. Select **View Dump Information** on the next menu.
5. If no dump is available, the following message is displayed:

There is no previous system dump to view.

### Fast-Path Command(s)

```
system dump view -previous_dump info
```

Figure 5-23 shows an example of view dump information output.

---

```
Device name:      /dev/hd7
Major device number: 10
Minor device number: 4
Size:            3461632 bytes
Date/Time:       Sat Jul 10 10:15:57 CDT 1993
Dump status:     successful
```

---

*Figure 5-23. Example of View Dump Information Output*

## Copy to Diskette or Transfer Directory

You can copy the system dump to a diskette or place the dump in the transfer directory. You can then view the dump while it resides in the dump device or transfer it out of the 6611 to be viewed using a remote 6611.

To use the System Manager to copy a system dump to a diskette or to the transfer directory:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **System Dump** on the next menu.
4. Select **Copy to Diskette or Transfer Directory** on the next menu.

5. Select a system dump destination (**dump diskette** or **transfer directory**) from the selector screen. If sent to the transfer directory, the system dump can be exported using:

- FTP
- A modem
- A DOS diskette
- A UNIX diskette

**Fast-Path Command(s)**

**system dump transfer**

An example of the status message you receive is:

---

The system dump is copied to the transfer directory as pd\_system.dump

---

*Figure 5-24. Example of System Dump Status Message*

## Format

The formatted dump facility interprets and formats the control structures in the base operating system and certain miscellaneous functions that are useful when examining a system dump.

To use the System Manager to view a formatted system dump:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **System Dump** on the next menu.
4. Select **Format** on the next menu.
5. Select the current dump location (**dump device** or **transfer directory**) from the System dump location selector screen.
6. Wait several minutes until the format processing stops.

If no dump is available, the following message is displayed:

---

There is not a dump in the dump device or the dump device cannot be accessed.

---

*Figure 5-25. Example of No Dump Available Message*

**Fast-Path Command(s)**

**system dump format -dump\_device**  
**system dump format -transfer**

Figure 5-26 shows an example of the beginning of the format output. The formatted dump is placed in the transfer directory in the file named `pd_system.fdump`. Select **File and Diskette Operations** from the Operations menu of the System Manager to view the dump in the transfer directory file.

---

SYSTEM STAT:

```
sysname: IBM 6611
nodename: u2
release: 1
version: 0
machine: 000268543100
time of crash: Sat Jul 10 10:15:57 1993
age of system: 4 day, 15 hr., 50 min.
```

SYSTEM VARIABLES

[MORE...10995]

---

*Figure 5-26. Example of a Partial Format Output*

## Extract Error Log Records

When the writing of a record to the error log on the hard disk is interrupted by a system dump, the error log record is still available in the system dump.

To use the System Manager to extract error log records from a system dump and copy them into the error log:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **System Dump** on the next menu.
4. Select **Extract Error Log Records** on the next menu.
5. If there are no lost error records, the following message is displayed:

---

There are no error records to extract from the previous system dump.

---

*Figure 5-27. Example of No Lost Error Records Message*

If error records do exist, the error log records are copied into the error log.

---

### Fast-Path Command(s)

**system dump extract -error\_log**

## Extract Trace Log Records

When the writing of a record to the trace log on the hard disk is interrupted by a system dump, the trace log record is still available in the system dump.

To use the System Manager to extract trace log records from a system dump and copy them into the trace log:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **System Dump** on the next menu.
4. Select **Extract Trace Log Records** on the next menu.
5. If there are no lost trace records, the following message is displayed:

---

There are no trace records to extract from the previous system dump.

A trace session must be in progress when the system dump is invoked.

---

*Figure 5-28. Example of No Lost Trace Records Message*

If trace log records do exist, the trace log records are copied into the trace log.

**Fast-Path Command(s)**

**system dump extract -trace\_log**

---

## Process and Protocol Dumps

Use this function to nondisruptively start or view dumps of selected protocols, or to disruptively start or view dumps of any user process. Only controlling users can issue dump requests. Figure 5-29 on page 5-38 shows the Process and Protocol Dumps menu.

IBM 6611	Process and Protocol Dumps	hostname
Move cursor to desired item and press Enter.		
Start Nondisruptive		
View Nondisruptive		
Start Disruptive		
View Disruptive		
F1=Help F10=Main Menu	F2=Redraw screen	F3=Return Esc+L=Turn Log On
F4=SysID		

Figure 5-29. Process and Protocol Dumps Menu

## Start Nondisruptive

To use the System Manager to start a nondisruptive dump of a selected protocol:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **Process and Protocol Dumps** on the next menu.
4. Select **Start Nondisruptive** on the next menu.
5. Select the protocol to dump from the list in the selector screen:
  - IP
  - VINES
  - DLSw
  - APPN
  - IPX
6. The dump is placed in the transfer directory. The name of the dump is displayed in a message, such as:

---

VINES routing protocol dump has started...  
 The VINES protocol dump is in the transfer directory as  
 pd\_route\_vines.dump.

---

Figure 5-30. Example of Start Nondisruptive Dump Message

The dumped output depends on the protocol you select.

#### Fast-Path Command(s)

**ip dump**  
**vines dump**  
**dls dump**  
**appn dump**  
**ipx dump**

## View Nondisruptive

To use the System Manager to view a nondisruptive dump of a selected process:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Process and Protocol Dumps** on the next menu.
3. Select **View Nondisruptive** on the next menu.
4. Select the protocol whose dump you want to view from the list in the selector screen:
  - IP
  - VINES
  - DLSw
  - APPN
  - IPX
5. If a dump exists, a COMMAND STATUS screen displays the dump. If the dump does not exist, you will get a message stating that the dump could not be found in the transfer directory. You may need to start a dump of that protocol first.

#### Fast-Path Command(s)

**files transfer view *file\_name***

where *file\_name* is the name of the dump you want to view

## Start Disruptive

Any active user process in the 6611 can be sent a signal telling it to dump its memory. This is a disruptive dump; the user process must be restarted by restarting the 6611.

A user process disruptive dump is created automatically if the process crashes.

The dump is automatically sent to the transfer directory, where you can view it or transfer it to a remote node.

To use the System Manager to start a disruptive dump of a user process:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **Process and Protocol Dumps** on the next menu.
4. Select **Start Disruptive** on the next menu.



5. Select a process name from the list in the selector screen.
6. You receive the following warning message:

ARE YOU SURE?

Executing a dump on a user process terminates the process. Dumping certain processes may hang your terminal or even bring down your IBM 6611, stopping all the protocols and processes including the current System Manager session.

Press Enter to continue with the dump.  
Press F3 (Esc+3) to cancel and return to the System Manager.

F1=Help                      F2=Redraw Screen      F3=Return  
F10=Main Menu

7. Press **Enter** to start the dump process.
8. This status message is displayed:

---

The dump has started.  
When completed, the dump will be located in the transfer directory referenced by the process name.

---

*Figure 5-31. Example of Start Disruptive Dump Message*

**Fast-Path Command(s)**

**process dump** *processID*

## View Disruptive

To use the System Manager to view a memory dump of a user process:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Process and Protocol Dumps** on the next menu.
3. Select **View Disruptive** on the next menu.
4. Select a process dump name from the list in the selector screen.
5. A COMMAND STATUS screen displays the dump, an example of which is shown in Figure 5-32 on page 5-41.

**Fast-Path Command(s)**

**files transfer view** *file\_name*

Where *file\_name* is the name of the dump you want to view.

Figure 5-32 on page 5-41 shows an example of view disruptive output.

---

00000000:	06700003	000048A4	00004E0F	00002FE8	.p....H...N.../.
00000010:	2FF7DC80	00000000	00000000	0B000000	/.....
00000020:	0000283A	00000000	D00F22A8	0000D0B0	..(:.....".....
00000030:	00224000	D00F22A8	DEADBEEF	DEADBEEF	."@...".....
00000040:	DEADBEEF	00000000	00000000	01000000	.....
00000050:	30000000	40000000	200006A4	30000000	0...@... ..0...
00000060:	00000106	00000000	00000000	00000000	.....
00000070:	00000000	00000000	00000000	00000000	.....
00000080:	00000000	00000000	00000000	00000000	.....
00000090:	00000000	00000000	00000000	E01E0000	.....
000000A0:	40000707	40001A9A	40000666	007FFFFFFF	@...@...@...f....
000000B0:	007FFFFFFF	007FFFFFFF	007FFFFFFF	007FFFFFFF	.....
000000C0:	007FFFFFFF	007FFFFFFF	007FFFFFFF	007FFFFFFF	.....
000000D0:	007FFFFFFF	40000A0A	007FFFFFFF	007FFFFFFF	....@.....
000000E0:	DEADBEEF	2FF7E018	2001C128	00000158	..../... ..(...X
000000F0:	DEADBEEF	DEADBEEF	DEADBEEF	DEADBEEF	.....
00000100:	DEADBEEF	DEADBEEF	DEADBEEF	DEADBEEF	.....
00000110:	DEADBEEF	200528F0	200528D8	20052D20	.... .( .( . -
00000120:	00000000	20051A10	200533B8	200533C8	.... ... .3. .3.
00000130:	20052D28	200534A8	20051A10	00000000	.- ( .4. ....
00000140:	20052D36	20052078	000A0007	20052D39	.-6 . x.... -9
00000150:	00000000	00001000	2007C7C8	2007C7C8	.....
00000160:	00000000	00000000	00000000	00000000	.....
00000170:	00000000	00000000	00000000	00000000	.....
00000180:	00000000	00000000	00000000	00000000	.....

---

Figure 5-32. Example of View Disruptive Output

---

## System Trace

The system trace facility is a system observation tool that captures a sequential flow of time-stamped system events. This facility is used by service personnel for problem determination. The trace goes to a 1 MB trace log that wraps when it is full. You can issue start and stop trace requests and generate and view trace reports.

Figure 5-33 on page 5-42 shows the System Trace menu.

IBM 6611	System Trace	hostname
Move cursor to desired item and press Enter.		
Start Stop Format		
F1=Help F10=Main Menu	F2=Redraw screen	F3=Return Esc+L=Turn Log On
F4=SysID		

Figure 5-33. System Trace Menu

## Start

Three buffer modes are available for tracing:

### Circular buffer mode

Two collection buffers are maintained. When one buffer becomes full, collection switches to the second buffer. The previous contents in the buffers are overwritten. The two buffers are written to the trace log when the trace is stopped. Only the last two buffers' worth of data is collected.

### Alternate buffer mode

Two collection buffers are maintained. When one buffer becomes full, collection switches to the second buffer, while the contents of the first buffer are written to the trace log. All data is collected, except when the trace log fills up.

### Single sweep buffer mode

A single collection buffer is maintained. The trace is stopped when the buffer is filled, or when a trace stop request is received, whichever happens first. The trace data is then written to the trace log.

To use the System Manager to start a system trace:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **System Trace** on the next menu.
4. Select **Start** on the next menu.
5. Select a trace mode, trace buffer size, trace log size, and event IDs from the dialog screen.

### Additional event IDs to include in trace

Press **F4 (Esc+4)** to list, **F9 (Esc+9)** to select, and **Enter** to record selections. The default is **None**.

### Trace mode

Press **Tab** to select either **alternate**, **single**, or **circular**.

### Trace buffer size in bytes

Define between 8192 and 524 288 (between 8K and 512K). This value must be in decimal. The default is 131 072 or 128K.

### Trace log size in bytes

Define between 1 048 576 and 10 485 760. The default is 1 048 576 or 1 M.

#### Fast-Path Command(s)

```
system trace -on (-trace_ID) trace_IDs
system trace -on -trace_group trace_groups
```

No output is generated from the Start menu.

## Stop

To use the System Manager to stop a system trace:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **System Trace** on the next menu.
4. Select **Stop** on the next menu.

No output is generated from the Stop menu.

#### Fast-Path Command(s)

```
system trace -off
```

## Format

The system trace facility creates a formatted trace report. The report can include:

- The whole trace log
- Selected specific event IDs
- Only trace records recorded between a specific start and end date and time

You may also specify specific event IDs to exclude.

To use the System Manager to view a system trace report:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **System Trace** on the next menu.
4. Select **Format** on the next menu.

5. Select values from the dialog screen to limit the scope of the trace report. To get a full report, use the default.

**Event ID filter action**

Press **Tab** to select **include** or **exclude**. The default is include.

**Event IDs on which to filter**

Press **F4 (Esc+4)** to list, **F9 (Esc+9)** to select, and **Enter** to record selections. The default is all.

**Starting date and time**

Type in **MMDDhhmmssYY** format.

**Ending date and time**

Type in **MMDDhhmmssYY** format.

6. A COMMAND STATUS screen displays the trace report, if it is less than 512 kilobytes. If the trace report is greater than 512 kilobytes, it is sent to the transfer directory as `pd_trace.report`. It must be viewed from the fast-path environment by issuing:

**files transfer view pd\_trace.report**

Figure 5-34 on page 5-45 shows an example of format output. If the status changes from running to OK and no trace output is displayed, no trace records meet the specified date and event ID criteria.

**Fast-Path Command(s)**

```
system trace report -all start_time end_time
system trace report -trace_ID trace_IDs
```

Tue May 26 13:15:46 1992  
System: IBM 6611 000013163000 Node: 3  
Machine: 000013163000  
Internet Address: 00000000 0.0.0.0

ID	PROCESS NAME	PID	I	SYSTEM CALL	ELAPSED	APPL	SYSCALL	KERNEL	INTERRUPT
001	trace	10526			0.000000				TRACE ON channel 0
20F	trace	10526			0.000055			unlockl	lock addr=11478
20E	trace	10526			0.000065			lockl	lock addr=30C38
20F	trace	10526			0.000080			unlockl	lock addr=30C38
104	trace	10526			0.000086				return from system call
101	trace	10526		getppid	0.000112			getppid	
147	trace	10526		getppid	0.000116			GETPPID	
104	trace	10526		getppid	0.000120				return from getppid [8 usec]
101	trace	10526		kill	0.000137			kill	
14E	trace	10526		kill	0.000146				kill: signal SIGUSR1 to process 10269 trace
20E	trace	10526		kill	0.000153			lockl	lock addr=30C30
119	trace	10526		kill	0.000183				KERN_SENDSIGNAL hookdata 0000
11F	trace	10526		kill	0.000208				set on ready queue trace 10269
11F	trace	10526		kill	0.000238				set on ready queue trace 10526
106	trace	10269			0.000249				dispatch trace 10269
200	trace	10269			0.000261				resume trace
20F	sysmon	7006			0.145551			unlockl	lock addr=56E8248
20E	sysmon	7006			0.145576			lockl	lock addr=56E8248
20F	sysmon	7006			0.145590			unlockl	lock addr=56E8248
20E	sysmon	7006			0.145710			lockl	lock addr=30C38
20F	sysmon	7006			0.145769			unlockl	lock addr=30C38
100	sysmon	7006			0.145841				DATA ACCESS PAGE FAULT
1B4	sysmon	7006			0.145869			VMM lockmiss:	V.S=02DD.345A ppage=03C1
				persistent_storage journaled system_segment modified					
200	sysmon	7006			0.145895			resume sysmon	
403	kproc	514	1		3.587969				(0010,0000,0000) rs offlevel ret 0 @ 2315
103	kproc	514	1		3.587981				return from slih [121 usec]
200	kproc	514	1		3.587988			resume IDLE	
100	kproc	514			3.589197				I/O INTERRUPT
102	kproc	514	1		3.589214				slih clock [1354 usec]
234	kproc	514	1		3.589236			KERN_PROF 7630	[10007 usec]
103	kproc	514	1		3.589315				return from slih [100 usec]
10C	kproc	514	1		3.589347				DISPATCH IDLE PROCESS
200	kproc	514	1		3.589350			resume IDLE	
100	kproc	514			3.599195				I/O INTERRUPT
102	kproc	514	1		3.599212				slih clock [9997 usec]
234	kproc	514	1		3.599232			KERN_PROF 7630	[9995 usec]
103	kproc	514	1		3.599296				return from slih [84 usec]
10C	kproc	514	1		3.599321				DISPATCH IDLE PROCESS

Figure 5-34. Example of Format Output

## Protocol and Process Traces

System Manager provides access to those traces that are designed to help debug problems in their respective protocols or processes. Some traces run continually, and some must be started and stopped manually.

Figure 5-35 on page 5-46 shows the Protocol and Process Traces menu.

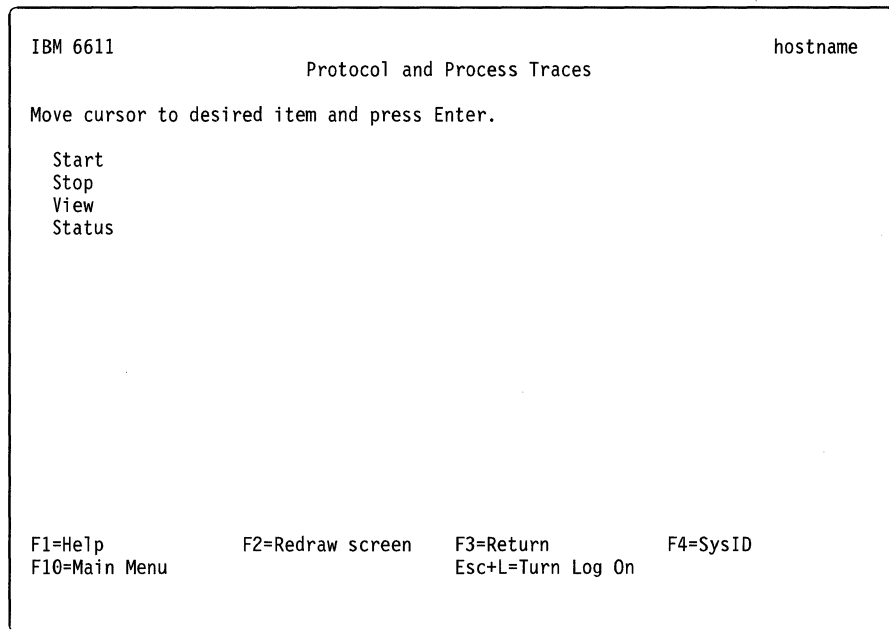


Figure 5-35. Protocol and Process Traces Menu

## Start

To use System Manager to start a protocol or process trace:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **Protocol and Process Traces** on the next menu.
4. Select **Start** on the next menu.
5. Select one of the processes listed in the selector screen:

- IP
- IPX
- XNS
- DECnet
- VINES
- APPN
- AppleTalk
- DLSw
- Source route bridge
- Source route bridge spanning tree
- Transparent bridge
- Transparent bridge spanning tree
- Translational bridge spanning tree
- SNMP

Depending on your selection, different sets of dialog screens are presented.

### Fast-Path Command(s)

```
ip trace -on trace_parameters
ipx trace -on
xns trace -on
decnet trace -on trace_level
vines trace -on
appn trace -on trace_parameters
appletalk trace -on trace_parameters
dlsw trace -on
bridge srb trace -on [(-transmit)|-receive|-both] number_frames interface
bridge srb trace -spt -on
bridge tb trace -on number_frames interface
bridge tb trace -spt -on
bridge tlb trace -spt -on
snmp trace -on process
```

## Stop

To use System Manager to stop a trace:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Protocol and Process Traces** on the next menu.
3. Select **Stop** on the next menu.
4. Select one of the processes listed in the selector screen:
  - IP
  - IPX
  - XNS
  - DECnet
  - VINES
  - APPN
  - AppleTalk
  - DLSw
  - Source route bridge
  - Source route bridge spanning tree
  - Transparent bridge
  - Transparent bridge spanning tree
  - Translational bridge spanning tree
  - SNMP



### Fast-Path Command(s)

```
ip trace -off
ipx trace -off
xns trace -off
decnet trace -off
vines trace -off
appn trace -off
appletalk trace -off
dlsn trace -off
bridge srb trace -off [(-transmit)|-receive|-both] interface
bridge srb trace -spt -off
bridge tb trace -off interface
bridge tb trace -spt -off
bridge tlb trace -spt -off
snmp trace -off process
```

## View

To use System Manager to view a trace:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Protocol and Process Traces** on the next menu.
3. Select **View** on the next menu.
4. Select the type of trace files to view on the selector screen:
  - IP
  - IPX
  - XNS
  - DECnet
  - VINES
  - APPN
  - AppleTalk
  - DLSw
  - SNMP
  - Source route bridge (SRB)
  - All spanning tree protocols (SPT)
  - Transparent bridge (TB)
  - LAN bridge (LB)
  - Point-to-Point Protocol (PPP)
  - X.25 Protocol
  - System Monitor Process (SYSMON)
5. The next step depends upon your previous selection.
  - For source route bridge (SRB) and transparent bridge (TB):
    - a. Select the interface on which to view bridging frame trace output on a selector screen.
    - b. For SRB only, select the direction of the frames to trace:
      - **receive** allows you to trace the frames that the adapter receives.
      - **transmit** allows you to trace the frames that the adapter sends.
      - **both** allows you to trace all frames.

The default is **receive**.

For APPN or DLSw:

**Event ID filter action**

Press **Tab** to select **include** or **exclude**. The default is **include**.

**Event IDs on which to filter**

Press **F4 (Esc+4)** to list, **F9 (Esc+9)** to select, and **Enter** to record selections. For APPN, the default values are 360 and 361. For DLSw, the default values are 000, 224, 240, 241, 242, 243, 244, 245, 246, 362, and 366.

**Starting date and time**

Type in **MMDDhhmmssYY** format.

**Ending date and time**

Type in **MMDDhhmmssYY** format.

For all other protocols, select the file name of the trace file that you want to view and the method of viewing it. Select **normal** to view the current version of the file. Select **continuous** to view the file as it is continuously updated.

6. If it is less than 512 kilobytes, a COMMAND STATUS screen displays the trace file. If the trace file is greater than 512 kilobytes, it is sent to the transfer directory and the name of the trace output file is shown in a message.

The trace file can be viewed from the fast-path environment by issuing:

**files transfer view file\_name**

7. If the file does not exist, you will see a COMMAND STATUS screen with the message:

---

The "name of protocol" trace file could not be found.

---

*Figure 5-36. Example of Missing Trace File Message*

**Fast-Path Command(s)**

**files transfer view file\_name**

Where *file\_name* is the name of the trace file in the transfer directory

## Status

To use System Manager to determine the status of all traces:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Protocol and Process Traces** on the next menu.
3. Select **Status** on the next menu.

Figure 5-37 on page 5-50 shows the output of this command.

Trace	Status	File/Interface
System (inc. APPN, DLS)	OFF	
IP	OFF	
IPX	OFF	pd_ipxd.SAP
XNS	OFF	
DEC	OFF	
VINES	OFF	
AT	OFF	
SNMP	OFF	pd_cfgd.log
	OFF	pd_r66d.log
	ON	pd_snmpd.log
SRB	ON	tk0
	ON	to1
TB	ON	pd_brtrc.output.te0
SRB_SPT	OFF	pd_sr-sptree
TB_SPT	OFF	pd_tb-sptree
TLB_SPT	OFF	pd_srtb-sptree
PPP	OFF	
X25	ON	pd_x25d.out
SYSMON	ON	pd_sysmon.trc
Line_Trace	OFF	

Figure 5-37. Sample Protocol and Process Trace Status Output

#### Fast-Path Command(s)

**system trace -status**

## Adapter Debug

The adapter debug facility is not used in normal operation of the 6611. This facility dumps adapter code for use by service representatives to troubleshoot problems with the peer-capable adapter software. The adapter line trace also can be used to determine data that flows to and from the 6611.

Table 5-1 lists the peer-capable adapters and explains the internal names for these adapters. The internal names are used throughout the adapter debug facility.

Table 5-1 (Page 1 of 2). Internal Adapter Name Table

Internal Adapter Name	Adapter
tktya#	1-port token-ring network 16/4 adapter
totya?	2-port serial adapter
tetya#	1-port Ethernet adapter
cetya+	serial/Ethernet combination adapter
cttya+	serial/token-ring combination adapter
detya?	2-port Ethernet adapter
dotya@	4-port serial adapter

Table 5-1 (Page 2 of 2). Internal Adapter Name Table

Internal Adapter Name	Adapter
dttya?	2-port token-ring network 16/4 adapter
<b>Legend:</b>	
#	A number from 0 to 6
?	A number from 0 to 13
\$	Either 0 or 1
+	A number from 0 to 20
@	A number from 0 to 27

Figure 5-38 shows the Adapter Debug menu.

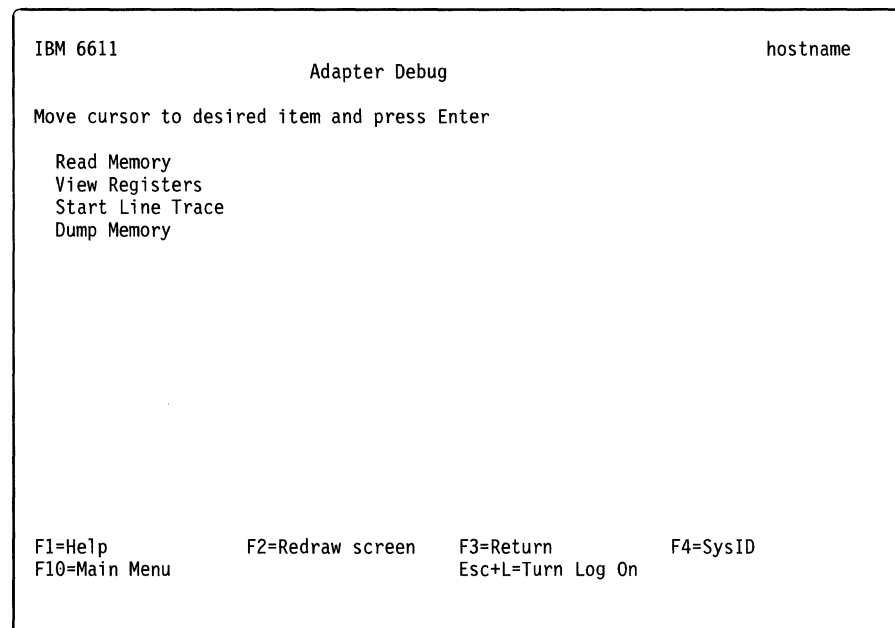


Figure 5-38. Adapter Debug Menu

## Read Memory

To use the System Manager to read a specified part of the adapter memory:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **Adapter Debug** on the next menu.
4. Select **Read Memory** on the next menu.
5. Select an adapter from the selector screen. See Table 5-1 on page 5-50 for an explanation of the adapter name.
6. Select or provide the appropriate values on the dialog screen to specify what to read from the adapter memory:
  - Unit to read memory by  
word      4 bytes

short      2 bytes  
byte        1 byte

- Address or symbol to start read

The address can be any hexadecimal number or known symbol. If you specify an address, the read starts at that address. If you specify a symbol, the read starts at the address of that symbol. You can also enter an expression using a plus sign (+) or a minus sign (-). For example, you could enter **cat+100** and the read would start at 256 bytes beyond the address of cat.

- Length of read (based on unit to read by specified above).

This is the specific amount of adapter memory you want to read.

## 7. A COMMAND STATUS screen displays the output.

Figure 5-39 shows an example of read memory output. This example was obtained by specifying the following values on the dialog screen:

- Unit to read by (word, short, byte): **word**
- Address or symbol to start read: **0**
- Length of read (in above units): **48**

### Fast-Path Command(s)

**adapter memory view** *adapter start\_addr num\_words*

00000000:	06700003	000048A4	00004E0F	00002FE8	.p....H...N.../.
00000010:	2FF7DC80	00000000	00000000	0B000000	/.....
00000020:	0000283A	00000000	D00F22A8	0000D0B0	..(:.....".....
00000030:	00224000	D00F22A8	DEADBEEF	DEADBEEF	."@...".....
00000040:	DEADBEEF	00000000	00000000	01000000	.....
00000050:	30000000	40000000	200006A4	30000000	0...@... ..0...
00000060:	00000106	00000000	00000000	00000000	.....
00000070:	00000000	00000000	00000000	00000000	.....
00000080:	00000000	00000000	00000000	00000000	.....
00000090:	00000000	00000000	00000000	E01E0000	.....
000000A0:	40000707	40001A9A	40000666	007FFFFFFF	@...@...@...f....
000000B0:	007FFFFFFF	007FFFFFFF	007FFFFFFF	007FFFFFFF	.....

Figure 5-39. Example of Read Memory Output

## View Registers

To use the System Manager to view the contents of the adapter registers on the screen:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **Adapter Debug** on the next menu.
4. Select **View Registers** on the next menu.
5. Select an adapter from the selector screen. See Table 5-1 on page 5-50 for an explanation of the adapter name.

6. A COMMAND STATUS screen displays the output. Figure 5-40 on page 5-53 shows an example of view registers output.

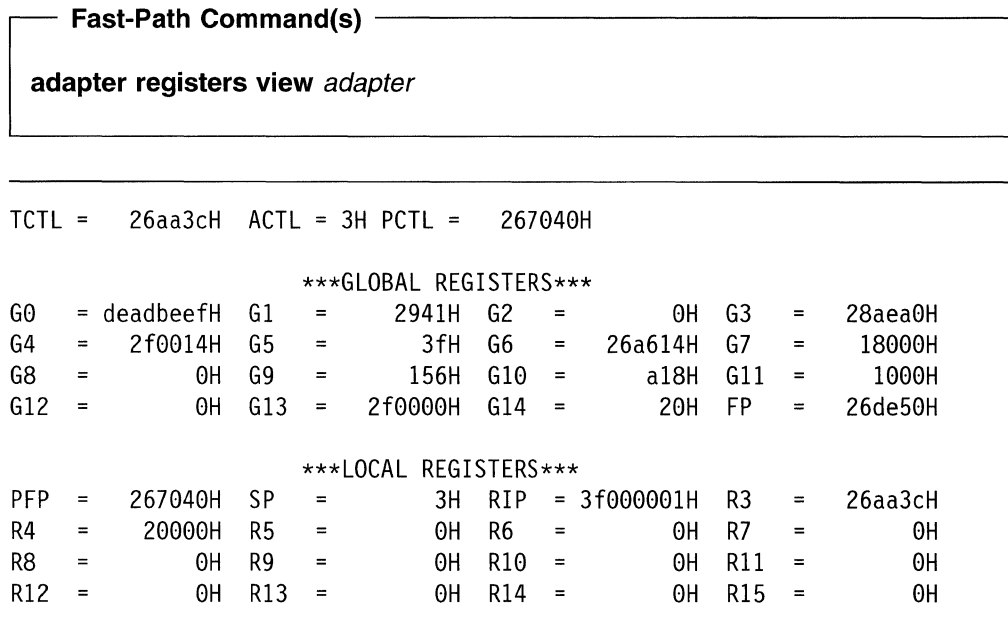


Figure 5-40. Example of View Registers Output

## Start Line Trace

The adapter line trace can be used to trace data that comes into the adapter from the network or another adapter. Only one adapter line trace can be running at a time. The line trace record size is 1 K.

**Note:** Running this trace may degrade system performance.

To use the System Manager to start a line trace on an adapter:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **Adapter Debug** on the next menu.
4. Select **Start Line Trace** on the next menu.
5. Select an adapter from the selector screen. See Table 5-1 on page 5-50 for an explanation of the adapter name.
6. On the dialog screen, enter the number of packets to capture in the trace. The adapter trace stops when the specified number of packets are collected.
7. A COMMAND STATUS screen displays the output.

An example of the message you receive when you start an adapter line trace is:

The line trace has been started. The line trace is collecting in pd\_trtya0.linetrace in the transfer directory.

Figure 5-41. Example of Start Line Trace Message

---

**Fast-Path Command(s)**

---

**adapter trace -line -on** *adapter num\_packets*

## Dump Memory

Select **Dump Memory** to dump the contents of the adapter memory.

Four files are placed in the transfer directory. The files contain DRAM memory, SRAM memory, PROM memory, and the contents of the registers (REGS). The output shows the dumped memory in hexadecimal with ASCII translation.

To use the System Manager to dump the memory of an adapter:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **Adapter Debug** on the next menu.
4. Select **Dump Memory** on the next menu.
5. Select an adapter from the selector screen. See Table 5-1 on page 5-50 for an explanation of the adapter name.
6. A COMMAND STATUS screen displays the output.

An example of the message you receive when you issue an adapter dump request is:

---

```
SRAM dumped to /tmp/hold/transfer/pd_trtya0.sram
DRAM dumped to /tmp/hold/transfer/pd_trtya0.dram
PROM dumped to /tmp/hold/transfer/pd_trtya0.prom
REGS dumped to /tmp/hold/transfer/pd_trtya0.regs
The dump for adapter, trtya0, has been completed.
```

---

*Figure 5-42. Example of Adapter Dump Message*

---

**Fast-Path Command(s)**

---

**adapter dump** *adapter*

---

## Protocol Debug

Figure 5-43 on page 5-55 shows the Protocol Debug menu.

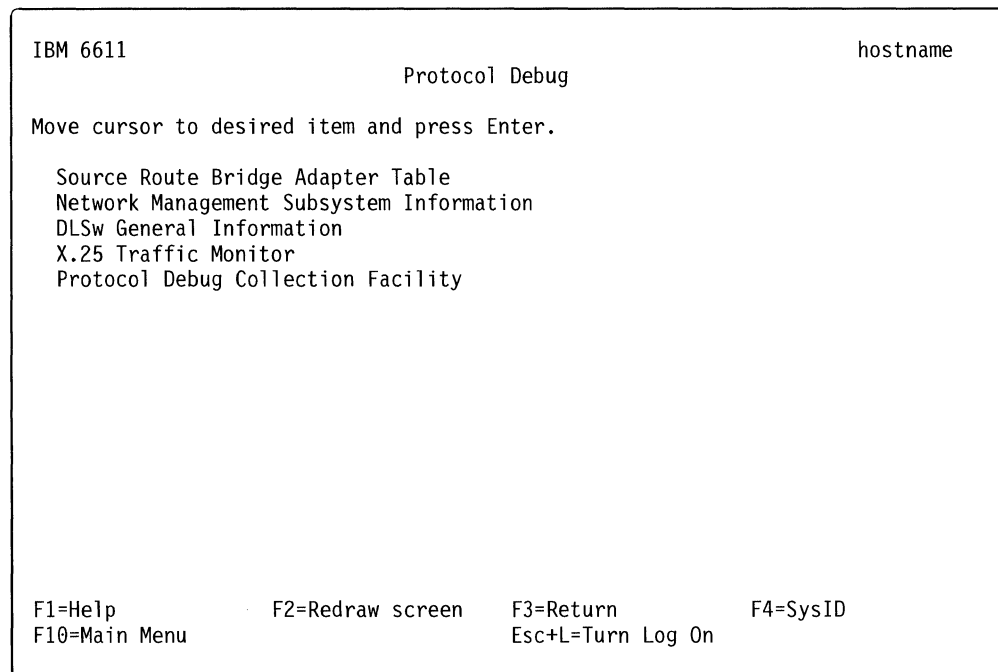


Figure 5-43. Protocol Debug Menu

## Source Route Bridge Adapter Table

To use System Manager to view the source route bridge adapter table:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Protocol Debug** on the next menu.
3. Select **Source Route Bridge Adapter Table** on the next menu.
4. Select an interface from the selector screen. Refer to Table 4-1 on page 4-7 for an explanation about the interface name used to identify the adapters.
5. A COMMAND STATUS screen displays the output.

### Fast-Path Command(s)

```
bridge srb view -interface_info interface
```

Figure 5-44 shows an example of the output. If source route bridging is not configured on the interface chosen, the output contains all zeros.

```
SRB Table MIB Data
Ring Adap Port  MaxLen MaxFld Stat MaxHop Bridge DesRing DLCI LPort Type
005  01  00   2052   20  47    7    1   ffff 0000    1  SRB
```

Figure 5-44. Example of Source Route Bridge Adapter Table Output



The field descriptions for source route bridge adapter table output are:

<b>Ring</b>	Ring number
<b>Adap</b>	Adapter number
<b>Port</b>	Port number
<b>MaxLen</b>	MTU (maximum transmission unit) size
<b>MaxFld</b>	MTU designator
	<b>0x00</b> 516 bytes
	<b>0x10</b> 1500 bytes
	<b>0x20</b> 2052 bytes (maximum allowed by T1 connections)
	<b>0x30</b> 4472 bytes (maximum allowed for 4MB token-ring connections)
	<b>0x40</b> 8144 bytes
	<b>0x50</b> 11 407 bytes
	<b>0x60</b> 17 800 bytes (maximum allowed for 16MB token-ring connections)
<b>Stat</b>	Status (this is a bit field)
	<b>0x01</b> Port is up and able to do bridging.
	<b>0x02</b> Single-route (limited) broadcast frames will be forwarded.
	<b>0x04</b> If set, this is a token-ring connection. If not set, the following bits apply:
	<b>0x10</b> Connection is a remote bridge.
	<b>0x08</b> Connection is Milford point-to-point connection.
	<b>0x18</b> Connection is regular PPP connection.
	<b>0x10 and 0x08</b> If both not set, represents frame relay connection.
	<b>0x20</b> This ring represents the system unit.
	<b>0x40</b> This ring is set for automatic mode with spanning tree.
<b>MaxHop</b>	Maximum number of hops that a frame could have gone through to be allowed to go through this port.
<b>Bridge</b>	Bridge number
<b>DesRing</b>	Designated ring number
<b>DLCI</b>	The DLCIs for frame relay
<b>LPort</b>	Internal bridge number
<b>Type</b>	SRB—source route bridging Dual—translational bridging

## Network Management Subsystem Information

Select **Network Management Subsystem Information** to create and view an SNMP process activity log, which may provide useful problem solving information. The displayed information includes:

- State of the SNMP process trace flags
- Maximum SNMP packet size
- SNMP query timeout
- SNMP subagent timeout
- All configured communities
- All configured views
- All configured subagents
- All configured SNMP trap destinations

To use the System Manager to obtain this information:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Protocol Debug** on the next menu.
3. Select **Network Management Subsystem Information** on the next menu.
4. A COMMAND STATUS screen displays the output.

Figure 5-45 shows an example of network management subsystem information output.

### Fast-Path Command(s)

```
snmp view -activity_log
```

```
Logfile:      /tmp/hold/transfer/pd_snmpd.log
Tracing:      ENABLED                ACTIVE
Debug level:  0
Max Packet Size:9216
Query Timeout: 60
SMUX Timeout: 15
COMMUNITY:    public
ADDRESS:      127.0.0.1
NETMASK:      255.255.255.255
PERMISSION:   readOnly
VIEW:         1.3.6.1.3.11.2.2
VIEW NAME:    1.3.6.1.3.11.2.1
SUBTREE(S):   iso
TRAP DESTINATION
public        9.66.23.4
SMUX CLIENT:  1.3.6.1.4.1.2.3.1.2.1.2
PASSWORD:    gated_password
ADDRESS:      127.0.0.1
NETMASK:      255.255.255.255
```

Figure 5-45. Example of Network Management Subsystem Information Output

## I DLSw General Information

To view selected information on the DLSw protocol:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **Protocol Debug** on the next menu.
4. Select **DLSw General Information** on the next menu.
5. On the selector screen, select an item on which to get information:

<b>message_queues</b>	Displays DLSw message queue usage. If you select this, you must select the queue on the next selector screen.
<b>semaphores</b>	Displays DLSw semaphore usage. If you select this, you must select the ID of the DLSw semaphore you want to view on the next selector screen.
<b>message_buffers</b>	Displays DLSw message buffer usage.
<b>general database</b>	Displays DLSw database information. If you select this, you can select the general database member you want to view and press <b>Enter</b> .

**conversation database** Displays the complete DLSw conversation database.

6. A COMMAND STATUS screen displays the output.

Figure 5-46 shows an example of DLSw message queue output.

### Fast-Path Command(s)

```
dls w debug view -message_queue msg_que_num
dls w debug view -semaphore semaphore_num
dls w debug view -message_buffer
dls w debug view -general_database (-summary)
dls w debug view -general_database gen_db_num
dls w debug view -conversation_database
```

```
Message queue id is      : 12295
No. of bytes on queue   : 65520
No. of msgs. on queue   : 911
Max bytes on queue      : 65535
Last proc. to snd msg   : 19304
Last proc. to rcv msg   : 19326
Time of last msg snd    : 744649249
Time of last msg rcv    : 744647572
```

Figure 5-46. Example of DLSw Message Queue Output

## X.25 Traffic Monitor

To view selected X.25 traffic monitor information:

1. Log in using a controlling user ID.
2. Select **Problem Determination** from the System Manager main menu.
3. Select **Protocol Debug** on the next menu.
4. Select **X.25 Traffic Monitor** on the next menu.
5. Select an adapter name from the selector screen.
6. Supply the following information on the dialog screen:
  - Packet Type  
The type of X.25 high-level data link control (HDLC) traffic that you want to monitor. The valid values are **packet**, **frame**, or **both**.
7. Press **Ctrl+C** to end the X.25 monitor. The output will be placed in the transfer directory with the file name `pd_x25mon.trc`.

### Fast-Path Command(s)

```
x25 monitor [(-packet) &| -frame] adapter
```

## Protocol Debug Collection Facility

To simplify the process of collecting pertinent debug information when the 6611 experiences a software problem, IBM created the Protocol Debug Collection Facility. The Protocol Debug Collection Facility gathers detailed debug information about bridging protocols, routing protocols, medium access control protocols, and adapter interfaces. The facility also allows you to set up and start debug traces for AppleTalk, APPN, DECnet, DLSw, and IP. The debug and trace information is stored in several files, which are then combined into one large file. For information about these files, refer to "Files Generated by the Protocol Debug Collection Facility" on page 5-61.

**Note:** IBM strongly urges that you only use the Protocol Debug Collection Facility when directed by IBM service representatives.

### Starting Protocol Traces

To set up start protocol traces:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Protocol Debug** on the next menu.
3. Select **Protocol Debug Collection Facility** on the next menu.
4. Select the protocol from the selector screen:
  - AppleTalk
  - APPN
  - DECnet
  - DLSw
  - IP
5. Select **Set up** from the selector screen.

6. Enter the appropriate trace information on the dialog screen. This information will differ for each protocol.
7. A COMMAND STATUS screen will display the output file names for the trace and setup information.

#### Fast-Path Command(s)

```
appletalk debug set {trace_parameters}
appn debug set {trace_parameters} {trace_IDs}
decnet debug set {trace_level} {trace_mask}
dls debug set {trace_IDs}
ip debug set {trace_log_size} {number_trace_files} {trace_parameters}
```

## Collecting Protocol Debug Information

To collect protocol debug information:

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Protocol Debug** on the next menu.
3. Select **Protocol Debug Collection Facility** on the next menu.
4. Select a protocol, Interface, or System from the selector screen. For a protocol, you can choose:
  - AppleTalk
  - APPN
  - DECnet
  - DLSw
  - Frame Relay (FR)
  - IP
  - IPX
  - LAN Bridge (LB)
  - PPP
  - SNMP
  - Source route bridge (SRB)
  - Transparent bridge (TB)
  - Translational bridge (TLB)
  - VINES
  - XNS
  - X.25
5. The next step depends upon your previous selection.
  - For AppleTalk, APPN, DECnet, DLSw, and IP:
    - a. Select **Collect** from the selector screen.
    - b. Select whether to Collect additional system information on the dialog screen. The default is **no**.
    - c. Select whether to stop the protocol trace on the dialog screen. The default is **yes**.
    - d. Select the type of output file you want generated on the dialog screen. The default is **tar**.
  - For frame relay, interface, and PPP:

- a. Select a single interface or select all interfaces on the selector screen.
- b. Select whether to Collect additional system information on the dialog screen. The default is **no**.
- c. Select the type of output file you want generated on the dialog screen. The default is **tar**.

For system:

- a. Enter the number of days you want saved in the error log. Any error log entries older than the number of days specified will be purged.
- b. Select the type of output file you want generated on the dialog screen. The default is **tar**.

For all other protocols:

- a. Select whether to Collect additional system information on the dialog screen. The default is **no**.
- b. Select the type of output file you want generated on the dialog screen. The default is **tar**.

6. A COMMAND STATUS screen will display the output.

#### Fast-Path Command(s)

```

appletalk debug (collect) {-system} {-notrcstop} [(-tar)l-cat] {output_file}
appn debug (collect) {-system} {-notrcstop} [(-tar)l-cat] {output_file}
bridge debug (collect) [(-srb)l-tbl-tlbi-lb] {-system} [(-tar)l-cat] {output_file}
decnet debug (collect) {-system} {-notrcstop} [(-tar)l-cat] {output_file}
dls debug (collect) {-system} {-notrcstop} [(-tar)l-cat] {output_file}
frame relay debug (collect) {-system} [(-tar)l-cat] {interface} {output_file}
interface debug (collect) {-system} [(-tar)l-cat] {interface} {output_file}
ip debug (collect) {-system} {-notrcstop} [(-tar)l-cat] {output_file}
ipx debug (collect) {-system} [(-tar)l-cat] {output_file}
ppp debug (collect) {-system} [(-tar)l-cat] {interface} {output_file}
snmp debug (collect) {-system} [(-tar)l-cat] {output_file}
system debug (collect) -paging_space [(-tar)l-cat] {output_file}
system debug (collect) [(-tar)l-cat] {number_days_errlog_clear} {output_file}
vines debug (collect) {-system} [(-tar)l-cat] {output_file}
xns debug (collect) {-system} [(-tar)l-cat] {output_file}
x25 debug (collect) {-system} [(-tar)l-cat] {output_file}

```

## Files Generated by the Protocol Debug Collection Facility

The Protocol Debug Collection Facility generates several individual files when collecting debug information for a protocol, an interface, or the system. These files appear in the transfer directory while the Protocol Debug Collection Facility assembles the debug information. After the information is assembled, the Protocol Debug Collection Facility creates a single output file using the individual files, then deletes the individual files from the transfer directory.

When setting up debug collection, you can specify the type of output file you want the Protocol Debug Collection Facility to generate. The choices are:

- **tar**—the Protocol Debug Collection Facility generates the output file using the AIX **tar** command. To retrieve the debug information:

1. Transfer the output file to an AIX or UNIX workstation using the binary mode of ftp
  2. Restore the individual files using the command: **tar -xvf filename**.
- **cat**—the Protocol Debug Collection Facility generates the output file using the AIX cat command. To retrieve the debug information, transfer the output file to any workstation using the ASCII mode of ftp. The output file can be viewed using most workstation editors.

Refer to “Using the File Transfer Protocol” on page 4-67 for information about transferring files with FTP.

## AppleTalk

Table 5-2 lists the name and description of each file created for the AppleTalk protocol. After collecting the necessary debug information, the files are compressed and placed in `pd_hostname_appletalk.debug`, where *hostname* is the host name of this 6611.

Table 5-2. Protocol Debug File Names - AppleTalk

File Name	Description
<i>hostname</i> .AT.adp.slots.db	6611 adapter list by slot
<i>hostname</i> .AT.adpinfo.db	Specific AppleTalk adapter information
<i>hostname</i> .AT.connections.db	Connection statistics
<i>hostname</i> .AT.framerelay.db	AppleTalk address to DLCI lookup table
<i>hostname</i> .AT.gen.adpinfo.db	General peer-capable adapter information
<i>hostname</i> .AT.if.status.db	Adapter interface status
<i>hostname</i> .AT.ifstat.db	AppleTalk interface information including traffic, connections, routes, statistics, and filters
<i>hostname</i> .AT.intro.db	Debug collection creation date, software level, and summary of commands and output files
<i>hostname</i> .AT.net.options.db	Network options
<i>hostname</i> .AT.route.db	AppleTalk routes and zones
<i>hostname</i> .AT.setup.db	Output from the AppleTalk debug set command, including the trace parameters used
<i>hostname</i> .AT.sys.route.db	System route table
<i>hostname</i> .AT.trace.db	Messages for stopping AppleTalk trace and renaming the trace output to <i>hostname</i> .pd_appletalk.trc

### Note:

*hostname* Host name of the 6611

Table 5-3 on page 5-63 lists the name and description of each file created if you choose to include additional system information.

Table 5-3. Additional System Files - AppleTalk

File Name	Description
<i>hostname.AT.cfg.report.db</i>	Detailed configuration report
<i>hostname.AT.config.sysid.db</i>	System configuration
<i>hostname.AT.err.report.db</i>	Detailed error report
<i>hostname.AT.filesystems.db</i>	File systems
<i>hostname.AT.mem.man.db</i>	Memory management statistics
<i>hostname.AT.page.space.db</i>	System paging space statistics
<i>hostname.AT.proc.stat.db</i>	Process status
<i>hostname.AT.sw.his.db</i>	Software history
<i>hostname.AT.sysmon.db</i>	System monitor trace log
<i>hostname.AT.trans.dir.db</i>	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## APPN

Table 5-4 lists the name and description of each file created for the APPN protocol. After collecting the necessary debug information, the files are compressed and placed in *pd\_hostname\_appn.debug*, where *hostname* is the host name of this 6611.

Table 5-4. Protocol Debug File Names - APPN

File Name	Description
<i>hostname.APPN.config.db</i>	APPN configuration information
<i>hostname.APPN.dlsconv.db</i>	DLSw conversation list
<i>hostname.APPN.dump.db</i>	Messages for saving old APPN dumps as <i>hostname.pd_dump.APPN.d#.old</i> and for dumping APPN into <i>pd_dump.APPN.d#</i> and renaming the dump to <i>hostname.APPN.d#</i> .
<i>hostname.APPN.err.report.db</i>	Detailed error report
<i>hostname.APPN.intro.db</i>	Debug collection creation date, software level, and summary of commands and output files
<i>hostname.APPN.setup.db</i>	Output from the APPN debug set command, including the trace parameters used
<i>hostname.APPN.sys.route.db</i>	System route table
<i>hostname.APPN.sysmon.db</i>	System monitor trace log
<i>hostname.APPN.trace.db</i>	Messages for stopping APPN trace and renaming trace to <i>hostname.pd_appn.trc</i>

**Note:**

*hostname* Host name of the 6611

Table 5-5 on page 5-64 lists the name and description of each file created if you choose to include additional system information.



Table 5-5. Additional System Files - APPN

File Name	Description
<i>hostname</i> .APPN.cfg.report.db	Detailed configuration report
<i>hostname</i> .APPN.config.sysid.db	System configuration
<i>hostname</i> .APPN.connections.db	Connection statistics
<i>hostname</i> .APPN.filesystems.db	File systems
<i>hostname</i> .APPN.mem.man.db	Memory management statistics
<i>hostname</i> .APPN.page.space.db	System paging space statistics
<i>hostname</i> .APPN.proc.stat.db	Process status
<i>hostname</i> .APPN.sw.his.db	Software history
<i>hostname</i> .APPN.trans.dir.db	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## DECnet

Table 5-6 lists the name and description of each file created for the DECnet protocol. After collecting the necessary debug information, the files are compressed and placed in *pd\_hostname\_decnet.debug*, where *hostname* is the host name of this 6611.

Table 5-6 (Page 1 of 2). Protocol Debug File Names - DECnet

File Name	Description
<i>hostname</i> .DEC.adp.slots.db	6611 adapter list by slot
<i>hostname</i> .DEC.connections.db	Connection statistics
<i>hostname</i> .DEC.data.struct.db	DECnet routing table structures
<i>hostname</i> .DEC.ethernet.db	DECnet DLCSTAT Ethernet information
<i>hostname</i> .DEC.framelay.db	DECnet address to DLCI lookup table
<i>hostname</i> .DEC.gen.adpinfo.db	General peer-capable adapter information
<i>hostname</i> .DEC.if.status.db	Adapter interface status
<i>hostname</i> .DEC.ifstat.db	DECnet interface information including traffic, connections, routes, statistics, and filters
<i>hostname</i> .DEC.intro.db	Debug collection creation date, software level, and summary of commands and output files
<i>hostname</i> .DEC.net.options.db	Network options
<i>hostname</i> .DEC.setup.db	Output from the DECnet debug set command, including the trace parameters used
<i>hostname</i> .DEC.sys.route.db	System route table
<i>hostname</i> .DEC.tokenring.db	DECnet DLCSTAT Token-ring information

Table 5-6 (Page 2 of 2). Protocol Debug File Names - DECnet

File Name	Description
<i>hostname</i> .DEC.trace.db	Messages for stopping DECnet trace and renaming trace to <i>hostname</i> .pd_decnet.trc DECnet trace output

**Note:**

*hostname* Host name of the 6611

Table 5-7 lists the name and description of each file created if you choose to include additional system information.

Table 5-7. Additional System Files - DECnet

File Name	Description
<i>hostname</i> .DEC.cfg.report.db	Detailed configuration report
<i>hostname</i> .DEC.config.sysid.db	System configuration
<i>hostname</i> .DEC.err.report.db	Detailed error report
<i>hostname</i> .DEC.filesystems.db	File systems
<i>hostname</i> .DEC.mem.man.db	Memory management statistics
<i>hostname</i> .DEC.page.space.db	System paging space statistics
<i>hostname</i> .DEC.proc.stat.db	Process status
<i>hostname</i> .DEC.sw.his.db	Software history
<i>hostname</i> .DEC.sysmon.db	System monitor trace log
<i>hostname</i> .DEC.trans.dir.db	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## DLSw

Table 5-8 lists the name and description of each file created for the DLSw protocol. After collecting the necessary debug information, the files are compressed and placed in *pd\_hostname\_dls.debug*, where *hostname* is the host name of this 6611.

Table 5-8 (Page 1 of 2). Protocol Debug File Names - DLSw

File Name	Description
<i>hostname</i> .DLSW.conv.db	DLSw conversation list
<i>hostname</i> .DLSW.database.db	DLSw database summary
<i>hostname</i> .DLSW.dlsinfo.db	DLSw information file
<i>hostname</i> .DLSW.dump.db	Messages for saving old DLSw dumps as <i>hostname</i> .pd_dump.DLSW.d#.old and for dumping DLSw into <i>pd_dump</i> .APPN.d# and renaming the dump to <i>hostname</i> .DLSW.d#
<i>hostname</i> .DLSW.err.report.db	Detailed error report
<i>hostname</i> .DLSW.intro.db	Debug collection creation date, software level, and summary of commands and output files
<i>hostname</i> .DLSW.msgbuf.db	DLSw message buffers

Table 5-8 (Page 2 of 2). Protocol Debug File Names - DLSw

File Name	Description
<i>hostname.DLSw.msgque.db</i>	DLSw message queues
<i>hostname.DLSw.partner.db</i>	DLSw partners
<i>hostname.DLSw.procinfo.db</i>	DLSw process information
<i>hostname.DLSw.setup.db</i>	Output from the DLSw debug set command, including the trace parameters used
<i>hostname.DLSw.sys.route.db</i>	System route table
<i>hostname.DLSw.sysmon.db</i>	System monitor trace log
<i>hostname.DLSw.trace.db</i>	Messages for stopping DLSw trace and renaming trace to <i>hostname.DLSw.trc</i>

**Note:**

*hostname* Host name of the 6611

Table 5-9 lists the name and description of each file created if you choose to include additional system information.

Table 5-9. Additional System Files - DLSw

File Name	Description
<i>hostname.DLSw.cfg.report.db</i>	Detailed configuration report
<i>hostname.DLSw.config.sysid.db</i>	System configuration
<i>hostname.DLSw.connections.db</i>	Connection statistics
<i>hostname.DLSw.filesystems.db</i>	File systems
<i>hostname.DLSw.mem.man.db</i>	Memory management statistics
<i>hostname.DLSw.page.space.db</i>	System paging space statistics
<i>hostname.DLSw.proc.stat.db</i>	Process status
<i>hostname.DLSw.sw.his.db</i>	Software history
<i>hostname.DLSw.trans.dir.db</i>	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## Frame Relay

Table 5-10 lists the name and description of each file created for the frame relay protocol. After collecting the necessary debug information, the files are compressed and placed in *pd\_hostname\_fr.debug* (where *hostname* is the host name of this 6611), or in *pd\_hostname\_fr.intf.debug* (where *intf* is the interface chosen).

Table 5-10 (Page 1 of 2). Protocol Debug File Names - Frame Relay

File Name	Description
<i>hostname.FR.adp.slots.db</i>	6611 adapter list by slot
<i>hostname.FR.adpinfo.db</i>	General peer-capable adapter information for frame-relay adapters
<i>hostname.FR.appletalk.db</i>	AppleTalk address to DLCI lookup table
<i>hostname.FR.arpstat.db</i>	ARP statistics

Table 5-10 (Page 2 of 2). Protocol Debug File Names - Frame Relay

File Name	Description
<i>hostname</i> .FR.bridge.db	Bridge address to DLCI lookup table
<i>hostname</i> .FR.connections.db	Connection statistics
<i>hostname</i> .FR.decnet.db	DECnet address to DLCI lookup table
<i>hostname</i> .FR.dropstat.db	Drop statistics
<i>hostname</i> .FR.error.db	Frame-relay error information
<i>hostname</i> .FR.flags.db	Other statistics and flags
<i>hostname</i> .FR.freebuf.db	Free buffer statistics
<i>hostname</i> .FR.ifstat.db	Interface packet traffic for frame-relay adapter
<i>hostname</i> .FR.intro.db	Debug collection creation date, software level, and summary of commands and output files
<i>hostname</i> .FR.ip.db	IP address to DLCI lookup table
<i>hostname</i> .FR.ipx.db	IPX address to DLCI lookup table
<i>hostname</i> .FR.linkstat.db	Link statistics
<i>hostname</i> .FR.mib.db	Frame-relay MIB information
<i>hostname</i> .FR.mystat.db	My statistics
<i>hostname</i> .FR.numstat.db	Num statistics
<i>hostname</i> .FR.sys.route.db	System route table
<i>hostname</i> .FR.xns.db	XNS address to DLCI lookup table

**Note:**

*hostname* Host name of the 6611

Table 5-11 lists the name and description of each file created if you choose to include additional system information.

Table 5-11. Additional System Files - Frame Relay

File Name	Description
<i>hostname</i> .FR.cfg.report.db	Detailed configuration report
<i>hostname</i> .FR.config.sysid.db	System configuration
<i>hostname</i> .FR.err.report.db	Detailed error report
<i>hostname</i> .FR.filesystems.db	File systems
<i>hostname</i> .FR.mem.man.db	Memory management statistics
<i>hostname</i> .FR.page.space.db	System paging space statistics
<i>hostname</i> .FR.proc.stat.db	Process status
<i>hostname</i> .FR.sw.his.db	Software history
<i>hostname</i> .FR.sysmon.db	System monitor trace log
<i>hostname</i> .FR.trans.dir.db	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## Interface

Table 5-12 lists the name and description of each file created for interfaces. After collecting the necessary debug information, the files are compressed and placed in `pd_hostname_if.debug`, where *hostname* is the host name of this 6611.

Table 5-12. Protocol Debug File Names - Interface

File Name	Description
<i>hostname</i> .IF.adp.slots.db	6611 adapter list by slot
<i>hostname</i> .IF.adpinfo.db	General adapter information
<i>hostname</i> .IF.connections.db	Connection statistics
<i>hostname</i> .IF.dump.db	Messages for dumping the interfaces and the interface dump
<i>hostname</i> .IF.ifstat.db	Interface information including traffic, connections, routes, statistics, and filters
<i>hostname</i> .IF.intro.db	Debug collection creation date, software level, and summary of commands and output files
<i>hostname</i> .IF.sys.route.db	System route table

### Note:

*hostname* Host name of the 6611

Table 5-13 lists the name and description of each file created if you choose to include additional system information.

Table 5-13. Additional System Files - Interface

File Name	Description
<i>hostname</i> .IF.cfg.report.db	Detailed configuration report
<i>hostname</i> .IF.config.sysid.db	System configuration
<i>hostname</i> .IF.err.report.db	Detailed error report
<i>hostname</i> .IF.filesystems.db	File systems
<i>hostname</i> .IF.mem.man.db	Memory management statistics
<i>hostname</i> .IF.page.space.db	System paging space statistics
<i>hostname</i> .IF.proc.stat.db	Process status
<i>hostname</i> .IF.sw.his.db	Software history
<i>hostname</i> .IF.sysmon.db	System monitor trace log
<i>hostname</i> .IF.trans.dir.db	Listing of transfer directory

### Note:

*hostname* Host name of the 6611

## IP

Table 5-14 on page 5-69 lists the name and description of each file created for IP. After collecting the necessary debug information, the files are compressed and placed in `pd_hostname_ip.debug`, where *hostname* is the host name of this 6611.

Table 5-14. Protocol Debug File Names - IP

File Name	Description
<i>hostname</i> .IP.adp.slots.db	6611 adapter list by slot
<i>hostname</i> .IP.connections.db	Connection statistics
<i>hostname</i> .IP.dump.db	Messages for dumping IP into /tmp/gated_dump and renaming dump to <i>hostname</i> .IP.dump
<i>hostname</i> .IP.framerelay.db	IP address to DLCI lookup table
<i>hostname</i> .IP.gen.adpinfo.db	General peer-capable adapter information
<i>hostname</i> .IP.if.status.db	Adapter interface status
<i>hostname</i> .IP.ifstat.db	IP interface information including traffic, connections, routes, statistics, and filters
<i>hostname</i> .IP.intro.db	Debug collection creation date, software level, and summary of commands and output files
<i>hostname</i> .IP.net.options.db	Network options
<i>hostname</i> .IP.ospf.db	IP OSPF information
<i>hostname</i> .IP.setup.db	Output from the IP debug set command, including the trace parameters used
<i>hostname</i> .IP.sys.route.db	System route table
<i>hostname</i> .IP.sysstat.db	IP system statistics
<i>hostname</i> .IP.trace.db	Messages for stopping IP trace and renaming trace to <i>hostname</i> .pd_ip.trc IP trace output

**Note:**

*hostname* Host name of the 6611

Table 5-15 lists the name and description of each file created if you choose to include additional system information.

Table 5-15. Additional System Files - IP

File Name	Description
<i>hostname</i> .IP.cfg.report.db	Detailed configuration report
<i>hostname</i> .IP.config.sysid.db	System configuration
<i>hostname</i> .IP.err.report.db	Detailed error report
<i>hostname</i> .IP.filesystems.db	File systems
<i>hostname</i> .IP.mem.man.db	Memory management statistics
<i>hostname</i> .IP.page.space.db	System paging space statistics
<i>hostname</i> .IP.proc.stat.db	Process status
<i>hostname</i> .IP.sw.his.db	Software history
<i>hostname</i> .IP.sysmon.db	System monitor trace log
<i>hostname</i> .IP.trans.dir.db	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## IPX

Table 5-16 lists the name and description of each file created for the IPX protocol. After collecting the necessary debug information, the files are compressed and placed in `pd_hostname_ipx.debug`, where *hostname* is the host name of this 6611.

Table 5-16. Protocol Debug File Names - IPX

File Name	Description
<i>hostname</i> .IPX.adp.slots.db	6611 adapter list by slot
<i>hostname</i> .IPX.config.db	IPX configuration information
<i>hostname</i> .IPX.connections.db	Connection statistics
<i>hostname</i> .IPX.dump.db	Messages for dumping IPX and the IPX dump
<i>hostname</i> .IPX.framerelay.db	IPX address to DLCI lookup table
<i>hostname</i> .IPX.gen.adpinfo.db	General peer-capable adapter information
<i>hostname</i> .IPX.if.status.db	Adapter interface status
<i>hostname</i> .IPX.ifstat.db	IPX interface information including traffic, connections, routes, statistics, and filters
<i>hostname</i> .IPX.intro.db	Debug collection creation date, software level, and summary of commands and output files
<i>hostname</i> .IPX.net.options.db	Network options
<i>hostname</i> .IPX.swinfo.db	IPX software information
<i>hostname</i> .IPX.sys.route.db	System route table
<i>hostname</i> .IPX.sysstat.db	IPX system statistics
<i>hostname</i> .IPX.trace.db	Messages for stopping IPX trace and renaming trace to <i>hostname</i> .pd_ipx.trc IPX trace output

### Note:

*hostname* Host name of the 6611

Table 5-17 lists the name and description of each file created if you choose to include additional system information.

Table 5-17 (Page 1 of 2). Additional System Files - IPX

File Name	Description
<i>hostname</i> .IPX.cfg.report.db	Detailed configuration report
<i>hostname</i> .IPX.config.sysid.db	System configuration
<i>hostname</i> .IPX.err.report.db	Detailed error report
<i>hostname</i> .IPX.filesystems.db	File systems
<i>hostname</i> .IPX.mem.man.db	Memory management statistics
<i>hostname</i> .IPX.page.space.db	System paging space statistics
<i>hostname</i> .IPX.proc.stat.db	Process status
<i>hostname</i> .IPX.sw.his.db	Software history
<i>hostname</i> .IPX.sysmon.db	System monitor trace log

Table 5-17 (Page 2 of 2). Additional System Files - IPX

File Name	Description
<i>hostname</i> .IPX.trans.dir.db	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## LAN Bridge

Table 5-18 lists the name and description of each file created for the LAN Bridge protocol. After collecting the necessary debug information, the files are compressed and placed in *pd\_hostname\_lb.debug*, where *hostname* is the host name of this 6611.

Table 5-18. Protocol Debug File Names - LAN Bridge

File Name	Description
<i>hostname</i> .LB.adp.slots.db	6611 adapter list by slot
<i>hostname</i> .LB.connections.db	Connection statistics
<i>hostname</i> .LB.framerelay.db	Bridge address to DLCI lookup table
<i>hostname</i> .LB.if.status.db	Adapter interface status
<i>hostname</i> .LB.ifstat.db	LAN Bridge interface information including traffic, connections, routes, statistics, and filters
<i>hostname</i> .LB.intro.db	Debug collection creation date, software level, and summary of commands and output files
<i>hostname</i> .LB.ipcs.db	LAN bridgie kernet information
<i>hostname</i> .LB.log.db	LAN bridging log information
<i>hostname</i> .LB.procinfo.db	LAN bridging process information
<i>hostname</i> .LB.ser.adpinfo.db	General adapter information for serial adapters
<i>hostname</i> .LB.sys.route.db	System route table

**Note:**

*hostname* Host name of the 6611

Table 5-19 lists the name and description of each file created if you choose to include additional system information.

Table 5-19 (Page 1 of 2). Additional System Files - LAN Bridge

File Name	Description
<i>hostname</i> .LB.cfg.report.db	Detailed configuration report
<i>hostname</i> .LB.config.sysid.db	System configuration
<i>hostname</i> .LB.err.report.db	Detailed error report
<i>hostname</i> .LB.filesystems.db	File systems
<i>hostname</i> .LB.mem.man.db	Memory management statistics
<i>hostname</i> .LB.page.space.db	System paging space statistics
<i>hostname</i> .LB.proc.stat.db	Process status



Table 5-19 (Page 2 of 2). Additional System Files - LAN Bridge

File Name	Description
<i>hostname.LB.sw.his.db</i>	Software history
<i>hostname.LB.sysmon.db</i>	System monitor trace log
<i>hostname.LB.trans.dir.db</i>	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## PPP

Table 5-20 lists the name and description of each file created for PPP. After collecting the necessary debug information, the files are compressed and placed in *pd\_hostname\_ppp.debug* (where *hostname* is the host name of this 6611), or in *pd\_hostname\_ppp.intf.debug* (where *intf* is the interface chosen).

Table 5-20. Protocol Debug File Names - PPP

File Name	Description
<i>hostname.PPP.adp.slots.db</i>	6611 adapter list by slot
<i>hostname.PPP.adpinfo.db</i>	PPP serial adapter data structures
<i>hostname.PPP.connections.db</i>	Connection statistics
<i>hostname.PPP.gen.adpinfo.db</i>	General peer-capable adapter information
<i>hostname.PPP.intro.db</i>	Debug collection creation date, software level, and summary of commands and output files
<i>hostname.PPP.procinfo.db</i>	PPP process information
<i>hostname.PPP.readwrite.db</i>	Serial adapter read and write addresses
<i>hostname.PPP.swinfo.db</i>	PPP software information
<i>hostname.PPP.sys.route.db</i>	System route table

**Note:**

*hostname* Host name of the 6611

Table 5-21 lists the name and description of each file created if you choose to include additional system information.

Table 5-21 (Page 1 of 2). Additional System Files - PPP

File Name	Description
<i>hostname.PPP.cfg.report.db</i>	Detailed configuration report
<i>hostname.PPP.config.sysid.db</i>	System configuration
<i>hostname.PPP.err.report.db</i>	Detailed error report
<i>hostname.PPP.filesystems.db</i>	File systems
<i>hostname.PPP.mem.man.db</i>	Memory management statistics
<i>hostname.PPP.page.space.db</i>	System paging space statistics
<i>hostname.PPP.proc.stat.db</i>	Process status
<i>hostname.PPP.sw.his.db</i>	Software history
<i>hostname.PPP.sysmon.db</i>	System monitor trace log

Table 5-21 (Page 2 of 2). Additional System Files - PPP

File Name	Description
<i>hostname</i> .PPP.trans.dir.db	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## SNMP

Table 5-22 lists the name and description of each file created for the SNMP protocol. After collecting the necessary debug information, the files are compressed and placed in *pd\_hostname\_snmp.debug*, where *hostname* is the host name of this 6611.

Table 5-22. Protocol Debug File Names - SNMP

File Name	Description
<i>hostname</i> .SNMP.intro.db	Debug collection creation date, software level, and summary of commands and output files
<i>hostname</i> .SNMP.log.db	SNMP trace logs
<i>hostname</i> .SNMP.netstat.db	SMUX network statistics
<i>hostname</i> .SNMP.procinfo.db	SNMP process information
<i>hostname</i> .SNMP.sys.route.db	System route table
<i>hostname</i> .SNMP.sysmon.db	System monitor trace log

**Note:**

*hostname* Host name of the 6611

Table 5-23 lists the name and description of each file created if you choose to include additional system information.

Table 5-23. Additional System Files - SNMP

File Name	Description
<i>hostname</i> .SNMP.cfg.report.db	Detailed configuration report
<i>hostname</i> .SNMP.config.sysid.db	System configuration
<i>hostname</i> .SNMP.connections.db	Connection statistics
<i>hostname</i> .SNMP.err.report.db	Detailed error report
<i>hostname</i> .SNMP.filesystems.db	File systems
<i>hostname</i> .SNMP.mem.man.db	Memory management statistics
<i>hostname</i> .SNMP.page.space.db	System paging space statistics
<i>hostname</i> .SNMP.proc.stat.db	Process status
<i>hostname</i> .SNMP.sw.his.db	Software history
<i>hostname</i> .SNMP.trans.dir.db	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## Source Route Bridge

Table 5-24 lists the name and description of each file created for the source route bridge protocol. After collecting the necessary debug information, the files are compressed and placed in `pd_hostname_srb.debug`, where *hostname* is the host name of this 6611.

Table 5-24. Protocol Debug File Names - Source Route Bridge

File Name	Description
<i>hostname</i> .SRB.adp.slots.db	6611 adapter list by slot
<i>hostname</i> .SRB.connections.db	Connection statistics
<i>hostname</i> .SRB.framerelay.db	Bridge address to DLCI lookup table
<i>hostname</i> .SRB.if.status.db	Adapter interface status
<i>hostname</i> .SRB.ifstat.db	Source route bridge interface information including traffic, connections, routes, statistics, and filters
<i>hostname</i> .SRB.intro.db	Debug collection creation date, software level, and summary of commands and output files
<i>hostname</i> .SRB.log.db	Source route bridge log information
<i>hostname</i> .SRB.mib.db	Source route bridge MIB information
<i>hostname</i> .SRB.procinfo.db	Source route bridge process information
<i>hostname</i> .SRB.ser.adpinfo.db	General adapter information for serial adapters
<i>hostname</i> .SRB.sys.route.db	System route table
<i>hostname</i> .SRB.tr.adpinfo.db	General adapter information for token-ring network 16/4 adapters

### Note:

*hostname* Host name of the 6611

Table 5-25 lists the name and description of each file created if you choose to include additional system information.

Table 5-25 (Page 1 of 2). Additional System Files - Source Route Bridge

File Name	Description
<i>hostname</i> .SRB.cfg.report.db	Detailed configuration report
<i>hostname</i> .SRB.config.sysid.db	System configuration
<i>hostname</i> .SRB.err.report.db	Detailed error report
<i>hostname</i> .SRB.filesystems.db	File systems
<i>hostname</i> .SRB.mem.man.db	Memory management statistics
<i>hostname</i> .SRB.page.space.db	System paging space statistics
<i>hostname</i> .SRB.proc.stat.db	Process status
<i>hostname</i> .SRB.sw.his.db	Software history
<i>hostname</i> .SRB.sysmon.db	System monitor trace log

Table 5-25 (Page 2 of 2). Additional System Files - Source Route Bridge

File Name	Description
<i>hostname</i> .SRB.trans.dir.db	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## System

Table 5-26 lists the name and description of each file created for the system debug commands. After collecting the necessary debug information, the files are compressed and placed in an output file. If you use the **system debug collect -paging\_space** command, the output is placed in *pd\_hostname\_pagingspace.debug*; otherwise, the output is placed in *pd\_hostname\_system.debug*. *hostname* is the host name of this 6611.

Table 5-26. Protocol Debug File Names - System

File Name	Description
<i>hostname</i> .SYS.cfg.report.db	Detailed configuration report
<i>hostname</i> .SYS.config.sysid.db	System configuration
<i>hostname</i> .SYS.connections.db	Connection statistics
<i>hostname</i> .SYS.err.report.db	Detailed error report
<i>hostname</i> .SYS.filesystems.db	File systems
<i>hostname</i> .SYS.intro.db	Debug collection creation date, software level, and summary of commands and output files
<i>hostname</i> .SYS.iostat.db	Input or Output statistics
<i>hostname</i> .SYS.mem.man.db	Memory management statistics
<i>hostname</i> .SYS.net.options.db	Network options
<i>hostname</i> .SYS.page.space.db	System paging space statistics
<i>hostname</i> .SYS.proc.stat.db	Process status
<i>hostname</i> .SYS.processes.db	Process list
<i>hostname</i> .SYS.socket.db	Socket information
<i>hostname</i> .SYS.sys.proto.stat.db	System protocol statistics
<i>hostname</i> .SYS.sys.route.db	System route table
<i>hostname</i> .SYS.sysmon.db	System monitor trace log
<i>hostname</i> .SYS.trans.dir.db	Listing of transfer directory
<i>hostname</i> .SYS.vmstat.db	Virtual memory statistics

**Note:**

*hostname* Host name of the 6611

## Translational Bridge

Table 5-27 on page 5-76 lists the name and description of each file created for the translational bridge protocol. After collecting the necessary debug information, the files are compressed and placed in *pd\_hostname\_tlb.debug*, where *hostname* is the host name of this 6611.

Table 5-27. Protocol Debug File Names - Translational Bridge

File Name	Description
<i>hostname.TLB.adp.slots.db</i>	6611 adapter list by slot
<i>hostname.TLB.connections.db</i>	Connection statistics
<i>hostname.TLB.en.adpinfo.db</i>	General adapter information for Ethernet adapters
<i>hostname.TLB.en.ifstat.db</i>	Translational bridge Ethernet interface information including traffic, connections, routes, statistics, and filters
<i>hostname.TLB.framerelay.db</i>	Bridge address to DLCI lookup table
<i>hostname.TLB.if.status.db</i>	Adapter interface status
<i>hostname.TLB.intro.db</i>	Debug collection creation date, software level, and summary of commands and output files
<i>hostname.TLB.log.db</i>	Translational bridge log information
<i>hostname.TLB.mib.db</i>	Translational bridge MIB information
<i>hostname.TLB.procinfo.db</i>	Translational bridge process information
<i>hostname.TLB.ser.adpinfo.db</i>	General adapter information for serial adapters
<i>hostname.TLB.ser.ifstat.db</i>	Translational bridge serial interface information including traffic, connections, routes, statistics, and filters
<i>hostname.TLB.sys.route.db</i>	System route table
<i>hostname.TLB.tr.adpinfo.db</i>	General adapter information for &trad.s
<i>hostname.TLB.tr.ifstat.db</i>	Translational bridge token-ring interface information including traffic, connections, routes, statistics, and filters

**Note:**

*hostname* Host name of the 6611

Table 5-28 lists the name and description of each file created if you choose to include additional system information.

Table 5-28 (Page 1 of 2). Additional System Files - Translational Bridge

File Name	Description
<i>hostname.TLB.cfg.report.db</i>	Detailed configuration report
<i>hostname.TLB.config.sysid.db</i>	System configuration
<i>hostname.TLB.err.report.db</i>	Detailed error report
<i>hostname.TLB.filesystems.db</i>	File systems
<i>hostname.TLB.mem.man.db</i>	Memory management statistics
<i>hostname.TLB.page.space.db</i>	System paging space statistics
<i>hostname.TLB.proc.stat.db</i>	Process status
<i>hostname.TLB.sw.his.db</i>	Software history
<i>hostname.TLB.sysmon.db</i>	System monitor trace log

Table 5-28 (Page 2 of 2). Additional System Files - Translational Bridge

File Name	Description
<i>hostname</i> .TLB.trans.dir.db	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## Transparent Bridge

Table 5-29 lists the name and description of each file created for the transparent bridge protocol. After collecting the necessary debug information, the files are compressed and placed in *pd\_hostname\_tb.debug*, where *hostname* is the host name of this 6611.

Table 5-29. Protocol Debug File Names - Transparent Bridge

File Name	Description
<i>hostname</i> .TB.adp.slots.db	6611 adapter list by slot
<i>hostname</i> .TB.connections.db	Connection statistics
<i>hostname</i> .TB.en.adpinfo.db	General adapter information for Ethernet adapters
<i>hostname</i> .TB.framerelay.db	Bridge address to DLCI lookup table
<i>hostname</i> .TB.if.status.db	Adapter interface status
<i>hostname</i> .TB.ifstat.db	Transparent bridge interface information including traffic, connections, routes, statistics, and filters
<i>hostname</i> .TB.intro.db	Debug collection creation date, software level, and summary of commands and output files
<i>hostname</i> .TB.log.db	Transparent bridge log information
<i>hostname</i> .TB.mib.db	Transparent bridge MIB information
<i>hostname</i> .TB.procinfo.db	Transparent bridge process information
<i>hostname</i> .TB.ser.adpinfo.db	General adapter information for serial adapters
<i>hostname</i> .TB.sys.route.db	System route table

**Note:**

*hostname* Host name of the 6611

Table 5-30 lists the name and description of each file created if you choose to include additional system information.

Table 5-30 (Page 1 of 2). Additional System Files - Transparent Bridge

File Name	Description
<i>hostname</i> .TB.cfg.report.db	Detailed configuration report
<i>hostname</i> .TB.config.sysid.db	System configuration
<i>hostname</i> .TB.err.report.db	Detailed error report
<i>hostname</i> .TB.filesystems.db	File systems
<i>hostname</i> .TB.mem.man.db	Memory management statistics

Table 5-30 (Page 2 of 2). Additional System Files - Transparent Bridge

File Name	Description
<i>hostname</i> .TB.page.space.db	System paging space statistics
<i>hostname</i> .TB.proc.stat.db	Process status
<i>hostname</i> .TB.sw.his.db	Software history
<i>hostname</i> .TB.sysmon.db	System monitor trace log
<i>hostname</i> .TB.trans.dir.db	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## VINES

Table 5-31 lists the name and description of each file created for the VINES protocol. After collecting the necessary debug information, the files are compressed and placed in *pd\_hostname\_vines.debug*, where *hostname* is the host name of this 6611.

Table 5-31. Protocol Debug File Names - VINES

File Name	Description
<i>hostname</i> .VINES.adp.slots.db	6611 adapter list by slot
<i>hostname</i> .VINES.arp.db	System ARP table
<i>hostname</i> .VINES.config.db	VINES configuration information
<i>hostname</i> .VINES.connections.db	Connection statistics
<i>hostname</i> .VINES.daemon.db	VINES daemon information
<i>hostname</i> .VINES.dump.db	Messages for dumping VINES and the VINES dump
<i>hostname</i> .VINES.gen.adpinfo.db	General peer-capable adapter information
<i>hostname</i> .VINES.if.status.db	Adapter interface status
<i>hostname</i> .VINES.ifstat.db	VINES interface information including traffic, connections, routes, statistics, and filters
<i>hostname</i> .VINES.intro.db	Debug collection creation date, software level, and summary of commands and output files
<i>hostname</i> .VINES.net.options.db	Network options
<i>hostname</i> .VINES.swinfo.db	VINES software information
<i>hostname</i> .VINES.sys.route.db	System route table
<i>hostname</i> .VINES.sysstat.db	VINES system statistics
<i>hostname</i> .VINES.trace.db	Messages for stopping VINES trace and renaming trace to <i>hostname.pd_vines.trc</i> VINES trace output

**Note:**

*hostname* Host name of the 6611

Table 5-32 on page 5-79 lists the name and description of each file created if you choose to include additional system information.

Table 5-32. Additional System Files - VINES

File Name	Description
<i>hostname.VINES.cfg.report.db</i>	Detailed configuration report
<i>hostname.VINES.config.sysid.db</i>	System configuration
<i>hostname.VINES.err.report.db</i>	Detailed error report
<i>hostname.VINES.filesystems.db</i>	File systems
<i>hostname.VINES.mem.man.db</i>	Memory management statistics
<i>hostname.VINES.page.space.db</i>	System paging space statistics
<i>hostname.VINES.proc.stat.db</i>	Process status
<i>hostname.VINES.sw.his.db</i>	Software history
<i>hostname.VINES.sysmon.db</i>	System monitor trace log
<i>hostname.VINES.trans.dir.db</i>	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## XNS

Table 5-33 lists the name and description of each file created for the XNS protocol. After collecting the necessary debug information, the files are compressed and placed in *pd\_hostname\_xns.debug*, where *hostname* is the host name of this 6611.

Table 5-33. Protocol Debug File Names - XNS

File Name	Description
<i>hostname.XNS.adp.slots.db</i>	6611 adapter list by slot
<i>hostname.XNS.config.db</i>	XNS configuration information
<i>hostname.XNS.connections.db</i>	Connection statistics
<i>hostname.XNS.framerelay.db</i>	XNS address to DLCI lookup table
<i>hostname.XNS.gen.adpinfo.db</i>	General peer-capable adapter information
<i>hostname.XNS.if.status.db</i>	Adapter interface status
<i>hostname.XNS.ifstat.db</i>	XNS interface information including traffic, connections, routes, statistics, and filters
<i>hostname.XNS.intro.db</i>	Debug collection creation date, software level, and summary of commands and output files
<i>hostname.XNS.net.options.db</i>	Network options
<i>hostname.XNS.swinfo.db</i>	XNS software information
<i>hostname.XNS.sys.route.db</i>	System route table
<i>hostname.XNS.sysstat.db</i>	XNS system statistics
<i>hostname.XNS.trace.db</i>	Messages for stopping XNS trace and renaming trace to <i>hostname.pd_xns.trc</i> XNS trace output

**Note:**

*hostname* Host name of the 6611



Table 5-34 on page 5-80 lists the name and description of each file created if you choose to include additional system information.

*Table 5-34. Additional System Files - XNS*

File Name	Description
<i>hostname.XNS.cfg.report.db</i>	Detailed configuration report
<i>hostname.XNS.config.sysid.db</i>	System configuration
<i>hostname.XNS.err.report.db</i>	Detailed error report
<i>hostname.XNS.filesystems.db</i>	File systems
<i>hostname.XNS.mem.man.db</i>	Memory management statistics
<i>hostname.XNS.page.space.db</i>	System paging space statistics
<i>hostname.XNS.proc.stat.db</i>	Process status
<i>hostname.XNS.sw.his.db</i>	Software history
<i>hostname.XNS.sysmon.db</i>	System monitor trace log
<i>hostname.XNS.trans.dir.db</i>	Listing of transfer directory

**Note:**

*hostname* Host name of the 6611

## X.25

Table 5-35 lists the name and description of each file created for the X.25 protocol. After collecting the necessary debug information, the files are compressed and placed in *pd\_hostname\_x25.debug*, where *hostname* is the host name of this 6611.

*Table 5-35. Protocol Debug File Names - X.25*

File Name	Description
<i>hostname.X25.adp.slots.db</i>	6611 adapter list by slot
<i>hostname.X25.config.sysid.db</i>	System configuration
<i>hostname.X25.connections.db</i>	Connection statistics
<i>hostname.X25.ifstat.db</i>	X.25 adapter interface status
<i>hostname.X25.intro.db</i>	Debug collection creation date, software level, and summary of commands and output files
<i>hostname.X25.log.db</i>	X.25 trace log
<i>hostname.X25.sysmon.db</i>	System monitor trace log

**Note:**

*hostname* Host name of the 6611

Table 5-36 lists the name and description of each file created if you choose to include additional system information.

*Table 5-36 (Page 1 of 2). Additional System Files - X.25*

File Name	Description
<i>hostname.X25.cfg.report.db</i>	Detailed configuration report
<i>hostname.X25.err.report.db</i>	Detailed error report
<i>hostname.X25.filesystems.db</i>	File systems

Table 5-36 (Page 2 of 2). Additional System Files - X.25

File Name	Description
<i>hostname.X25.mem.man.db</i>	Memory management statistics
<i>hostname.X25.page.space.db</i>	System paging space statistics
<i>hostname.X25.proc.stat.db</i>	Process status
<i>hostname.X25.sw.his.db</i>	Software history
<i>hostname.X25.trans.dir.db</i>	Listing of transfer directory
<b>Note:</b>	
<i>hostname</i> Host name of the 6611	

## Concurrent Hardware Diagnostics

Select **Concurrent Hardware Diagnostics** to perform hardware problem determination. Refer to *IBM 6611 Network Processor Maintenance Information* for detailed information about analyzing a suspected hardware problem.

All of the menu items on the Problem Determination menu lead to another menu screen or group of menu screens for the System Manager, except for Concurrent Hardware Diagnostics. When you select **Concurrent Hardware Diagnostics**, control is passed to the Hardware Diagnostics Facility. You are no longer in the System Manager.

Concurrent hardware diagnostics can be run while the system is in operation. They are designed to test as much of the system, or specified resource, as possible without interfering with system operations. These are the only type of diagnostics that can be run from the System Manager. For information about stand-alone diagnostics, refer to the *IBM 6611 Network Processor Maintenance Information*.

To test as much of the system or specified resource as possible without interfering with system operations, it is necessary to limit diagnostic testing. If the resource cannot be totally tested in this mode because the resource is in use by the system, a message is displayed informing you of this. You can stop some of the system to free the resource for more complete testing. You can use the facilities of the System Manager to perform an orderly shutdown of the system and test the resource in stand-alone mode.

Running diagnostics requires one of the following:

- An ASCII terminal or terminal emulator attached directly to the S1 or S2 EIA 232 serial ports.
- An ASCII terminal or terminal emulator attached via a modem to the S1 or S2 EIA 232 serial ports.
- A remote workstation attached through the IP network.

**Note:** Only a controlling user can run hardware diagnostics.

## Running from a Direct-Attached ASCII Terminal

When an ASCII terminal or terminal emulator is attached directly to the S1 or S2 serial port of an operational 6611, a login screen appears. Log in to the 6611 using a controlling user ID and password. Select the correct terminal type when prompted. The System Manager main menu appears.

1. Select **Problem Determination** from the System Manager main menu.
2. Select **Concurrent Hardware Diagnostics** from the next menu.
3. The Diagnostic Operating Instructions screen (refer to Figure 5-47) is displayed. After reading the screen, press **Enter** to continue.

```
LICENSED MATERIALS - PROPERTY OF IBM.  
IBM 6611 Network Processor DIAGNOSTICS VERSION 2.0  
(C) COPYRIGHTS BY IBM AND BY OTHERS 1982, 1994.  
ALL RIGHTS RESERVED.  
US GOVERNMENT USERS RESTRICTED RIGHTS -  
USE, DUPLICATION OR DISCLOSURE RESTRICTED  
BY GSA ADP SCHEDULE CONTRACT WITH IBM CORP.
```

### DIAGNOSTIC OPERATING INSTRUCTIONS

These programs contain diagnostics and service aids for the system. These procedures should be used whenever problems with the system occur which have not been corrected by any software application procedures available. In general, the procedures will run automatically. However, sometimes you will be required to select options, inform the system when to continue, do simple tasks, and exchange diskettes.

Several keys are used to control the procedures:

- The Enter key continues the procedure or performs an action
- The Backspace key allows keying errors to be corrected.
- The cursor keys are used to select an option.

Press the F3 key to exit or press Enter to continue.

*Figure 5-47. Diagnostic Operating Instructions Screen*

4. On the FUNCTION SELECTION screen (refer to Figure 5-48 on page 5-83 for an example), select **Diagnostic Routines**.

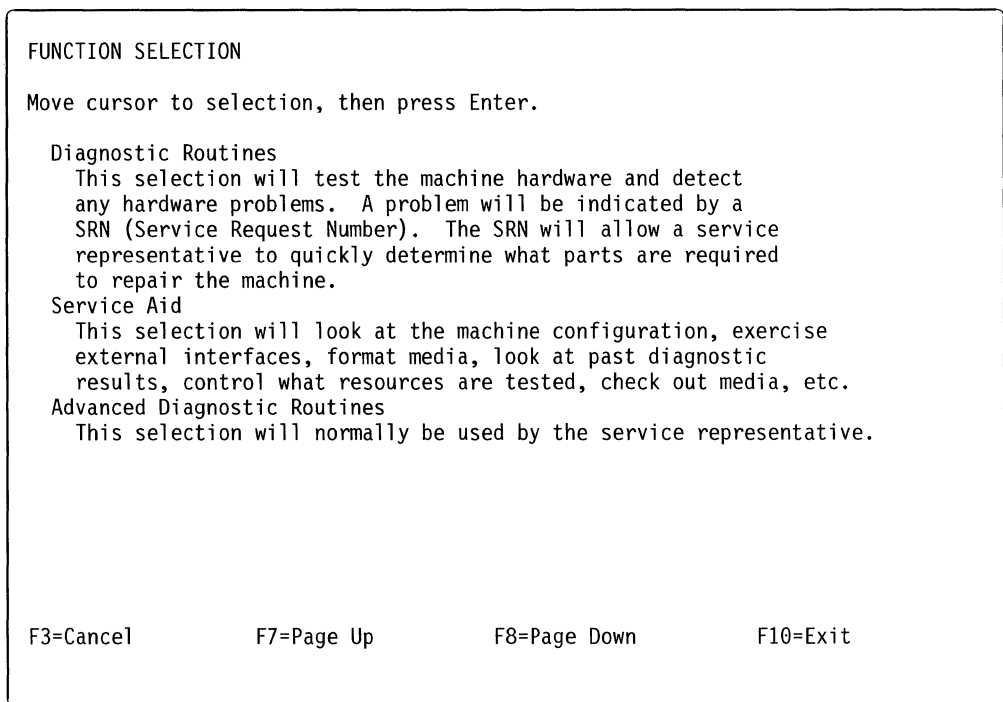


Figure 5-48. FUNCTION SELECTION Screen

5. The DIAGNOSTIC MODE SELECTION screen (refer to Figure 5-49 for an example) is displayed. Select one of the following:

- **System Verification** to check the correct operation of the system after repairs have been completed.
- **Problem Determination** to test the system when a problem is suspected. In addition to running the hardware diagnostics, it analyzes the error log to determine whether there have been system errors over the past 24 hours.

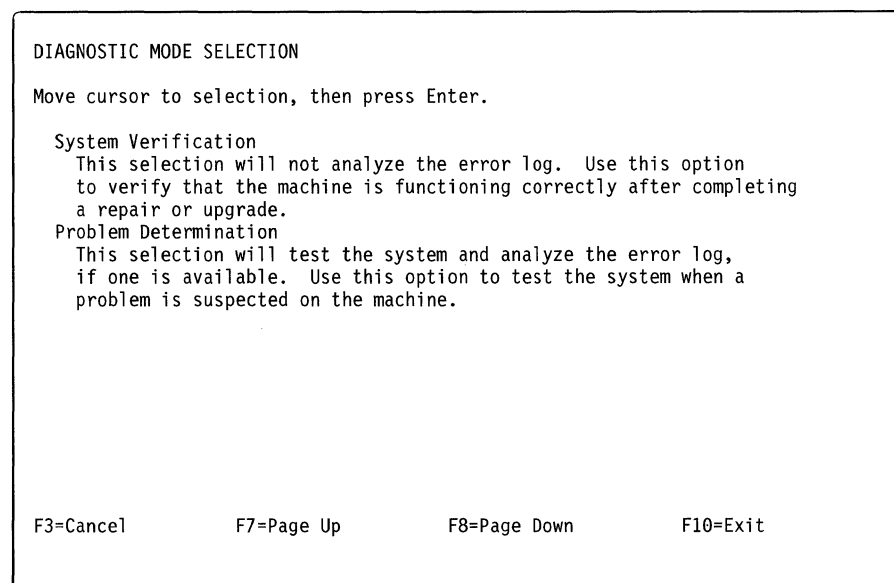


Figure 5-49. Diagnostic Mode Selection Screen

Whichever mode you select, the next menu (DIAGNOSTIC SELECTION) provides a list of the components that can be tested.

6. On the DIAGNOSTIC SELECTION screen (refer to Figure 5-50 for an example), select the resources that you want to test.

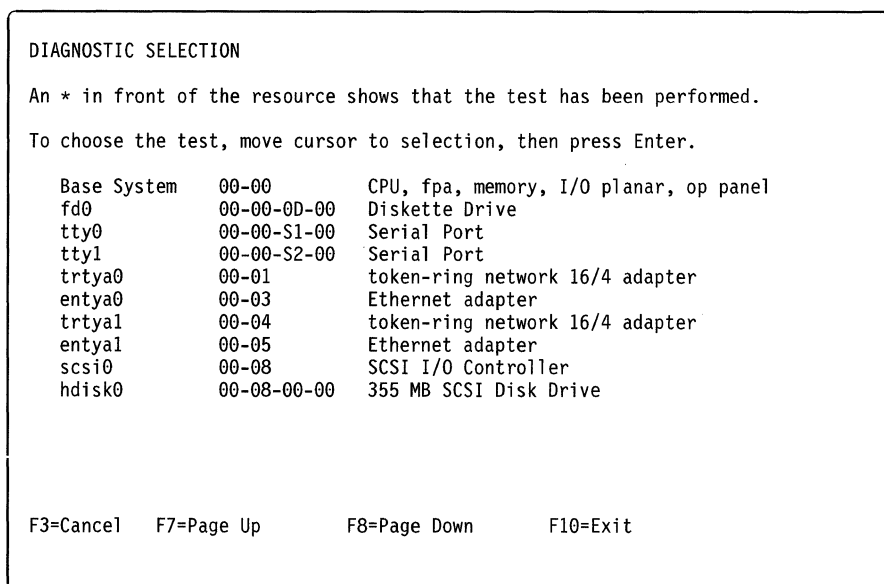


Figure 5-50. Example of Diagnostic Selection Screen in the Diagnostics Program

7. Select the component to be tested by moving the cursor up or down using the up-arrow or the down-arrow keys, and press **Enter** when the cursor is at the correct position.

To exit from any menu to the DIAGNOSTIC OPERATING INSTRUCTIONS screen, press **F3 (Esc+3)**.

## Running from a Modem-Attached ASCII Terminal

To run diagnostics testing from a modem-attached terminal, there must be at least one 6611 on the IP network with a modem attached to either its S1 or S2 serial port. This does not have to be the same 6611 needing to be tested. The modem-attached terminal must be an ASCII terminal or terminal emulator with a communication package capable of dialing out to the 6611 with the modem. The telephone number, baud rate, a configured user ID, and password must be known for the 6611 with the modem. The host name or IP address and a controlling user ID and password must be known for the 6611 to be tested.

To test a 6611 without a modem:

1. With the terminal or terminal emulator and its modem set to the same baud rate and settings as the modem attached to the 6611, use the instructions for the modem and terminal to dial into the 6611 as you would a remote host. See "Using a Modem" on page 3-12 for information about using a modem.
2. Log in to the 6611 as a controlling user.
3. Specify the correct terminal type.
4. Select **Operations** on the System Manager main menu.
5. Select **Remote Access to Other Nodes** from the next menu.

6. Select **rlogin - Remote login** from the next menu. You receive a dialog screen. Specify the host name or IP address of the 6611 needing to be tested. Specify a user ID configured at that 6611. Press **Enter** and you are prompted for the password. After entering the password, you are logged in to the 6611 needing to be tested.
7. The rest of the procedure is the same as the numbered steps for a direct-attached ASCII terminal (refer to “Running from a Direct-Attached ASCII Terminal” on page 5-82).

To test a 6611 with a modem:

1. With the terminal or terminal emulator and its modem set to the same baud rate and settings as the modem attached to the 6611, use the instructions for the modem and terminal to dial into the 6611 as you would a remote host. See “Using a Modem” on page 3-12 for information about using a modem.
2. Log in to the 6611 as a controlling user.
3. Specify the correct terminal type.
4. The rest of the procedure is the same as the numbered steps for a direct-attached ASCII terminal (refer to “Running from a Direct-Attached ASCII Terminal” on page 5-82).

## Running from a Workstation on the IP Network

From any workstation on the IP network, you can remotely run concurrent diagnostics on a 6611 using a Telnet session. The host name or IP address and a controlling user ID and password must be known for the 6611 to be tested.

1. Type **telnet <hostname or IP address>** to begin the Telnet session.
2. Log in using the controlling user ID and password when prompted. Specify the terminal type, if prompted. See “Using Telnet” on page 3-4 for more details about Telnet sessions.
3. Control is passed to the System Manager, which displays a login screen.
4. The rest of the procedure is the same as the numbered steps for a direct-attached ASCII terminal (refer to “Running from a Direct-Attached ASCII Terminal” on page 5-82).



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## Chapter 6. Configuration

About This Chapter	6-2
Configuring with the System Manager	6-2
Configuration Troubleshooting	6-3
Updating Configuration Parameters Overview	6-4
Performing System Configuration Changes	6-6
Configuration Objects	6-6
APPN Configuration Objects	6-6
System Manager Configuration Utility	6-7
Initial Configuration Using a Diskette	6-11
Initial Configuration without Using a Diskette	6-11
Direct IP Connection	6-12
Modem Attachment	6-12
FTP Transfer Method	6-13
Minimal Configuration Using the System Manager	6-15
User IDs and Passwords	6-17
List All User IDs	6-18
Add a User ID	6-18
Delete a User ID	6-19
Change Any Password	6-19
Change Your Password	6-20
Apply Changes	6-20
Commit Changes	6-21
Reject Uncommitted Changes	6-22
Configuration Reports	6-22
Summary Configuration Report	6-23
Detailed Configuration Report	6-23
Receive and Apply Configuration	6-24
Send Configuration	6-26
Reinstate a Saved Configuration	6-26



---

## About This Chapter

This chapter explains how to use the System Manager to configure the 6611.

To enter the System Manager configuration facility, select **Configuration** from the System Manager main menu. The Configuration menu (Figure 6-1) appears.

```
IBM 6611                               hostname
                                Configuration

Move cursor to desired item and press Enter.

System Manager Configuration Utility
User IDs and Passwords

Apply Changes
Commit Changes
Reject Uncommitted Changes

Configuration Reports

Receive and Apply Configuration
Send Configuration
Reinstate a Saved Configuration


F1=Help      F2=Redraw Screen  F3=Return  F4=SysID
F10=Main Menu      Esc+L=Turn Log On
```

Figure 6-1. Configuration Menu

Refer to the following for information about the individual menu items:

- “System Manager Configuration Utility” on page 6-7
- “User IDs and Passwords” on page 6-17
- “Apply Changes” on page 6-20
- “Commit Changes” on page 6-21
- “Reject Uncommitted Changes” on page 6-22
- “Configuration Reports” on page 6-22
- “Receive and Apply Configuration” on page 6-24
- “Send Configuration” on page 6-26
- “Reinstate a Saved Configuration” on page 6-26

---

## Configuring with the System Manager

You can configure the 6611 using either the Configuration Program or the System Manager. The *primary method* of configuring the 6611 is with the Configuration Program. The System Manager is an alternate method of configuring the 6611, used mainly for backup purposes if the Configuration Program is not available.

**Warning:** The System Manager method of configuring the 6611 is *not* designed to be the primary method to configure the 6611 because System Manager provides minimal error checking and no dependency checking. If a parameter or set of parameters is dependent on another set of parameters, no checks are made to see that both sets are configured at the same time. Only experienced 6611 configuration experts should use this method for configuring the 6611.

Most of the configuration parameters that exist in the Configuration Program also exist in the dialogs under the Configuration menu.

There are two types of configuration files:

#### **Binary configuration file**

This file contains the actual configuration. It is created when a user defines configuration parameters from either the Configuration Program or the System Manager. It is transferred between the Configuration Program and the 6611 using one of the following methods:

- Direct connection over an IP network, when the configuration station is an IBM RISC System/6000 workstation.
- The File Transfer Protocol (FTP), when the configuration station is connected to the same IP network as the 6611.
- The Xmodem Protocol, when the configuration station has a modem and a connection to the 6611 through the public switched network.
- A diskette, when there is no remote method available to transfer the file.

#### **Configuration reports**

There are two types of configuration reports:

- Summary
- Detailed

The configuration reports contain descriptive information about the current configuration as it exists at the user ID from which it is viewed.

There are three System Manager configuration tasks:

1. It can be used to update configuration parameters, when the Configuration Program is not available.
2. It is involved in the transfer of the binary configuration file from the Configuration Program to the 6611.
3. It is used to view and transfer the configuration reports.

**Note:** You must be a controlling user to use the System Manager for most of these configuration tasks.

---

## **Configuration Troubleshooting**

Errors in the Configuration Program may cause different types of problems. A problem with configuration may appear initially to be a hardware problem because the IBM 6611 will not start or data will not flow through an adapter port. In addition, problems with configuration may not result in an error initially; an error may occur only when specific conditions are encountered or when heavy network traffic occurs.

If you cannot resolve a problem after making a few changes to your configuration, generate a new configuration. Endless changes to a configuration often compound the problem, whereas a new configuration can usually be generated and tested within a few hours.

---

## Updating Configuration Parameters Overview

Only a controlling user can use the System Manager to update configuration parameters.

The System Manager method of configuring the 6611 includes an apply, test, and either commit or reject scenario. The configuration changes are *applied* and *tested* in an actual test environment, and then either *committed* if the changes are approved, or *rejected* if the changes are not approved. Refer to “System Manager Configuration Utility” on page 6-7 for the details of this scenario.

When you begin modifying the system configuration using the System Manager, a local copy of the configuration data is created in the home directory of your user ID. The local copy acts as a work file in which any additional configuration modifications are recorded. The changes in the local copy are not yet part of the system configuration database.

If you want to try out the changes, but want to be able to restore the original configuration, select **Apply Changes** from the Configuration menu. At some time later you can commit these changes. You can make additional modifications to the configuration, and apply these changes in an incremental fashion.

If you want to commit the changes to the configuration database, select **Commit Changes**. You have the choice of committing only the previously applied changes or both the previously applied changes and the unapplied changes made from this controlling user ID. The System Manager then makes the configuration changes described in the work file a permanent part of the current configuration.

If you want to remove uncommitted configuration changes, select **Reject Uncommitted Changes**. You can undo all your configuration changes since the last commit operation (both applied and unapplied changes), or simply discard any changes made since the last apply or commit operation (only unapplied changes).

When you begin to modify the configuration data from a specific user ID and a local copy is made, the System Manager displays the modified version, not the current version. Because the local copy is user-specific, changes that have not been applied or committed can only be seen using that particular user ID. When the changes have been committed or applied, the System Manager returns to showing the current configuration. This may be confusing if multiple users are modifying or importing configuration data.

**Warning:** Make all System Manager configuration changes from the same controlling user ID to minimize the possibility of overriding another user's configuration changes.

Press **F4** or **Esc+4** from any System Manager menu to view the status of your configuration changes. An example of this screen is shown in Figure 6-2 on page 6-5. When viewing this screen, press **Enter** to return to the System Manager menu screen.

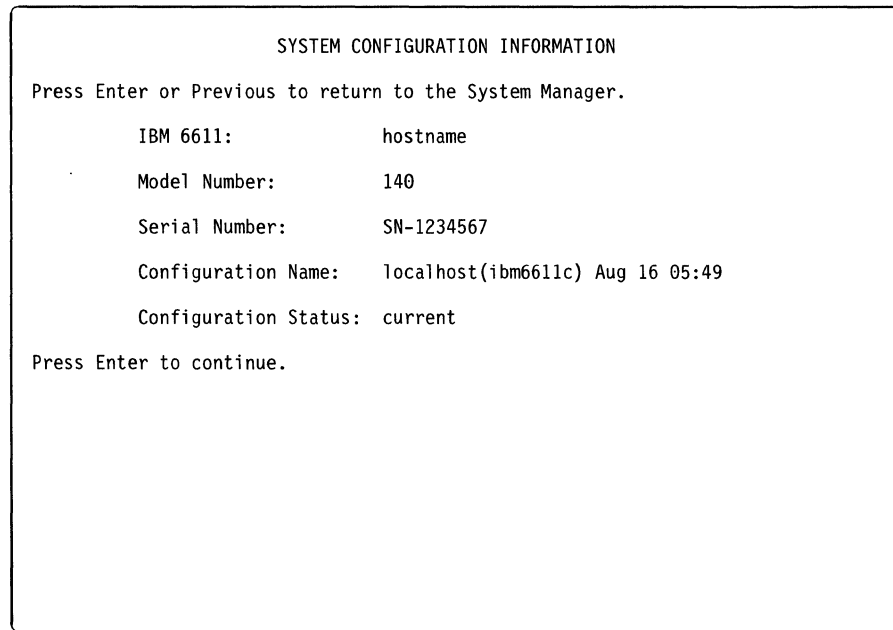


Figure 6-2. System Configuration Information Screen

When the System Manager is used to create the latest applied or committed configuration changes, the configuration name has the following format:

localhost(userid) Date Time

The user ID is the name of the user who made the latest applied or committed configuration changes at the date and time specified.

The configuration status presented is from the perspective of the user who pressed **F4 (Esc+4) = SysID** to view this information. The configuration status is either current, applied, unapplied, or partially applied.

- If the status is current, then all configuration changes made from the user ID that you are logged in to have been committed. However, there may be unapplied or applied configuration changes made by a different user. If another user has some applied, but not committed changes, the configuration name will have the local host format. The user ID will contain the name of the user who has applied, but not committed, the last configuration changes. Log in with each controlling user ID and press **F4 (Esc+4) = SysID** to view its configuration status to determine if there are unapplied configuration changes.
- When the status is applied, the user ID that you used to log in has some applied, but not committed configuration changes.
- When the status is unapplied, the user ID that you used to log in has some unapplied configuration changes.
- When the status is partially applied, the user ID that you used to log in has some applied and unapplied configuration changes.

If you want to view only the applied or committed changes, log off and log back in with another user ID. The configuration output produced from the different user ID does not reflect the unapplied changes made from the previous user ID. It reflects all applied changes made from the previous user ID.

**Warning:** Please make all System Manager configuration changes from the same controlling user ID to minimize the chance of overriding another user's configuration changes.

## Performing System Configuration Changes

Select **Configuration** to make changes to the system configuration. This menu is shown in Figure 6-1 on page 6-2. All of the tasks shown on the Configuration menu can also be performed using the Configuration Program.

## Configuration Objects

The configuration parameters are separated into logical configuration objects. The configuration parameters associated with any object are related by function and by data structure type. The System Manager groups these configuration objects both by function and by data structure type.

If the configuration object is not adapter dependent, it is considered to be a *box-level parameter*. If the configuration object is adapter dependent, it is considered to be a *port-level parameter*. If the configuration object is a single entity, not containing lists, it is called a *single object*. If the configuration object contains multiple occurrences of the same set of parameters, it is called a *list object*.

There are two sets of System Manager configuration commands. The set you choose depends on the type of configuration object data structure. When selecting the correct set of commands, you choose its high-level functional grouping, either box-level or port-level.

Each configuration object in the System Manager is updated as a complete entity on the same dialog screen.

## APPN Configuration Objects

The following box level APPN configuration objects can be accessed through the System Manager only. These objects are intended for use by IBM service personnel.

---

*Table 6-1 (Page 1 of 2). APPN Configuration Objects Accessible Via System Manager*

---

### Parameter Information

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<b>Parameter</b>	Constrained threshold
<b>Valid Values</b>	0 to 100 percent. If 0 is specified, APPN uses the default value.
<b>Default Value</b>	70 percent
<b>Description</b>	This parameter sets a threshold at which APPN begins to limit any new usage of shared memory allocated to the node. The percentage specified for this parameter should be less than the percentage specified for the Critical threshold parameter.

---

Table 6-1 (Page 2 of 2). APPN Configuration Objects Accessible Via System Manager

Parameter Information	
<b>Parameter</b>	Critical threshold
<b>Valid Values</b>	0 to 100 percent. If 0 is specified, APPN uses the default value.
<b>Default Value</b>	85 percent
<b>Description</b>	This parameter sets a threshold at which APPN begins to reduce the existing usage of shared memory allocated to the node. For example, the APPN node will establish a window size of one to restrict the flow of messages from connection partners. The percentage specified for this parameter should be greater than the percentage specified for the Constrained threshold parameter.
<b>Parameter</b>	Retry counter
<b>Valid Values</b>	1 to 255
<b>Default Value</b>	3
<b>Description</b>	This parameter specifies the number of times the APPN network node attempts to restart node processes after a failure has occurred.

## System Manager Configuration Utility

Only a controlling user can change the configuration from the System Manager. To change the values of the configuration parameters using the System Manager, perform the following steps after logging in as a controlling user.

To select the System Manager Configuration Utility and start the configuration procedure:

- Step 1** Select **Configuration** from the System Manager main menu.
- Step 2** Select **System Manager Configuration Utility** from the next menu. The first screen you receive is a warning screen, shown in Figure 6-3. This screen warns you to exit if you are not familiar with the configuration parameters or the System Manager method of configuring the 6611.
- Step 3** Press **Enter** to go to the main System Manager Configuration Utility menu. This menu is shown in Figure 6-4 on page 6-8.

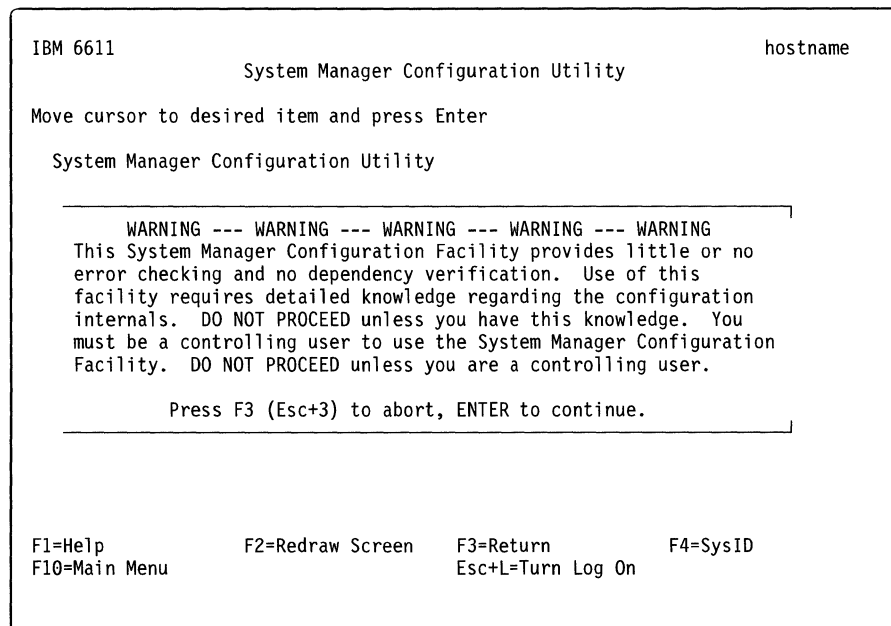


Figure 6-3. Warning Screen for the Configuration Menu Item

IBM 6611	System Manager Configuration Utility	hostname
Move cursor to desired item and press Enter		
Show Configuration Values for Single Object Set Configuration Values for Single Object		
List Configuration Elements in a List Object Add Configuration Element to a List Object Delete Configuration Element from a List Object		
F1=Help F10=Main Menu	F2=Redraw Screen	F3=Return Esc+L=Turn Log On
F4=SysID		

Figure 6-4. System Manager Configuration Utility Menu

**Step 4** Determine whether the configuration parameter is a single object or a list object, and whether it is a box-level object or a port-level object. If you select a port-level object, you also need to know the slot number of the adapter and the port number for which the configuration parameter is being changed.

To determine if a parameter is a box-level or port-level object, see the Configuration Worksheets for the protocol with which you are working.

To determine if a parameter is a single or list object, see the port-level and box-level worksheets in the *IBM Multiprotocol Network Program Configuration Guide*. If the table heading says they are **List Item Parameters**, then the parameter is a list object. If the table heading does *not* say that, then the parameter is a single object.

If you are updating a single object, continue with Step 5. If you are updating a list object, go to Step 6.

**Step 5** For a single object, select **Set Configuration Values for Single Object** to change the values of its parameters. The Select Parameter Level selector screen appears as shown in Figure 6-5 on page 6-9, requesting you to select the functional level of the configuration object. If you are updating a box-level parameter, go to Step 7. If you are updating a port-level parameter, go to Step 8.

Select Parameter Level		
Move cursor to desired item and press Enter.		
Box Level Parameters		
Port Level Parameters		
F1=Help	F2=Redraw Screen	F3=Return
F5=Top	F6=Bottom	F7=Page Up
F8=Page Down	F10=Main Menu	

Figure 6-5. Select Parameter Level Selector Screen

**Step 6** For a list object, select **Add Configuration Element to a List Object** to add a new element to the list object. Select **Delete Configuration Element from a List Object** to delete an existing element from the list. A selector screen appears requesting you to select the functional level of the configuration object. Figure 6-5 shows the selector screen for choosing the type of parameter. If you are updating a box-level parameter, continue with Step 7. If you are updating a port-level parameter, go to Step 8.

**Step 7** Select **Box Level Parameters**. Go to Step 9.

**Step 8** Select **Port Level Parameters**. Two more selector screens appear requesting the slot number and the port number for the adapter you are configuring. Only the slots containing installed adapters are shown. Only the possible port numbers for the chosen adapter are shown. See Figure 6-6 and Figure 6-7 for a sample of these selector screens. Select the correct values based on your hardware configuration.

Adapter Slot Number		
Move cursor to desired item and press Enter.		
Slot 1 :: 6611 X.25		
Slot 2 :: 6611 4-Port SDLC		
Slot 3 :: 6611 2-Port Serial		
Slot 4 :: 6611 Ethernet		
Slot 5 :: 6611 Token-Ring		
Slot 6 :: 6611 Ethernet		
Slot 7 :: 6611 Token-Ring		
F1=Help	F2=Redraw Screen	F3=Return
F5=Top	F6=Bottom	F7=Page Up
F8=Page Down	F10=Main Menu	

Figure 6-6. Sample Adapter Slot Number Selector Screen



Adapter Port Number		
Move cursor to desired item and press Enter.		
Port 1		
Port 2		
Port 3		
Port 4		
F1=Help	F2=Redraw Screen	F3=Return
F5=Top	F6=Bottom	F7=Page Up
F8=Page Down	F10=Main Menu	

Figure 6-7. Sample Adapter Port Number Selector Screen

**Step 9** Select the configuration object from the **Configuration Data Type to Set** selector screen. You have a long list from which to select.

**Step 10** A dialog screen appears. The parameters presented depend on the selected object. Press **F1 (Esc+1)** for references to locate details about each parameter. Press **Enter** after changing the parameters.

**Step 11** A COMMAND STATUS screen appears. If the process is successful, a Command: OK message is displayed. Press **F3 (Esc+3)** until you return to the Configuration menu. If you receive error messages, try to correct the problem, if you can, or call your IBM service personnel for assistance.

**Step 12** At this point you may want to view the configuration changes that you have made. If the configuration object is a single object, that is, the changes were made using the Set Configuration Values for Single Object menu item, select **Show Configuration Values for Single Object** to view the changes. Follow the same path through the Parameter Level selector screen(s) to the Configuration Data Type to Show selector screen to view the configuration object.

If the configuration object is a list object, that is, if the changes were made using either the Add Configuration Element to a List Object or Delete Configuration Element from a List Object menu items, select **List Configuration Elements in a List Object** to view the changes. Follow the same path through the selector screen(s) to the Configuration Data Type to List selector screen to view the configuration object.

**Step 13** If you agree with the new configuration changes that you made, and you want to make them the new configuration, select **Apply Changes** from the Configuration menu. This selection applies the configuration changes and the changed configuration values become the new configuration. The previous settings of the configuration values are saved.

**Warning:** If you updated any configuration parameters that cannot be changed dynamically, either the 6611 is restarted or the protocol with the changed configuration is restarted. Wait a few minutes after selecting **Apply Changes** to apply the configuration changes and before executing other 6611 commands, in case the 6611 is restarted.

**Step 14** After operating with the changed configuration, you can accept the new values by committing the new configuration or return to the previous configuration by rejecting the new configuration. To commit the configuration changes, select **Commit Changes** from the Configuration

menu. Any new changes to the configuration that have not been applied are also committed. To reject the configuration changes, select **Reject Uncommitted Changes** from the Configuration menu. On the resulting selector screen, you can choose to reject only the unapplied changes or both the unapplied changes and applied changes. When you choose the applied and unapplied changes option, the current configuration is restored to the last committed state. When you choose the only unapplied changes option, the current configuration is not affected. You cannot reject a configuration that has a time delay configured.

---

## Initial Configuration Using a Diskette

To initially configure the 6611 using the Configuration Program:

1. Create the configuration file with the Configuration Program and place it on a diskette. See the *IBM Multiprotocol Network Program Configuration Guide* for instructions about using the Configuration Program.
2. Insert the diskette in the 6611 diskette drive.
3. Set the key mode switch on the front panel in the Normal position and turn the power switch to **On**.

The configuration file is read and the new parameters are used as the current configuration.

**Note:** To prevent subsequent configurations from this diskette or accidental overwriting of the configuration data, remove the diskette from the diskette drive.

---

## Initial Configuration without Using a Diskette

The System Manager can be used to minimally configure the 6611 so that it can be initially configured from the Configuration Program without using a diskette. There are three methods to transfer the configuration file from the Configuration Program to the 6611 without using a diskette.

1. Direct IP Connection

This method is available only when using a RISC System/6000 workstation to perform configuration.

2. Modem Attachment

- A modem must be attached to the configuration workstation and to an 6611 on the network.
- The configuration workstation must also have a communication package that supports CALLOUT and the Xmodem Protocol.
- This method could be used with a PS/2\* configuration workstation that has a supported communication package.

### 3. FTP

- The configuration workstation must be attached to the 6611 through the IP network.
- This method could be used with a PS/2 configuration workstation that has TCP/IP installed.

One of these methods must be available, if you want to perform initial configuration on the 6611 from the Configuration Program without using a diskette.

## Direct IP Connection

Direct IP connection is available only when using a RISC System/6000 configuration workstation attached to the same IP network as the 6611 needing initial configuration. Perform the following steps to configure the 6611 initially over the IP network.

1. The 6611 must be minimally configured for IP. See "Minimal Configuration Using the System Manager" on page 6-15 for details about minimal configuration.
2. See the *IBM Multiprotocol Network Program Configuration Guide* for the details about sending the configuration file from the Configuration Program over the direct connection.

## Modem Attachment

When you are using the modem-attachment method to configure the 6611 initially and the modem is attached to the 6611 needing to be configured, minimal configuration is not necessary. Perform the following steps to configure the 6611 initially using the modem connection to send the configuration file.

1. Attach a 2400-bps modem to the EIA 232 S2 serial port on the 6611 (labelled S2 on the Model 120 and the Model 170, and labelled Serial 2 on the Model 140). The S2 serial port is initially configured for 2400-bps modem support. See "Using a Modem" on page 3-12 for details about using a modem.
2. From the configuration station, establish the modem connection to the 6611 using the directions supplied with the communication package.
3. Log in to the 6611 using the default controlling user ID and password:  
**Default userid:**       ibm6611c  
**Default password:**   ibm6611c
4. Prepare the 6611 to receive the configuration file and use it as the new configuration after it has been received:
  - a. Select **Configuration** from the System Manager main menu.
  - b. Select **Receive and Apply Configuration** from the Configuration menu.
  - c. Select **modem** as the import method on the Import method selector screen.

See "Using the Xmodem Protocol" on page 4-69 for further details about using the Xmodem Protocol to transfer files.

5. Determine the location and name of the configuration file at the configuration workstation. You must determine in which subdirectory the file has been placed. It will be marked as a **.cfg** file. Instruct the configuration workstation to send the configuration file.

If the modem is attached to a different 6611 on the IP network than the 6611 needing to be initially configured, the 6611 has to be minimally configured for an IP connection. Perform the following steps to configure the 6611 initially using the modem connection to send the configuration file.

1. Minimally configure the 6611 using the directions provided in "Minimal Configuration Using the System Manager" on page 6-15.
2. From the configuration workstation, establish a modem connection to the 6611 with a modem that is on the same IP network as the 6611 that you minimally configured. See "Using a Modem" on page 3-12 for details about using a modem. Use the directions supplied with the communication package on the configuration workstation for modem connection.
3. Log in to the 6611 with the modem from the configuration workstation. Establish an rlogin session from the 6611 with the modem to the 6611 needing to be configured. See "Using Remote Login" on page 3-6 for details about using rlogin.
4. Prepare the 6611 that needs to be configured to receive the configuration file and use it as the new configuration when received.
  - a. Select **Configuration** from the System Manager main menu.
  - b. Select **Receive and Apply Configuration** from the next menu.
  - c. Select **modem** as the receive method on the Import method selector screen.

See "Using the Xmodem Protocol" on page 4-69 for further details about using the Xmodem Protocol to transfer files.

5. Determine the location and name of the configuration file at the configuration workstation. You must determine in which subdirectory the file has been placed. It will be marked as a **.cfg** file. Instruct the configuration workstation to send the configuration file.

## FTP Transfer Method

The configuration file may be sent using FTP, if the configuration workstation is on the IP network and it supports FTP. Use the following steps to configure the 6611 initially using FTP to transfer the file.

1. Minimally configure the 6611 using the directions provided in "Minimal Configuration Using the System Manager" on page 6-15.
2. Know the location and file name of the configuration file on the configuration station. In this procedure, the configuration file name is *config*.
3. From the directory that has the configuration file in the configuration station, use the following scenario to place the configuration file in the transfer directory of the 6611 needing to be configured. What you are expected to input from the configuration station is provided under "**Type in**". What you should expect to see displayed on the screen is provided under "**Output displayed**".

**Type in:**

**ftp hostname**

where hostname is the host name of the 6611 needing to be configured. The IP address can be used in place of the host name to identify the 6611 to which the configuration files is sent.

**Output displayed:**

```
Connected to hostname.domainname
220 hostname FTP server (Version 4.1 Date) ready.
Name (hostname):
```

**Type in:**

```
6611_userid
```

**Output displayed:**

```
331 Password required for 6611_userid.
Password:
```

**Type in:** (Type the password. It will not be displayed.)

**Output displayed:**

```
230 User 6611_userid logged in.
/transfer is read-write and /static is read-only.
ftp>
```

**Type in:**

```
cd /transfer
```

**Output displayed:**

```
250 CWD command successful.
ftp>
```

**Type in:**

```
binary
```

**Output displayed:**

```
200 Type set to I.
ftp>
```

**Type in:**

```
put "file_name"
```

**Output displayed:**

```
200 PORT command successful.
150 Opening BINARY mode data connection for filename1.
226 Transfer complete.
local: "file_name" remote: "file_name"
13029 bytes sent in 0.07388 seconds (172.2 Kbytes/s)
ftp>
```

**Type in:**

```
quit
```

**Output displayed:**

```
221 Goodbye.
```

**Note:** The numbers associated with the FTP messages are standard message numbers for this protocol. They have no significance other than to identify the message.

4. The configuration file is now in the transfer directory of the 6611. Receive the file and use it as the new configuration:
  - a. Select **Configuration** from the System Manager main menu.

- b. Select **Receive and Apply Configuration** from the next menu.
- c. Select **transfer directory** as the import method on the resulting selector screen.
- d. A dialog screen appears requesting you to enter the name of the binary configuration file. The default configuration file name is *config*. If this is not the name of the configuration file that you are importing from the transfer directory, press **F4 (Esc+4)** to list the files in the transfer directory and select the configuration file from the list. Optionally, you can type the file name in the entry field. Press **Enter** after you have selected or typed the name.

See "Using the File Transfer Protocol" on page 4-67 for further details about using FTP to transfer files.

---

## Minimal Configuration Using the System Manager

To minimally configure the 6611, you must have either an Ethernet adapter or a token-ring network 16/4 adapter configured for IP. The procedure for minimal configuration can be performed by the IBM service representative when the 6611 is installed. You need to know the slot number and the IP address for the adapter. If a token-ring network 16/4 adapter is used, you also need to know the ring speed. There must be a terminal attached directly to the EIA 232 S1 serial port, that is a supported terminal type or can emulate a supported terminal type. See the *IBM 6611 Network Processor Introduction and Planning Guide* for a list of the supported terminal types.

- Step 1** Log in to the 6611. Type user ID **ibm6611c** and password **ibm6611c**. (These are the defaults.) Select the terminal type. See "Logging In to a 6611" on page 3-13 for details about logging in and selecting terminal types.
- Step 2** The main menu of the System Manager is displayed. Select **Configuration** from the System Manager main.
- Step 3** Select **System Manager Configuration Utility** on the next menu and press **Enter** twice to get to the System Manager Configuration Utility menu and beyond the warning screen.  
  
If you are performing the minimal configuration for an Ethernet adapter, continue with Step 4. If you are performing the minimum configuration for a token-ring network 16/4 adapter, go to Step 5.
- Step 4** To configure a Ethernet adapter for IP connection minimally:
  1. Select **Set Configuration Values for Single Object** from the Configuration main menu.
  2. Select **Port Level Parameters** from the selector screen.
  3. Select the slot number of the Ethernet adapter from the Adapter Slot Number selector screen.
  4. Select **Port 1** from the Adapter Port Number selector screen.
  5. Select **Ethernet Adapter Parameters** from the Configuration Data Type to Set selector screen.

6. A dialog screen appears. Press **Tab** to select **yes** for the Enable interface parameter. Use the defaults of the other parameters. Press **Enter** to update the configuration changes for the Ethernet adapter.
7. A COMMAND STATUS screen is displayed. If the process is successful, a Command: OK message displays. Press **F3 (Esc+3)** until you return to the Configuration menu. If you receive error messages, try to correct the problem, or call IBM service personnel for assistance.
8. Go to Step 6.

**Step 5** To minimally configure a token-ring network 16/4 adapter for IP connection:

1. Select **Set Configuration Values for Single Object** from the Configuration main menu.
2. Select **Port Level Parameters** from the selector screen.
3. Select the slot number of the token-ring network 16/4 adapter from the Adapter Slot Number selector screen.
4. Select **Port 1** from the Adapter Port Number selector screen.
5. Select **Token-Ring Adapter Parameters** from the Configuration Data Type to Set selector screen.
6. A dialog screen appears. Press **Tab** to select **yes** for the Enable interface parameter. Press **Tab** to select the correct ring speed for the Token ring data rate parameter. You must also specify a valid MAC address (a locally-administered address). Use the defaults for the other parameters. Press **Enter** to update the configuration changes for the token-ring network 16/4 adapter.
7. A COMMAND STATUS screen displays. If the process is successful, a Command: OK message displays. Press **F3 (Esc+3)** until you return to the Configuration menu. If you receive error messages, try to correct the problem, or call IBM service personnel for assistance.

**Step 6** To configure the correct IP address:

1. Select **Set Configuration Values for Single Object** from the Configuration main menu.
2. Select **Port Level Parameters** from the selector screen.
3. Select the slot number of the adapter you configured from the selector screen.
4. Select **Port 1** from the selector screen.
5. Select **IP Parameters** from the Configuration Data Type to Set selector screen.
6. A dialog screen is displayed. Enter the IP address of the adapter in the IP Address entry field. Enter the address mask of the IP address in the Subnet mask entry field. Press **Tab** to select **yes** for the Enable IP routing on this port parameter. Use the defaults for the other parameters. Press **Enter** to add the configuration changes for the IP address.

7. A command status screen is displayed. If the process is successful, a *Command: OK* message is displayed. Press **F3 (Esc+3)** until you return to the Configuration menu. If you received any error messages, try to correct the problem or call IBM service personnel for assistance.

**Step 7** Select **Apply Changes** from the Configuration menu to apply the configuration changes.

**Note:** These changes are not dynamic. The 6611 is stopped and restarted. Do not execute any other IBM 6611 tasks until the system has been restarted.

When the 6611 is restarted, it is possible for the Configuration Program to either transfer the configuration file directly to the 6611 or to use FTP to transfer the file to the 6611. See “Direct IP Connection” on page 6-12 or “FTP Transfer Method” on page 6-13 for further information about initial configuration using the Configuration Program.

## User IDs and Passwords

To log into the 6611 you are required to have a user ID and password. There are two classes of users:

- Controlling
- Viewing

Viewing users can only perform a subset of the operations of the 6611. Refer to “Tasks Restricted to Controlling Users” on page 3-16 for more information.

From the System Manager you can list all the users, add a user, delete a user, and change user passwords. Only a controlling user can change user IDs or passwords. The only exception is the ability of any user to change his or her own password. When adding or deleting system users, the configuration change must be applied or committed before it becomes part of the base configuration. When a user changes his or her own password, the apply is done automatically.

Figure 6-8 on page 6-18 shows the User IDs and Passwords menu.



IBM 6611	User IDs and Passwords	hostname
Move cursor to desired item and press Enter		
List All User IDs Add a User ID Delete a User ID  Change Any Password Change Your Password		
F1=Help F10=Main Menu	F2=Redraw Screen	F3=Return Esc+L=Turn Log On
F4=SysID		

Figure 6-8. User IDs and Passwords Menu

### List All User IDs

To list all configured users:

1. Log in using a controlling user ID.
2. Select **Configuration** from the System Manager main menu.
3. Select **User IDs and Passwords** from the next menu.
4. Select **List All User IDs** from the next menu.
5. A COMMAND STATUS screen displays all of the configured user IDs. For example,

Controlling users:  
ibm6611c

Viewing users:  
ibm6611v

<b>Fast-Path Command(s)</b>  <b>user (id) list</b>
--

### Add a User ID

To add a controlling or viewing user ID and password:

1. Log in using a controlling user ID.
2. Select **Configuration** from the System Manager main menu.
3. Select **User IDs and Passwords** from the next menu.

4. Select **Add a User ID** from the next menu.
5. Type in the user name on the dialog screen. A user name is a unique string of 8 or fewer alphanumeric lowercase characters.
6. Select the privilege class using the **Tab** on the dialog screen. The privilege class is either viewing or controlling. The default is **viewing**.
7. System Manager prompts you for a password for the new user ID. Enter the password twice. System Manager will not display the password.
8. Press **Enter** to return to the dialog screen.
9. Press **F3 (Esc+3)** twice to return to the Configuration menu.
10. Select **Apply Changes** to apply the configuration change.

**Fast-Path Command(s)**

```
user add -controlling userID passwd  
user add -viewing userID passwd
```

### Delete a User ID

To delete a controlling or viewing user ID and password:

1. Log in using a controlling user ID.
2. Select **Configuration** from the System Manager main menu.
3. Select **User IDs and Passwords** from the next menu.
4. Select **Delete a User ID** from the next menu.
5. Select the user ID to be deleted from the selector screen.
6. A COMMAND STATUS screen will display any output.
7. Press **F3 (Esc+3)** until you get to the Configuration menu.
8. Select **Apply Changes** to apply the configuration change.

**Fast-Path Command(s)**

```
user id delete userID
```

### Change Any Password

To change any user password:

1. Log in using a controlling user ID.
2. Select **Configuration** from the System Manager main menu.
3. Select **Change Any Password** from the next menu.
4. Select a user ID from the selector screen.
5. System Manager prompts you for the new password for the user. Enter the password twice. System Manager does not display the password.
6. Press **Enter** to return to System Manager.
7. Press **F3 (Esc+3)** until you get back to the Configuration menu.

8. Select **Apply Changes** to apply the configuration change.

**Fast-Path Command(s)**

```
user password change userID passwd new_passwd
```

## Change Your Password

To change your password:

1. Select **Configuration** from the System Manager main menu.
2. Select **User IDs and Passwords** from the next menu.
3. Select **Change Your Password** from the next menu.
4. System Manager prompts you with the message:

You have requested to change your password.  
Are you sure you want to do this? (y or n)

If you type **n**, you will be told to press **Enter** to return to System Manager.

If you type **y**, System Manager then prompts you for your old and new password. Enter the old password once and the new password twice. Neither password is displayed.

5. Press **Enter** to return to System Manager.

## Apply Changes

The System Manager method of configuring the 6611 includes an apply, test, and either commit or reject scenario. The configuration changes are *applied* and *tested* in an actual test environment, and then either *committed* if the changes are approved, or *rejected* if the changes are not approved.

Whenever you make a configuration change, the System Manager Configuration Facility updates a local configuration copy which is stored in the home directory of your user ID. The System Manager Configuration Facility adds the configuration changes to the global configuration copy, when you apply the change. The configuration change becomes a part of the running configuration only after you apply it. If you log off your user ID before applying the changes, you have not lost them. The local configuration copy retains the unapplied changes, along with all your applied changes. Applied changes that have not been committed, have a saved backup version associated with them.

**Warning:** Make all System Manager configuration changes from the same controlling user ID to minimize the chance of overriding another user's configuration changes.

To apply changes to a configuration database using the System Manager:

1. Log in using a controlling user ID.
2. Select **Configuration** on the System Manager main menu.
3. Select **Apply Changes** from the next menu.
4. You will see an "Are you sure?" menu from which you can cancel the operation or choose to continue. If you continue, a COMMAND STATUS screen displays the following message:

Waiting for acknowledgment from config daemon ... done.  
Command completed successfully

**Fast-Path Command(s)**

**config apply**

**Note:** Most configuration changes are not done dynamically. The 6611 is stopped and restarted. Do not execute any other 6611 tasks until the system has been restarted.

## Commit Changes

The System Manager Configuration Facility deletes the local backup copy of the configuration when the configuration is committed. You cannot reject a committed configuration change. If you commit your configuration changes, you will not be able to return to the previous configuration, unless you manually undo each change you made. You have the choice of committing only your applied changes or both your applied and unapplied changes.

To commit changes to a configuration database using the System Manager:

1. Log in using a controlling user ID.
2. Select **Configuration** on the System Manager main menu.
3. Select **Commit Changes** from the next menu.
4. On the selector screen, select **only applied changes** to commit only the applied changes. Select **applied and unapplied changes** to commit both the applied and unapplied changes.
5. You will see an "Are you sure?" menu from which you can cancel the operation or choose to continue. If you continue, a COMMAND STATUS screen displays the message:

Waiting for acknowledgment from config daemon ... done.  
Command completed successfully

**Fast-Path Command(s)**

**config commit -applied**  
**config commit -both**

**Note:** Most configuration changes are not done dynamically. The 6611 is stopped and restarted. Do not execute any other 6611 tasks until the system has been restarted.

## Reject Uncommitted Changes

When you issue a reject, the System Manager Configuration Facility removes the configuration changes you choose to reject. You have the choice of rejecting only your unapplied changes or both your applied and unapplied changes. The unapplied changes are removed from your local copy of the configuration and the applied changes are removed from the local copy and the global copy of the configuration. The Configuration Facility replaces the local copy of the configuration with the local backup copy.

To cancel uncommitted changes to a configuration database using the System Manager:

1. Log in using a controlling user ID.
2. Select **Configuration** on the System Manager main menu.
3. Select **Reject Uncommitted Changes** from the next menu.
4. On the selector screen, select **only unapplied changes** to reject only the unapplied changes. Select **applied and unapplied changes** to reject both the applied and unapplied changes.
5. A COMMAND STATUS screen displays the following message:  
The configuration is rejected.

### Fast-Path Command(s)

```
config reject -unapplied  
config reject -both
```

## Configuration Reports

The configuration report contains information about the current configuration. It is provided in both summary and detailed formats.

These configuration reports can be viewed with the System Manager or transferred from the 6611 for remote viewing.

1. Select **Configuration** on the System Manager main menu.
2. Select **Configuration Reports** from the next menu.
3. On the selector screen, select **summary** or **detailed** as the type of report.
4. A COMMAND STATUS screen displays the report type chosen.

The configuration report generated by a user shows the current running configuration unless the user has made some unapplied configuration changes. The configuration report shows all unapplied configuration changes updated by the user who generates the configuration report. It is possible for different users to produce different configuration reports. It is also possible to produce a configuration report that does not accurately reflect the running configuration. To produce a configuration report that accurately reflects the running configuration, either:

- Apply all configuration changes, or
- Reject all unapplied changes.

Configuration reports may be sent to the System Manager log. First, the log must be turned on (**Esc+L**).

## Summary Configuration Report

The summary configuration report contains a few system level configuration parameters, such as host and domain name. The adapter type in each of the slots is listed along with the protocols configured for that adapter.

**Fast-Path Command(s)**

**config view -summary**

See Figure 6-9 for an example of a summary configuration report.

---

```
Brief Configuration Report
IBM 6611 '6611host' on Mon Aug 30 14:09:57 1993

    IBM 6611 Host Name: 6611host
    IBM 6611 Domain name:
    System contact:
    System name:
    System location:

DECnet is enabled
    Local DECnet address (1 - 63 .1 - 1025):2.2
Bridging is enabled
    Bridge number (0-15): 14
IPX is enabled
XNS is enabled
Slot 1 contains a 6611 X.25 Adapter

Slot 2 contains a 6611 Ethernet Adapter

Configuration data for slot 2, port 1
Ethernet is enabled
IP is enabled
    IP Address: 9.66.31.8
    Subnet mask: 255.255.255.0

Slot 4 contains a 6611 Token-Ring Adapter

Configuration data for slot 4, port 1
Token-Ring is enabled
IP is enabled
    IP Address: 9.66.23.8
    Subnet mask: 255.255.255.0
```

---

*Figure 6-9. Summary Configuration Report Example*

## Detailed Configuration Report

The detailed format contains a listing of the configured configuration objects and the values of each of the parameters.

**Fast-Path Command(s)**

**config view -detail**

See Figure 6-10 on page 6-24 for an example of a portion of a detailed configuration report.

---

Detailed Configuration Report  
IBM 6611 '6611host' on Mon Jul 13 14:10:21 1992  
Configuration: UNNAMED CONFIG

---

Object: Protocol Independent Parameters  
(slot 255, port 255, id 21500, count 1, size 100)

IBM 6611 Host Name: 6611host  
IBM 6611 Domain name:  
Enable name resolution by remotename servers: no  
Enable time service by remote time servers: no

---

Object: List of Controlling User Names and Passwords  
(slot 255, port 255, id 22400, count 1, size 20)

User id: ibm6611c  
Password: \*

---

Object: List of Viewing User Names and Passwords  
(slot 255, port 255, id 22401, count 1, size 20)

User id: ibm6611v  
Password: \*

---

Object: IP Parameters  
(slot 255, port 255, id 21000, count 1, size 35)

Connection Decay Interval (5 - 20 minutes): 10  
Status Of All Defined IP Filters: enable

---

Object: Ethernet Adapter Parameters  
(slot 2, port 1, id 2600, count 1, size 19)

Enable interface: yes  
MAC Address: Use card MAC address  
Alternate Ethernet MAC Address (Canonical format): 00-00-00-00-00-00  
Allow multicasting: no

---

*Figure 6-10. Part of a Detailed Configuration Report Example*

## Receive and Apply Configuration

Besides initial configuration, there are other situations in which it is necessary for the System Manager to either receive the configuration file from the Configuration Program or another 6611. These tasks can be performed from the Configuration menu.

Only a controlling user can receive the binary configuration file and use it as the current configuration.

To receive the configuration file and use it as the current configuration:

1. Select **Configuration** on the System Manager main menu.

2. Select **Receive and Apply Configuration** from the next menu.
3. On the selector screen (Figure 6-11), select the import (or receive) method. Select a method, depending on the location of the configuration file.

Import method		
Move cursor to desired item and press Enter.		
FTP		
modem		
DOS diskette		
transfer directory		
F1=Help	F2=Redraw Screen	F3=Return
F5=Top	F6=Bottom	F7=Page Up
F8=Page Down	F10=Main Menu	

Figure 6-11. Import Method Selector Screen

### FTP

Select **FTP** if the configuration file is located in the transfer directory of another 6611 and has the file name *config*. You are required to provide the following input on the dialog screen:

- Host name or IP address of the node containing the configuration file
- User ID configured at that node.
- Import method is shown as FTP. It cannot be changed on the dialog screen.

Press **Enter** after typing in the entry fields. You will be prompted for the password of the specified user ID.

### modem

Select **modem** (using the Xmodem Protocol) if the configuration file is located at a node that is connected to the 6611 over a modem connection. You will get a message screen stating the system is ready to receive the configuration file.

### DOS diskette

Select **DOS diskette** if the configuration file is located on a DOS diskette that is in the diskette drive of the 6611 and has the file name *config*. You will see a command status screen.

### transfer directory

Select **transfer directory** if the configuration file is located in the transfer directory of the 6611. It could have been sent to the transfer directory using FTP or Xmodem. The configuration file can have any name. You are required to supply the name of the binary configuration file on the dialog screen. The default configuration file name is *config*. If this is not the name of the configuration file that you are importing from the transfer directory, press **F4 (Esc+4)** to list the files in the transfer directory. Select the correct configuration file from the list. Optionally, you can type the file name in the entry field. Press **Enter** after you have selected or typed the name.

The import method is shown as transfer directory. It cannot be changed on the dialog screen.



4. After selecting the import method and entering any dialog information, the configuration file is added as the current configuration.

**Fast-Path Command(s)**

**files transfer receive** via some method  
and  
**config apply**

## Send Configuration

To send the binary configuration file using the System Manager:

1. Select **Configuration** from the System Manager main menu.
2. Select **Send Configuration** on the next menu.
3. Select an export method from the Export method selector screen.
  - FTP
  - Modem
  - DOS diskette
  - Transfer directory
4. With each of these file transfer methods, the current configuration file is transferred with the name *config*. In addition:
  - Transferring the file with FTP requires you to give the host name or IP address and a user ID at the destination node on the dialog screen. You are prompted for the password for the user ID.
  - Transferring the file to the transfer directory requires you to specify the name of the file in the transfer directory. The default file name is *config*.

**Fast-Path Command(s)**

**files transfer send -ftp** *host\_name*  
**files transfer send -modem** *file\_name*  
**files transfer send -dos** *file\_name* *DOS\_file\_name*

## Reinstate a Saved Configuration

The 6611 saves the last ten configurations that it receives from either the System Manager or the Configuration Program.

To reinstate a saved configuration file and use it as the current configuration:

1. Select **Configuration** from the System Manager main menu.
2. Select **Reinstate a Saved Configuration** on the next menu.
3. On the selector screen, select the configuration file to reinstate. Locate the file you want to reinstate and press **Enter**. Depending on the configuration parameters being changed, the IBM 6611 may be restarted.

**Fast-Path Command(s)**

**config list -cfgfile**  
**config reinstate** *cfgfile\_number*

---

## Chapter 7. Software Installation and Maintenance

About This Chapter	7-3
Software Updates	7-4
Transferring Software Updates	7-4
From a Diskette to an IBM 6611	7-5
From Tape to an IBM 6611	7-6
From Diskette to the RISC System/6000 Workstation	7-7
From Tape to the RISC System/6000 Workstation	7-7
From a RISC System/6000 Workstation to a 6611 Using FTP	7-8
From a RISC System/6000 Workstation to a 6611 Using Xmodem	7-10
From a 6611 to a 6611 Using FTP	7-11
Installing Software Updates	7-14
Storage Space Management for Updates	7-14
Possible Messages When Receiving Files in Transfer Directory	7-16
Possible Messages When Applying PTFs	7-17
Interruptions to the Installation Process	7-18
Correcting Installation Failures	7-19
Recommended Software Pre-Installation Actions	7-19
Cleaning Up the 6611 Transfer Directory	7-19
Checking for Corrupted Data	7-19
Stopping Traces	7-20
Handling Development PTFs	7-20
Software Installation Procedure	7-21
Receive Installation File(s)	7-25
List Installation Files	7-26
List All Problems Fixed by Software Updates	7-27
Apply Software Updates	7-27
Post Software Installation Functions	7-28
Clean Up after a Failed Installation	7-28
List All Applied but Not Committed Software	7-29
Commit Applied Updates	7-29
Reject Applied Updates	7-31
View Software Vital Product Data	7-32
View Software History	7-32
List Software Updates	7-33
List Software Prerequisites	7-35
List Software Dependents	7-36
List Software Product ID	7-36
Automating Software Installation and Maintenance Facility Functions	7-37
Using Your Own Commands and Scripts	7-38
Sample Noninteractive FTP Command	7-38
Sample Rexec and Rsh Commands	7-39
Using the 6611-Provided Commands and Scripts	7-39
Using the .netrc File	7-40
Installation States and Phases	7-41
Using Control Files as Part of the Installation Process	7-41
Control File Keywords	7-42
Option Keywords in a Control File	7-43
Sample Control File	7-44
Obtaining Remote Installation Output	7-45
Sending Software Changes to One or Multiple 6611s	7-47

MPNP Backup Restore Utility . . . . .	7-50
Hard Disk Formatting Operation . . . . .	7-50
Configuration Data . . . . .	7-50
Required Software and Hardware . . . . .	7-50
Creating Backup Tapes . . . . .	7-51
Backing Up the Hard Disk . . . . .	7-51
Restoring the Hard Disk . . . . .	7-53
Using Multiple Backup Tapes . . . . .	7-55
Backing Up the Hard Disk Using Multiple Tapes . . . . .	7-55
Restoring the Hard Disk Using Multiple Tapes . . . . .	7-55
Tape Compatibility . . . . .	7-55
Error Messages . . . . .	7-55
Helpful Hints . . . . .	7-57

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## About This Chapter

This chapter describes the Software Installation and Maintenance Facility, which is used to install software updates for the Multiprotocol Network Program. It is also a tracking utility that maintains status and history information about the Multiprotocol Network Program software. There is a multiphase commit and reject capability for software updates. This allows you to test specific software updates on the system for a period of time before you decide whether to make the changes permanent.

This chapter also describes the automatic software installation and maintenance facility that lets you install software changes on one or more 6611s from a single control point.

Figure 7-1 shows the Software Installation and Maintenance menu.

```
IBM 6611                               hostname
                                Software Installation and Maintenance

Move cursor to desired item and press Enter.

  Receive Installation File(s)
  List Installation Files
  List All Problems Fixed by Software Updates

  Apply Software Updates
  Clean up After a Failed Installation

  List All Applied but Not Committed Software
  Commit Applied Updates
  Reject Applied Updates

  View Software Vital Product Data

F1=Help      F2=Redraw Screen    F3=Return    F4=SysID
F10=Main Menu Esc+L=Turn Log On
```

*Figure 7-1. Software Installation and Maintenance Menu*

Refer to the following for information about the individual menu items:

- “Receive Installation File(s)” on page 7-25
- “List Installation Files” on page 7-26
- “List All Problems Fixed by Software Updates” on page 7-27
- “Apply Software Updates” on page 7-27
- “Clean Up after a Failed Installation” on page 7-28
- “List All Applied but Not Committed Software” on page 7-29
- “Commit Applied Updates” on page 7-29
- “Reject Applied Updates” on page 7-31
- “View Software Vital Product Data” on page 7-32

---

## Software Updates

A software update provides either:

- A program temporary fix (PTF)
- A new level of code

Software updates are sent as self-contained packages including:

- Update instructions
- Prerequisite and corequisite information
- Authorized program analysis report (APAR) information
- Files containing fixed code

Each software update contains instructions explaining how the update is installed on the system. This includes programs invoked during installation. In addition, information, such as the available storage required to apply the update, is embedded within the update instructions.

Each software update also contains information about all updates that are prerequisite or corequisite. A prerequisite update must be applied to the Multiprotocol Network Program before the installation of another software update that designates it as a prerequisite. Corequisite software updates must be applied during the same installation session. The Software Installation and Maintenance Facility ensures that the software updates are applied correctly using the prerequisite and corequisite information supplied.

The APAR information is also included to tell you the problems that are fixed by the software update. One software update can fix one or more APARs.

---

## Transferring Software Updates

Software updates are sent to you on a diskette or tape. The files need to be sent to the transfer directory of the 6611 before the update can be installed. There are four methods available to move the software update from either a diskette or tape to the transfer directory:

- **Method A:**

Place the software diskettes or tape in the appropriate drive for the 6611 needing the software change. Copy the files on the diskettes or tape into the transfer directory. Refer to "From a Diskette to an IBM 6611" on page 7-5 for information about importing files from a diskette. Refer to "From Tape to an IBM 6611" on page 7-6 for information about importing files from tape. This is the IBM-recommended method.

- **Method B:**

Place the software diskettes or tape in the appropriate drive for another 6611 on the same IP network as the 6611 needing the software change. Copy the files on the diskettes or tape into the transfer directory. Refer to "From a Diskette to an IBM 6611" on page 7-5 for information about importing files from a diskette. Refer to "From Tape to an IBM 6611" on page 7-6 for information about importing files from tape.

Use FTP to transfer the software changes to the transfer directory of the 6611 needing the software change. Refer to “From a 6611 to a 6611 Using FTP” on page 7-11 for information about using FTP.

- **Method C:**

Place each of the software diskettes or the tape in the appropriate drive of an RISC System/6000 workstation on the same IP network as the 6611 needing the software change. Copy the files on the diskettes or the tape to a directory on the RISC System/6000 workstation. Refer to “From Diskette to the RISC System/6000 Workstation” on page 7-7 and “From Tape to an IBM 6611” on page 7-6 for information about importing files to a RISC System/6000 workstation.

Use FTP to transfer the software changes to the transfer directory in the 6611. Refer to “From a RISC System/6000 Workstation to a 6611 Using FTP” on page 7-8 for information about using FTP.

- **Method D:**

Place each of the software diskettes or tape in the appropriate drive of a RISC System/6000 workstation that has CALLOUT modem access to the public switch network. Copy them to a directory on the RISC System/6000 workstation. Refer to “From Diskette to the RISC System/6000 Workstation” on page 7-7 and “From Tape to an IBM 6611” on page 7-6 for information about importing files to a RISC System/6000 workstation.

Establish a connection to a RISC System/6000 workstation or to a 6611 on the same IP network as the 6611 needing the software changes. Transfer the software to the transfer directory of the 6611 using the Xmodem Protocol. Refer to “From a RISC System/6000 Workstation to a 6611 Using Xmodem” on page 7-10 for information about using the Xmodem Protocol.

## From a Diskette to an IBM 6611

The software changes are sent to you on a diskette or several diskettes depending on the size of the software installation package. (If you received the software changes on tape, refer to “From Tape to an IBM 6611” on page 7-6 for details.) Use the following scenario to place the software updates into the transfer directory of the 6611 using the System Manager:

- Step 1** Place the software diskette in the diskette drive of the 6611.
- Step 2** Select **Software Installation and Maintenance** from the System Manager main menu.
- Step 3** Select **Receive Installation File(s)** from the next menu.
- Step 4** Select **diskette** on the Import method selector screen.
- Step 5** Select the desired software you want to transfer. You can press **Enter** on the dialog screen to use the default of **all** to indicate all the software is to be transferred.  
  
You may also use **F4 (Esc+4)** to get a list of the software on the diskette. Use **F9 (Esc+9)** to select the software to be transferred. Press **Enter** to record the selections.
- Step 6** Follow any messages that appear requesting you to insert the next diskette, if more than one.

If the installation command becomes suspended, press **Ctrl+C** to end the suspension. The bottom of the dialog screen will have the Processing data ... message as shown.

F1=Help F10=Exit	Processing data ...
---------------------	---------------------

A possible cause for the problem is the wrong diskette is in the diskette drive or there is no diskette in the diskette drive. Retry to import the software. You may need to delete the partially imported software from the transfer directory and start again from the beginning. Refer to "Delete Transfer Directory Files" on page 4-43 for details on using System Manager to do this.

## From Tape to an IBM 6611

In this instance, the software changes are sent to you on tape. (If you received the software changes on diskette or diskettes, refer to "From a Diskette to an IBM 6611" on page 7-5 for details.) Use the following scenario to place the software updates into the transfer directory of the 6611 using the System Manager:

- Step 1** Place the software tape in the tape drive of the 6611.
- Step 2** Select **Software Installation and Maintenance** from the System Manager main menu.
- Step 3** Select **Receive Installation File(s)** from the next menu.
- Step 4** Select **tape** on the Import method selector screen.
- Step 5** Select the desired software you want to transfer. You can press **Enter** on the dialog screen to use the default of **all** to indicate all the software is to be transferred.

You may also use **F4 (Esc+4)** to get a list of the software on the tape. Use **F9 (Esc+9)** to select the software to be transferred. Press **Enter** to record the selections.

If the installation command becomes suspended, press **Ctrl+C** to end the suspension. The bottom of the dialog screen will have the Processing data ... message as shown below.

F1=Help F10=Exit	Processing data ...
---------------------	---------------------

Retry to import the software. You may need to delete the partially imported software from the transfer directory and start again from the beginning. Refer to "Delete Transfer Directory Files" on page 4-43 for details on using System Manager to do this.

## From Diskette to the RISC System/6000 Workstation

If you want to perform your software distribution tasks from a central location, you can either import the software from a RISC System/6000 workstation or from another 6611 and distribute the files using FTP. The remote stations must be on the same IP network as the 6611 needing the software change. If you are using another 6611, refer to “From a Diskette to an IBM 6611” on page 7-5 or “From Tape to an IBM 6611” on page 7-6. You can use the following scenario to copy the software diskettes to the `/usr` directory of a RISC System/6000 workstation that is used for remote installation (`/usr` is used as an example. You are not required to use that directory).

**Note:** These instructions assume that the RISC System/6000 workstation is using AIX Version 3.2, and that you are the root user.

**Step 1** Place the software diskette in the diskette drive of the RISC System/6000 workstation on the same IP network as the 6611 needing the software change.

**Step 2** Import the software from the diskettes to the directory `/usr`, using either the System Management Interface Tool or using a command from the shell prompt:

- Using the System Management Interface Tool:
  1. Select **Software Installation and Maintenance** from the main menu.
  2. Select **Install/Update Software** from the next menu.
  3. Select **Copy Software to Hard Disk for Future Installation** from the next menu.
  4. Press **F4 (Esc+4)** to get a selection list for INPUT device/directory for software.
  5. Select **/dev/fd0** for the diskette drive from the list and press **Enter**.
  6. Change the DIRECTORY for storing software from `/usr/sys/inst.images` to `/usr` and use the defaults for the other entry fields.
  7. Respond to any messages that appear requesting you to insert the next diskette, if there is more than one diskette.
- Using the command line:
  1. Enter the following command from the shell prompt on the RISC System/6000 workstation:  
**bffcreate -qv -d /dev/fd0 -t /usr -X all**
  2. Follow any messages that appear requesting you to insert the next diskette, if there is more than one diskette.

## From Tape to the RISC System/6000 Workstation

If you want to perform your software distribution tasks from a central location, you can either import the software from a RISC System/6000 workstation or from another 6611 and distribute the files using FTP. The remote stations must be on the same IP network as the 6611 needing the software change. If you are using another 6611, refer to “From a Diskette to an IBM 6611” on page 7-5 or “From Tape to an IBM 6611” on page 7-6. You can use the following scenario to copy



the software tape to the */usr* directory of a RISC System/6000 workstation that is used for remote installation (*/usr* is used as an example. You are not required to use that directory).

**Note:** These instructions assume that the RISC System/6000 workstation is using AIX Version 3.2, and that you are the root user.

**Step 1** Place the software tape in the tape drive of the RISC System/6000 workstation on the same IP network as the 6611 needing the software change.

**Step 2** Import the software from the tape to the directory */usr*, using either the System Management Interface Tool or using a command from the shell prompt:

- Using the System Management Interface Tool:
  1. Select **Software Installation and Maintenance** from the main menu.
  2. Select **Install/Update Software** from the next menu.
  3. Select **Copy Software to Hard Disk for Future Installation** from the next menu.
  4. Press **F4 (Esc+4)** to get a selection list for INPUT device/directory for software.
  5. Select **/dev/rmt#.1** from the list, where # may be a value from 0 on up and indicates which tape drive is being used. Where only one tape drive is being used, for example, the value would be **rmt0.1**.
  6. Press **Enter**.
  7. Change the DIRECTORY for storing software from */usr/sys/inst.images* to */usr* and use the defaults for the other entry fields.
- Using the command line:
  1. Enter the following command from the shell prompt on the RISC System/6000 workstation:  
**bffcreate -qv -d /dev/rmt#.1 -t /usr -X all**  
where # may be a value from 0 on up and indicates which tape drive is being used. Where only one tape drive is being used, for example, the value would be **rmt0.1**.

## From a RISC System/6000 Workstation to a 6611 Using FTP

You can use the following scenario to copy the software installation package from the RISC System/6000 workstation to the 6611 needing the software change using FTP. This scenario assumes that you have previously copied the software installation package to the hard disk of the */usr* directory of the RISC System/6000 workstation using "From Diskette to the RISC System/6000 Workstation" on page 7-7 or "From Tape to the RISC System/6000 Workstation" on page 7-7. (*/usr* is used as an example. You are not required to use that directory.) The information you are expected to type in is provided under the heading, "**Type in**". The information you should see displayed on the screen is provide under the heading, "**Output displayed**".

**Type in:**

```
cd /usr  
ftp hostname
```

The IP address of the 6611 can be used instead of the host name.

**Output displayed:**

```
Connected to hostname.  
220 hostname FTP server (Version 4.1 Date) ready.  
Name (hostname: risc_userid):
```

**Type in:**

```
6611_userid
```

**Output displayed:**

```
331 Password required for 6611_userid.  
Password:
```

**Type in:**

(Enter the password. It will not be displayed.)

**Output displayed:**

```
230 User 6611_userid logged in.  
/transfer is read-write and /static is read-only.  
ftp>
```

**Type in:**

```
cd /transfer
```

**Output displayed:**

```
250 CWD command successful.  
ftp>
```

**Type in:**

```
binary
```

**Output displayed:**

```
200 Type set to I.  
ftp>
```

**Type in:**

```
mput *
```

**Output displayed:**

Each file in the directory is displayed and you are given the opportunity to state whether or not you want to send it.

```
mput filename1?
```

**Type in:**

Type **y** for each file in the software installation package that you want to send to the 6611. Type **n** for those files you do not want to send.

**y**

**Output displayed:**

```
200 PORT command successful.
150 Opening BINARY mode data connection for filename1.
226 Transfer complete.
13029 bytes sent in 0.07388 seconds (172.2 Kbytes/s)
mput filename2?
```

**Type in:**

**y**

**Output displayed:**

```
200 PORT command successful.
150 Opening BINARY mode data connection for filename2.
226 Transfer complete.
13029 bytes sent in 0.07388 seconds (172.2 Kbytes/s)
ftp>
```

**Type in:**

**quit**

**Output displayed:**

```
221 Goodbye.
```

**Note:** The numbers associated with the FTP messages are standard message numbers for this protocol. They have no significance other than to identify the message. Refer to "Using the File Transfer Protocol" on page 4-67 for more information about FTP.

## From a RISC System/6000 Workstation to a 6611 Using Xmodem

Use the following scenario to copy the software installation package from the */usr* directory of the RISC System/6000 workstation to the 6611 needing the software change using the Xmodem Protocol (*/usr* is used as an example. You are not required to use that directory).

1. List the files in the */usr* directory and write down the file names. In this scenario, the file names are filename1, filename2 ....
2. Establish a switched connection from the RISC System/6000 workstation containing the software images in the */usr* directory to any 6611 that is attached to the public switched network through a modem connected to one of its EIA 232 serial ports. Refer to the RISC System/6000 documentation for information about using the Asynchronous Terminal Emulator (ATE) to perform this function.

3. Log in to the 6611 and select the correct terminal type.
4. You are now in the 6611's System Manager. From the System Manager, setup the 6611 to receive the software:
  - Select **Software Installation and Maintenance** from the System Manager main menu.
  - Select **Receive Installation File(s)** from the next menu.
  - Select **modem** from the selector screen.
  - Type **filename1** for "Software to be imported" on the dialog screen.

You receive the following messages on the System Manager screen:

You can return to the local machine and begin file transmission.  
The system is ready to receive file filename1.  
Use Ctrl+X to stop xmodem.

5. Press **Ctrl+V** at the RISC System/6000 workstation. Instruct the RISC System/6000 workstation to send the file by selecting **Send** or typing the following command on the command line of the Connected Main Menu:

**s /usr/filename1**

The software files are transferred to the transfer directory of the 6611.

Refer to "Using a Modem" on page 3-12 and "Transferring Files between a RISC System/6000 and a 6611" on page 4-70 for more details about using modems and transferring files between a RISC System/6000 workstation and a 6611.

## From a 6611 to a 6611 Using FTP

The following scenario can be used to copy the software placed in the transfer directory from one 6611 to another 6611 needing the software change using FTP. This scenario assumes that you have previously copied the software installation package into the transfer directory of the remote 6611 using "From a Diskette to an IBM 6611" on page 7-5 or "From Tape to an IBM 6611" on page 7-6. This process uses the System Manager.

**Step 1** Write down the names of the software changes that have previously been placed in the transfer directory of the remote 6611:

- Select **Software Installation and Maintenance** on the System Manager main menu.
- Select **List Installation Files** on the next menu.
- Write down the names of the software changes that you want to transfer to the 6611 needing the software change, and any matching patterns in the names of the software changes. For example, the following two software subcomponents contain the pattern "mpnp".

mpnp.obj.01.01.0001.0000  
mpnp.data.01.01.0001.0000

- Press **F3 (Esc+3)** until you reach the System Manager main menu.

**Step 2** Transfer these files to the 6611 needing the software changes using FTP.

1. Select **Operations** on the System Manager main menu.
2. Select **File and Diskette Operations** on the next menu.
3. Select **Send Transfer Directory File** on the next menu.

4. Select **remote host via FTP** as the transfer method from the selector screen.
5. Type the host name or IP address of the 6611 needing the software changes on the dialog item.
6. Press **Enter**. Use the following scenario to transfer the software to the transfer directory of the 6611 needing the software changes. The information you are expected to type in from the remote 6611 is provided under the heading "**Type in**". The output you should expect to see on the screen is provided under the heading "**Output displayed**".

**Type in:**

(From the System Manager screen.)

**ftp hostname**

The IP address of the 6611 can be used in the place of the host name.

**Output displayed:**

Connected to hostname.  
220 hostname FTP server (Version 4.1 Date) ready.  
Name (hostname: local\_userid):

**Type in:**

**6611\_userid**

**Output displayed:**

331 Password required for 6611\_userid.  
Password:

**Type in:**

(Enter the password. It will not be displayed.)

**Output displayed:**

230 User 6611\_userid logged in.  
/transfer is read-write and /static is read-only.  
ftp>

**Type in:**

**cd /transfer**

**Output displayed:**

250 CWD command successful.  
ftp>

**Type in:**

**binary**

**Output displayed:**

```
200 Type set to I.  
ftp>
```

**Type in:**

```
mput *pattern*
```

where *pattern* is “mpnp” in the example above.

**Output displayed:**

```
mput filename1?
```

**Type in:**

```
y
```

**Output displayed:**

```
200 PORT command successful.  
150 Opening BINARY mode data connection for filename1.  
226 Transfer complete.  
13029 bytes sent in 0.07388 seconds (172.2 Kbytes/s)
```

**Output displayed:**

```
mput filename2?
```

**Type in:**

```
y
```

**Output displayed:**

```
200 PORT command successful.  
150 Opening BINARY mode data connection for filename2.  
226 Transfer complete.  
53349 bytes sent in 0.09288 seconds (579.8 Kbytes/s)  
ftp>
```

**Type in:**

```
quit
```

### Output displayed:

221 Goodbye.

As an alternative to the above scenario, from the receiving 6611 you may either:

- Issue the **software receive -ftp** command with the appropriate parameters, or
- Select the System Manager **Receive Installation File(s)** path from the Software Installation and Maintenance menu.

#### Fast-Path Command(s)

```
files transfer send -ftp host_name
```

---

## Installing Software Updates

Software updates are installed from the transfer directory using the Software Installation and Maintenance Facility of the Multiprotocol Network Program. This is a multiphase process that permits the software updates to be tested before making them a permanent part of the Multiprotocol Network Program.

When software updates are first installed, they are applied to the system. The files that are replaced by the software update are saved, in case you want to reject the software update. The applied update becomes part of the running system and can be tested. The files are saved until you commit the software update. When you commit the software update, the saved files are deleted, eliminating the possibility of returning to the previous version. If you reject the applied, but not committed, software update, the saved files are restored and the applied update files are deleted. You cannot reject a software update that has been committed.

**Warning:** When you commit the software update, the change is permanent.

There are several rules to consider when installing software updates that have dependencies:

- Software updates cannot be applied until their prerequisite software updates have been applied.
- Corequisite software updates must be applied during the same installation step.
- Applied software updates cannot be committed until their prerequisite software updates have been committed.
- Corequisite software updates must be committed during the same installation step.

### Storage Space Management for Updates

A software update is also known as a program temporary fix (PTF). PTF installation has been enhanced to determine, at installation time, if there is sufficient storage space available to allow PTF installation to complete. If there is not sufficient space, and the install procedure would fail, all installation activity stops. The advantages of storage space management are:

- PTF processing occurs when it has been determined that sufficient storage space is available for successful completion. This avoids failures because space is exhausted, later service is not possible, and the hard disk might possibly have to be replaced.
- Using the selections available at load and apply time, any PTF package can be broken up into sections that *can* be processed. This is provided no single PTF exceeds the space available. This avoids a deadlock problem in which a package with multiple PTFs is too large to be processed.

Refer to “Receive Installation File(s)” on page 7-25 for details on using the System Manager to receive files and on how to select updates using **F4 (Esc+4)**. Selecting a specific PTF automatically selects all of its prerequisites.

During PTF installation, the installation process determines for the selected PTFs:

- How much storage space is available.
- The highest-level PTF that can be installed, given the space requirements for it and its prerequisites. In general, a higher-numbered PTF includes lower-numbered PTFs as its prerequisites.



For example, if the list of selected PTFs and their size requirements are:

*Table 7-1. Example of PTFs and Size Requirements*

PTF Number	Size Requirement	Prerequisite PTF
PTF 5	10 MB	PTF 4
PTF 4	6 MB	PTF 3
PTF 3	8 MB	PTF 2
PTF 2	12 MB	PTF 1
PTF 1	14 MB	

and 36 MB of space is available, then PTF 3 is the highest-level PTF that can successfully be installed. (PTF 3 and its prerequisites, PTF 1 and PTF 2, require a total of 34 MB, which can successfully be contained in the 36 MB space available.)

When all PTFs cannot be applied at once (that is, a highest-level PTF was indicated beyond which DASD space failure occurred), you can take other action. At this point, nothing has been processed. You can free additional space to allow the PTFs to fit, or can make different software installation selections.

When you receive PTFs that fit, and then apply and commit the PTFs, storage space becomes free again. Then the entire installation process can be repeated, picking up where the just-completed process left off. Only the PTFs still waiting to be applied will be processed.

For example, using Table 7-1 again, assume that PTFs 1 through 3 have already been applied. When the PTFs are committed, storage space becomes free and 36 MB is again available. Selecting PTF 5 results in processing both it and its prerequisite, PTF 4. Their storage requirements of 10 MB and 16 MB total 26 MB, which fits in the 36 MB available. These PTFs can now be applied. In effect, the PTF service package has been divided into manageable subsets, avoiding failure of a lengthy installation process.

**Possible Messages When Receiving Files in Transfer Directory:** When you attempt to receive the files into the transfer directory of the 6611, you are presented with messages indicating:

- If the selected service can be applied
- The highest-level PTF that can successfully be applied

such as:

Image mpnp.obj 1.1.1.2.NP00601 requires 5491712 bytes.

Space in /tmp/hold/transfer is sufficient to install mpnp.obj 1.1.1.2.NP00601

or:

Image mpnp.obj 1.1.1.2.NP00602 requires 6507520 bytes.

bffcreate failed. It needs 3500 more 1K blocks in /tmp filesystem.

In the case of insufficient space, you will be told to make more disk space available and to press **Return** or **Enter** to return to the System Manager.

Based on the messages displayed, you must decide whether or not to continue with the receive operation. If you decide to continue and complete the receive

operation, then the apply operation may begin. Refer to “Apply Software Updates” on page 7-27 for details on using System Manager.

**Possible Messages When Applying PTFs:** When you decide to apply the PTFs that have been successfully loaded into the transfer directory, you should check first that the:

- /usr
- /tmp
- /root

file systems have at least 2000 1K blocks free in each of them. If this much space is not available, you will see a system message similar to:

```
Installation cannot be started at this time because the
free space available on the disk is not sufficient.
Please press enter to view the detailed information.
```

(Assuming **Enter** is pressed, the detailed message is displayed:)

```
installp could not complete because there is not enough
space in file system /usr. and it needs 476 more 1024-character
blocks.
The space available in /usr is less than the minimum required
for this operation.
The selected install operation will not be started now.
Press Enter to continue.
```

**Note:** If you know you have insufficient space in the file systems, or later receive messages stating so, you must contact IBM service. IBM service will make the appropriate adjustments to the file systems.

If there are more than 2000 1K blocks free in each file system, then you will see different messages depending on whether there was sufficient room for the PTFs you selected to apply. For example, if you selected PTFs to apply for which more room is needed, you will still see informational messages describing the processes being performed. Then you will see messages similar to this for each PTF:

```
The number of restored files is 1.
```

```
Software product mpnp.obj 01.01.01.02.NP00601 cannot be applied because
the following file systems have insufficient free space.
```

```
/ requires 305 more 1K Blocks to complete this operation.
/usr requires 5325 more 1K Blocks to complete this operation.
```

If you select multiple PTFs to be applied and there is room for some, but not all, none will be applied. You will be informed of this. You may receive messages similar to:

The number of restored files is 1.

The existing file system spaces are sufficient to apply software product mpnp.obj 01.01.01.02.NP00601

The number of restored files is 1.

Software product mpnp.obj 01.01.01.02.NP00602 cannot be applied because the following file systems have insufficient free space.

/usr requires 2965 more 1K Blocks to complete this operation.

Press Enter to continue.

Press Enter to return to System Manager.

If there is sufficient space for all PTFs, you will see messages similar to:

The selected updates will now be applied.

You will not see any message on this screen until the installation completes. The output is being collected in the file pd\_update.log.10227 in the transfer directory. If the installation fails, you will be provided an opportunity to view that file, otherwise this IBM 6611 will shutdown and restart automatically.

Press Enter to broadcast a message to all users of this IBM 6611 and continue.

Press Enter to return to System Manager.

## Interruptions to the Installation Process

During the installation process, status and error messages are written to the screen. If the installation fails, a reason for the failure should be displayed on the screen. If failures are detected, or if the installation process is interrupted, the Software Installation and Maintenance Facility attempts to automatically “clean up” by removing software updates that were partially installed and restoring the component to its previous state before attempting to install the software update.

In most cases, the Software Installation and Maintenance Facility’s automatic cleanup is successful. Normally, you must perform a manual cleanup only when the system shuts down or loses power during the installation. If you have a problem with your installation that results in a partial installation and the automatic cleanup is not successful, select **Clean Up after a Failed Installation** to clean up the partial installation and restore the saved file.

If the system successfully returns to the previous state, you may apply software updates to the Multiprotocol Network Program. If the system does not return to the previous state, the Multiprotocol Network Program is marked as broken. IBM recommends that you call your service representative if the Multiprotocol Network Program is broken.

A summary report is provided at the end of the installation step that lists the status of each of the software updates that were installed.

## Correcting Installation Failures

The installation of software updates can fail for several reasons:

- There is insufficient space in the file system where the saved files are stored, when the update is applied. To create more space, you can commit applied software updates. Refer to “Commit Applied Updates” on page 7-29 for details.
- The software update failed its verification during the installation step. The software update files were damaged during the transfer to the 6611. You can attempt to recover by resending the files. Refer to “Checking for Corrupted Data” for information on what to do if you suspect this problem will occur before beginning installation.
- Software updates that are a prerequisite to the one being applied have not already been applied and are not part of the software package being applied.
- Software updates that are a corequisite to the one being applied are not part of the software package being applied.

When installing software updates from the transfer directory, the software update images are removed from the directory after installation.

## Recommended Software Pre-Installation Actions

Potential problems or delays in the installation procedure can be avoided if you perform certain actions first. These actions do not need to be performed before every software change, but rather when certain problem situations are suspected.

### Cleaning Up the 6611 Transfer Directory

Receiving installation files results in their transfer into the transfer directory of the 6611. If you know you have unnecessary files in the transfer directory (such as outdated dumps or code), delete the files before beginning the installation. Refer to “Delete Transfer Directory Files” on page 4-43 for details.

Committing previously applied updates, if appropriate, will also free space. Refer to “Commit Applied Updates” on page 7-29 for details.

### Checking for Corrupted Data

Checking for corrupted data need not be performed every time files are received. However, if installation files were received through FTP, or you have reason to think data may have been corrupted in the transfer, you may want to check for corrupted data.

When installing a software update, refer to installation directions shipped with the update for the *blocksize* values.

After you have received the software installation files:

1. Issue the **files transfer checksum** command for the appropriate file name in the transfer directory. (Refer to 9-67 for details.)

You will see output displayed similar to:

```
552544952 21236736 /tmp/hold/transfer/mpnp.obj 1.1.00.002.NP61002
```

for the file name you specified on the command. The first number is the checksum; the second is the file size (bytes).

2. Compare these two numbers to those in your documentation. If they match, you know the installation files were received in good condition.

If the numbers do not match, reissue the **files transfer checksum** command and repeat this verification procedure. If the numbers still do not match, call your IBM service representative.

## Stopping Traces

Before beginning the installation process for any component or update, stop all trace activities. Active trace activities might cause installation to fail because of insufficient space. Refer to “Stop” on page 5-47 for information about stopping protocol and process traces. Refer to “Stop” on page 5-43 for information about stopping the system trace.

## Handling Development PTFs

Before beginning the installation process for any software update, check to see if you have any development PTFs on your system. Development PTFs may be identified as containing the characters *FX* in their names, for example:

```
mpnp.obj 01.01.0001.0002.FX10014
```

If you know that you have development PTFs on your system, call your IBM Support Center with information on:

- Which development PTFs are already on your system
- What software update(s) you wish to install

You will receive directions on how to proceed. If the software change you want to make incorporates the fixes of the development PTF, you will be directed to reject the development PTF before making any software change. Your IBM Support Center may also send you a new development PTF to apply *after* making your desired software changes.

This is important because any development PTF you have has been tailored to your system environment. After you make any other changes to your system, the development PTF is no longer appropriate. If you try to reapply the development PTF to your system after making changes, other problems may occur.

If you are not sure and want to check if there are any development PTFs already on your system:

1. Select **Software Installation and Maintenance** on the System Manager main menu.
2. Select **List All Applied but Not Committed Software** on the next menu. (Refer to “List All Applied but Not Committed Software” on page 7-29 for details.) Check for any development PTFs.
3. After you have identified any development PTFs (and have checked with your IBM Support Center for direction), you are free to continue with the installation procedure for other software changes. (If you perform the rejection of the development PTFs now, instead of as part of the overall installation process, you will shut down the 6611 unnecessarily.)

If your IBM Support Center finds it necessary to supply a new development PTF, you should install it *after* the software update is installed.

## Software Installation Procedure

To perform software installation from the System Manager:

1. Log in to the System Manager using a controlling user ID.
2. Select **Software Installation and Maintenance** on the System Manager main menu.

Follow this procedure to install your software installation package using the System Manager:

**Step 1** Your software installation package is sent to you on diskettes or tape. The software package must be moved to the transfer directory for installation.

Before proceeding, refer to “Recommended Software Pre-Installation Actions” on page 7-19 for suggested actions if you have not already done so.

**Step 2** Select **Receive Installation File(s)** from the Software Installation and Maintenance menu to move the installation files to the transfer directory in the 6611. These import methods are available:

- FTP
- Modem
- Tape
- Diskette

Before receiving any installation files, the system validates that enough space is available in the transfer directory. To ensure that enough space is available in the transfer directory using System Manager:

1. Select **Operations** from the main System Manager menu.
2. Select **File and Diskette Operations** from the next menu.
3. Select **View Transfer Directory File** from the selector screen.

A screen displays the files in the transfer directory. At the top of the screen, you can find the free space available in the transfer directory. The software package documentation should state how much space is needed. If the transfer directory does not have enough space, you need to delete all unnecessary files from that directory. Refer to “Delete Transfer Directory Files” on page 4-43 for information about deleting files in the transfer directory.

Refer to “Transferring Software Updates” on page 7-4 for more information about receiving the software files.

Press **F3 (Esc+3)** until you return to the main System Manager menu and again select **Software Installation and Maintenance**.

### Fast-Path Command(s)

```
software receive [-diskettel-tape] -all
software receive [-diskettel-tape] software_name
software receive -ftp host_name userID passwd software_files
```

**Step 3** If you want to view a list of the software in the transfer directory of the 6611, select **List Installation Files** to list the software.

**Fast-Path Command(s)**

**software list -transfer**

Sample output from this command is shown in Figure 7-2.

Option Name	Level	I/U Q Content
=====	=====	=====
mpnp.obj	01.01.0000.0003.NP61003	U Y usr,root
# Multiprotocol Network Program		
mpnp.obj	01.01.0000.0002.NP61002	U Y usr,root
# Multiprotocol Network Program		
mpnp.obj	01.01.0000.0001.NP61001	U Y usr,root
# Multiprotocol Network Program		

Figure 7-2. Sample List of Installation Files in Transfer Directory

Press **F3 (Esc+3)** to return to the Software Installation and Maintenance menu.

**Step 4** If you want to view the problems fixed by the updates in the transfer directory, and select from that list:

1. Select **List All Problems Fixed by Software Updates** to list the problems fixed by the software updates in the transfer directory.
2. Specify the update name on the dialog screen that follows. To select the update name, you can press **Enter** on the dialog screen to use the default of **all**. This lists the problems fixed by all the software updates in the transfer directory.

You may also use **F4 (Esc+4)** to get a list of the possible values. Use **F9 (Esc+9)** to select the specific update whose problems you want to list. Press **Enter** to record the selections.

3. Specify a specific update. Select the software update in the transfer directory whose problems you want to list. Or, press **F4 (Esc+4)** to get a list of possible values.

Software updates are in the form:

mpnp.obj.01.01.0000.0000.NP12345  
mpnp.data.01.01.0000.0000.NP12345

Press **Enter** to record the selections.

**Fast-Path Command(s)**

**software update view -fixes -all**  
**software update view -fixes update\_name**

See Figure 7-3 on page 7-23 for sample output.

---

Fix information

---

files restored: 2

usr/share fix information for  
mpnp.obj 1.1.00.003.NP61003  
NP61003 Test software update3

Required 1.1 update.

root fix information for  
mpnp.obj 1.1.00.003.NP61003  
NP61003 Test software update3

Required 1.1 update.

files restored: 2

usr/share fix information for  
mpnp.obj 1.1.00.002.NP61002  
NP61002 Test software update2

Required 1.1 update.

root fix information for  
mpnp.obj 1.1.00.002.NP61002.  
NP61002 Test software update2

Required 1.1 update.

files restored: 2

usr/share fix information for  
mpnp.obj 1.1.00.001.NP61001  
NP61001 Test software update1

Required 1.1 update.

root fix information for  
mpnp.obj 1.1.00.001.NP61001  
NP61001 Test software update1  
Required 1.1 update.

---

*Figure 7-3. Sample List of Problems Fixed by Software Updates*

4. Press **F3 (Esc+3)** until you return to the Software Installation and Maintenance menu.

**Step 5** This step installs the software updates in the package.

1. Select **Apply Software Updates** to install the software updates in the package.
2. Press **F9 (Esc+9)** to select **Update names** on the selector screen. There are two methods for selecting the update name. Select one of the following:



### **mpnp.all**

Apply all the software updates.

### **Any number of the listed updates**

Apply each of the selected software updates.

Software updates are in the form:

mpnp.obj.01.01.0000.0000.NP12345

mpnp.data.01.01.0000.0000.NP12345

Press **Enter** to record the selections.

#### **Fast-Path Command(s)**

**software update apply (-transfer) {-all} {update\_name}**

**software update apply (-transfer) -noprecheck {-all}**

If you receive error messages during the software installation, the installation may have failed. If there is an error in the installation, you will receive informational messages stating why the installation failed. Press **Enter** to view the detailed information. When all the messages have displayed, press **Enter** to return to System Manager.

A summary report is provided at the end of the installation step that lists the status of each of the software updates that have been installed.

Figure 7-4 is an example of the summary report generated after installation of some Multiprotocol Network Program updates.

#### Install Summary

Name	Fix Id	Part	Event	Result	State
mpnp.obj	NP61003	USR	APPLY	SUCCESS	APPLIED
mpnp.obj	NP61003	ROOT	APPLY	SUCCESS	APPLIED
mpnp.obj	NP61002	USR	APPLY	SUCCESS	APPLIED
mpnp.obj	NP61002	ROOT	APPLY	SUCCESS	APPLIED
mpnp.obj	NP61001	USR	APPLY	SUCCESS	APPLIED
mpnp.obj	NP61001	ROOT	APPLY	SUCCESS	APPLIED

Figure 7-4. Software Update Installation Output

Press **F3 (Esc+3)** until you return to the Software Installation and Maintenance menu.

**Step 6** After installing a new version of software, that version becomes the current version (whether it has been applied or committed). If you decide to commit the applied update at this time, refer to “Commit Applied Updates” on page 7-29 for details.

Immediately after the installation of software changes, the 6611 will be automatically restarted. It is important to schedule the installation of software changes at a time of low usage for the 6611.

There is a command to stop and restart the 6611. Refer to 9-129 for details of the **system stop** command. This command stops all operations in the base operating system, including all routing to access the main system and all user sessions.

If one of the peer-capable adapters was disabled before the system is restarted, it remains disabled after the system is restarted. When this occurs, any new adapter code destined for that adapter is not downloaded. The 6611 should be powered off and back on again after a minute to restart the adapter and to download the new code to the adapter.

Before the beginning of the system restart, users are notified with a message stating the number of minutes before the system will be shut down. There are a series of messages that are displayed during the shutdown process. These messages vary slightly depending on whether you are connected over an EIA 232 serial port or a remote network connection, such as Telnet. See Figure 7-5 for an example of the system restart messages received over a direct connection. The last line is not displayed, if the system restart is issued from a remote user over a Telnet session.

---

```
SHUTDOWN PROGRAM
Sun Dec 22 18:07:50 1991

Broadcast message from ibm6611c on tty ...

PLEASE LOG OFF NOW !!!

System maintenance in progress.
All processes will be killed in 3 minutes.

Broadcast message from ibm6611c on tty ...

THE SYSTEM IS BEING BROUGHT DOWN NOW

Process accounting has stopped.
Error reporting has stopped.
Stopping NFS/NIS Daemons
The Subsystem or Group, nfsd, is currently inoperative.
The Subsystem or Group, biod, is currently inoperative.
The Subsystem or Group, rpc.lockd, currently inoperative.
The Subsystem or Group, rpc.statd, currently inoperative.
The Subsystem or Group, rpc.mountd, currently inoperative.
The Subsystem or Group, yppasswdd, currently inoperative.
The Subsystem or Group, ypupdated, currently inoperative.
All processes currently running will now be killed.
```

---

*Figure 7-5. System Restart Messages*

## Receive Installation File(s)

Select **Receive Installation File(s)** to import software updates to the 6611 when using FTP over the IP network, using a modem, or copying from a diskette or tape.

To use the System Manager to receive installation files:

1. Select **Software Installation and Maintenance** from the System Manager main menu.
2. Select **Receive Installation File(s)** on the next menu.

3. From the selector screen, select the import method to be used. The supported methods are:

<b>FTP</b>	<p>On the dialog screen, specify the host name or IP address of the remote IP station from which software is sent using FTP.</p> <p>Specify the user ID at the remote IP station from which software was sent. You will be prompted for the password of the user ID.</p> <p>Specify the name of the software update to be imported. The name is the same at the remote node and at the 6611 where it arrives.</p>
<b>Modem</b>	<p>Specify the software to be imported. This is the name as it appears in the 6611</p>
<b>Tape</b>	<p>Specify the software to be imported. You may use the default of <i>all</i> to import all the software from the tape. Or you may use <b>F4 (Esc+4)</b> to get a list of software.</p>
<b>Diskette</b>	<p>Specify the software to be imported. You may use the default of <i>all</i> to import all the software from the diskette. Or you may use <b>F4 (Esc+4)</b> to get a list of software.</p> <p>Press <b>F9 (Esc+9)</b> to make your selections.</p> <p>Press <b>Enter</b> to register your selections.</p>

4. From the next selector screen, select the files to be imported.

If you use FTP to receive the files, you will see messages indicating the transfer is complete. You will be directed to press **Enter** to return to the System Manager.

**Fast-Path Command(s)**

```
software receive [-diskettel-tape] -all
software receive [-diskettel-tape] software_name
software receive -ftp host_name userID passwd software_files
```

## List Installation Files

System Manager allows you to display a list of all software updates that are in the transfer directory and available for installation.

To list all software updates using System Manager:

1. Select **Software Installation and Maintenance** from the System Manager main menu.
2. Select **List Installation Files** on the next menu.
3. A COMMAND STATUS screen displays the list.

**Fast-Path Command(s)**

```
software list -transfer
```

Figure 7-6 on page 7-27 is an example of the output received.

Option Name	Level	I/U	Q	Content
mpnp.obj	01.01.0000.0003.NP610003	U	Y	usr,root
# Multiprotocol Network Program				
mpnp.obj	01.01.0000.0003.NP610002	U	Y	usr,root
# Multiprotocol Network Program				
mpnp.obj	01.01.0000.0003.NP610001	U	Y	usr,root
# Multiprotocol Network Program				

Figure 7-6. Example of List Installation Files Output

## List All Problems Fixed by Software Updates

To list all code problems fixed by a software update:

1. Select **List All Problems Fixed by Software Updates**.
2. A dialog screen is displayed. Select the software updates in the transfer directory whose problems you want to list. You may select the default, *all*, for the update name. Or press **F4 (Esc+4)** to get a list of updates.
3. Press **F9 (Esc+9)** to select each software component on the screen that follows. Press **Enter** to record the selections.
4. Press **Enter** to execute the function.
5. A COMMAND STATUS screen displays the output.

The software updates selected are listed along with a problem description abstract.

### Fast-Path Command(s)

```
software update view -fixes -all
software update view -fixes update_name
```

Figure 7-3 on page 7-23 provides a sample list of problems.

## Apply Software Updates

**Note:** You cannot install updates until all prerequisite software is installed.

To install software updates:

1. Select **Software Installation and Maintenance** from the System Manager main menu.
2. Select **Apply Software Updates** on the next menu.
3. Press **F9 (Esc+9)** to select updates on the Update name selector screen. There are two methods for selecting the update name. Select one of the following:

**mpnp.all**

Apply *all* the software updates.

### Any number of the listed updates

Apply each of the selected software updates.

Software updates are in the form:

mpnp.obj.01.01.0000.0000.NP12345

mpnp.data.01.01.0000.0000.NP12345

Press **Enter** to record the selections.

#### Fast-Path Command(s)

```
software update apply (-transfer) {-all} {update_name}  
software update apply (-transfer) -noprecheck {-all}
```

---

## Post Software Installation Functions

There are several software installation-related functions that may need to be performed after the software has been installed. The following sections explain how and when to perform these functions:

- “Clean Up after a Failed Installation”
- “Commit Applied Updates” on page 7-29
- “Reject Applied Updates” on page 7-31

## Clean Up after a Failed Installation

During the installation process, status and error messages are written to the screen. If the installation fails, a reason for the failure should display. If failures are detected or, if the installation process is interrupted, the Software Installation and Maintenance Facility attempts to “clean up” by removing software updates that were partially installed. The facility also attempts to restore the component to the state it was in before it attempted installing the software update.

In most cases, the Software Installation and Maintenance Facility’s automatic cleanup is successful. Normally, you might perform a manual cleanup only when the system shuts down or loses power during the installation. If you have a problem with your installation that results in a partial installation and the automatic cleanup is not successful, you want to clean up the partial installation and restore the saved file.

**Note:** Any manual cleanup operation should be done at the direction of IBM service.

To perform cleanup:

1. Select **Software Installation and Maintenance** from the System Manager main menu.
2. Select **Clean Up after a Failed Installation** on the next menu.
3. A COMMAND STATUS screen is displayed reporting the success or failure of the manual cleanup attempt.

#### Fast-Path Command(s)

**software cleanup**

If the system successfully returns to the previous state, you may apply software updates to the Multiprotocol Network Program. If the system does not return to the previous state, the Multiprotocol Network Program is marked as broken. IBM recommends that you call your service representative if the Multiprotocol Network Program is broken.

## List All Applied but Not Committed Software

You may choose to list all software updates that have not been committed. This option is useful:

- If you need to free disk space by deleting files saved when the update is applied. You can commit the applied update.
- If you need to revert to the previous version of a file saved when the update is applied. You can reject an applied update.

To list software:

1. Select **Software Installation and Maintenance** from the System Manager main menu.
2. Select **List All Applied but Not Committed Software** on the next menu.
3. A COMMAND STATUS screen is displayed reporting the success or failure of the command. Figure 7-7 on page 7-30 shows sample output of a successful search.

#### Fast-Path Command(s)

**software update list -nocommit**

## Commit Applied Updates

**Note:** You must have a minimum of 2000 1K blocks of free space in your /usr, /tmp, and root file systems. Use the **file system (view)** command to view the used and available space in the 6611 file systems. (Refer to 9-67 for details.) If you do not have this space, contact your IBM service representative before rejecting PTFs.

After running a new applied software update, you can decide to commit the update as permanent or to reject the update and use the previously saved files. The commit and reject functions are valid only for software updates that are applied, and not already committed.

Committing software updates removes the files that were saved when the update was applied. This frees space so that other software updates can be applied.

**Warning:** When you commit the software update, the change becomes permanent.

Before committing a software update:

- Determine all the updates that are a prerequisite to the update you are committing. Select the **View Software Vital Product Data** menu item on the Software Installation and Maintenance menu for that determination. (See “View Software Vital Product Data” on page 7-32 for more information.) If an update is a prerequisite to the one being committed, it also will be committed, if not already committed.
- Determine all the updates that have been applied but not yet committed. Select **List All Applied but Not Committed Software** to list all the software that has been applied, but not committed. Press **Enter** to view the list. See Figure 7-7 for an example of this list.

Name	Part	Level	State
mpnp.obj	USR	01.01.0000.0003.NP61003	APPLIED
mpnp.obj	ROOT	01.01.0000.0003.NP61003	APPLIED
mpnp.obj	USR	01.01.0000.0002.NP61002	APPLIED
mpnp.obj	ROOT	01.01.0000.0002.NP61002	APPLIED
mpnp.obj	USR	01.01.0000.0001.NP61001	APPLIED
mpnp.obj	ROOT	01.01.0000.0001.NP61001	APPLIED

Figure 7-7. Example of List of Applied But Not Committed Software Output

- Evaluate the effect of the update and its uncommitted prerequisites on your system's performance.

If, after careful examination of the situation, you decide to commit the software update:

1. Select **Software Installation and Maintenance** from the System Manager main menu.
2. Select **Commit Applied Updates**.
3. Press **F9 (Esc+9)** to select the update name on the selector screen that follows. There are two methods for selecting the update name. Select one of the following:

**mpnp.all**

Commit all the software updates that are applied.

**Any number of the listed updates**

Commit each of the selected software updates.

Software updates are in the form:

```
mpnp.obj.01.01.0000.0000.NP12345
mpnp.data.01.01.0000.0000.NP12345
```

Press **Enter** to record the selections.

**Fast-Path Command(s)**

```
software update commit -all
software update commit update_name
```

An error message screen displays if there are no applied updates to be committed. Press **Enter** or **F3 (Esc+3)** to return to the System Manager.

## Reject Applied Updates

After running a new applied software update, you can decide to commit the update as permanent or to reject the update and use the previously saved files. The commit and reject functions are valid only for software updates that are applied, but not committed.

Rejecting software updates removes the update files from the current system and replaces them with the files that were saved when the update was applied. This frees space so that other software updates can be applied.

Before rejecting a software update:

1. Determine all the updates that are dependents of the update you are rejecting.
2. Select the **View Software Vital Product Data** menu item on the Software Installation and Maintenance menu for that determination. Refer to “List Software Dependents” on page 7-36 for the steps involved. If an update is a dependent of the one being rejected, it also will be rejected.
3. Return to the Software Installation and Maintenance menu.
4. Select **List All Applied but Not Committed Software** to list all the software that has been applied, but not committed. (Refer to “List All Applied but Not Committed Software” on page 7-29 for information.) See Figure 7-7 on page 7-30 for an example of this list.
5. Evaluate the effect of rejecting the update and its dependents on your system’s performance.

If, after careful examination of the situation, you decide to reject the software update:

1. Select **Software Installation and Maintenance** from the System Manager main menu.
2. Select **Reject Applied Updates**.
3. Press **F9 (Esc+9)** to select the update name on the selector screen that follows. There are two methods for selecting the update name. Select one of the following:

**mpnp.all**

Reject all the software updates that are applied.

**Any number of the listed updates**

Reject each of the selected software updates.

Software updates are in the form:

mpnp.obj.01.01.0000.0000.NP12345

mpnp.data.01.01.0000.0000.NP12345

Press **Enter** to record the selections.

**Fast-Path Command(s)**

**software update reject** *update\_name*



An error message screen displays if there are no applied updates to be rejected. Press **Enter** or **F3 (Esc+3)** to return to the System Manager.

## View Software Vital Product Data

Select this option to get selected information on MPNP. You can select any of the following functions:

- View software history
- List software updates
- List software prerequisites
- List software dependents
- View software product IDs

## View Software History

This option presents you with all installation actions for the Multiprotocol Network Program since the current release was installed.

To show the entire installation history information:

1. Select **Software Installation and Maintenance** from the System Manager main menu.
2. Select **View Software Vital Product Data** from the next menu.
3. Select **history** from the selector screen.

### Fast-Path Command(s)

```
software view -history
```

The output displays:

- The software name and its path
- Fix IDs (number)
- Release level
- Fix status
- Last action taken
- Date of last action
- Time of last action
- ID of user who performed the last action

Figure 7-8 on page 7-33 is an example showing history information for the mpnp.obj component.

Name							
-----							
Fix Id	Release	Status	Action	Date	Time	User Name	
-----							
Path: /usr/lib/objrepos							
mpnp.obj							
	00.01.0200.9343	COMPLETE	COMMIT	10/21/93	16:48:55	root	
	00.01.0200.9343	COMPLETE	APPLY	10/21/93	16:32:34	root	
F102201	00.01.0200.9343	COMPLETE	COMMIT	10/28/93	07:29:15	root	
	00.01.0200.9343	COMPLETE	APPLY	10/28/93	07:04:29	root	
mpnp.obj							
F102501	00.01.0200.9344	COMPLETE	APPLY	10/28/93	08:03:49	root	
Path: /etc/objrepos							
mpnp.obj							
	00.01.0200.9343	COMPLETE	COMMIT	10/21/93	16:48:56	root	
	00.01.0200.9343	COMPLETE	APPLY	10/21/93	16:43:49	root	
F102201	00.01.0200.9343	COMPLETE	COMMIT	10/28/93	07:29:17	root	
	00.01.0200.9343	COMPLETE	APPLY	10/28/93	07:07:35	root	
mpnp.obj							
F102501	00.01.0200.9344	COMPLETE	APPLY	10/28/93	08:08:00	root	
Path: /usr/share/lib/objrepos							
mpnp.data							
	00.01.0200.9343	COMPLETE	COMMIT	10/21/93	16:48:56	root	
	00.01.0200.9343	COMPLETE	APPLY	10/21/93	16:48:36	root	

Figure 7-8. Sample List of History Information for Software Components

## List Software Updates

You may list all software updates installed for the current version. To perform this function:

1. Select **Software Installation and Maintenance** from the System Manager main menu.
2. Select **View Software Vital Product Data** from the next menu.
3. Select **updates** from the selector screen.

### Fast-Path Command(s)

```
software update list
software update list -nocommit
```

The output contains information on:

- The software name and its path
- PFT name (number)
- State (applied, committed, or available)
- Fix information

Figure 7-9 on page 7-34 provides an example of listing software updates.

---

Path: /usr/lib/objrepos

LPP NAME: mpnp.obj  
PTF Name: NP02201  
State: COMMITTED  
Fix information:  
NA00123

The system manager only allows installing software from transfer directory or diskette. We also need support for installing from tape.

LPP NAME: mpnp.obj 01.02.0000.0000  
PTF Name: NP02501  
State: APPLIED  
Fix information:  
NA00123

The system manager only allows installing software from transfer directory or diskette. We also need support for installing from tape.

NA00456

If AppleTalk is disabled on last adapter that had AppleTalk enabled, then is enabled again, AppleTalk does not come up on that adapter.

Path: /etc/objrepos

LPP NAME: mpnp.obj  
PTF Name: NP02201  
State: COMMITTED  
Fix information:  
NA00123

The system manager only allows installing software from transfer directory or diskette. We also need support for installing from tape.

LPP NAME: mpnp.obj 01.02.0000.0000  
PTF Name: NP02501  
State: APPLIED  
Fix information:  
NA00123

The system manager only allows installing software from transfer directory or diskette. We also need support for installing from tape.

Path: /usr/share/lib/objrepos

---

*Figure 7-9. List Software Updates Sample Output*

## List Software Prerequisites

You may list all software updates that are prerequisites for all software updates. Any prerequisites must be installed before the specified update. To perform this function:

1. Select **Software Installation and Maintenance** from the System Manager main menu.
2. Select **View Software Vital Product Data** from the next menu.
3. Select **prerequisites** from the selector screen.

### Fast-Path Command(s)

```
software view -prerequisites
```

The output lists:

- The software name and its path
- Fix ID (number)
- State (applied, committed, or available)
- Prerequisites

Figure 7-10 shows a sample of software prerequisites output:

Name	Fix Id	State	Prerequisites
Path: /usr/lib/objrepos mpnp.obj		COMMITTED	
			*prereq mpnp.obj v=01 r=02 m=0000
mpnp.obj 01.02.0000.0000	NP02501	APPLIED	
			*prereq mpnp.obj v=01 r=02 m=0000
Path: /etc/objrepos mpnp.obj		COMMITTED	
			*prereq mpnp.obj v=01 r=02 m=0000
mpnp.obj 01.02.0000.0000	NP02501	APPLIED	
			*prereq mpnp.obj v=01 r=02 m=0000
Path: /usr/share/lib/objrepos mpnp.data		COMMITTED	*prereq mpnp.obj v=01 r=02

Figure 7-10. Sample Output of Prerequisite Information for Software Component

## List Software Dependents

You may obtain a listing of all software components or updates that depend on a listed software component or update. (The listed component or update must be installed before the dependent software.) To perform this function:

1. Select **Software Installation and Maintenance** from the System Manager main menu.
2. Select **View Software Vital Product Data** from the next menu.
3. Select **dependents** from the selector screen.

### Fast-Path Command(s)

**software view -dependents**

The output (shown in Figure 7-11) lists:

- The software name and its path
- Dependents
- Dependents state

Name	Dependents	Dependents State
<Name> is a prerequisite of <Dependents>		
Path: /usr/lib/objrepos		
mpnp.obj	mpnp.obj 01.02.0000.0000.NP02201	COMMITTED
	mpnp.obj 01.02.0000.0000.NP02501	APPLIED
mpnp.obj 01.02.0000.0000.NP02201		
	NONE	
mpnp.obj 01.02.0000.0000.NP02501		
	NONE	
Path: /etc/objrepos		
mpnp.obj	mpnp.obj 01.02.0000.0000.NP02201	COMMITTED
	mpnp.obj 01.02.0000.0000.NP02501	APPLIED
mpnp.obj 01.02.0000.0000.NP02201		
	NONE	
mpnp.obj 01.02.0000.0000.NP02501		
	NONE	
Path: /usr/share/lib/objrepos		
mpnp.data	NONE	

Figure 7-11. Sample Output of Dependents Information for Software Component

## List Software Product ID

You may show the product ID number of a software component. IBM software services uses unique IDs for each licensed program. To perform this function:

1. Select **Software Installation and Maintenance** from the System Manager main menu.
2. Select **View Software Vital Product Data** from the next menu.

3. Select **product ID** from the selector screen.

**Fast-Path Command(s)**

**software view -product\_ID**

The output (a sample of which is shown in Figure 7-12) lists:

- The software name and its path
- Fix ID (number)
- Vendor code
- Product ID
- Feature ID
- Product name

Name	Fix Id	Vendr Code	Product Id	Feature Id	Product Name
Path: /usr/lib/objrepos					
mpnp.obj			5648-01600	0000	mpnp
	NP02201		5648-01600	0000	mpnp
mpnp.obj 01.02.0000.0000					
	NP02501		5648-01600	0000	mpnp
Path: /etc/objrepos					
mpnp.obj			5648-01600	0000	mpnp
	NP02201		5648-01600	0000	mpnp
mpnp.obj 01.02.0000.0000					
	NP02501		5648-01600	0000	mpnp
Path: /usr/share/lib/objrepos					
mpnp.data			5648-01600	0000	mpnp

Figure 7-12. Sample Output of Product ID Information for Software Component

## Automating Software Installation and Maintenance Facility Functions

The installation of software updates on one or more 6611s can be managed from a single control point. This control point may be either a RISC System/6000 workstation or an 6611 working as a network installation server, and connected to the client 6611s' IP network. (A *client* is any operational 6611 containing network installation code and connected to an IP network.)

**Note:** IBM recommends that you synchronize the time on the control point and all clients before you begin an automatic installation.

Software installation can be automated in different ways:

- You may write and use your own scripts, or use individual commands or the System Manager to transfer and install files.
- You may use fast-path commands or scripts provided with the 6611 to perform overall installation:

- From the RISC System/6000 workstation, you may use the scripts provided: rimon, rinstall, and ristop
- From the 6611, you may use the fast-path software commands (as described in Chapter 9 on page 9-1)

When you use the provided scripts, you must first ensure the required .netrc and control files are defined appropriately. Refer to “Using the .netrc File” on page 7-40 and “Using Control Files as Part of the Installation Process” on page 7-41 for details.

IBM recommends that you use the scripts provided with the 6611 if you are going to automate software installation.

---

## Using Your Own Commands and Scripts

From the RISC System/6000 workstation, FTP can be used to transfer the software to the 6611. After the software is on the 6611, you have two options to install the changes:

- Use the **telnet** command to access the 6611 and use the System Manager or the fast-path commands to install the software.
- Use the **rexec** or **rsh** commands to install the software, either by issuing single commands or by issuing multiple commands included in rsh scripts.

The noninteractive **ftp** command (which must be run from the 6611) and the **rsh** and **rexec** commands can be combined into scripts that automate the software installation process. Several commands can apply software updates. There are additional commands to commit, reject, remove, and reinstate the software and to list the software and its vital product data. For detailed information on the available set of software commands, refer to “Software Commands” on page 9-112 or use help in the fast-path environment.

## Sample Noninteractive FTP Command

The noninteractive **ftp** command has the following format on the 6611 in the fast-path environment:

**ftp -c userid password action filename filetype hostname**

Where:

- c** Allows the user ID, password, and transfer command to be placed on the command line.
- userid** User ID at the node to which the **ftp** command is sent.
- password** Password of the user ID at the node to which the **ftp** command is sent.
- action** One of the following transferring actions:
  - **get** or **mget** - Retrieve a file from the node to which the **ftp** command is sent.
  - **put** or **mput** - Send a file to the node to which the **ftp** command is sent.
- filename** File name or file name group of the file(s) being sent or received.
- filetype** Specify either **ascii** or **binary**.

**hostname** Host name of the node to which the **ftp** command is sent.

## Sample Rexec and Rsh Commands

**Rexec** and **rsh** commands are typically used as part of a shell script. Such scripts may be used to transfer and apply software changes from a remote host. For example, to start the transfer of installation files using **rexec**, you could issue:

```
cmd="software receive -ftp -remote $thisaddr $thisid $thispw $filelist"
rexec $client $cmd
```

where the **software** command is used to transfer the files from the remote host to the transfer directory of the 6611. In this example, the first line defines the **\$cmd** parameter specified on the **rexec** command. The other parameters (**\$thisaddr**, **\$thisid**, **\$thispw**, **\$filelist**, and **\$client**) must also be defined with real values.

To start an installation process using **rsh**, you might issue:

```
cmd="software update apply -noprecheck -remote"
rsh $client -l ibm6611c ibm6611c $cmd
```

where the **software** command begins applying the update immediately, without prechecking and without committing it upon completion. In this example, **\$cmd** is defined in the first line and **\$client** must be defined with a real value.

---

## Using the 6611-Provided Commands and Scripts

Three installation-related scripts are provided with the 6611. If you are using a RISC System/6000 as the network installation server, you would use these scripts:

- **rimon**
- **rinstall**
- **ristop**

Refer to “Sending Software Changes to One or Multiple 6611s” on page 7-47 for the definition and use of these scripts.

Use of these scripts requires prior definition of both **.netrc** and control files. (Refer to “Using the **.netrc** File” on page 7-40 and “Using Control Files as Part of the Installation Process” on page 7-41 for details.)

Using the provided scripts also provides automatic recovery for installation failures.

If you are using a 6611 as the network installation server, you would use the commands:

- **software rimon** *control\_file\_name*
- **software rinstall** **{-quiet}** **{-verbose}** *control\_file\_name*
- **software ristop** *control\_file\_name*

Refer to “Software Commands” on page 9-112 for details on these commands.

The network installation server must have sufficient space to store the installation files (up to 35 MB). The installation files can be located:

1. On diskette

A diskette drive must be on the network installation server.

2. On tape



- A tape drive must be on the network installation server.
3. In the transfer directory of a 6611 in the network
  4. In a directory accessible from the network installation server

In the first three cases, the transfer of the installation files to a directory on the network installation server is done automatically.

If you are using a 6611 as the network installation server, the 6611 acting as the server cannot also be a client 6611.

If you are using a RISC System/6000 workstation as the network installation server, the network installation scripts must be installed and your network administrator must have a user ID. (Refer to "Sending Software Changes to One or Multiple 6611s" on page 7-47 for information on the IBM-supplied installation scripts.)

## Using the .netrc File

Access to 6611s is controlled by user IDs and passwords. For the network installation process to work, it must know the passwords of the user IDs on the 6611s with which it works. You must specify the:

- Host name
- User ID
- Password

of all client 6611s in a .netrc file. (This file might or might not already exist in your home directory.)

The .netrc file is defined by AIX and is used by the ftp and rexec commands. If the file does not contain the needed 6611 information, then you will be prompted for the user ID and password of each client 6611 during the installation process.

To therefore make effective use of the rinstall script, ensure that:

- The .netrc file is indeed named .netrc.
- If a RISC System/6000 is the network installation server, the file is in the user's home directory.

The file must be owned by the current user and must have a permission of 600 (chmod 600 .netrc).

- If a 6611 is the network installation server, the file is in the transfer directory
- The format for each entry is:

```
machine host_name login userID password passwd
```

where the values in italics should specify the client 6611's name, user ID, and password.

**Note:** The alternative to this scenario, if you do not want to store passwords in the file, is to manually enter the passwords each time you are prompted by the remote installation process.

## Installation States and Phases

The overall installation process goes through different states and phases.

The **software state view** command displays the installation state of the 6611. Additionally, output from the provided scripts contains messages related to the different phases occurring during the overall installation process. For this output to be as informative as possible, you should be aware of these states and phases.

The installation phases are:

- Idle
- Transfer
- Setup
- Install

Within each phase, installation proceeds through these states:

<b>Idle</b>	Installation has not yet started
<b>Transfer prepared</b>	The client 6611 has been prepared for transfer
<b>Transfer started</b>	The transfer of installation files is in progress
<b>Transfer complete</b>	Installation files have been transferred
<b>Transfer failed</b>	The transfer of the installation files failed
<b>Setup started</b>	Precheck and setup have started
<b>Setup complete</b>	Ready to activate the installation
<b>Setup failed</b>	Precheck or setup has failed
<b>Install pending</b>	The installation timer has been set
<b>Install started</b>	The installation timer has expired, and installation is running
<b>Install complete</b>	Installation was successful
<b>Install recover</b>	Installation failed, and recovery is in progress
<b>Install failed</b>	Installation failed, and recovery (if any) was successful
<b>Install broken</b>	Installation and recovery have both failed

## Using Control Files as Part of the Installation Process

You must create a control file containing the instructions for the network installation process.

**Note:** You must use separate control files for each version of software change being installed.

The control file must:

- Be an ASCII file containing statements separated by new line characters
- Begin each statement with a keyword
- Contain the names of any drives and the addresses of any 6611s involved in the installation process
- Specify when the installation should start

A sample control file template is provided in the static directory of the 6611. This template, which you can extract from the directory and modify, is named `ri_tmplt` and looks like:

```
# Network Install Control File Template
# Remove the # on the statements to be used.
# Replace the parts in <> with your parameters.

# update <NP00xxx>
#
# directory <server_path>
# source </dev/fd0 | /dev/rmt0.1 | ip_address path>
#
# option clear yes
# option fixes nocommit
# option patches keep
# option continue no
# option commit yes
# option monitor no
# option timeout <minutes>
# option interval <seconds>
# option manyxfer <number>
#
# client <client_address> <+mm | MMDDhhmm[.ss] | (blank)>
```

You can, of course, create your own control file.

## Control File Keywords

Each statement in a control file must start with a keyword. The valid keywords are:

- |                  |   |
|------------------|---|
| <b>#</b>         | A comment; the rest of the line is ignored.   |
| <b>update</b>    | <p>The fix ID of an update to be installed. There can be more than one of these statements in the file; however the order of the statements is the order in which the updates are transferred to each client 6611</p> <p>An example of a fix ID is NP00288.</p>                             |
| <b>directory</b> | The full path of the network installation server directory that contains or will contain the installation files. If the server is a 6611, a directory statement is not needed. If the server is a RISC System/6000, only <i>one</i> directory statement should be used in the control file. |
| <b>source</b>    | The source of the installation files. You may omit this statement if the installation files are already in the directory specified with the directory keyword.  |
| <b>option</b>    | Sets an installation option. Refer to “Option Keywords in a Control File” on page 7-43 for details.   |
| <b>client</b>    | Specifies a client and the time at which the installation should be activated. You must have at least one of these in a control file, or else no transfer or installation occurs.   |

This keyword must be followed by:

- The IP address of the client 6611. This can either be a name (such as router1) or a decimal address. (In this case, the name used is an alias for the IP address.)
- The time that the installation should be activated. The time may be *relative* from the time at which all the client 6611s have completed

precheck. The format for relative is +mm, where *mm* represents minutes.

The time may also be *absolute*, reflecting the time on that 6611. The format for absolute is MMDDhhmm[.ss].

If no time is specified, the default is +0, which means installation starts immediately.

The order in which client statements appear is significant. The order of the statements is the order in which:

- Files will be transferred to the client 6611(s)
- Installation timers will be started on the client 6611s. When specifying values on the client statements, the network administrator must either:
  - Set timers so that there is time for commands to reach all the client 6611s involved in the process, or
  - Arrange the client statements so that the most distant client 6611s are on the statements listed first

## Option Keywords in a Control File

The option keyword is followed by an option name and a value. Table 7-2 shows the valid options and values. Default values are highlighted.

Table 7-2 (Page 1 of 2). Options for the Option Keyword

Option	Value	Value Description
clear	yes	Clear the client 6611s' transfer directory before transferring files. This will help prevent failures due to lack of space.
	<b>no</b>	Do not clear the transfer directory.
fixes	<b>commit</b>	Commit the applied, but not committed, PTFs.
	nocommit	Do not commit any PTFs. If any uncommitted PTFs exist, and a component is being installed, the installation will be stopped.
patches	<b>reject</b>	Automatically reject any applied development PTFs before installation.
	keep	Do not reject applied development PTFs before installation. If any exist, installation will be stopped on this 6611. This option is ignored if all the updates being applied are development PTFs.
continue	<b>yes</b>	Continue installation on other client 6611s if installation on one fails.
	no	Do not continue. If installation on one client 6611 fails, the network installation process will be stopped.
commit	<b>yes</b>	Apply and commit the installation files.
	no	Apply, but do not commit, the installation files. This value is not valid for development PTFs.
monitor	yes	Continue to monitor the client 6611s after the network installation server starts the installation timer.
	<b>no</b>	Do not continue monitoring activities.

Table 7-2 (Page 2 of 2). Options for the Option Keyword

Option	Value	Value Description
timeout	<i>minutes</i>	The amount of time to allow for each phase of the installation. (Refer to "Installation States and Phases" on page 7-41 for definitions of the phases.) If the time that the client 6611 is in any one phase exceeds this value, the installation is considered to have failed.
	<b>60</b>	The default time, in minutes.
interval	<i>seconds</i>	The polling interval for the installation monitor.
	<b>20</b>	The default polling interval, in seconds.
manyxfer	<b>#</b>	The number of installation file transfers to be done in parallel. You supply this value.
	<b>1</b>	Transfer files to one client 6611 at a time.

### Sample Control File

A sample control file is shown in Figure 7-13.

```
update NP00284
directory /u/mydir/images/1112/ptfs/ptf284
option clear yes
option fixes commit
option patches reject
option commit no
option continue yes
option interval 15
client router1 +2
client router2 +5
client router3 +15
```

Figure 7-13. Example of a Control File

As an example, this sample control file:

- Specifies only one update (NP00284) to be handled
- Shows the installation file is in the directory on a RISC System/6000
- Clears the 6611's transfer directory before transferring begins
- Requests that applied, but not committed, PTFs be committed
- Automatically rejects any development PTFs before installation
- Requests that the specified update be applied, but not committed
- Requests that installation continue on the remaining client 6611s even if it fails on one
- Specifies a polling interval of 15 seconds for the installation monitor
- Does not include an *option timeout* statement. This results in the default (60 minutes) being used. This means that 60 minutes will be allowed for each phase of the installation
- Identifies three client 6611s (whose IP addresses are known to the IP network) and the relative time, in minutes, at which installation should be activated

Any options not shown are defaulted.

## Obtaining Remote Installation Output

The control file must be specified before you use any of the scripts from the network installation server. In this scenario, assume you have defined a control file like that in Figure 7-13 on page 7-44. If you are using a RISC System/6000 network installation server, type:

```
rinstall -v control_file_name
```

If you are using a 6611 network installation server, type:

```
software rinstall -verbose control_file_name
```

In either case, specifying the `-verbose` option results in output as shown in Figure 7-14. Refer to “Installation States and Phases” on page 7-41 for definitions of the various phases for which messages are issued.

---

```
Please enter the password for mydir at 19.7.195.39
Files to transfer are:
/u/mydir/images/1112/ptfs/ptf284/mpnp.B.01.01.0001.0002.NP00284.bff
Total size of files to transfer=12059 (1K blocks).
Getting current states of clients...
  Update mismatch - resetting state for router1 to idle.
  Update mismatch - resetting state for router2 to idle.
  Update mismatch - resetting state for router3 to idle.
Preparing clients...
  Preparing client router1
    Free space on router1 = 48492 (1K blocks).
  Preparing client router2
    Free space on router2 = 36545 (1K blocks).
  Preparing client router3
    Free space on router3 = 43896 (1K blocks).
Transferring files...
  Issuing transfer command to client router1
  Client router1 is now in state transfer started
  Client router1 is now in state transfer complete
  Issuing transfer command to client router2
  Client router2 is now in state transfer started
  Client router2 is now in state transfer complete
  Issuing transfer command to client router3
  Client router3 is now in state transfer started
  Client router3 is now in state transfer complete
Setup phase...
  Issuing setup command to client router1
  Issuing setup command to client router2
  Issuing setup command to client router3
  Client router1 is now in state setup started
  Client router2 is now in state setup started
  Client router3 is now in state setup started
  Client router1 is now in state setup complete
  Client router2 is now in state setup complete
  Client router3 is now in state setup complete
Install phase...
  Issuing install command to client router1
  Issuing install command to client router2
  Issuing install command to client router3
  Client router1 is now in state install pending
  Client router2 is now in state install pending
  Client router3 is now in state install pending
  Client router1 is now in state install started
  Client router2 is now in state install started
  Client router1 is now in state install complete
  Client router2 is now in state install complete
  Client router3 is now in state install started
  Client router3 is now in state install complete
```

---

*Figure 7-14. Output of Remote Installation Command (Verbose)*

If you specified the same commands without the `-verbose` option, you would get output as shown in Figure 7-15 on page 7-47.

---

```
Please enter the password for mydir at 19.7.195.39
Files to transfer are:
/u/mydir/images/1112/ptfs/ptf284/mpnp.B.01.01.0001.0002.NP00284.bff
Getting current states of clients...
Preparing clients...
Transferring files...
Setup phase...
Install phase...
```

---

*Figure 7-15. Output of Remote Installation Command (without Verbose)*

## Sending Software Changes to One or Multiple 6611s

The static directory of the 6611 already contains the provided scripts that you can use to more easily automate remote installation of software updates. These scripts are:

- |                 |   |
|-----------------|---|
| <b>rimon</b>    | Starts remote monitoring of all client 6611s.   |
| <b>rinstall</b> | Starts remote installation of an update on multiple client 6611s.                     |
| <b>ristop</b>   | Stops a pending installation on one or more client 6611s specified in a control file. |

Scripts may be executed from a RISC System/6000 workstation or from the 6611, depending on which is being used as the network installation server. If you are using a RISC System/6000 as the network installation server, you must transfer the scripts from the static directory of the 6611 to the RISC System/6000 using FTP. At the workstation, create the necessary control file, containing the software update file names and the necessary information about each of the 6611s requiring the software installation. (Refer to “Using Control Files as Part of the Installation Process” on page 7-41 for details.) If you are using a 6611 as the network installation server, no transfer is needed.

To send a file from the static directory:

1. Select **Operations** on the System Manager main menu.
2. Select **File and Diskette Operations** on the next menu.
3. Select **&flstat1.** on the next menu to accomplish this. Refer to “Send Static Directory File” on page 4-48 for details.

You may distribute and install updates across a single IP network or on different IP networks provided there are routes between the networks.

**Note:** The length of time needed to add a new software update depends on the size of the software change.

For the following procedure, see Figure 7-16 on page 7-48 for a picture of an IP network in which you have multiple client 6611s and are using a RISC System/6000 as the network installation server.



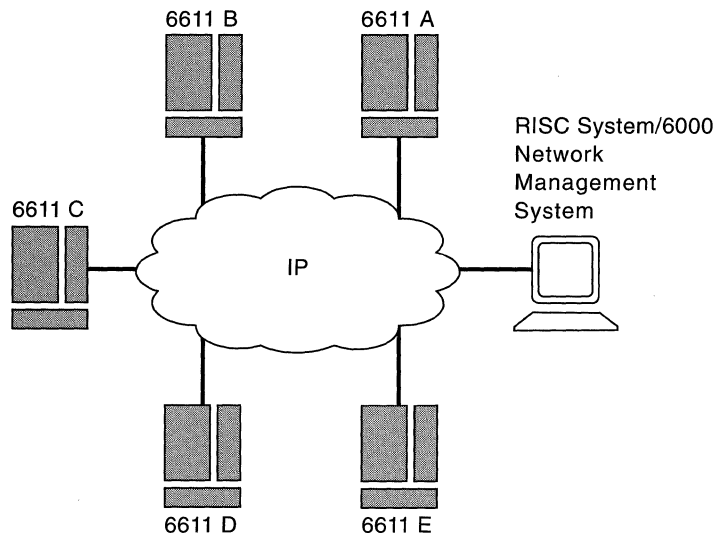


Figure 7-16. Network with Multiple Client 6611s and RISC System/6000 Server

The procedure for performing a remote installation is:

**Step 1** The software installation package is sent to you on diskettes or tape. If a workstation is being used, transfer the software files to a directory on the workstation. Refer to “From Diskette to the RISC System/6000 Workstation” on page 7-7 or “From Tape to the RISC System/6000 Workstation” on page 7-7 for details.

The rinstall script will handle this transfer for you if you use the **source** keyword in the required control file.

If a 6611 is being used as the network installation server, refer to “From a Diskette to an IBM 6611” on page 7-5 or “From Tape to an IBM 6611” on page 7-6 for details.

**Step 2** Transfer the scripts from the static directory of a 6611 to the workstation, if the workstation is being used. (To use a script, it must be in a directory that is in your path, and the script must have execute permission. Otherwise, no transfer is required.) Refer to “Send Static Directory File” on page 4-48 for details on the menu path to take to send the files via FTP.

**Step 3** Create the control file that is to be accessed by this script. (Refer to “Using Control Files as Part of the Installation Process” on page 7-41 for details on using control files.)

If a 6611 is used as the network installation server, the file should be stored in the transfer directory.

**Step 4** Execute the rinstall script. You are prompted for the password of the user ID at the workstation from which you execute this script.

Before using rinstall, refer to “Using the .netrc File” on page 7-40 for more information.

If you are using a 6611 as the network installation server, issue the **software rinstall control\_file\_name** command, with the appropriate options. You must also ensure the .netrc file is in the transfer directory of the 6611.

#### Fast-Path Command(s)

If you are using a RISC System/6000 network installation server, type:

**rinstall -v** *control\_file\_name*

If you are using a 6611 network installation server, type:

**software rinstall -verbose** *control\_file\_name*

The message output from this script is displayed on the screen of the workstation.

#### Step 5 (Optional)

Display the status of the installation process on one client 6611.

#### Fast-Path Command(s)

From either network installation server, type:

**rexec** *client\_address* **software state view**

where *client\_address* is the IP address of the 6611. This example checks one client 6611 one time.

#### Step 6 (Optional)

Start monitoring of all client 6611s listed in the control file.

#### Fast-Path Command(s)

If you are using a RISC System/6000 network installation server, type:

**rimon** *control\_file\_name*

If you are using a 6611 network installation server, type:

**software rimon** *control\_file\_name*

This example checks multiple client 6611s repetitively.

#### Step 7 (As needed)

Stop a pending installation on one or all client 6611s listed in the control file.

#### Fast-Path Command(s)

If you are using a RISC System/6000 network installation server, type:

**rexec** *client\_address* **software cancel {-force}**

**ristop** *control\_file\_name*

If you are using a 6611 network installation server, type:

**rexec** *client\_address* **software cancel {-force}**

**software ristop** *control\_file\_name*

*client\_address* is the IP address of the 6611. In this example, the **rexec** commands cancel installation on one client 6611. The **ristop** commands cancel installation on all client 6611s.

### Step 8 (Optional)

View the `pd_update.log` and `pd_install.log` in the transfer directory of the 6611 if you encounter an error in the installation.

#### Fast-Path Command(s)

```
files transfer view file_name
```

---

## MPNP Backup Restore Utility

The MPNP Backup Restore utility allows you to include the 6611 in your disaster recovery procedures. The fast-path environment provides a command you can use to back up a 6611 hard disk. When necessary, you can restore the hard disk using the self-restoring backup tape.

This utility lets you capture, on magnetic tape, an image of the hard disk contents from an operational 6611. This tape can be used to recreate those hard disk contents, either on the original hard disk or a different hard disk of the same model.

This utility consists of:

- Tape backup, in which you copy the hard disk contents to tape. Refer to “Backing Up the Hard Disk” on page 7-51 for details.
- Tape restore, in which you copy the tape contents to a hard disk. Refer to “Restoring the Hard Disk” on page 7-53 for details.

## Hard Disk Formatting Operation

The restore program created on the backup tape can perform a format operation on the hard disk. The format operation writes and verifies information on each sector of the hard disk. This establishes a known initial working state for the hard disk. Certain failure modes, like loss of power at critical times, may require that the hard disk be reformatted.

While this formatting step is recommended, it is optional to accommodate certain uses of the tape restore function. For example, a test bed can be restored to a specific software level by using the restore function, but formatting the hard disk is not likely to be useful in this instance. Formatting adds approximately 15 minutes per hard disk to the restore time operation.

## Configuration Data

A configuration diskette is required before 6611 operation because the backup tape does not contain configuration data. Exclusion of the configuration data allows a single tape to serve as backup for multiple 6611s of the same model and software service level.

## Required Software and Hardware

To use the MPNP Backup Restore utility, certain software and hardware elements must be installed. See Chapter 7 in the *IBM 6611 Network Processor Introduction and Planning Guide* for the required software and hardware.

## Creating Backup Tapes

Your enterprise should already have a disaster recovery procedure as insurance against unplanned outages. To include the 6611 in your recovery procedures, create a backup tape after configuring and testing each 6611. Thereafter, make a new backup tape whenever you update the MPNP software on each 6611. You may want to make an additional copy of the backup tape. Keep one copy near the 6611 and another at a remote site.

**Note:** Because the backup operation does not copy the configuration information that can be unique to each 6611, you should also retain a copy of the configuration diskette for each 6611. To expedite your backup operation, you need only make a backup tape for each model of 6611 with a level of MPNP used in your establishment's network. For example, if you have 10 Model 120s, 10 Model 140s, and five Model 170s, you would need to make three backup tapes.

## Backing Up the Hard Disk

The backup operation is initiated from an operational 6611. To back up the 6611 hard disk:

1. Remove the terminator from the connector on the SCSI adapter.

**Note:** When installing the hardware RPQ (see the *IBM 6611 Network Processor Introduction and Planning Guide* for the appropriate number), the service representative plugs the SCSI cable into the 6611 and then attaches the other end to your tape drive. This should be attached to the tape drive before the 6611 is powered on.

2. If not already attached, plug the cable into the connector on the SCSI adapter. If you are not sure of the location of the SCSI adapter, see the *IBM 6611 Network Processor Maintenance Information* manual.

3. Tighten the screws to secure the cable to the connector to the SCSI adapter.

**Note:** There are no screws on the Model 120 SCSI adapter cable.

4. Plug the other end of the cable into the connector on the tape drive.

**Warning:** Follow the procedures for attaching the tape drive to the 6611. All supported IBM tape drives require you to shut down the 6611 and power it off before connecting the tape drive. For specific connection instructions, see the installation or setup instructions provided with your tape drive.

5. Using the setup information supplied with your tape drive, set the SCSI Address Switch on the tape drive to 3.

6. Power on **(I)** the 6611 in Normal Mode.

7. Power on **(I)** the tape drive.

8. Ensure that the tape is *not* write-protected, then insert the tape into the tape drive.

9. Log in using a controlling user ID.

10. Ensure there are a minimum of 8000 1K blocks of free space in the transfer directory:

- a. Select **Operations** from the System Manager main menu.

- b. Select **fdo** from the next menu.

- c. Select **Delete Transfer Directory Files** from the next menu. The header of the selector screen displays the free space in the transfer directory:
 

```

# Free space in transfer directory: 40708 1K blocks
# File Name                               Date/Time                Size(bytes)
# -----
      
```
  - d. If the number of 1K blocks is less than 8000, use **F9 (Esc+9)** to select the files to delete. You may want to delete large, unnecessary files (such as dumps or traces) before continuing, to minimize the backup process.
  - e. Press **Enter** to register your selection.
  - f. A COMMAND STATUS screen displays a message after the file or files have been deleted.
  - g. Press **F10 (Esc+0)** to return to the System Manager main menu.
11. Press **F3 (Esc+3)** from the System Manager main menu to get to the fast-path command line.
  12. Type **system backup** and press **Enter**.
  13. These messages will display.
 

```

Are you sure you want to back up the system?
All data on the backup tape will be destroyed.
Enter "y" to continue, anything else to stop.
      
```
  14. When you type **y** and press **Enter**, the backup begins with these messages:
 

```

Configuring tape drive ...
Setting tape block size ...
Writing system backup tape ...
      
```

**Note:** If you are using a tape media that requires more than one tape to back up the contents of the hard disk, messages prompting you to remove full tapes and insert empty tapes display on the screen. Refer to "Using Multiple Backup Tapes" on page 7-55 for more information.
  15. After approximately 5 to 10 minutes, this message displays:
 

```

0301-164 bosboot: Boot image is xxxx 512 blocks
      
```

The backup operation continues. Various informational and progress messages display during the approximately 15 to 60 minutes needed for the backup operation to complete (depending on the type of tape drive used). When finished, the tape rewinds and this message displays:

```

System backup is complete.
      
```
  16. Remove the tape from the tape drive.
  17. Shut down and power off the 6611.
  18. If you are not going to leave the tape drive permanently connected to the 6611, power off the tape drive, then unplug the cable from the SCSI adapter and reinstall the terminator.
  19. Label the backup tape. The backup tape label should include (at a minimum):
 

```

6611 name
Configuration name
MPNP Release and PTF level (for example, MPNP 1.1.1.2 + PTF
NP00287)
Creation date
      
```

Tape drive model used  
Tape number (if multiple tapes were used)

You may want to include more information (for example, the 6611 location) as appropriate for your enterprise. Remember, the more information you include on the tape label, the easier it will be to use if it becomes necessary to restore the hard disk.

20. Store backup tapes in a safe place. You may also wish to store a matching configuration diskette with the backup tape. Your disaster recovery procedures should already describe where and how to store backup tapes. You may want to keep one copy near the 6611 and another at your remote storage site.

## Restoring the Hard Disk

The restore operation is initiated from a nonoperational 6611 by booting the tape image obtained from a previous backup operation. The only requirement is that the 6611 hardware is functional. Because the backup tape image contains the actual program used for the restore operation, the contents of the 6611 hard disk can be anything, including items such as nonoperational code or previous versions.

The restore operation support is limited. The target (hard disk) for the restore must be the same type (the same 6611 model) as the original source used to create the tape with the backup function.

If you or your service representative suspect that the hard disk needs to be replaced, try to restore it using its backup tape. To restore the hard disk:

1. Shut down and power **Off (O)** the 6611.
2. Remove the terminator from the connector on the SCSI adapter.
3. Attach the tape drive to the SCSI adapter, using the appropriate cable. See Chapter 7 in the *IBM 6611 Network Processor Introduction and Planning Guide* for the required software and hardware.
4. Power **On (I)** the tape drive.
5. (Optional) Attach and power on **(I)** an ASCII terminal.

**Note:** You will need the ASCII terminal if you are restoring the hard disk from more than one tape (1/4 inch only), or you want to bypass the hard disk formatting step. For more information, refer to "Using Multiple Backup Tapes" on page 7-55 and "Hard Disk Formatting Operation" on page 7-50.

6. Insert the backup tape in the tape drive.
7. Verify that the diskette drive is empty.
8. Turn the key mode switch to the Service position.
9. Power on **(I)** the 6611.

**Note:** The total restore operation takes approximately 35 to 120 minutes to complete, depending on the type of tape drive used, the 6611 model, and whether the hard disk formatting is performed. The Model 140 will take longer than the other models (approximately 50 to 120 minutes) as there are two hard disks to format as opposed to the single hard disk on the Models 120 and 170.

If an ASCII terminal is attached to the 6611, these messages display when the restore operation begins:

```
INIT: EXECUTING /sbin/rc.boot 2
6611 Installation
```

```
Bypass hard disk format operation?
Enter yes to bypass hard disk format or press RETURN to continue.
```

**Note:** You have 15 seconds to respond to this prompt. If there is no response within 15 seconds, the default (perform formatting) is taken. This 15 second timer allows for a restore operation without an ASCII terminal attached, while still allowing you to bypass the format operation (with a terminal attached).

If you bypass formatting, you will see the following message instead of the formatting progress messages:

```
Hard disk will NOT be formatted. If the restore operation fails,
preform restore again and select hard disk format.
```

If formatting was selected (or you used the default), you will see the following progress messages:

```
Format in progress. Please stand by.
1% complete ...
Format complete.
```

The percentage amount will be incremented as the hard disk is formatted. The Model 140 will display this information twice, once for each hard disk.

When the formatting is completed, the following message will be displayed:

```
Certify in progress. Please stand by.
1% complete ...
Certify complete.
```

**Note:** The Model 140 does not display the Certify Complete message.

The percentage amount will be incremented as the hard disk is certified. The Model 140 will display this information for each hard disk.

When the certification is completed, the following message will be displayed:

```
Retrieving file systems from install media ....
```

**Note:** After these messages display, the tape drive scans the tape for several minutes (as long as 30 minutes if using a slower tape drive). When scanning completes, informational messages display as the restore operation continues.

10. When the restore operation completes, the tape rewinds, the 6611 shuts down, c60 appears in the 6611 3-digit display, and this message displays:

```
Halt completed ....
```

11. Remove the tape from the tape drive.

12. Turn the key mode switch to the Normal position and power off **(O)** the 6611.
13. If you are not going to leave the tape drive permanently connected to the 6611, power off the tape drive, then unplug the cable from the SCSI adapter and reinstall the terminator.
14. Insert the correct configuration diskette in the diskette drive, then power on **(I)** the 6611.

**Note:** IBM recommends that you reset the time after restoring the hard drive.

## Using Multiple Backup Tapes

If your tape drive cannot store the entire contents of the hard disk (approximately 150–200 MB) on one tape, the program will prompt you to remove one tape and insert another.

### Backing Up the Hard Disk Using Multiple Tapes

When the tape is full and the program needs another tape to continue, the tape rewinds and these messages display:

```
There are xxxxx blocks on /dev/rmt0.1.  
Insert next tape into tape drive and press Return.
```

The program continues to back up the hard disk to tape and this message displays:

```
Proceeding to device /dev/rmt0.1.
```

When finished, the tape rewinds and this message displays:

```
System backup is complete.
```

### Restoring the Hard Disk Using Multiple Tapes

When one tape has been read and another tape is needed for the backup operation to continue, the tape rewinds and this message displays:

```
Insert next tape into tape drive.  
Type "go" when ready to proceed (or "quit" to stop):
```

The program will continue to restore the hard disk from tape.

## Tape Compatibility

When restoring a hard disk from a backup tape, you should use the same model tape drive that you used to create the backup tape. However, the following information may be helpful.

- The IBM 7207-012 will read backup tapes created on an IBM 7207-001.
- The IBM 7208-011 will read backup tapes created on an IBM 7208-001.

## Error Messages

```
-----  
ERROR: System backup failed: no tape drives available
```

```
EXPLANATION: A tape drive is not attached or the tape drive is  
powered off.
```

```
This message appears after "Configuring tape drive ..."
```

```
USER RESPONSE: Attach or power on (|) the SCSI tape drive.
```



---

ERROR: Tape drive is not ready.  
Make sure that a tape is inserted in the tape drive  
and that the door is closed.  
Press Return to continue. Otherwise type "quit" to stop.

EXPLANATION: There is no tape drive attached or the tape drive is  
powered off.  
This message appears after "Configuring tape drive ..."

USER RESPONSE: Attach or power on (|) the SCSI tape drive.

---

ERROR: System backup failed: not enough space in transfer directory.

To continue the backup operation delete unnecessary files in the  
transfer directory.

EXPLANATION: There are less than 8000 1K blocks of free space in the  
transfer directory.

USER RESPONSE: To continue the backup operation,  
delete unnecessary files in the transfer directory.  
From the System Manager Main Menu, select  
"Operations".  
Then select "File and Diskette Operations" to delete  
unnecessary files.

---

ERROR: Tape is write protected.

Tape is write protected.  
Check the write protect tab on the tape. If the tape is  
write protected then unprotect it.  
Press return to continue. Otherwise enter "quit" to stop.

EXPLANATION: The backup operation cannot write information on a  
write protected tape.

USER RESPONSE: Remove the tape from the tape drive.  
Verify you are using the correct tape. If you are using the  
correct tape, remove the write protection.

---

ERROR: System backup failed: could not rewind tape.

EXPLANATION: The tape may have broken, or caught in the mechanism.

USER RESPONSE: Remove the tape and examine.

-----  
ERROR: System backup failed: no table of contents on tape.

EXPLANATION: The tape is damaged.

USER RESPONSE: Retry the operation with a new tape.

-----  
ERROR: System backup failed: could not create verification data file.

EXPLANATION: The tape is corrupted.

USER RESPONSE: Retry the operation with a new tape.

-----  
ERROR: System backup failed: system backup tape is damaged.

EXPLANATION: The tape is damaged.

USER RESPONSE: Retry the operation with a new tape.  
-----

## Helpful Hints

If a backup or restore operation fails:

1. Check the cable connections and repeat the procedure.
2. Call your service representative.



---

# Chapter 8. Hardware Maintenance

	About This Chapter . . . . .	8-2
	Hardware VPD Format . . . . .	8-3
	Installed Devices . . . . .	8-4
	Device Characteristics . . . . .	8-5
	Hardware Vital Product Data . . . . .	8-6
	Configuration Change VPD Update . . . . .	8-7
	Serial Number . . . . .	8-8
	Model Number . . . . .	8-9

---

## About This Chapter

This chapter describes how to use the System Manager to gather data about the hardware vital product data (VPD).

Using the System Manager, you can view information about the hardware components of the 6611. You can list all the supported, defined, and installed hardware components. Characteristics about defined devices can be listed. VPD is available for all installed devices.

### Supported devices

Devices that are allowed on the 6611 but not necessarily present, configured, or enabled.

### Defined devices

Supported devices that exist at different status levels. The status levels are:

**Available** The device is present, configured, and enabled.

**Defined** The device is configured, but it is disabled. Defined does not necessarily mean that the device is present. The device may have been moved or removed, and the VPD remains from a previous configuration. Select the **Configuration Change VPD Update** menu item to match the VPD with the actual hardware setup.

**Stopped** The device is not operating. Either it is not configured or contains an error. Contact an IBM service representative or select **Configuration Change VPD Update** to remove this device.

### Installed devices

Devices that are present and defined.

Figure 8-1 shows the Hardware Maintenance menu.

```
IBM 6611                                     hostname
                                     Hardware Maintenance

Move cursor to desired item and press Enter.

Installed Devices
Device Characteristics

Hardware Vital Product Data
Configuration Change VPD Update

Serial Number
Model Number

F1=Help      F2=Redraw screen  F3=Return    F4=SysID
F10=Main Menu Esc+L=Turn Log On
```

Figure 8-1. Hardware Maintenance Menu

Refer to the following for information about the individual menu items:

- “Installed Devices” on page 8-4
- “Device Characteristics” on page 8-5
- “Hardware Vital Product Data” on page 8-6
- “Configuration Change VPD Update” on page 8-7

---

## Hardware VPD Format

There is a facility that manages the hardware components of the 6611. Records are maintained in the VPD repository for each supported, defined, and installed hardware component. The record contents are:

### Hardware Component

A 2-byte field that uniquely identifies the hardware component.

### Component Description

A brief description of the part, for example, Ethernet adapter.

### FRU Number

The FRU number is an 8-character ASCII entry that defines the part number used by field service to order a replacement part. It is usually different from the manufacturing part number.

### Part number

An 8-character ASCII field that contains the manufacturing part number that identifies the hardware element. This is the number used by manufacturing and development.

### Engineering Change (EC) Level

An 8-character ASCII field used by manufacturing and development that specifically identifies the maintenance level of the hardware element.

### Manufacturer

The manufacturer descriptor field is a 6-byte ASCII field. Components manufactured by IBM use IBM for the first three characters. The next 3 characters are alphanumeric and are a code assigned to each IBM location, for example, RTP is assigned code 023.

Vendor manufacturers are identified by a 6-digit number assigned by the purchasing department when a contract is established. An abbreviation for the IBM location establishing the contract is concatenated to the purchase order number.

### Serial Number

The serial number is specified as an 8-character ASCII field in the range from 00000000 to ZZZZZZZZ. This number is required to allow you to track assets and allows IBM to track components in the field for machine control purposes.

### ROM Level and ID

The data portion of this descriptor is in ASCII format and is a minimum of 4 characters. Optionally, a second field of variable length information specifies the ROM ID. This additional information is required if the adapter contains more than one ROM module.

### Loadable Microcode Level

The level of microcode that exists in the adapter.

**Network Address (Token Ring and Ethernet)**

The 6-byte universal address for the network interfaces on the hardware element that support universally assigned network addresses. This includes all the LAN adapters in the 6611. There is one entry for each network interface on the adapter.

**Slot Location**

An ASCII number from 0 to 7 that indicates the physical slot in which an adapter resides.

**Available for Adapter-Specific Use (Z0 L–ZZ L)**

Displays various adapter specific information such as the adapter ID. The amount of information varies according to the adapter.

There is a detailed discussion of hardware VPD in the *IBM 6611 Network Processor Maintenance Information*.

## Installed Devices

The Installed Devices menu item generates a list of all installed hardware devices along with their location and description.

1. Select **Hardware Maintenance** from the System Manager main menu.
2. Select **Installed Devices** from the next menu.
3. A COMMAND STATUS screen displays the list of installed devices.

Fast-Path Command(s)
<b>hardware list -installed</b>

Figure 8-2 on page 8-5 shows an example of the output.

---

The following resources are installed on the machine.

+/- = Added or deleted from Diagnostic Test List.

\* = NOT supported by Diagnostics.

Device Name	Location Code	Device Description
-----	-----	-----
+ sysplanar0	00-00	CPU Planar
+ fpa0	00-00	Floating Point Processor
* slc0	00-00	Serial Optical Link Chip
+ mem0	00-0D	16 MB Memory Card
+ ioplanar0	00-00	I/O Planar
* bus0	00-00	Micro Channel Bus
* sio0	00-00	Standard I/O Planar
+ fda0	00-00-0D	Standard I/O Diskette Adapter
+ fd0	00-00-0D-00	Diskette Drive
* ppa0	00-00-0P	Standard I/O Parallel Port Adapter
+ sa0	00-00-S1	Standard I/O Serial Port 1
+ tty0	00-00-S1-00	Asynchronous Terminal
+ sal	00-00-S2	Standard I/O Serial Port 2
+ tty1	00-00-S2-00	Asynchronous Terminal
+ trtya0	00-01	token-ring network 16/4 adapter
+ entya0	00-03	Ethernet adapter
+ entya1	00-04	Ethernet adapter
+ entya2	00-05	Ethernet adapter
+ tltya0	00-06	Serial Adapter
+ scsi0	00-08	SCSI I/O Controller
+ hdisk0	00-08-00-00	355 MB SCSI Disk Drive
* sysunit0	00-00	IBM 6611 Network Processor
* tlty0	00-06-01	Serial Adapter Port
* tlty1	00-06-02	Serial Adapter Port
* trty0	00-01-01	token-ring network 16/4 adapter Port
* enty0	00-03-01	Ethernet adapter Port
* enty1	00-04-01	Ethernet adapter Port
* enty2	00-05-01	Ethernet adapter Port

---

Figure 8-2. Example of Installed Devices Output

## Device Characteristics

The Device Characteristics menu item generates information about a configured and defined hardware device.

1. Select **Hardware Maintenance** from the System Manager main menu.
2. Select **Device Characteristics** from the next menu.
3. On the selector screen, select the defined device from a list.
4. Press **Enter** to make your choice.
5. A COMMAND STATUS screen displays the output. Figure 8-3 on page 8-6 displays an example of the device characteristics output obtained for the Ethernet adapter. The device name is listed along with its description, status, and location.

When displaying device attributes, you may get additional information. The first column shows the attribute description. The second column shows the current attribute's values.



#### Fast-Path Command(s)

**hardware device view** *device\_name*

Use **hardware device (list)** for the *device\_name* parameter.

name	description	status	location
enty1	Ethernet adapter Port	Available	00-04-00

description	value
RECEIVE DATA TRANSFER OFFSET	32
Enable ALTERNATE ETHERNET address	no
ALTERNATE ETHERNET address	0x

Figure 8-3. Example of Device Characteristics Output

## Hardware Vital Product Data

The VPD of all installed hardware devices (such as adapters) is listed. For some devices, there is very little or no VPD given. For other devices, complete VPD is provided.

To display this information:

1. Select **Hardware Maintenance** from the System Manager main menu.
2. Select **Hardware Vital Product Data** from the next menu.
3. A COMMAND STATUS screen displays the output.

#### Fast-Path Command(s)

**hardware view**

When you display the hardware VPD for most items, as shown by the example in Figure 8-4, you receive:

- Hardware component
- Slot location
- Component description

Hardware Component	Slot Location	Component Description
fpa0	00-00	Floating Point Processor
bus0	00-00	Micro Channel Bus
fd0	00-00-0D-00	Diskette Drive

Figure 8-4. Example of Displaying Hardware VPD (Most Common Format)

When you display the hardware VPD, some hardware components will also display a list of other VPD items, if the information is available. Figure 8-5 on page 8-7 contains an example of this longer type of VPD display for the token-ring network 16/4 adapter and Ethernet adapter.

---

#### INSTALLED RESOURCE LIST WITH VPD

The following resources are installed on your machine.

```
trtya0          00-01          token-ring network 16/4 adapter
trty0           00-01-00       token-ring network 16/4 adapter port
    Device Specific.(Z0).....{
    Network Address.....08005A13006A
    Part Number.....93F1146
    EC Level.....C40140
    FRU Number.....93F3066
    Serial Number.....000106
    Displayable Message.....6611 Token-Ring Network 16/4 Adapter
    Manufacturer.....RAL7868898
    Device Driver Level.....00
    Diagnostic Level.....00
    ROS Level and ID.....00
    Loadable Microcode Level....00

entya0          00-03          Ethernet adapter
enty0           00-03-00       Ethernet adapter port
    Device Specific.(Z0).....z
    Network Address.....08005A13224D
    Part Number.....93F1145
    EC Level.....C40140
    FRU Number.....93F3067
    Serial Number.....000589
    Displayable Message.....Ethernet adapter
    Manufacturer.....RAL7868898
    Device Driver Level.....00
    Diagnostic Level.....00
    ROS Level and ID.....00
    Loadable Microcode Level....00
```

---

*Figure 8-5. Example of Hardware Vital Product Data (Extended Output)*

## Configuration Change VPD Update

Use this option to update the hardware VPD to match the present configuration.

When hardware devices are added or removed from the 6611, the hardware component information needs to be updated to reflect the change. The 6611 can check for changes in its hardware configuration using the System Manager or the fast-path environment commands.

To use the System Manager to check for configuration changes:

1. Log in using a controlling user ID.
2. Select **Hardware Maintenance** from the System Manager main menu.
3. Select **Configuration Change VPD Update** from the next menu.

## Fast-Path Command(s)

### hardware config update

If the 6611 finds differences between the existing hardware VPD and the present hardware configuration, a menu is displayed. The menu identifies the items that have different VPD and configuration information. A list of possible scenarios causing the mismatch is provided. Select the one that explains the mismatch.

Figure 8-6 displays an example of this report. In the example, an Ethernet adapter was removed.

```
MISSING RESOURCE                                801020

The following resource was detected previously, but is not detected now:

- entya 0                00-04                Ethernet adapter

Has the resource been removed from the screen, moved to another location
or address, or turned off?

The resource has NOT been removed from the system, moved to
another location or address, or turned off.
This selection will determine why the resource was not detected.
The resource has been removed from the system and should be
removed from the system configuration.
The resource has been moved to another location and should be
removed from the system configuration.
The resource has been turned off and should be removed from
the system configuration.
The resource has been turned off but should remain in the
system configuration.

F3=Cancel          Esc+7=Page Up          Esc+8=Page Down          Esc+0=Exit
```

Figure 8-6. Example of Configuration Change VPD Update Output

When no changes are found by the Configuration Change VPD Update, the system returns to the Hardware Maintenance menu screen.

## Serial Number

To update the serial number of the 6611:

1. Select **Hardware Maintenance** from the System Manager main menu.
2. Select **Serial Number** from the next menu.
3. Select the type of action on the dialog screen:

### view

Allows you to view the serial number.

### update

Updates the serial number with the number you type in the Serial number field.

4. A COMMAND STATUS screen displays the output.

Fast-Path Command(s)

**hardware serial update** *serial\_number*

## Model Number

To update the model number of the 6611:

1. Select **Hardware Maintenance** from the System Manager main menu.
2. Select **Model Number** from the next menu.
3. Select the type of action on the dialog screen:

**view**

Allows you to view the model number.

**update**

Updates the model number with the number you type in the Model number field.

4. A COMMAND STATUS screen displays the output.

Fast-Path Command(s)

**hardware model update** *model\_number*



---

## Chapter 9. Fast-Path Environment

About This Chapter	9-3
Fast-Path Commands	9-3
Syntax	9-3
Notation	9-3
Abbreviations	9-4
Output	9-4
The Fast-Path Log	9-4
Fast-Path Environment Help	9-5
Global Help	9-5
Object-Specific Help	9-6
The More Facility	9-7
The Retrieve Key	9-8
AIX-Like Commands	9-8
Support of Older Command Format	9-9
Adapter Commands	9-11
Summary of Adapter Commands	9-12
AppleTalk Commands	9-13
Summary of AppleTalk Commands	9-16
APPN Commands	9-18
Summary of APPN Commands	9-24
Bridge Commands	9-25
Summary of Bridge Commands	9-34
Config Commands	9-36
Summary of Config Commands	9-38
DECnet Commands	9-39
Summary of DECnet Commands	9-46
Diskette Commands	9-48
Summary of Diskette Commands	9-49
DLSw Commands	9-50
Summary of DLSw Commands	9-57
Errorlog (Error) Commands	9-58
Summary of Error Commands	9-63
Files Commands	9-65
Summary of Files Commands	9-72
Framerelay Command	9-74
Summary of Framerelay Command	9-74
Hardware Commands	9-75
Summary of Hardware Commands	9-78
Hostname Commands	9-79
Summary of Hostname Commands	9-80
Interface Commands	9-81
Summary of Interface Commands	9-83
IP Commands	9-84
Summary of IP Commands	9-92
IPX Commands	9-94
Summary of IPX Commands	9-97
LED Commands	9-98
Summary of LED Commands	9-98
Nameserver Commands	9-99
Summary of Nameserver Commands	9-100

PPP Command . . . . .	9-101
Summary of PPP Command . . . . .	9-101
Process Commands . . . . .	9-102
Summary of Process Commands . . . . .	9-103
Remote Access Commands . . . . .	9-104
Summary of the Remote Access Commands . . . . .	9-107
Serialport Commands . . . . .	9-108
Summary of Serialport Commands . . . . .	9-108
SNMP Commands . . . . .	9-109
Summary of SNMP Commands . . . . .	9-111
Software Commands . . . . .	9-112
Summary of Software Commands . . . . .	9-121
System Commands . . . . .	9-123
Summary of System Commands . . . . .	9-131
Terminal Commands . . . . .	9-133
Summary of Terminal Commands . . . . .	9-133
Timeofday Commands . . . . .	9-134
Summary of Timeofday Commands . . . . .	9-134
Timeserver Commands . . . . .	9-135
Summary of Timeserver Commands . . . . .	9-136
User Commands . . . . .	9-137
Summary of User Commands . . . . .	9-139
VINES Commands . . . . .	9-140
Summary of VINES Commands . . . . .	9-144
XNS Commands . . . . .	9-146
Summary of XNS Commands . . . . .	9-149
X.25 Commands . . . . .	9-150
Summary of X.25 Commands . . . . .	9-151

---

## About This Chapter

This chapter describes the fast-path environment and contains an alphabetical listing of all the fast-path commands.

---

## Fast-Path Commands

There are four types of commands available in the fast-path environment:

- Object-oriented commands
- Help commands
- Remote access commands
- Exit commands: **exit** and **quit**

For more information about help, refer to “Fast-Path Environment Help” on page 9-5. For more information about the remote access commands, refer to “Remote Access Commands” on page 9-104.

## Syntax

Figure 9-1 shows the fast-path command syntax, which follows these guidelines:

- An object may or may not have a subobject, option, or parameter.
- An object always has an action.
- Actions follow the subobject.
- Options follow the action.
- Options *always* begin with a hyphen.
- Parameters follow the options.

object subobject action options parameters

*Figure 9-1. Command Syntax for Object-Oriented Fast-Path Commands*

## Notation

These guidelines describe how commands are structured:

- Brackets ([ ]) surround:
  - Groups of options separated by an |, when only one option in the group can be specified (for example, **[-diskettel-tape]**)
  - Groups of options separated by an &, when one or more options in the group can be specified (for example, **[(-packet) &|-frame]**)
- Parameters are in italics (*italics*). However, in the online helps parameters are in double quotation marks (“ ”) instead of italics.
- Parentheses ( ( ) ) surround any defaults for the subobjects, actions (depending on the subobject), and options.
- Braces ( { } ) surround options and parameters that are not required.



## Abbreviations

At the beginning of each command set, a table lists the abbreviations for the object, subobjects, actions, and options. You can use any combination of the full or abbreviated forms when issuing a fast-path command.

For example, you can view the files in the static directory by issuing this command:

**files static list**

or any of these abbreviated equivalent commands:

```
files static l
files st list
files st l
file static list
file static l
file st list
file st l
f static list
f static l
f st list
f st l
```

## Output

Most of the fast-path environment commands send their output to the screen. However, some send it directly to the transfer directory. The detailed command help ("Object-Specific Help" on page 9-6) states the file name that contains the output when it is sent directly to the transfer directory. You can view any output file in the transfer directory with the **files transfer view** *file\_name* command. The More Facility is invoked when files longer than one screen are viewed from the fast-path environment. For information on using the More Facility, refer to "The More Facility" on page 9-7.

---

## The Fast-Path Log

The fast-path log can gather output from most commands that send output to the screen, such as:

- Route tables
- Statistical output

There can be a separate fast-path log for each user ID. The fast-path log name has the form:

`fp.log.userID`

where `userID` is the user who issued the command with the `-log` option.

Each of the fast-path logs are monitored when a user enters the fast-path environment. If the file is longer than 512 K bytes, it is renamed to `fp.log.userid.old` and a new log is created when data is directed to the log. The previous `fp.log.userid.old` is overlaid.

Types of output that are excluded from the log include:

- Most traces
- Error report output

- Dumps
- Commands ended by **Ctrl+C** (commands with continuous displays)
- Commands whose output is only one or two lines

To send output to the log, type the **-log** option on the command being issued. Output will go to the log, not to your screen. A time stamp, along with the command issued, will be included in each entry. Entries are appended to the log.

You should delete this file when it is no longer needed. To delete it, enter:

**files transfer delete fp.log.userID**

---

## Fast-Path Environment Help

There are two kinds of help available in the fast-path environment:

- Global—Offers general information about using the fast-path environment
- Object-specific—Offers three levels of help for each object-oriented command set

## Global Help

The fast-path environment global help provides the following information:

- How to use the fast-path environment—which includes information about:
  - The More facility
  - Command syntax
  - Command abbreviations
  - Command output
  - Object-specific help
  - Fast-path log
- How to use the RSH and REXEC environments
- A list of all objects and their abbreviations
- A list of all subobjects and their abbreviations
- A list of all options and their abbreviations

You can access fast-path global help by selecting **Fast Path** on the System Manager help panel, which only displays the help on how to use the fast-path environment, or by typing in one of the following fast-path commands:

- **help fastpath** or **help fp**
- **help remote** or **help rem**
- **help object** or **help obj**
- **help subobj** or **help so**
- **help action** or **help act**
- **help option** or **help opt**

## Object-Specific Help

Object-specific help exists at the object, subobject, and action levels. For each of these, you can request help in three levels of detail with the *h* character.

- Level one detail (*h*) shows only the command syntax for the valid commands having the given *object subobject action*.
- Level two detail (*hh*) adds on a brief functional description of the command.

You can also get level two help for each of the commands having a given object by just entering the object.

- Level three detail (*hhh*) adds help for each of the commands in the group.

The detailed command help gives the command syntax, the environments in which the command is supported, the user authorization level necessary to issue the command, and detailed information about the parameters. For example, there are some commands that are only valid in the fast-path environment. The detailed help also states when a list can be used to provide valid values for a command parameter.

If you request level 3 detail for just the object, you get a paragraph describing the set of commands, starting with the object and a list of the valid abbreviations for the object, subobjects, actions, and options used with the set of commands.

To invoke detailed help in the fast-path environment, type the portion of the command on which you request help, with one to three *hs*. For example:

**appletalk list h** or **at list h**

invokes first-level detailed help for the appletalk list command, resulting in:

```
appletalk (list) -trace_parameters {-log}
```

Specifying:

**appletalk list hh** or **at list hh**

invokes second-level detailed help, resulting in:

```
appletalk (list) -trace_parameters {-log}
- List the AppleTalk protocol trace parameters.
```

Specifying:

**appletalk list hhh** or **at list hhh**

invokes third-level detailed help, resulting in:

APPLETALK LIST

COMMAND SYNTAX:	appletalk (list) -trace_parameters {-log}
DESCRIPTION:	List the AppleTalk protocol trace parameters .
PARAMETERS:	None
AUTHORIZATION:	Controlling and viewing users
SYSTEM ENVIRONMENT:	RSH, REXEC, and fast-path

---

## The More Facility

Fast-path help uses the More facility to view the help text. The More facility displays continuous text one screen at a time, pausing after each screen with an indication of how much of the file has already been read:

More--(xx%) [space = page down b = page up q = quit h = help]

See Table 9-1 and Table 9-2 for a list of available functions. The Action column lists what you should enter or press to perform the function.

*Table 9-1. More Facility Basic Functions*

Function	Action	Note
Next page	<b>Space bar</b>	1
Next line	<b>Enter</b>	2
Forward one screen	<b>f</b>	2
Backward one screen	<b>b</b>	2
Down 1/2 page	<b>d</b>	1
Go to end of file	<b>g</b>	
Repeat previous command	<b>.</b>	
Display line number	<b>=</b>	
Display file name and line number	<b>:f</b>	
Redisplay screen	<b>Ctrl+L</b>	
Exit this facility	<b>q</b>	

### Notes:

1. Typing a number before the action allows you to scroll down that number of lines. For example, typing **5<space>** scrolls down five lines. For these actions, a default page size is automatically set. To change the default, type **nz**, where *n* is the desired number of lines per page.
2. Typing a number before this action repeats the function. For example, typing **5b** scrolls backward five screens.

*Table 9-2. More Facility Search Functions*

Function	Action
Search for a string	<b>/string</b>
Find the next occurrence of a string	<b>n</b>
Go to where the last search began	<b>'</b>

The More facility is also used to view any command output that spans more than one page.

---

## The Retrieve Key

A retrieve key with editing functions exists for use in the fast-path environment. Key functions and user actions are:

*Table 9-3. Retrieve Key Functions*

Function	Action
Retrieve the last command	Press the up arrow. The cursor is placed at the end of the line
Retrieve the next command	Press the down arrow. The cursor is placed at the end of the line
Move the cursor to the left	Press the left arrow
Move the cursor to the right	Press the right arrow
Append to the displayed command	Type with the cursor at the end of the command
Insert into the displayed command	Type with the cursor at the insert spot
Delete a character	Press <b>Backspace</b> with the cursor immediately to the right of the character to be deleted
Overlay a character	Press <b>Backspace</b> to delete, and then type the new character

---

## AIX-Like Commands

Table 9-4 on page 9-9 lists the AIX-like commands available in the fast-path environment and the exact fast-path command associated with each AIX-like command. System Manager does not support a full implementation of the AIX commands; only the options and parameters shown in the table are available.

Table 9-4. AIX-Like Commands and Their Fast-Path Command Equivalents

AIX Command	Fast-Path Command
<code>cat file_name</code>	files (transfer) view <i>file_name</i>
<code>cksum file_name</code>	files (transfer) checksum <i>file_name</i>
<code>compress file_name</code>	files (transfer) compress <i>file_name</i>
<code>date</code>	timeofday view
<code>df</code>	files system (view)
<code>diff file_name file_name</code>	files (transfer) compare <i>file_name</i> <i>file_name</i>
<code>iostat number_seconds number_samples</code>	system statistics (view) -input_output <i>number_seconds number_samples</i>
<code>ls</code>	files (transfer) list
<code>lscfg</code>	hardware (list) -installed
<code>mv file_name new_file_name</code>	files (transfer) rename <i>file_name</i> <i>new_file_name</i>
<code>ps</code>	process list -status
<code>rm file_name</code>	files (transfer) delete <i>file_name</i>
<code>sar number_seconds number_samples</code>	system statistics (view) -activity <i>number_seconds number_samples</i>
<code>shutdown number_minutes</code>	system stop (-restart) (-minutes) <i>number_minutes</i>
<code>sum file_name</code>	files (transfer) checksum <i>file_name</i>
<code>ts</code>	hardware slots (view) -detail
<code>uncompress file_name</code>	files (transfer) uncompress <i>file_name</i>
<code>vmstat number_seconds number_samples</code>	system statistics (view) -virtual_memory <i>number_seconds number_samples</i>
<code>who</code>	user (id) view (-logged_in)

## Support of Older Command Format

Older versions of most fast-path commands are still supported. For the commands not supported, you will receive an error message. The commands no longer supported (and the current means of invoking their functions, if available) are:

<b>arp_sys_add_perm_nopub</b>	This function no longer exists.
<b>arp_sys_add_perm_pub</b>	This function no longer exists.
<b>arp_sys_add_temp_nopub</b>	This function no longer exists.
<b>arp_sys_add_temp_pub</b>	This function no longer exists.
<b>arp_sys_del_host</b>	This function no longer exists.
<b>atecho</b>	<b>appletalk echo</b>
<b>config_err_rpt</b>	This function no longer exists.
<b>err_rpt_etype_det</b>	<b>Error Log and Reports</b> menu item
<b>err_rpt_etype_sum</b>	<b>Error Log and Reports</b> menu item

	<b>err_type_list</b>	<b>Error Log and Reports</b> menu item
	<b>hw_serial_model</b>	<b>hardware serial view</b> or <b>hardware serial set</b>
		<b>hardware model view</b> or <b>hardware model set</b>
	<b>install_verify</b>	This function no longer exists.
	<b>stat_sys_lanbr</b>	bridge lanbr view
	<b>time_zone_set</b>	<b>Date and Time</b> menu item
	<b>trace_log_trans</b>	This function no longer exists.
	<b>trace_sys_man_trans</b>	This function no longer exists.

## Adapter Commands

Use the adapter commands to:

- List the adapter names for the active interfaces
- Dump or trace the peer-capable adapters
- View the registers and memory of the peer-capable adapters

Table 9-5. Abbreviations for Adapter Commands

Type of term	Term and Abbreviations	
Object	adapter	adp, a
Subobject	memory	mem, m
	registers	reg, r
Action	dump	du
	list	l
	trace	tr, t
	view	v
Option	-line	-ln
	-log	-l
	-on	

### adapter dump *adapter*

**Description:** Dump the memory and registers of the adapter. The information is sent to the transfer directory in the files:

```
pd_adapter_name.dram
pd_adapter_name.sram
pd_adapter_name.prom
pd_adapter_name.regs
pd_slot_list
```

where *adapter\_name* is the name of the specified adapter.

**Parameters:** Use the **adapter list** command to list the installed adapters.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### adapter list {-log}

**Description:** List the installed peer-capable adapters.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### adapter memory (view) {-log} *adapter start\_addr num\_words*

**Description:** View the adapter memory starting at the specified address for a specific number of words.



**Parameters:** Use the **adapter list** command to list the installed adapters.

Specify the starting address of memory and the number of words to display. The starting address is either a hexadecimal number or a symbol name. The number of words can be from 1 to 10 000.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## **adapter registers (view) {-log} adapter**

**Description:** View the adapter registers.

**Parameters:** Use the **adapter list** command to list the installed adapters.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## **adapter trace (-line) (-on) adapter num\_packets**

**Description:** Start a line trace on the specified adapter. The trace stops after the specified number of packets are captured. The trace information is sent to the transfer directory as the file `pd_adapter_name.linetrace`, where *adapter\_name* is the name of the adapter traced.

**Parameters:** Use the **adapter list** command to list the installed adapters. Specify a number from 1 to 200 for the *num\_packets* parameter. Each packet can require up to 150 kilobytes in the transfer directory. The /tmp file system needs to have available space equal to the number of packets times 150; otherwise the line trace will not start. Use the **files system (view)** command to view the available space in the /tmp file system.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## **Summary of Adapter Commands**

*Table 9-6. Summary of Adapter Commands*

<b>Command</b>	<b>Function</b>
<code>adapter dump adapter</code>	Dump the adapter memory and registers.
<code>adapter list {-log}</code>	List the installed adapters.
<code>adapter memory (view) {-log} adapter start_addr num_words</code>	View the adapter memory.
<code>adapter registers (view) {-log} adapter</code>	View the adapter registers.
<code>adapter trace (-line) (-on) adapter num_packets</code>	Trace the input and output of the adapter.

---

## AppleTalk Commands

Use the AppleTalk commands to:

- Start and stop the AppleTalk protocol trace
- List the trace parameters
- Send an echo to an AppleTalk node
- View the AppleTalk Address Resolution Protocol (AARP) table
- View AppleTalk routes, connections, and protocol statistics
- View filter and zone information.
- Set up AppleTalk for debug collection
- Collect AppleTalk debug information

Table 9-7. Abbreviations for AppleTalk Commands

Type of term	Term and Abbreviations	
Object	appletalk	appl, at
Subobject	arp	a
	connections	connection, con, c
	debug	db
	filters	filter, fil, f
	routes	route, r
	statistics	statistic, stat, s
	zones	zone, z
Action	collect	col, c
	echo	e
	list	l
	set	s
	trace	tr, t
	view	v
Option	-cat	-c
	-interface	-intf, -if, -i
	-log	-l
	-notrcstop	-nts, -no
	-off	
	-on	
	-system	-sys, -s
	-tar	-t
	-trace_parameters	-tp

### **appletalk arp (view) -interface {-log} interface**

**Description:** View the AppleTalk ARP table for a given interface.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for AppleTalk.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **appletalk arp (view) (-system) {-log}**

**Description:** View the AppleTalk ARP table.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **appletalk connections (view) {-log} interface**

**Description:** View the AppleTalk interface connections.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for AppleTalk.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **appletalk debug (collect) {-system} {-notrcstop} [(-tar)|-cat] {output\_file}**

**Description:** Collect AppleTalk debug information. Specify the -system option to collect additional system debug information. Specify the -notrcstop option to keep the AppleTalk trace running while collecting the other debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf output\_file** command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the -cat option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** If you do not specify an output file name, the output is placed in the file *pd\_hostname.appletalk.debug*, where *hostname* is the host name for this 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the output file name.

If you specify an output file name, the prefix *pd\_* is added to it. Specify only alphanumeric characters, periods (.), dashes (–), and underscores (\_) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **appletalk debug set {trace\_parameters}**

**Description:** Set up AppleTalk to collect debug information. The output is placed in the file *hostname.AT.setup.db*, where *hostname* is the host name of the 6611. When you run the **appletalk debug collect** command, *hostname.AT.setup.db* is combined with the debug collection files and placed in the output file. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the setup file name.

This command starts the AppleTalk trace. The trace output is placed in the file *pd\_appletalk.trc*.

| **Parameters:** Use the **appletalk (list) -tp** command to list the valid trace  
| parameters. If you do not specify any trace parameters, the AppleTalk trace is  
| started with the *all* and *errors* parameters.

| **Authorization:** Controlling users only

| **System Environment:** RSH, REXEC, and fast-path

### **appletalk echo {-log} dest\_network\_id dest\_node\_id number\_echos**

**Description:** Issue an echo request to another AppleTalk node.

**Parameters:** The destination network ID is the unique AppleTalk network ID. The destination node ID is the AppleTalk node ID. Specify 1 to 1000. for the *number\_echos* parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **appletalk filters (view) {-log} interface**

**Description:** View the AppleTalk interface filters.

| **Parameters:** Use the **interface list** command to list the active interfaces. Choose  
| only the interfaces configured for AppleTalk.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **appletalk (list) -trace\_parameters {-log}**

**Description:** List the AppleTalk protocol trace parameters.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **appletalk routes (view) -interface {-log} interface**

**Description:** View the AppleTalk route table for a given interface.

| **Parameters:** Use the **interface list** command to list the active interfaces. Choose  
| only the interfaces configured for AppleTalk.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **appletalk routes (view) (-system) {-log}**

**Description:** View the AppleTalk system route table.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **appletalk statistics (view) (-interface) {-log} interface**

**Description:** View the AppleTalk network interface protocol statistics.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for AppleTalk.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **appletalk trace -off**

**Description:** Stop the AppleTalk protocol trace. The trace output is sent to the transfer directory as pd\_appletalk.trc.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **appletalk trace (-on) trace\_parameters**

**Description:** Start the AppleTalk protocol trace.

**Parameters:** Use the **appletalk list (-trace\_parameters)** command to list the valid trace parameters.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **appletalk zones (view) {-log}**

**Description:** View the AppleTalk zone table.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **Summary of AppleTalk Commands**

Table 9-8 (Page 1 of 2). Summary of AppleTalk Commands

Command	Function
appletalk arp (view) -interface {-log} interface	View the AppleTalk ARP table for a given interface.
appletalk arp (view) (-system) {-log}	View the AppleTalk ARP table.
appletalk connections (view) {-log} interface	View the AppleTalk interface connections.
appletalk debug (collect) {-system} {-notrcstop} [(-tar) -cat] {output_file}	Collect the AppleTalk protocol debug information.
appletalk debug set {trace_parameters}	Set up the AppleTalk protocol for collecting debug information.

Table 9-8 (Page 2 of 2). Summary of AppleTalk Commands

Command	Function
<code>appletalk echo {-log} dest_network_id dest_node_id number_echos</code>	Issue an echo request to another AppleTalk node.
<code>appletalk filters (view) {-log} interface</code>	View the AppleTalk interface filters.
<code>appletalk (list) -trace_parameters {-log}</code>	List the AppleTalk protocol trace parameters.
<code>appletalk routes (view) -interface {-log} interface</code>	View the AppleTalk route table for a given interface.
<code>appletalk routes (view) (-system) {-log}</code>	View the AppleTalk system route table.
<code>appletalk statistics (view) (-interface) {-log} interface</code>	View the AppleTalk network interface protocol statistics.
<code>appletalk trace -off</code>	Stop the AppleTalk protocol trace.
<code>appletalk trace (-on) trace_parameters</code>	Start the AppleTalk protocol trace.
<code>appletalk zones (view) {-log}</code>	View the AppleTalk zone table.

## APPN Commands

Use the APPN commands to:

- Dump the APPN process
- Start or stop tracing the APPN protocol
- Format the APPN trace report
- List the APPN trace parameters and trace IDs
- Restart the APPN protocol
- Set or view user characteristics of an APPN class of service (COS)
- Set or view the APPN COS mode name
- Transfer an APPN COS file to and from the transfer directory.
- Set up APPN for debug collection
- Collect APPN debug information

Table 9-9. Abbreviations for APPN Commands

Type of term	Term and Abbreviations	
Object	APPN	appn, ap
Subobject	debug	db
Action	collect	col, c
	dump	du
	list	l
	restart	res
	set	s
	trace	tr, t
	transfer	trans, tf
Option	view	v
	-cat	-c
	-COS	-cos, -c
	-format	-for, -f
	-from	-fr, -f
	-log	-l
	-mode_name	-mode, -mod, -mn, -m
	-notrcstop	-nts, -no
	-off	
	-on	
	-restart	-res, -r
	-system	-sys, -s
	-tar	-t
	-to	-t
	-trace_ID	-tid, -ti, -id
	-trace_log	-tl
	-trace_parameters	-tp
	-transmission_group	-tg, -TG
	-user1	-u1
	-user2	-u2
	-user3	-u3

**appn debug (collect) {-system} {-notrcstop} [(-tar)-cat] {output\_file}**

**Description:** Collect APPN protocol debug information. Specify the -system option to collect additional system debug information. Specify the -notrcstop option to keep the APPN trace running while collecting the other debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the **-tar** option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf** *output\_file* command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the **-cat** option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** If you do not specify an output file name, the output is placed in the file *pd\_hostname.appn.debug*, where *hostname* is the host name for the 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the output file name. If you specify an output file name, the prefix *pd\_* is added to it. Specify only alphanumeric characters, periods (.), dashes (–), and underscores (\_) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## **appn debug set {trace\_parameters} {trace\_IDs}**

**Description:** Set up APPN to collect debug information. The output is placed in the file *hostname.APPN.setup.db*, where *hostname* is the host name of the 6611. When you run the **appn debug collect** command, *hostname.APPN.setup.db* is combined with the debug collection files and placed in the output file. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the setup file name.

This command starts the APPN trace. The APPN trace is integrated with the system trace. The trace output is placed in the file *hostname.APPN.trcfile*, where *hostname* is the host name of the 6611.

**Parameters:** Use the **appn (list) -tp** command to list the valid trace parameters. If you do not specify additional trace parameters, the APPN trace is started with the *all* parameter.

Use the **appn (list) -ti** command to list the valid trace IDs. The APPN trace is always started with the global trace IDs 001, 002, 106 10C, 134, and 139, and with the APPN trace IDs 360 and 361. Any additional trace IDs must be specified as three-digit uppercase hexadecimal numbers.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## **appn dump**

**Description:** Dump APPN nondisruptively. There can be up to three APPN dumps present at any given time. The dump is placed in the transfer directory as *pd\_dump.APPN.d#*, where # is either 1, 2, or 3.

**Parameters:** None



**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **appn (list) -trace\_ID {-log}**

**Description:** List the system trace IDs. The APPN trace is integrated with the system trace. These are the trace IDs for the portion of the trace that is common for all traces based on the system trace.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **appn (list) -trace\_parameters {-log}**

**Description:** List the APPN trace parameters. The APPN trace is integrated with the system trace. These are the parameters for the APPN-only section of the trace.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **| appn restart**

**Description:** Restart the APPN protocol.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **| appn set (-COS) (-mode\_name) {-restart} COS\_number mode\_name**

**Description:** Add a mode name to an APPN class of service (COS) file. The mode name is used at session set up to specify session characteristics, including the COS. This configuration change is effective only after APPN is restarted. Specify the -restart option to restart APPN immediately. Use the **appn restart** command to restart APPN at a later time.

**Note:** To ensure that all 6611 network nodes in an APPN network use the same criteria to make routing decisions, each of the network nodes should have identical COS files. Consequently, any changes to a COS file should be made on each 6611 network node in the network.

**Parameters:** Specify the number corresponding to the APPN COS:

- 1—#BATCH
- 2—#BATCHSC
- 3—#CONNECT
- 4—#INTER
- 5—#INTERSC
- 6—#CPSVCMG

## 7-SNASVCMG

Specify a string up to 8 characters in length (including special characters) for the *mode\_name* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **appn set (-COS) [-user1|-user2|-user3] {-restart} COS\_number TG\_row**

*min\_user\_char max\_user\_char*

**Description:** Set the minimum and maximum values for a user-defined transmission group (TG) characteristic within an APPN COS file. Specify either the -user1, -user2, or -user3 option to determine which user-defined characteristic will be modified.

This configuration change is effective only after APPN is restarted. Specify the -restart option to restart APPN immediately. Use the **appn restart** command to restart APPN at a later time.

**Note:** To ensure that all 6611 network nodes in an APPN network use the same criteria to make routing decisions, each of the network nodes should have identical COS files. Consequently, any changes to a COS file should be made on each 6611 network node in the network.

**Parameters:** Specify the number corresponding to the APPN COS:

- 1-BATCH
- 2-BATCHSC
- 3-CONNECT
- 4-INTER
- 5-INTERSC
- 6-CPSVCMG
- 7-SNASVCMG

Specify a number between 1 and 8 for the *TG\_row* parameter. Specify a number between 0 and 255 for both the *min\_user\_char* and the *max\_user\_char* parameters. The *min\_user\_char* parameter must not be higher than the *max\_user\_char* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **appn trace -format**

**Description:** Format the APPN trace. The APPN trace is integrated with the system trace. The trace output is placed in the transfer directory as *pd\_appn.trc*.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **appn trace -off**

**Description:** Stop the APPN trace. The APPN trace is integrated with the system trace. The trace log file is in trcfile.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **appn trace (-on) {-trace\_log} {trace\_log\_size} {trace\_IDs}**

**Description:** Start the APPN trace. The APPN trace is integrated with the system trace. Use the **appn trace -trace\_parameters** command to set trace parameters.

To stop the trace, issue **appn trace -off**. To format the trace, issue **appn trace -format**. The output is placed in pd\_appn.trc; the trace log file is in trcfile.

**Parameters:** If you specify the -trace\_log option, the *trace\_log\_size* parameter is required, and must precede any trace IDs. The trace log size is between 1 048 576 and 10 485 760 bytes with a default of 1 048 576 bytes.

The trace is always started with the global trace IDs 001, 002, 106, 10C, 134, and 139, with APPN trace IDs 360 and 361. Any additional trace IDs must be represented as three digit uppercase hexadecimal numbers. Use the **appn (list) -trace\_ID** command to list the valid APPN trace IDs.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **appn trace -trace\_parameters trace\_parameters**

**Description:** Set the APPN trace options. The APPN trace is integrated with the system trace. These are the parameters for the APPN-only section of the trace.

**Parameters:** Use the **appn (list) -trace\_parameters** command to list the valid trace parameters.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **appn transfer (-COS) [(-to)|-from] COS\_number**

**Description:** Move a specific COS file between the APPN directory and the transfer directory.

Specify the -to option to move the COS file from the APPN directory to the transfer directory. After the COS file is in the transfer directory, you can export the file to a remote host for editing. As a rule, you should not edit a COS file manually unless you need to change a characteristic in the file that cannot be changed through System Manager. An error introduced into a COS file can negatively impact the routing of traffic in your APPN network.

Specify the -from option to move the COS file from the transfer directory to the APPN directory. APPN automatically restarts when you use the -from option.

**Note:** To ensure that all 6611 network nodes in an APPN network use the same criteria to make routing decisions, each of the network nodes should have identical COS files. Consequently, any changes to a COS file should be made on each 6611 network node in the network.

Refer to “Transferring Files” on page 4-62 for information about transferring files between the 6611 and a remote host.

**Parameters:** Specify the number corresponding to the APPN COS:

- 1—#BATCH
- 2—#BATCHSC
- 3—#CONNECT
- 4—#INTER
- 5—#INTERSC
- 6—CPSVCMG
- 7—SNASVCMG

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

#### **appn view (-COS) {-log} COS\_number**

**Description:** Display the specified APPN COS file.

**Parameters:** Specify the number corresponding to the APPN COS:

- 1—#BATCH
- 2—#BATCHSC
- 3—#CONNECT
- 4—#INTER
- 5—#INTERSC
- 6—CPSVCMG
- 7—SNASVCMG

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

#### **appn view (-COS) -mode\_name COS\_number**

**Description:** Display the mode names in a specific APPN COS file.

**Parameters:** Specify the number corresponding to the APPN COS:

- 1—#BATCH
- 2—#BATCHSC
- 3—#CONNECT
- 4—#INTER
- 5—#INTERSC
- 6—CPSVCMG
- 7—SNASVCMG

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **appn view (-COS) -transmission\_group COS\_number TG\_row**

**Description:** Display the APPN COS information for a specific TG row.

**Parameters:** Specify the number corresponding to the APPN COS:

- 1—#BATCH
- 2—#BATCHSC
- 3—#CONNECT
- 4—#INTER
- 5—#INTERSC
- 6—CPSVCMG
- 7—SNASVCMG

Specify a number between 1 and 8 for the *TG\_row* parameter.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **Summary of APPN Commands**

Table 9-10. Summary of APPN Commands

Command	Function
appn debug (collect) {-system} {-notrcstop} [(-tar) -cat] {output_file}	Collect the APPN protocol debug information.
appn debug set {trace_parameters} {trace_IDs}	Set up the APPN protocol for collecting debug information.
appn dump	Dump APPN nondisruptively.
appn (list) -trace_ID {-log}	List the APPN trace IDs.
appn (list) -trace_parameters {-log}	List the APPN trace parameters.
appn restart	Restart the APPN protocol.
appn set (cos) (-mode_name) {-restart} COS_number mode_name	Add a mode name to an APPN COS file.
appn set (cos) [-user1 user2 user3] COS_number TG_row min_user_char max_user_char	Set the minimum and maximum values for a user-defined TG characteristic for a specific TG and COS.
appn trace -format	Format the APPN trace.
appn trace -off	Stop the APPN trace.
appn trace (-on) {-trace_log} {trace_log_size} {trace_IDs}	Start the APPN trace.
appn trace -trace_parameters trace_parameters	Set the APPN trace parameters.
appn transfer (-COS) [(-to) -from] COS_number	Move a COS file between the APPN directory and the transfer directory.
appn view (-COS) {-log} COS_number	Display an APPN COS file.
appn view (-COS) -mode_name COS_number	Display the mode names in a specific APPN COS file.
appn view (-COS) -transmission_group COS_number TG_row	Display APPN COS information for a specific TG row.

---

## Bridge Commands

There are bridge commands for:

- LAN bridging
- Source route bridging
- Transparent bridging
- Translational bridging

Use the bridge commands to:

- Trace source route bridging
- View statistical information for source route, transparent, translational, and LAN bridging
- View the possible interfaces or port indexes for source route, transparent, translational, and LAN bridging
- Collect bridging debugging information
- View the MAC addresses necessary to define a bridge with LAN Network Manager

Table 9-11. Abbreviations for Bridge Commands

Type of term	Term and Abbreviations	
Object	bridge	brdg, br, b
Subobject	debug	db
	LAN_bridge	lanbr, lb
	LAN_network_manager	lnm
	source_route_bridge	srb, s
	transparent_bridge	tb, t
	translational_bridge	tlb
Action	collect	col, c
	list	l
	trace	tr, t
	view	v
Option	-both	-b
	-cat	-c
	-filter	-filters, -fil, -f
	-frame_trace	-ft
	-interface	-intf, -if, -i
	-interface_info	-info, -ii, -i
	-internal_frames	-if
	-LAN_bridge	-lanbr, -lb
	-local	-loc
	-log	-l
	-off	
	-on	
	-port_index	-pi, p
	-receive	-rec, -rcv, -r
	-remote	-rem
	-source_route_bridge	-srb
	-spanning_tree	-spt
	-spanning_tree_frame_relay	-sptfr
	-statistics	-statistic, -stat
	-system	-sys, -s
	-tar	-t
	-transmit	-xmit, -tr, -t
	-transparent_bridge	-tb
	-translational_bridge	-tlb

### bridge debug (collect) [(-srb)|-tbl|-lb|-tlb] {-system} [(-tar)|-cat] {output\_file}

**Description:** Collect bridge debug information for either source route bridge, transparent bridge, LAN bridge, or translational bridge. Specify the -system option to collect additional system debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf output\_file** command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the -cat option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** If you do not specify an output file name, the output is placed in the file:

pd\_hostname.srb.debug  
pd\_hostname.tb.debug  
pd\_hostname.lb.debug  
pd\_hostname.tlb.debug

where *hostname* is the host name of this 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the output file name. If you specify an output file name, the prefix *pd\_* is added to it. Specify only alphanumeric characters, periods (.), dashes (–), and underscores (\_) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **bridge lb list (-interface)**

**Description:** List the possible LAN bridging interfaces.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge lb (view) -internal\_frames interface number\_seconds**

**Description:** View the internal frames for the LAN bridge protocol for the given serial interface. Press **Ctrl+C** to end the command.

**Parameters:** Use the **bridge lb list (-interface)** command to list the possible LAN bridging interfaces. Choose only the serial interfaces configured for LAN bridge.

Use the *number\_seconds* parameter to specify the time interval between updating the display. Specify a number between 1 and 5 for this parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **bridge lb (view) (-statistics) interface number\_seconds**

**Description:** View the LAN bridge interface statistics for a given serial interface. Press **Ctrl+C** to end the command.

**Parameters:** Use the **bridge lb list (-interface)** command to list the possible LAN bridging interfaces. Choose only the serial interfaces configured for LAN bridge.

Use the *number\_seconds* parameter to specify the time interval between updating the display. Specify a number between 1 and 5 for this parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **bridge lb (view) (-statistics) -system interface number\_seconds**



**Description:** View the LAN bridge system statistics for a given serial interface.  
Press **Ctrl+C** to end the command.

**Parameters:** Use the **bridge lb list (-interface)** command to list the possible LAN bridging interfaces. Choose only the serial interfaces configured for LAN bridge.

Use the *number\_seconds* parameter to specify the time interval between updating the display. Specify a number between 1 and 5 for this parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **bridge lnm (view) [(-local)|-remote]**

**Description:** View the bridge port MAC addresses needed to create a bridge definition on LAN Network Manager.

Specify the -local option when defining a local bridge. The output contains the physical MAC address of the port on the 6611 connected to the token ring, and the DLSw virtual MAC address.

Specify the -remote option when defining a remote bridge. The output contains the physical MAC address of the ring to be managed, and the DLSw virtual MAC address.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge (srb) list (-interface)**

**Description:** List the possible source route bridging interfaces.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge (srb) list -port\_index interface**

**Description:** List the port indexes of the given serial interface that are configured for source route bridging and frame relay.

**Parameters:** Use the **bridge (srb) list (-interface)** command to list the possible source route bridging interfaces. Choose only the serial interfaces configured for source route bridging and frame relay.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge (srb) trace -off [(-transmit)|-receive|both ] interface**

**Description:** Stop the source route bridging frame trace on the given interface tracing transmitted, received, or transmitted and received frames.

**Parameters:** Use the **bridge (srb) list (-interface)** command to list the possible source route bridging interfaces. Choose only the interfaces configured for source route bridging.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge (srb) trace (-on) [(-transmit)|-receive|-both ] number\_frames interface**

**Description:** Start the source route bridging frame trace on the given interface tracing the given number of transmitted, received, or transmitted and received frames.

**Parameters:** You can trace from 1 to 32 frames. The *number\_frames* parameter can be any number from 1 to 800. If 32 or less is specified, that number of frames is captured and the trace is stopped. If a number greater than 32 is specified, the last 32 frames are captured.

Use the **bridge (srb) list (-interface)** command to list the possible source route bridging interfaces. Choose only the interfaces configured for source route bridging.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge (srb) trace -spt [(-on)|-off]**

**Description:** Start or stop the source route bridge spanning tree trace.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge (srb) (view) -filter {-log} interface**

**Description:** View source route bridge filter information for the given interface.

**Parameters:** Use the **bridge (srb) list (-interface)** command to list the possible source route bridging interfaces. Choose only the interfaces configured for source route bridging.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge (srb) (view) -frame\_trace [(-transmit)|-receive|-both ] {-log} interface**

**Description:** View the source route bridging frame trace on the given interface tracing transmitted, received, or transmitted and received frames.

**Parameters:** Use the **bridge (srb) list (-interface)** command to list the possible source route bridging interfaces. Choose only the interfaces configured for source route bridging.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

| **bridge (srb) (view) -information\_info {-log} interface**

| **Description:** View the source route bridge interface information for the given  
| interface.

| **Parameters:** Use the **bridge (srb) list (-interface)** command to list the possible  
| source route bridging interfaces. Choose only the interfaces configured for source  
| route bridging.

| **Authorization:** Controlling and viewing users

| **System Environment:** RSH, REXEC, and fast-path

**bridge (srb) (view) (-statistics) interface number\_seconds**

**Description:** View the source route bridge statistics for the given interface. Press **Ctrl+C** to end the command.

| **Parameters:** Use the **bridge (srb) list (-interface)** command to list the possible  
| source route bridging interfaces. Choose only the interfaces configured for source  
| route bridging.

| Use the *number\_seconds* parameter to specify the time interval between updating  
| the display. Specify a number between 1 and 5 for this parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

**bridge (srb) (view) (-statistics) -spt interface number\_seconds**

**Description:** View the source route bridge spanning tree statistics for the given interface. Press **Ctrl+C** to end the command.

| **Parameters:** Use the **bridge (srb) list (-interface)** command to list the possible  
| source route bridging interfaces. Choose only the interfaces configured for source  
| route bridging.

| Use the *number\_seconds* parameter to specify the time interval between updating  
| the display. Specify a number between 1 and 5 for this parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

**bridge (srb) (view) (-statistics) -sptfr port\_index number\_seconds**

**Description:** View the source route bridging spanning tree frame relay statistics for the given interface. Press **Ctrl+C** to end the command.

**Parameters:** Use the **bridge (srb) list -port\_index interface** command to list the source route bridging port indexes for the given serial interface.

| Use the *number\_seconds* parameter to specify the time interval between updating  
| the display. Specify a number between 1 and 5 for this parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **bridge tb list (-interface)**

**Description:** List the possible transparent bridging interfaces.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge tb list -port\_index interface**

**Description:** List the port indexes of the given serial interface that are configured for transparent bridging and frame relay.

**Parameters:** Use the **bridge tb list (-interface)** command to list the possible transparent bridging interfaces. Choose only the serial interfaces configured for transparent bridging and frame relay.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge tb trace -off interface**

**Description:** Stop the transparent bridging frame trace on the specified interface.

**Parameters:** Use the **bridge tb list (-interface)** command to list the possible transparent bridging interfaces. Choose only the interfaces configured for transparent bridging.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge tb trace (-on) number\_frames interface**

**Description:** Start the transparent bridging frame trace on the specified interface tracing the given number of frames.

**Parameters:** You can trace from 1 to 32 frames. The *number\_frames* parameter can be any number from 1 to 800. If 32 or less is specified, that number of frames is captured and the trace is stopped. If a number greater than 32 is specified, the last 32 frames are captured.

Use the **bridge tb list (-interface)** command to list the possible transparent bridging interfaces. Choose only the interfaces configured for transparent bridging.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge tb trace -spt [(-on)|-off]**

**Description:** Start or stop the transparent bridge spanning tree trace.

**Parameters:** None

| **Authorization:** Controlling and viewing users

| **System Environment:** RSH, REXEC, and fast-path

| **bridge tb (view) -filter {-log} interface**

| **Description:** View transparent bridge filter information for the given interface.

| **Parameters:** Use the **bridge tb list (-interface)** command to list the possible transparent bridging interfaces. Choose only the interfaces configured for transparent bridging.

| **Authorization:** Controlling and viewing users

| **System Environment:** RSH, REXEC, and fast-path

| **bridge tb (view) -frame\_trace {-log} interface**

| **Description:** View transparent bridging frame trace on the given interface.

| **Parameters:** Use the **bridge tb list (-interface)** command to list the possible transparent bridging interfaces. Choose only the interfaces configured for transparent bridging.

| **Authorization:** Controlling and viewing users

| **System Environment:** RSH, REXEC, and fast-path

| **bridge tb (view) (-statistics) interface number\_seconds**

| **Description:** View the transparent bridge statistics for the given interface. Press **Ctrl+C** to end the command.

| **Parameters:** Use the **bridge tb list (-interface)** command to list the possible transparent bridging interfaces. Choose only the interfaces configured for transparent bridging.

| Use the *number\_seconds* parameter to specify the time interval between updating the display. Specify a number between 1 and 5 for this parameter.

| **Authorization:** Controlling and viewing users

| **System Environment:** Fast-path only

| **bridge tb (view) (-statistics) -spt interface number\_seconds**

| **Description:** View the transparent bridge spanning tree statistics for the given interface. Press **Ctrl+C** to end the command.

| **Parameters:** Use the **bridge tb list (-interface)** command to list the possible transparent bridging interfaces. Choose only the interfaces configured for transparent bridging.

| Use the *number\_seconds* parameter to specify the time interval between updating the display. Specify a number between 1 and 5 for this parameter.

| **Authorization:** Controlling and viewing users

| **System Environment:** Fast-path only

### **bridge tb (view) (-statistics) -sptfr port\_index number\_seconds**

**Description:** View the transparent bridging spanning tree frame-relay statistics for the given interface. Press **Ctrl+C** to end the command.

**Parameters:** Use the **bridge tb list -port\_index interface** command to list the transparent bridging port indexes for the given serial interface.

Use the *number\_seconds* parameter to specify the time interval between updating the display. Specify a number between 1 and 5 for this parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **bridge tlb list (-interface)**

**Description:** List the possible translational bridging interfaces.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge tlb list -port\_index interface**

**Description:** List the port indexes of the given serial interface that are configured for translational bridging and frame relay.

**Parameters:** Use the **bridge tlb list (-interface)** command to list the possible translational bridging interfaces. Choose only the serial interfaces configured for translational bridging and frame relay.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge tlb trace -spt [(-on)|-off]**

**Description:** Start or stop the translational bridge spanning tree trace.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **bridge tlb (view) (-statistics) -spt interface number\_seconds**

**Description:** View the translational bridge spanning tree statistics for the given interface. Press **Ctrl+C** to end the command.

**Parameters:** Use the **bridge tlb list (-interface)** command to list the interfaces configured for translational bridging. Choose only the interfaces configured for translational bridging.

Use the *number\_seconds* parameter to specify the time interval between updating the display. Specify a number between 1 and 5 for this parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **bridge tlb (view) (-statistics) -sptfr port\_index number\_seconds**

**Description:** View the translational bridging spanning tree frame-relay statistics for the given interface. Press **Ctrl+C** to end the command.

**Parameters:** Use the **bridge tlb list -port\_index interface** command to list the translational bridging port indexes for the given serial interface.

Use the *number\_seconds* parameter to specify the time interval between updating the display. Specify a number between 1 and 5 for this parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

## **Summary of Bridge Commands**

Table 9-12 (Page 1 of 2). Summary of Bridge Commands

Command	Function
bridge debug (collect) [(-srb) -tbl -lbr -tlb] {-system} [(-tar) -cat] {output_file}	Collect bridging debugging information for either source route bridge, transparent bridge, translational bridge, or LAN bridge.
bridge lb list (-interface)	List the possible LAN bridging interfaces.
bridge lb (view) -internal_frames interface number_seconds	View the internal frames for the LAN bridge protocol for the given serial interface.
bridge lb (view) (-statistics) interface number_seconds	View the LAN bridge interface statistics for a given serial interface.
bridge lb (view) (-statistics) -system interface number_seconds	View the LAN bridge system statistics for a given serial interface.
bridge lnm (view) [(-local) -remote]	View the bridge port MAC addresses needed to create a bridge definition in LAN Network Manager.
bridge (srb) list (-interface)	List the possible source route bridging interfaces.
bridge (srb) list -port_index interface	List the port indexes of the given serial interface that are configured for source route bridging and frame relay.
bridge (srb) trace -off [(-transmit) -receive -both ] interface	Stop the source route bridging frame trace on the given interface tracing transmitted, received, or transmitted and received frames.
bridge (srb) trace (-on) [(-transmit) -receive -both ] number_frames interface	Start the source route bridging frame trace on the given interface tracing the given number of transmitted, received, or transmitted and received frames.
bridge (srb) trace -spt [(-on) -off]	Start or stop the source route bridge spanning tree trace.
bridge (srb) (view) -filter {-log} interface	View the source route bridging filter information for the given interface.
bridge (srb) (view) -frame_trace [(-transmit) -receive -both ] {-log} interface	View the source route bridging frame trace on the given interface tracing transmitted, received, or transmitted and received frames.

Table 9-12 (Page 2 of 2). Summary of Bridge Commands

Command	Function
bridge (srb) (view) -mib {-log} <i>interface</i>	View the source route bridging MIB information for the given interface.
bridge (srb) (view) (-statistics) <i>interface number_seconds</i>	View the source route bridge statistics for the given interface.
bridge (srb) (view) (-statistics) -spt <i>interface number_seconds</i>	View the source route bridging spanning tree statistics for the given interface.
bridge (srb) (view) (-statistics) -sptfr <i>port_index number_seconds</i>	View the source route bridging spanning tree frame relay statistics for the given interface.
bridge tb list (-interface)	List the possible transparent bridging interfaces.
bridge tb list -port_index <i>interface</i>	List the port indexes of the given serial interface that are configured for transparent bridging and frame relay.
bridge tb trace -off <i>interface</i>	Stop the transparent bridging frame trace on the specified interface.
bridge tb trace (-on) <i>number_frames interface</i>	Start the transparent bridging frame trace on the specified interface.
bridge tb trace -spt [(-on) -off]	Start or stop the transparent bridge spanning tree trace.
bridge tb (view) -filter {-log} <i>interface</i>	View the transparent bridging filter information for the given interface.
bridge tb (view) -frame_trace {-log} <i>interface</i>	View the transparent bridging frame trace on the given interface.
bridge tb (view) (-statistics) <i>interface number_seconds</i>	View the transparent bridge statistics for the given interface.
bridge tb (view) (-statistics) -spt <i>interface number_seconds</i>	View the transparent bridge spanning tree statistics for the given interface.
bridge tb (view) (-statistics) -sptfr <i>port_index number_seconds</i>	View the transparent bridging spanning tree frame relay statistics for the given interface.
bridge tlb list (-interface)	List the possible translational bridging interfaces.
bridge tlb list -port_index <i>interface</i>	List the port indexes of the given serial interface that are configured for translational bridging and frame relay.
bridge tlb trace -spt [(-on) -off]	Start or stop the translational bridge spanning tree trace.
bridge tlb (view) (-statistics) -spt <i>interface number_seconds</i>	View the translational bridge spanning tree statistics for the given interface.
bridge tlb (view) (-statistics) -sptfr <i>port_index number_seconds</i>	View the translational bridging spanning tree frame relay statistics for the given interface.



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## Config Commands

Use the configuration (config) commands to:

- Install a new configuration from the transfer directory
- Send the current configuration to the transfer directory
- Apply, commit, or reject configurations created from the System Manager or the fast-path environment
- Reinstall saved configurations and list the saved configurations from the System Manager or the fast-path environment
- View a configuration report, the state of the configuration, and the configuration script

Table 9-13. Abbreviations for Config Commands

Type of term	Term and Abbreviations	
Object	config	cfg, c
Subobject	script	scr
	state	st
Action	apply	app, a
	commit	com, c
	install	in, i
	list	l
	reinstall	rein
	reject	rej
	send	s
	view	v
Option	-applied	-app, -a
	-both	-b
	-cfgfile	-cf, -c
	-detail	-det, -d
	-log	-l
	-summary	sum, -s
	-unapplied	-una, -u

### config apply

**Description:** Apply configuration changes. They can later be rejected.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### config commit [-applied|-both ]

**Description:** Commit configuration changes. They cannot be rejected later. If you select **-both**, all unapplied and applied configuration changes made with your user ID are committed. If you select **-applied**, only applied configuration changes made with your user ID are committed.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **config install** *cfgfile\_name*

**Description:** Install the configuration file in the transfer directory.

**Parameters:** Specify the configuration file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **config list (-cfgfile) {-log}**

**Description:** List the saved configuration files. The last ten configurations are saved.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **config reinstate** *cfgfile\_number*

**Description:** Reinstate a saved configuration file. The last ten configurations are saved. A new saved configuration file is created anytime a configuration change is made from the System Manager or the fast-path environment and the change is either applied or committed. If the latest configuration change made from this user ID is unapplied, the change is rejected before the configuration file is reinstated. If the latest configuration change made from this user ID is applied, the change is committed before the configuration file is reinstated.

**Parameters:** Use the **config list -cfgfile** command to list the saved configurations. Use only the number of the configuration file.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **config reject [-unapplied|-both ]**

**Description:** Reject the uncommitted configuration changes. If you select **-both**, all applied and unapplied configuration changes made with your user ID are rejected. If you select **-unapplied**, only unapplied configuration changes made with your user ID are rejected.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **config script (view)**

**Description:** View the configuration script. The output is sent to the transfer directory as config.script.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## | **config send**

| **Description:** Send the current configuration on the 6611 to the transfer directory  
| as config.

| **Parameters:** None

| **Authorization:** Controlling users only

| **System Environment:** RSH, REXEC, and fast-path

## **config state (view) {-log}**

| **Description:** View the configuration name and state. The 6611 host name, serial  
| number, and model number are also displayed, as well as a description of the  
| adapters in each of the slots.

| **Parameters:** None

| **Authorization:** Controlling and viewing users

| **System Environment:** RSH, REXEC, and fast-path

## **config (view) [-detail-summary ] {-log}**

| **Description:** View the detailed or summary configuration report. The output is  
| sent to the transfer directory as either config.report.detail or  
| config.report.summary.

| **Parameters:** None

| **Authorization:** Controlling and viewing users

| **System Environment:** RSH, REXEC, and fast-path

## **Summary of Config Commands**

Table 9-14. Summary of Config Commands

Command	Function
config apply	Apply configuration changes.
config commit [ -appliedl-both ]	Commit configuration changes.
config install <i>cfgfile_name</i>	Install configuration file in transfer directory.
config list (-cfgfile) {-log}	List saved configuration files.
config reinstate <i>cfgfile_number</i>	Reinstate saved configuration file.
config reject [ -unappliedl-both ]	Reject uncommitted configuration changes.
config script (view)	View the configuration script.
config send	Send the current configuration on the 6611 to the   transfer directory.
config state (view) {-log}	View the configuration name and state.
config (view) [-detail-summary ] {-log}	View the detailed or summary configuration report.

## DECnet Commands

Use the DECnet (decnet) commands to:

- Start and stop the DECnet trace
- Change the output destination of the trace
- Set the trace parameters, the trace mask, and time stamp mask
- List the trace mask settings
- View DECnet routes, connections, and protocol statistics
- View filter and routing information
- Set up DECnet for debug collection
- Collect DECnet debug information

Table 9-15. Abbreviations for DECnet Commands

Type of term	Term and Abbreviations	
Object	decnet	dec
Subobject	connections	connection, con, c
	debug	db
	filters	filter, fil, f
	routes	route, r
	statistics	statistic, stat, s
Action	collect	col, c
	list	l
	set	s
	trace	tr, t
	view	v
Option	-adjacencies	-adj
	-area_cost	-ac
	-area_hop	-ah
	-area_minimum_cost	-amc
	-area_minimum_hop	-amh
	-area_output_adj	-aoa
	-area_reach	-ar
	-cat	-c
	-circuit	-cir
	-cost	-c
	-decnet	-dec, -d
	-executor	-exec, -ex
	-hop	-h
	-interface	-intf, -if, -i
	-log	-l
	-minimum_cost	-mc
	-minimum_hop	-mh
	-notrcstop	-nts, -no
	-off	
	-on	
	-output_adj	-oa
	-reach	-r
	-route_info	-ri
	-system	-sys, -s
	-tar	-t
	-timestamp_mask	-tsm
	-trace_log	-tl
	-trace_mask	-tm

**decnet connections (view) {-log} interface**

**Description:** View the DECnet interface connections.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for DECnet.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet debug (collect) {-system} {-notrcstop} [(-tar)|-cat] {output\_file}**

**Description:** Collect DECnet debug information. Specify the -system option to collect additional system debug information. Specify the -notrcstop option to keep the DECnet trace running while collecting the other debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf output\_file** command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the -cat option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** If you do not specify an output file name, the output is placed in the file *pd\_hostname.decnet.debug*, where *hostname* is the host name of this 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the output file name. If you specify an output file name, the prefix *pd\_* is added to it. Specify only alphanumeric characters, periods (.), dashes (–), and underscores (–) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **decnet debug set {trace\_level} {trace\_mask}**

**Description:** Set up DECnet to collecting debug information. The output is placed in the file *hostname.DEC.setup.db*, where *hostname* is the host name of the 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the setup file name. When you run the **decnet debug collect** command, *hostname.DEC.setup.db* is combined with the debug collection files and placed in the output file.

This command starts the DECnet trace. The trace output is placed in the file *pd\_dnarouted.log*.

**Parameters:** You can specify a trace level from 1 to 15. If you do not specify a trace level, the DECnet trace is started with a level of 15.

You can specify an eight digit hexadecimal trace mask. If you do not specify a trace mask, the DECnet trace is started with a trace mask of X'FFFFFFFF'. Use the **decnet (list) -tm** to list the valid trace mask settings.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **decnet filters (view) {-log} interface**

**Description:** View the DECnet interface filters.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for DECnet.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet (list) -trace\_mask {-log}**

**Description:** List the DECnet trace mask settings.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet routes (view) -interface {-log} interface**

**Description:** View the DECnet route table for a given interface.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for DECnet.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet routes (view) -route\_info -adjacencies {-log} start\_entry number\_entries**

**Description:** View the DECnet adjacency vector.

**Parameters:** The *start\_entry* parameter must be in the range from 0 to 1023. The *number\_entries* parameter must be in the range from 1 to 283. Each of these parameters is optional. The defaults are:

- *start\_entry* = 0
- *number\_entries* = 283

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet routes (view) -route\_info -area\_cost {-log} start\_entry number\_entries**

**Description:** View the DECnet area cost matrix.

**Parameters:** The *start\_entry* parameter must be in the range from 0 to 63. The *number\_entries* parameter must be in the range from 1 to 64. Each of these parameters is optional. The defaults are:

- *start\_entry* = 0
- *number\_entries* = 64

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**decnet routes (view) -route\_info -area\_hop {-log} start\_entry number\_entries**

**Description:** View the DECnet area hop matrix.

**Parameters:** The *start\_entry* parameter must be in the range from 0 to 63. The *number\_entries* parameter must be in the range from 1 to 64. Each of these parameters is optional. The defaults are:

- *start\_entry* = 0
- *number\_entries* = 64

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**decnet routes (view) -route\_info -area\_minimum\_cost {-log} start\_entry number\_entries**

**Description:** View the DECnet area minimum cost vector.

**Parameters:** The *start\_entry* parameter must be in the range from 0 to 63. The *number\_entries* parameter must be in the range from 1 to 64. Each of these parameters is optional. The defaults are:

- *start\_entry* = 0
- *number\_entries* = 64

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**decnet routes (view) -route\_info -area\_minimum\_hop {-log} start\_entry number\_entries**

**Description:** View the DECnet area minimum hop vector.

**Parameters:** The *start\_entry* parameter must be in the range from 0 to 63. The *number\_entries* parameter must be in the range from 1 to 64. Each of these parameters is optional. The defaults are:

- *start\_entry* = 0
- *number\_entries* = 64

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**decnet routes (view) -route\_info -area\_output\_adj {-log} start\_entry number\_entries**

**Description:** View the DECnet area output adjacency vector.

**Parameters:** The *start\_entry* parameter must be in the range from 0 to 63. The *number\_entries* parameter must be in the range from 1 to 64. Each of these parameters is optional. The defaults are:

- *start\_entry* = 0

- *number\_entries* = 64

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet routes (view) -route\_info -area\_reach {-log} start\_entry number\_entries**

**Description:** View the DECnet area reach vector.

**Parameters:** The *start\_entry* parameter must be in the range from 0 to 63. The *number\_entries* parameter must be in the range from 1 to 64. Each of these parameters is optional. The defaults are:

- *start\_entry* = 0
- *number\_entries* = 64

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet routes (view) -route\_info -circuit {-log} start\_entry number\_entries**

**Description:** View the DECnet circuit vector.

**Parameters:** The *start\_entry* parameter must be in the range from 1 to 14. The *number\_entries* parameter must be in the range from 1 to 14. Each of these parameters is optional. The defaults are:

- *start\_entry* = 1
- *number\_entries* = 14

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet routes (view) -route\_info -cost {-log} start\_entry number\_entries start\_column number\_columns**

**Description:** View the DECnet cost matrix.

**Parameters:** The *start\_entry* parameter must be in the range from 0 to 1023. The *number\_entries* parameter must be in the range from 1 to 1024. The *start\_column* parameter must be in the range from 0 to 46. The *number\_columns* parameter must be in the range from 1 to 47. Each of these parameters is optional. The defaults are:

- *start\_entry* = 0
- *number\_entries* = 1024
- *start\_column* = 0
- *number\_columns* = 47

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet routes (view) -route\_info (-executor) {-log}**

**Description:** View the DECnet executor data structure.



**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**decnet routes (view) -route\_info -hop {-log} start\_entry number\_entries start\_column number\_columns**

**Description:** View the DECnet hop matrix.

**Parameters:** The *start\_entry* parameter must be in the range from 0 to 1023. The *number\_entries* parameter must be in the range from 1 to 1024. The *start\_column* parameter must be in the range from 0 to 46. The *number\_columns* parameter must be in the range from 1 to 47. Each of these parameters is optional. The defaults are:

- *start\_entry* = 0
- *number\_entries* = 1024
- *start\_column* = 0
- *number\_columns* = 47

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**decnet routes (view) -route\_info -minimum\_cost {-log} start\_entry number\_entries**

**Description:** View the DECnet minimum cost vector.

**Parameters:** The *start\_entry* parameter must be in the range from 0 to 1023. The *number\_entries* parameter must be in the range from 1 to 1024. Each of these parameters is optional. The defaults are:

- *start\_entry* = 0
- *number\_entries* = 1024

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**decnet routes (view) -route\_info -minimum\_hop {-log} start\_entry number\_entries**

**Description:** View the DECnet minimum hop vector.

**Parameters:** The *start\_entry* parameter must be in the range from 0 to 1023. The *num\_entries* parameter must be in the range from 1 to 1024. Each of these parameters is optional. The defaults are:

- *start\_entry* = 0
- *number\_entries* = 1024

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**decnet routes (view) -route\_info -output\_adj {-log} start\_entry number\_entries**

**Description:** View the DECnet output adjacency vector.

**Parameters:** The *start\_entry* parameter must be in the range from 0 to 1023. The *number\_entries* parameter must be in the range from 1 to 1024. Each of these parameters is optional. The defaults are:

- *start\_entry* = 0
- *number\_entries* = 1024

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet routes (view) -route\_info -reach {-log} start\_entry number\_entries**

**Description:** View the DECnet reach vector.

**Parameters:** The *start\_entry* parameter must be in the range from 0 to 1023. The *number\_entries* parameter must be in the range from 1 to 1024. Each of these parameters is optional. The defaults are:

- *start\_entry* = 0
- *number\_entries* = 1024

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet routes (view) (-system) {-log}**

**Description:** View the DECnet system route table.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet statistics (view) (-interface) {-log} interface**

**Description:** View the DECnet network interface protocol statistics.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for DECnet.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet trace -off**

**Description:** Stop the DECnet routing protocol trace. The debug level is set to 0.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet trace (-on) trace\_level**

**Description:** Start the DECnet routing protocol trace.

**Parameters:** Set the debug level of DECnet tracing to a number between 0 and 15. A tracing level of 0 traces only error conditions and essentially turns off the trace. Everything is traced with a debug level of 15.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet trace -timestamp\_mask *timestamp\_mask***

**Description:** Set the DECnet trace time stamp mask. The *timestamp\_mask* parameter is a 32 bit number with each bit corresponding to a particular action to trace. If the bit is on, a time stamp is recorded with each trace entry when it is traced.

**Parameters:** Use the **decnet (list) -timestamp\_mask** to list the valid timestamp masks. The *timestamp\_mask* parameter is specified in hexadecimal.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet trace -trace\_log [-system|(-decnet)]**

**Description:** Set the DECnet trace output to either the system log or the DECnet log. The change does not take effect until after the DECnet routing process is restarted.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **decnet trace -trace\_mask *trace\_mask***

**Description:** Set DECnet trace mask. The *trace\_mask* is a 32 bit number with each bit corresponding to a particular action to trace. If the bit is on and the debug level of the action is less than or equal to the current debug level, the action is traced.

**Parameters:** Use the **decnet (list) -trace\_mask** command to list the valid trace masks. The *trace\_mask* is specified in hexadecimal.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **Summary of DECnet Commands**

Table 9-16 (Page 1 of 2). Summary of DECnet Commands

Command	Function
decnet connections (view) {-log} <i>interface</i>	View the DECnet interface connections.
decnet debug (collect) {-system} {-notrcstop} [(-tar) -cat] { <i>output_file</i> }	Collect the DECnet protocol debug information.

Table 9-16 (Page 2 of 2). Summary of DECnet Commands

Command	Function
decnet debug set { <i>trace_level</i> } { <i>trace_mask</i> }	Set up the DECnet protocol for collecting debug information.
decnet filters (view) {-log} <i>interface</i>	View the DECnet interface filters.
decnet (list) -trace_mask {-log}	List DECnet trace mask settings.
decnet routes (view) -interface {-log} <i>interface</i>	View the DECnet route table for a given interface.
decnet routes (view) -route_info -adjacencies {-log} <i>start_entry number_entries</i>	View the DECnet adjacency vector.
decnet routes (view) -route_info -area_cost {-log} <i>start_entry number_entries</i>	View the DECnet area cost matrix.
decnet routes (view) -route_info -area_hop {-log} <i>start_entry number_entries</i>	View the DECnet area hop matrix.
decnet routes (view) -route_info -area_minimum_cost {-log} <i>start_entry number_entries</i>	View the DECnet area minimum cost vector.
decnet routes (view) -route_info -area_minimum_hop {-log} <i>start_entry number_entries</i>	View the DECnet area minimum hop vector.
decnet routes (view) -route_info -area_output_adj {-log} <i>start_entry number_entries</i>	View the DECnet area output adjacency vector.
decnet routes (view) -route_info -area_reach {-log} <i>start_entry number_entries</i>	View the DECnet area reach vector.
decnet routes (view) -route_info -circuit {-log} <i>start_entry number_entries</i>	View the DECnet circuit vector.
decnet routes (view) -route_info -cost {-log} <i>start_entry number_entries start_column number_columns</i>	View the DECnet cost matrix.
decnet routes (view) -route_info (-executor) {-log}	View the DECnet executor data structure.
decnet routes (view) -route_info -hop {-log} <i>start_entry number_entries start_column number_columns</i>	View the DECnet hop matrix.
decnet routes (view) -route_info -minimum_cost {-log} <i>start_entry number_entries</i>	View the DECnet minimum cost vector.
decnet routes (view) -route_info -minimum_hop {-log} <i>start_entry number_entries</i>	View the DECnet minimum hop vector.
decnet routes (view) -route_info -output_adj {-log} <i>start_entry number_entries</i>	View the DECnet output adjacency vector.
decnet routes (view) -route_info -reach {-log} <i>start_entry number_entries</i>	View the DECnet reach vector.
decnet routes (view) (-system) {-log}	View the DECnet system route table.
decnet statistics (view) (-interface) {-log} <i>interface</i>	View the DECnet network interface protocol statistics.
decnet trace -off	Stop DECnet routing protocol trace.
decnet trace (-on) <i>trace_level</i>	Start DECnet routing protocol trace.
decnet trace -timestamp_mask <i>timestamp_mask</i>	Set DECnet trace time stamp mask.
decnet trace -trace_log [-system (-decnet) ]	Set the DECnet trace output to either the system log or the DECnet
decnet trace -trace_mask <i>trace_mask</i>	Set DECnet trace mask.

---

## Diskette Commands

Use the diskette commands to:

- Format a DOS diskette
- Format a UNIX diskette

*Table 9-17. Abbreviations for Diskette Commands*

Type of term	Term and Abbreviations	
Object	diskette	disk
Subobject	DOS	dos, d
	UNIX	unix, u
Action	format	for, f
Option	-high	-hi, -h
	-low	-lo, -l

### diskette dos format (-high)

**Description:** Format a high density DOS diskette.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### diskette dos format -low

**Description:** Format a low density DOS diskette.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### diskette (unix) format (-high)

**Description:** Format a high density UNIX diskette.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### diskette (unix) format -low

**Description:** Format a low density UNIX diskette.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

## Summary of Diskette Commands

*Table 9-18. Summary of Diskette Commands*

<b>Command</b>	<b>Function</b>
diskette dos format (-high)	Format a high density DOS diskette.
diskette dos format -low	Format a low density DOS diskette.
diskette (unix) format (-high)	Format a high density UNIX diskette.
diskette (unix) format -low	Format a low density UNIX diskette.

## DLSw Commands

Use the data link switching (DLSw) commands to:

- Dump DLSw
- List DLSw trace IDs, semaphore numbers, message queue numbers, and general database members
- Start or stop tracing DLSw
- Format DLSw trace reports
- Start, stop, or restart the DLSw protocol
- View DLSw partners
- View some DLSw specific debug information
- Set up DLSw for debug collection
- Collect DLSw debug information
- Set or view the DLSw circuit pacing value
- Set or view the NetBIOS negative cache option
- Set or view the TCP delay option

Table 9-19. Abbreviations for DLSw Commands

Type of term	Term and Abbreviations	
Object	DLSw	dls, d
Subobject	debug	db
	partners	partner, part, p
Action	collect	col, c
	dump	du
	list	l
	restart	res
	set	s
	start	begin, b
	stop	end, e
	trace	tr, t
	view	v
Option	-cat	-c
	-circuit_pacing	-cp
	-conversation_database	-con, -cd, -c
	-format	-for, -f
	-general_database	-gen, -gd, -g
	-log	-l
	-message_buffer	-msgb, -mb
	-message_queue	-msgq, -mq
	-negative_cache	-nc
	-notrcstop	-nts, -no
	-off	
	-on	
	-tar	-t
	-tcp_delay	-td
	-semaphore	-sem
	-summary	-sum
	-system	-sys, -s
	-trace_ID	-ti, -tid, -id
	-trace_log	-tl
	-trace_parameters	-tp

**dls, d** debug (collect) {-system} {-notrcstop} [(-tar)|-cat] {output\_file}

**Description:** Collect DLSw debug information. Specify the `-system` option to collect additional system debug information. Specify the `-notrcstop` option to keep the DLSw trace running while while collecting other debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the `-tar` option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the `tar -xvf output_file` command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the `-cat` option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** If you do not specify an output file name, the output is placed in the transfer directory with the file name `pd_hostname.dls.debug`, where *hostname* is the host name of this 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the output file name. If you specify an output file name, the prefix `pd_` is added to it. Specify only alphanumeric characters, periods (.), dashes (–), and underscores (–) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **dlsw debug set {trace\_IDs}**

**Description:** Set up DLSw for collecting debug information. The output is placed in the file `hostname.DLSW.setup.db`, where *hostname* is the host name of the 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the setup file name. When you run the **dlsw debug collect** command, `hostname.DLSW.setup.db` is combined with the debug collection files and placed in the output file.

This command also starts the DLSw trace. The DLSw trace is integrated with the system trace. The trace output is placed in the file `hostname.DLSW.trcfile`, where *hostname* is the host name of the 6611.

**Parameters:** The DLSw trace is started with the default trace IDs 001, 002, 106, 10C, 134, 139, and 362. Any additional trace IDs must be specified as three digit uppercase hexadecimal numbers. Use the **dlsw (list) -ti** command to list the valid trace IDs. Use the **dlsw (list) -tp** command to list the subset of valid trace IDs that are specific to DLSw.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **dlsw debug (view) -conversation\_database {-log}**

**Description:** View the DLSw conversation database.

**Parameters:** None



**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dlsb debug (view) -general\_database {-log} gen\_db\_num**

**Description:** View the specified object from the DLSb general database.

**Parameters:** Use the **dlsb (list) -general\_database** command to list the valid general database numbers. Specify only the number.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dlsb debug (view) -general\_database (-summary) {-log}**

**Description:** View a summary of the information in the DLSb general database.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dlsb debug (view) -message\_buffer {-log}**

**Description:** View the DLSb message buffers.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dlsb debug (view) -message\_queue {-log} msg\_que\_num**

**Description:** View the specified DLSb message queue.

**Parameters:** Use the **dlsb (list) -message\_queue** command to list the valid message queue numbers. Specify only the number.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dlsb debug (view) -semaphore {-log} semaphore\_num**

**Description:** View the specified DLSb semaphore.

**Parameters:** Use the **dlsb (list) -semaphore** command to list the valid semaphore numbers. Specify only the number.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dlsb dump**

**Description:** Dump DLSb nondisruptively. The dump is placed in pd\_dls.dump in the transfer directory.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **dlsb (list) -general\_database {-log}**

**Description:** List the valid DLSb general database numbers.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dlsb (list) -message\_queue {-log}**

**Description:** List the valid DLSb message queue numbers.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dlsb (list) -semaphore {-log}**

**Description:** List the valid DLSb semaphore numbers.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dlsb (list) -trace\_ID {-log}**

**Description:** List the valid DLSb trace IDs.

The DLSb trace is integrated with the system trace. These are the trace IDs that are common for all traces based on the system trace.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dlsb (list) -trace\_parameters {-log}**

**Description:** List the subset of trace IDs specific to DLSb.

The DLSb trace is integrated with the system trace. These are the system trace IDs that are specific to DLSb.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dlswh partners (view) {-log}**

**Description:** View the DLSw partners.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dlswh restart**

**Description:** Restart the DLSw protocol.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **dlswh set -circuit\_pacing *pacing\_value***

**Description:** Set the DLSw circuit pacing value. This value limits the number of packets from a single circuit that DLSw will queue before sending a busy signal to the sender.

Circuit pacing is useful when applications that do not use fixed end-to-end pacing transfer large files across a relatively slow WAN. If DLSw circuit pacing is not used, the bulk data may build up on the transmit queue, interfering with interactive traffic. If you specify a relatively small pacing value, bulk data will be intermixed with other DLSw traffic.

**Parameters:** Specify a number between 2 and 49 for the *pacing\_value* parameter. Specify a zero (0) for the *pacing\_value* parameter to discontinue DLSw circuit pacing.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **dlswh set -negative\_cache [(-on)|-off]**

**Description:** Set the DLSw NetBIOS negative caching either on or off.

DLSw creates an entry in cache memory at the beginning of each NetBIOS session. If no frames are received from a destination node for a period of time, known as the destination cache timeout, DLSw purges the entry from cache memory, ending the NetBIOS session. (You can set the destination cache timeout with the Configuration Program.) If DLSw negative cache is turned on, DLSw will not set up a new NetBIOS session with that destination for a period of time equal to the destination cache timeout. If DLSw negative cache is turned off, DLSw will begin a new NetBIOS session as soon as the destination resumes active communications.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **dls w set -tcp\_delay [(-on)|-off]**

**Description:** Set the DLSw TCP delay either on or off.

If you set the TCP delay parameter to **on**, the 6611 will delay transmitting one or more DLSw frames until TCP can send multiple frames as a single TCP segment, increasing the link utilization in heavy traffic conditions. If you set the TCP delay parameter to **off**, the 6611 will transmit all DLSw frames immediately, lowering the effective link utilization.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **dls w start**

**Description:** Start the DLSw protocol.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **dls w stop**

**Description:** Stop the DLSw protocol.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **dls w trace -format**

**Description:** Format the DLSw trace. The DLSw trace is integrated with the system trace. The trace output is placed in the transfer directory as pd\_dls\_trc.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dls w trace -off**

**Description:** Stop the DLSw trace. The DLSw trace is integrated with the system trace.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **dls w trace (-on) {-trace\_log} {trace\_log\_size} {trace\_IDs}**

**Description:** Start the DLSw trace. The DLSw trace is integrated with the system trace.

To stop the trace, use the **dls w trace -off** command. To format the trace, use the **dls w trace -format** command. The output is placed in the transfer directory as pd\_dls\_trc.

**Parameters:** If you specify the -trace\_log option, the trace\_log\_size parameter must be specified and must precede the trace\_IDs. The trace\_log\_size is between 1 048 576 and 10 485 760 bytes with a default of 1 048 576 bytes.

The trace is started with the global trace IDs of 001, 002, 106, 10C, 134, and 139, and with the DLSw trace ID 362. Any additional trace IDs must be specified as three digit uppercase hexadecimal numbers. Use the **dls w (list) -trace\_ID** command to list the valid trace IDs. Use the **dls w (list) -trace\_parameters** command to list the subset of trace IDs specifically related to DLSw.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **dls w view -circuit\_pacing**

**Description:** Display the DLSw circuit pacing value.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dls w view -negative\_cache**

**Description:** Display the setting for DLSw negative caching.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **dls w view -tcp\_delay**

**Description:** Display the setting for DLSw TCP delay.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## Summary of DLSw Commands

Table 9-20. Summary of DLSw Commands

Command	Function
dlsw debug (collect) {-system} {-notrcstop} [(-tar) -cat] output_file	Collect the DLSw protocol debug information.
dlsw debug set {trace_IDs}	Set up the DLSw protocol for collecting debug information.
dlsw debug (view) -conversation_database {-log}	View the DLSw conversation database.
dlsw debug (view) -general_database {-log} gen_db_num	View the specified object from the DLSw general database.
dlsw debug (view) -general_database (-summary) {-log}	View a summary of the information in the DLSw general database.
dlsw debug (view) -message_buffer {-log}	View the DLSw message buffers.
dlsw debug (view) -message_queue {-log} msg_que_num	View the specified DLSw message queue.
dlsw debug (view) -semaphore {-log} semaphore_num	View the specified DLSw semaphore.
dlsw dump	Dump DLSw nondisruptively.
dlsw (list) -general_database {-log}	List the valid DLSw general database numbers.
dlsw (list) -message_queue {-log}	List the valid DLSw message queue numbers.
dlsw (list) -semaphore {-log}	List the valid DLSw semaphore numbers.
dlsw (list) -trace_ID {-log}	List the system trace IDs.
dlsw (list) -trace_parameters {-log}	List the DLSw trace IDs.
dlsw partners (view) {-log}	View the DLSw partners.
dlsw restart	Restart the DLSw protocol.
dlsw set -circuit_pacing pacing_value	Set the DLSw circuit pacing value.
dlsw set -negative_cache [(-on) -off]	Turn NetBIOS negative caching on or off.
dlsw set -tcp_delay [(-on) -off]	Turn TCP delay on or off.
dlsw start	Start the DLSw protocol.
dlsw stop	Stop the DLSw protocol.
dlsw trace -format	Format the DLSw trace.
dlsw trace -off	Stop the DLSw trace.
dlsw trace (-on) {-trace_log} {trace_log_size} {trace_IDs}	Start the DLSw trace.
dlsw view -circuit_pacing	View the DLSw circuit pacing value.
dlsw view -negative_cache	View the setting of the NetBIOS negative cache option.
dlsw view -tcp_delay	View the setting of the TCP delay option.

## Errorlog (Error) Commands

Use the error commands to:

- Clear the error log
- Generate a customized error report
- List the valid error IDs, hardware and software resources, and sequence numbers
- Transfer the error log to the transfer directory

Table 9-21. Abbreviations for Errorlog Commands

Type of term	Term and Abbreviations	
Object	errorlog	error, err, e
Action	clear	clr, c
	list	l
	report	rep, rpt, r
	transfer	trans, tf, t
Option	-continuous	-con, -c
	-detail	-det, -d
	-error_ID	-eid, -ei, -id, -e
	-error_log	-el
	-hardware	-hw
	-hw_resource	-hwsrc, -hr
	-log	-l
	-operator	-op
	-sequence_number	-seq, -sn
	-software	-sw
	-summary	-sum, -s
	-sw_resource	-swsrc, -sr

### error clear {number\_of\_days}

**Description:** Delete all entries from the error log that are older than the number of days specified with the *number\_of\_days* parameter.

**Parameters:** Specify a whole number greater than zero for the *number\_of\_days* parameter. If you specify zero or do not specify the *number\_of\_days* parameter, the entire error log is cleared.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### error clear -error\_ID error\_ID {number\_of\_days}

**Description:** Delete entries with a specific error ID from the error log.

If you do not specify the *number\_of\_days* parameter, all entries with a specific error ID are deleted from the error log. If you specify the *number\_of\_days* parameter, only the entries with a specific error ID that are older than the specific number of days are deleted from the error log.

**Parameters:** Use the **error list -error\_ID** command to list the valid error IDs. Specify a positive, whole number greater than zero for the *number\_of\_days* parameter.

| **Authorization:** Controlling users only

| **System Environment:** RSH, REXEC, and fast-path

| **error clear -hardware {number\_of\_days}**

| **Description:** Delete hardware entries from the error log.

| If you do not specify the *number\_of\_days* parameter, all hardware entries are  
| deleted from the error log. If you specify the *number\_of\_days* parameter, only the  
| hardware entries that are older than the specific number of days are deleted from  
| the error log.

| **Parameters:** Specify a positive, whole number greater than zero for the  
| *number\_of\_days* parameter.

| **Authorization:** Controlling users only

| **System Environment:** RSH, REXEC, and fast-path

| **error clear -hw\_resource hw\_resource {number\_of\_days}**

| **Description:** Delete hardware entries pertaining to a hardware resource specified  
| with the *hw\_resource* parameter.

| If you do not specify the *number\_of\_days* parameter, all hardware entries pertaining  
| to a specific hardware resource are deleted from the error log. If you specify the  
| *number\_of\_days* parameter, only the hardware entries pertaining to a specific  
| hardware resource that are older than the specific number of days are deleted from  
| the error log.

| **Parameters:** Use the **error list -hw\_resource** command to list the hardware  
| resources currently in the error report. Specify a positive, whole number greater  
| than zero for the *number\_of\_days* parameter.

| **Authorization:** Controlling users only

| **System Environment:** RSH, REXEC, and fast-path

| **error clear -operator {number\_of\_days}**

| **Description:** Delete operator entries in from the error log.

| If you do not specify the *number\_of\_days* parameter, all operator entries are  
| deleted from the error log. If you specify the *number\_of\_days* parameter, only the  
| operator entries that are older than the specific number of days are deleted from  
| the error log.

| **Parameters:** Specify a positive, whole number greater than zero for the  
| *number\_of\_days* parameter.

| **Authorization:** Controlling users only

| **System Environment:** RSH, REXEC, and fast-path

| **error clear -software {number\_of\_days}**



**Description:** Delete software entries from the error log.

If you do not specify the *number\_of\_days* parameter, all software entries are deleted from the error log. If you specify the *number\_of\_days* parameter, only the software entries that are older than the specific number of days are deleted from the error log.

**Parameters:** Specify a positive, whole number greater than zero for the *number\_of\_days* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **error clear -sw\_resource sw\_resource {number\_of\_days}**

**Description:** Delete software entries pertaining to a software resource specified with the *sw\_resource* parameter.

If you do not specify the *number\_of\_days* parameter, all software entries pertaining to a specific software resource are deleted from the error log. If you specify the *number\_of\_days* parameter, only the software entries pertaining to a specific software resource that are older than the specific number of days are deleted from the error log.

**Parameters:** Use the **error list -sw\_resource** command to list the software resources currently in the error report. Specify a positive, whole number greater than zero for the *number\_of\_days* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **error list (-error\_ID) {-log}**

**Description:** List the error IDs in the error report.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **error list -hw\_resource {-log}**

**Description:** List the hardware resources names in the error report.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **error list -sequence\_number {-log}**

**Description:** List the sequence numbers in the error report.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **error list -sw\_resource {-log}**

**Description:** List the software resource names in the error report.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **error (report) -continuous**

**Description:** Generate a continuous summary report of all errors. Lines are displayed immediately on the screen as errors are logged. Press **Ctrl+C** to end the display.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **error (report) [ -detail-summary ] {start\_date} {end\_date}**

**Description:** Generate a summary or detailed error report for all errors. The output is sent to the transfer directory as pd\_error.report.

**Parameters:** If a start date is specified, error records with earlier time stamps are excluded from the report. If an end date is specified, error records with later time stamps are excluded from the report. If dates are not specified, error records are not excluded from the report. The start date and end date format is MMDDhhmmYY.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **error (report) -error\_ID [ -detail-summary ] error\_ID {start\_date} {end\_date}**

**Description:** Generate a summary or detailed error report for errors with the given error ID. The output is sent to the transfer directory as pd\_error.report.

**Parameters:** If a start date is specified, error records with earlier time stamps are excluded from the report. If an end date is specified, error records with later time stamps are excluded from the report. If dates are not specified, error records are not excluded from the report. The start date and end date format is MMDDhhmmYY.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **error (report) -hardware [ -detail-summary ] {start\_date} {end\_date}**

**Description:** Generate a summary or detailed error report for all hardware errors. The output is sent to the transfer directory as pd\_error.report.

**Parameters:** If a start date is specified, error records with earlier time stamps are excluded from the report. If an end date is specified, error records with later time stamps are excluded from the report. If no dates are specified, no error records are excluded from the report. The start date and end date format is MMDDhhmmYY.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**error (report) -hw\_resource [ -detail-summary ] hw\_resource {start\_date} {end\_date}**

**Description:** Generate a summary or detailed error report for hardware errors for the specified resource. The output is sent the transfer directory as pd\_error.report.

**Parameters:** If a start date is specified, error records with earlier time stamps are excluded from the report. If an end date is specified, error records with later time stamps are excluded from the report. If no dates are specified, no error records are excluded from the report. The start date and end date format is MMDDhhmmYY.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**error (report) -operator [ -detail-summary ] {start\_date} {end\_date}**

**Description:** Generate a summary or detailed error report for all operator errors. The output is sent to the transfer directory as pd\_error.report.

**Parameters:** If a start date is specified, error records with earlier time stamps are excluded from the report. If an end date is specified, error records with later time stamps are excluded from the report. If no dates are specified, no error records are excluded from the report. The start date and end date format is MMDDhhmmYY.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**error (report) -sequence\_number {-log} sequence\_number**

**Description:** Generate an error report for a given sequence number.

**Parameters:** Use the **error list -seq** command for the sequence\_number parameter.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**error (report) -software [ -detail-summary ] {start\_date} {end\_date}**

**Description:** Generate a summary or detailed error report for all software errors. The output is sent to the transfer directory as pd\_error.report.

**Parameters:** If a start date is specified, error records with earlier time stamps are excluded from the report. If an end date is specified, error records with later time stamps are excluded from the report. If no dates are specified, no error records are excluded from the report. The start date and end date format is MMDDhhmmYY.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**error (report) -sw\_resource [ -detail-summary ] sw\_resource {start\_date} {end\_date}**

**Description:** Generate a summary or detailed error report for software errors for the specified resource. The output is sent to the transfer directory as pd\_error.report.

**Parameters:** If a start date is specified, error records with earlier time stamps are excluded from the report. If an end date is specified, error records with later time stamps are excluded from the report. If no dates are specified, no error records are excluded from the report. The start date and end date format is MMDDhhmmYY.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**error transfer (-error\_log)**

**Description:** Transfer a copy of the error log to the transfer directory. The error log is placed in the transfer directory as pd\_error.log.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## Summary of Error Commands

Table 9-22 (Page 1 of 2). Summary of Error Commands

Command	Function
error clear {number_of_days}	Delete all entries from the error log older than the given number of days.
error clear -error_ID error_ID {number_of_days}	Delete entries with specified error IDs from the error log.
error clear -hardware {number_of_days}	Delete hardware entries from the error log.
error clear -hw_resource hw_resource {number_of_days}	Delete hardware entries for the specified hardware resource from the error log.
error clear -operator {number_of_days}	Delete operator entries from the error log.
error clear -software {number_of_days}	Delete software entries from the error log.
error clear -sw_resource sw_resource {number_of_days}	Delete software entries for the specified software resource from the error log.
error list (-error_ID) {-log}	List the error IDs in the error report.
error list -hw_resource {-log}	List the hardware resources names in the error report.

Table 9-22 (Page 2 of 2). Summary of Error Commands

Command	Function
error list -sequence_number {-log}	List the sequence numbers in the error report.
error list -sw_resource {-log}	List the software resource names in the error report.
error (report) -continuous	Generate a continuous summary report of all errors.
error (report) [ -detail-summary ] {start_date} {end_date}	Generate a summary or detailed error report for all errors.
error (report) -error_ID [ -detail-summary ] error_ID {start_date} {end_date}	Generate a summary or detailed error report for errors with the given error ID.
error (report) -hardware [ -detail-summary ] {start_date} {end_date}	Generate a summary or detailed error report for all hardware errors.
error (report) -hw_resource [ -detail-summary ] hw_resource {start_date} {end_date}	Generate a summary or detailed error report for hardware errors for the specified resource.
error (report) -operator [ -detail-summary ] {start_date} {end_date}	Generate a summary or detailed error report for all operator errors.
error (report) -sequence_number {-log} sequence_number	Generate an error report for a given sequence number.
error (report) -software [ -detail-summary ] {start_date} {end_date}	Generate a summary or detailed error report for all software errors.
error (report) -sw_resource [ -detail-summary ] sw_resource {start_date} {end_date}	Generate a summary or detailed error report for software errors for the specified resource.
error transfer (-error_log)	Transfer a copy of the error log to the transfer directory.

---

## Files Commands

Use the files commands to:

- List the files in the transfer or static directory
- View a file in the transfer or static directory
- Send a file from the transfer or static directory to a remote node or place it on a diskette
- Issue a checksum against a file in the transfer or static directory to be assured that it was transferred correctly to the remote node
- Receive a file into the transfer directory from a remote node or from a diskette
- Delete, rename, compare, compress, and uncompress files in the transfer directory
- Scan a file or all files in the transfer directory for a certain pattern
- List files on a diskette
- View the space used by the various file systems
- Execute a special file, supplied by IBM service, in the transfer directory

Table 9-23. Abbreviations for Files Commands

Type of term	Term and Abbreviations	
Object	files	file, f
Subobject	diskette	disk, d
	static	st
	system	systems, sys, s
	transfer	trans, t
Action	checksum	chk, cs, sum
	compare	comp, com
	compress	c
	delete	del, d
	exec	ex, e
	list	l
	receive	rec, rcv, r
	rename	ren
	scan	sc
	send	s
	uncompress	unc, u
	view	v
Option	-all	
	-append	-app, -a
	-create	-cre, -c
	-DOS	-dos, -d
	-ftp	-f
	-modem	-mod, -m
	-UNIX	-unix, -u

### files diskette (list) -dos {-log}

**Description:** List files on a DOS diskette.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files diskette (list) -unix {-log}**

**Description:** List files on a UNIX diskette.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files static checksum {-log} file\_name**

**Description:** Issue a checksum to a file in the static directory.

**Parameters:** Use the **files static (list)** command to list the files in the static directory.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **files static (list) {-log}**

**Description:** List all files in the static directory.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **files static send -dos file\_name DOS\_file\_name**

**Description:** Send a static directory file to a DOS diskette.

**Parameters:** Use the **files static (list)** command to list the files in the static directory.

Specify a file name on the DOS diskette for the DOS file name parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files static send (-ftp) host\_name**

**Description:** Send a static directory file to a remote host using FTP. This is an interactive session. You are prompted for the user ID and password at the remote host and the static directory file name.

**Parameters:** The host IP address can be used in place of the destination host name, if the name is not known. Use the **files static (list)** command to list the files in the static directory.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files static send -modem file\_name**

**Description:** Send a static directory file to a remote host over a modem.

**Parameters:** Use the **files static (list)** command to list the files in the static directory.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files static send -unix (-append) file\_name**

**Description:** Send a static directory file to an existing UNIX diskette.

**Parameters:** Use the **files static (list)** command to list the files in the static directory.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files static send -unix -create file\_name**

**Description:** Send a static directory file to a new UNIX diskette.

**Parameters:** Use the **files static (list)** command to list the files in the static directory.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files static view file\_name**

**Description:** View a file in the static directory.

**Parameters:** Use the **files static (list)** command to list the files in the static directory.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files system (view) {-log}**

**Description:** View the used and available space on the 6611 file systems.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **files (transfer) checksum {-log} file\_name**

**Description:** Issue a checksum to a file in the transfer directory.

**Parameters:** Use the **files (transfer) list** command to list the files in the transfer directory.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path



### **files (transfer) compare {-log} file\_name file\_name**

**Description:** Compare two transfer directory files.

**Parameters:** Use the **files (transfer) list** command to list the files in the transfer directory.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **files (transfer) compress file\_name**

**Description:** Compress a file in the transfer directory. The compressed file is stored in the transfer directory as file\_name.Z.

**Parameters:** Use the **files (transfer) list** command to list the files in the transfer directory. Only those files without the .Z extension can be compressed.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **files (transfer) delete file\_name**

**Description:** Delete a file from the transfer directory.

**Parameters:** Use the **files (transfer) list** command to list the files in the transfer directory.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **files (transfer) delete -all**

**Description:** Delete files from the transfer directory. See Table 4-4 on page 4-64 for a list of the files that will be removed.

**Note:** Deleting these files in the transfer directory may result in the loss of needed problem determination output.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **files (transfer) exec file\_name {program\_parameters}**

**Description:** Execute a special file in the transfer directory.

**Parameters:** The *file\_name* must be a special file given to you by IBM service.

The *program\_parameters* are determined by the requirements of the special file.

**Note:** This function cannot be used on user-written files.

**Authorization:** Controlling users only

**System Environment:** Fast-path only

### **files (transfer) list {-log}**

**Description:** List all files in the transfer directory.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **files (transfer) receive -dos *DOS\_file\_name new\_file\_name***

**Description:** Receive a file from a DOS diskette.

**Parameters:** Use the **files diskette (list) -dos** command to list the files on the DOS diskette.

Specify the file name to receive the DOS diskette file.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files (transfer) receive (-ftp) *host\_name***

**Description:** Receive a file from a remote host using FTP. This is an interactive session. You are prompted for the user ID, password, and file name at the remote host.

**Parameters:** The host's IP address can be used in place of the host name, if the name is not known.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files (transfer) receive -modem *file\_name***

**Description:** Receive a file to a remote host over a modem.

**Parameters:** The file specified must be in the local directory of the remote host.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files (transfer) receive -unix *file\_name***

**Description:** Receive a file from a UNIX diskette.

**Parameters:** Use the **files diskette (list) -unix** command to list the files on the UNIX diskette.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files (transfer) receive -unix -all**

**Description:** Receive all files on a UNIX diskette.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

**files (transfer) rename** *file\_name new\_file\_name*

**Description:** Rename a file in the transfer directory.

**Parameters:** Use the **files (transfer) list** command to list the files in the transfer directory.

Specify the new file name for the file.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

**files (transfer) scan -all {-log} pattern**

**Description:** Scan all files in the transfer directory for a given pattern and display the lines containing the pattern.

**Parameters:** Specify the search pattern. The pattern can be any search string.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**files (transfer) scan {-log} pattern file\_names**

**Description:** Scan specific files in the transfer directory for a given pattern and display the lines containing the pattern.

**Parameters:** Use the **files (transfer) list** command to list the files in the transfer directory.

Specify the search pattern. The pattern can be any search string.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**files (transfer) send -dos file\_name DOS\_file\_name**

**Description:** Send a (transfer) directory file to a DOS diskette.

**Parameters:** Use the **files (transfer) list** command to list the files in the transfer directory.

Specify a file name on the DOS diskette for the DOS file name parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files (transfer) send (-ftp) *host\_name***

**Description:** Send a transfer directory file to a remote host using FTP. This is an interactive session. You are prompted for the user ID and password at the remote host and the transfer directory file name.

**Parameters:** The host's IP address can be used in place of the host name, if the name is not known. Use the **files (transfer) list** command to list the files in the transfer directory.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files (transfer) send -modem *file\_name***

**Description:** Send a transfer directory file to a remote host over a modem.

**Parameters:** Use the **files (transfer) list** command to list the files in the transfer directory.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files (transfer) send -unix (-append) *file\_name***

**Description:** Send a transfer directory file to an existing UNIX diskette.

**Parameters:** Use the **files (transfer) list** command to list the files in the transfer directory.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files (transfer) send -unix -create *file\_name***

**Description:** Send a transfer directory file to a new UNIX diskette.

**Parameters:** Use the **files (transfer) list** command to list the files in the transfer directory.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **files (transfer) uncompress *file\_name***

**Description:** Uncompress a file in the transfer directory.

**Parameters:** Use the **files (transfer) list** command to list the files in the transfer directory. Only those files with the .Z extension can be uncompress.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **files (transfer) view *file\_name***

**Description:** View a file in the transfer directory.

**Parameters:** Use the **files (transfer) list** command to list the files in the transfer directory.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

## Summary of Files Commands

Table 9-24 (Page 1 of 2). Summary of Files Commands

Command	Function
files diskette (list) -dos {-log}	List files on a DOS diskette.
files diskette (list) -unix {-log}	List files on a UNIX diskette.
files static checksum {-log} <i>file_name</i>	Issue a checksum to a file in the static directory.
files static (list) {-log}	List all files in the static directory.
files static send -dos <i>file_name</i> <i>DOS_file_name</i>	Send a static directory file to a DOS diskette.
files static send (-ftp) <i>host_name</i>	Send a static directory file to a remote host using ftp.
files static send -modem <i>file_name</i>	Send a static directory file to a remote host over a modem.
files static send -unix (-append) <i>file_name</i>	Send a static directory file to an existing UNIX diskette.
files static send -unix -create <i>file_name</i>	Send a static directory file to a new UNIX diskette.
files static view <i>file_name</i>	View a file in the static directory.
files system (view) {-log}	View the used and available space on the 6611 filesystems.
files (transfer) checksum {-log} <i>file_name</i>	Issue a checksum to a file in the transfer directory.
files (transfer) compare {-log} <i>file_name</i> <i>file_name</i>	Compare two files in the transfer directory.
files (transfer) compress <i>file_name</i>	Compress a file in the transfer directory.
files (transfer) delete <i>file_name</i>	Delete a file from the transfer directory.
files (transfer) delete -all	Delete files from the transfer directory.
files (transfer) exec <i>file_name</i> { <i>program_parameters</i> }	Execute a special file in the transfer directory.
files (transfer) list {-log}	List all files in the transfer directory.
files (transfer) receive -dos <i>DOS_file_name</i> <i>new_file_name</i>	Receive a file from a DOS diskette.
files (transfer) receive (-ftp) <i>host_name</i>	Receive a file from a remote host using ftp.
files (transfer) receive -modem <i>file_name</i>	Receive a file to a remote host over a modem.
files (transfer) receive -unix <i>file_name</i>	Receive a file from a UNIX diskette.
files (transfer) receive -unix -all	Receive all files on a UNIX diskette.
files (transfer) rename <i>file_name</i> <i>new_file_name</i>	Rename a file in the transfer directory.
files (transfer) scan -all {-log} <i>pattern</i>	Scan all files in the transfer directory for a given pattern and echo the lines containing it.
files (transfer) scan {-log} <i>pattern</i> <i>file_names</i>	Scan specific files in the transfer directory for a given pattern and echo the lines containing it.
files (transfer) send -dos <i>file_name</i> <i>DOS_file_name</i>	Send a (transfer) directory file to a DOS diskette.

Table 9-24 (Page 2 of 2). Summary of Files Commands

Command	Function
files (transfer) send (-ftp) <i>host_name</i>	Send a transfer directory file to a remote host using ftp.
files (transfer) send -modem <i>file_name</i>	Send a transfer directory file to a remote host over a modem.
files (transfer) send -unix (-append) <i>file_name</i>	Send a transfer directory file to an existing UNIX diskette.
files (transfer) send -unix -create <i>file_name</i>	Send a transfer directory file to a new UNIX diskette.
files (transfer) uncompress <i>file_name</i>	Uncompress a file in the transfer directory.
files (transfer) view <i>file_name</i>	View a file in the transfer directory.

## Framerelay Command

Use the frame relay command to collect frame-relay debug information.

Table 9-25. Abbreviations for Framerelay Command

Type of term	Term and Abbreviations	
Object	framerelay	fr
Subobject	debug	db
Action	collect	col, c
Option	-cat	-c
	-system	-sys, -s
	-tar	-t

### framerelay debug (collect) {-system} [(-tar)|-cat] {interface} {output\_file}

**Description:** Collect frame-relay debug information for a specific serial adapter interface or for all serial interfaces configured for frame relay. Specify the -system option to collect additional system debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf output\_file** command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the -cat option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only those interfaces configured for frame relay. If you do not specify an output file name, the output is placed in the file *pd\_hostname.fr.intf.debug* (where *hostname* is the host name for this 6611 and *intf* is the interface name), or in the file *pd\_hostname.fr.debug* for all frame relay interfaces. If the *hostname* contains a colon (:), it will be replaced with a dash (-) in the output file name. If you specify an output file name, the prefix *pd\_* is added to it. Specify only alphanumeric characters, periods (.), dashes (-), and underscores (\_) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## Summary of Framerelay Command

Table 9-26. Summary of Framerelay Command

Command	Function
framerelay debug (collect) {-system} [(-tar) -cat] {interface} {output_file}	Collect frame-relay debug information.

---

## Hardware Commands

Use the hardware commands to:

- List the supported, defined, and installed devices
- List the devices that are testable (those that have hardware diagnostics)
- Update the hardware vital product data (VPD) after configuration changes
- View hardware vital product data
- List the devices for which detailed characteristics can be viewed
- View the detailed characteristics of a defined device
- Test a specified hardware device
- View the type of adapter in a slot
- View or update the serial or model number.

Table 9-27. Abbreviations for Hardware Commands

Type of term	Term and Abbreviations	
Object	hardware	hw
Subobject	config	cfg, c
	device	dev, d
	model	mod, m
	serial	ser, s
	slots	slot, sl
Action	list	l
	test	t
	update	upd, u
	view	v
Option	-defined	-def, -d
	-detail	-det, -d
	-installed	-in, -i
	-log	-l
	-supported	-sup, -s
	-testable	-test, -t

### hardware config (update)

**Description:** Update hardware VPD after configuration changes.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### hardware device (list) {-log}

**Description:** List the devices for which detailed characteristics can be viewed.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### hardware device test *device\_name*

**Description:** Run a test with the specified hardware device.



**Parameters:** Use the **hardware (list) -testable** command to list the devices supported by the Hardware Diagnostics Facility.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **hardware device view {-log} device\_name**

**Description:** View the detailed characteristics of a defined device.

**Parameters:** Use the **hardware device (list)** command to list the devices for which detailed characteristics can be viewed.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **hardware (list) -defined {-log}**

**Description:** List the defined devices.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **hardware (list) -installed {-log}**

**Description:** List the installed devices.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **hardware (list) -supported {-log}**

**Description:** List the supported devices.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **hardware (list) -testable {-log}**

**Description:** List the devices for which diagnostics can be run.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **hardware model update model\_number**

**Description:** Update the hardware VPD with new model number.

**Parameters:** Specify 120, 125, 140, 145, 170, or 175 for the *model\_number* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### hardware model (view)

**Description:** View model number from hardware VPD.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### hardware serial update *serial\_number*

**Description:** Update hardware VPD with new serial number.

**Parameters:** The *serial\_number* parameter has the format XX-NNNNNNNN, where XX is any two-character uppercase alphanumeric string and NNNNNNNN is any seven-character alphanumeric string.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### hardware serial (view)

**Description:** View serial number from hardware VPD.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### hardware slots {view} {-detail} {-log}

**Description:** View the type of adapters in each slot of the 6611. Specify the -detail option to get the in depth hardware information.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### hardware view {-log}

**Description:** View hardware VPD.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## Summary of Hardware Commands

Table 9-28. Summary of Hardware Commands

Command	Function
hardware config (update)	Update the hardware VPD after configuration changes.
hardware device (list) {-log}	List the devices for which detailed characteristics can be viewed.
hardware device test <i>device_name</i>	Run a test with the specified hardware device.
hardware device view {-log} <i>device_name</i>	View the detailed characteristics of a defined device.
hardware (list) -defined {-log}	List the defined devices.
hardware (list) -installed {-log}	List the installed devices.
hardware (list) -supported {-log}	List the supported devices.
hardware (list) -testable {-log}	List the devices for which diagnostics can be run.
hardware model update <i>model_number</i>	Update the hardware VPD with new model number.
hardware model (view)	View the model number from the hardware VPD.
hardware serial update <i>serial_number</i>	Update the hardware VPD with a new serial number.
hardware serial (view)	View the serial number from the hardware VPD.
hardware slots (view) {-detail} {-log}	View the type of adapter in each slot of the 6611
hardware view {-log}	View the hardware VPD.

---

## Hostname Commands

Use the host name commands to:

- View the host name for this 6611 and change the name
- View the list of IP addresses that have been mapped to host names
- Add and delete entries from the mapping

Table 9-29. Abbreviations for Hostname Commands

Type of term	Term and Abbreviations	
Object	hostname	host, hn, h
Subobject	map	m
Action	add	a
	delete	del, d
	set	s
	view	v
Option	-log	-l

### hostname map add *host\_name IP\_address*

**Description:** Add a host name and IP address pair to the mapping. You must issue the **config apply** or **config commit** command for the new host name and IP address to become part of the mapping.

**Parameters:** Specify up to 31 alphanumeric characters, periods (.), dashes (-), or underscores (\_) for the *host\_name* parameter. Specify a dotted decimal IP address for the *IP\_address* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### hostname map delete *host\_name*

**Description:** Delete a host name and IP address pair from the mapping. You must issue the **config apply** or **config commit** command for the new host name and IP address to be removed from the mapping.

**Parameters:** Use the **hostname map view** command to list the configured host names.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### hostname map (view) {-log}

**Description:** View the mapping of host names to their IP addresses.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### hostname set *host\_name domain\_name*

**Description:** Set the host name and domain name of the 6611. You must issue the **config apply** or **config commit** command for the new host name and domain name to be part of the working configuration.

**Parameters:** Specify up to 31 alphanumeric characters, periods (.), dashes (–), or underscores (\_) for the *host\_name* parameter. Specify up to 63 alphanumeric characters, periods (.), dashes (–), or underscores (\_) for the *domain\_name* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## hostname view

**Description:** View the host name and domain name of the 6611.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## Summary of Hostname Commands

Table 9-30. Summary of Hostname Commands

Command	Function
hostname map add <i>host_name</i> <i>IP_address</i>	Add a host name and IP address pair to the mapping.
hostname map delete <i>host_name</i>	Delete a host name and IP address pair from the mapping.
hostname map (view) {-log}	View the mapping of host names to their IP addresses.
hostname set <i>host_name</i> <i>domain_name</i>	Set the host name and domain name of the 6611.
hostname view	View the host name and domain name of the 6611.

## Interface Commands

Use the interface commands to:

- List the interface names and adapter names for the active interfaces
- View the interface status, interface packet traffic statistics, and interface utilization statistics
- Collect interface debug information

Table 9-31. Abbreviations for Interface Commands

Type of term	Term and Abbreviations	
Object	interface	intf, i
Subobject	debug	db
	state	st
	statistics	statistic, stat, s
Action	collect	col, c
	list	l
	reinsert	rins, ri
	view	v
Option	-cat	-c
	-log	-l
	-system	-sys, -s
	-tar	-t
	-traffic	-trf
	-utilization	-util, -u

### **interface debug (collect) {interface} {-system} [(-tar)-cat] {output\_file}**

**Description:** Collect debug information for a specified peer-capable adapter interface or for all peer-capable adapter interfaces. Specify the -system option to collect additional system debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf output\_file** command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the -cat option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** Use the **interface list** command to list the active adapter interfaces.

If you do not specify an output file name, the output is placed in the file *pd\_hostname.intf.debug*, where *hostname* is the host name for this 6611 and *intf* is either the adapter interface name as specified with the *interface* parameter, or the word *interface* when running this command for all adapter interfaces. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the output file name. If you specify an output file name, the prefix *pd\_* is added to it. Specify only alphanumeric characters, periods (.), dashes (–), and underscores (\_) in the output file name.

|           **Authorization:** Controlling users only

|           **System Environment:** RSH, REXEC, and fast-path only

| **interface list {-log}**

|           **Description:** List the interface names for the active interfaces.

|           **Parameters:** None

|           **Authorization:** Controlling and viewing users

|           **System Environment:** RSH, REXEC, and fast-path

| **interface reinsert interface**

|           **Description:** Reinsert a token-ring interface to the LAN.

|           **Parameters:** Use the **interface list** command to list the active interfaces. Specify only token-ring interfaces.

|           **Authorization:** Controlling users only

|           **System Environment:** RSH, REXEC, and fast-path

| **interface state (view) interface**

|           **Description:** View the state of the interface and some protocol information for some of the protocols configured for that interface.

|           **Parameters:** Use the **interface list** command to list the active interfaces. All interfaces are valid except for the mpq# interfaces.

|           **Authorization:** Controlling and viewing users

|           **System Environment:** RSH, REXEC, and fast-path

| **interface statistics (view) (-traffic) interface number\_seconds**

|           **Description:** View the interface packet traffic statistics. Press **Ctrl+C** to end the command.

|           **Parameters:** Use the **interface list** command to list the active interfaces. Only the te#, tk#, and to# interfaces are valid.

|           Specify a number between 1 and 5 for the *number\_seconds* parameter.

|           **Authorization:** Controlling and viewing users

|           **System Environment:** Fast-path only

| **interface statistics (view) -utilization number\_seconds {xt0\_speed} {xt1\_speed} {xt2\_speed} {xt3\_speed}**

|           **Description:** View the interface utilization statistics. The statistics are continually updated. Press **Ctrl+C** to end the command.

**Parameters:** Specify a number between 15 and 60 for the *number\_seconds* parameter.

The *xt#\_speed* parameters specify the line speeds of the configured X.25 adapters. Use the **hardware (list) -installed** command to list the configured devices. X.25 adapters will be listed as **ampx#**, where the # will match the # in the *xt#\_speed* parameter. The number of *xt#\_speed* parameters must equal the number of configured X.25 interfaces.

**Authorization:** Controlling users only

**System Environment:** Fast-path only

## Summary of Interface Commands

Table 9-32. Summary of Interface Commands

Command	Function
interface debug (collect) { <i>interface</i> } {-system} [(-tar) -cat] { <i>output_file</i> }	Collect debug information for a specified peer-capable adapter interface.
interface list {-log}	List the interface names for the active interfaces.
interface reinsert <i>interface</i>	Reinsert a token-ring interface on a LAN.
interface state (view) <i>interface</i>	View the state of the interface and some protocol information for some of the protocols configured for that interface.
interface statistics (view) (-traffic) <i>interface</i> <i>number_seconds</i>	View the interface packet traffic statistics.
interface statistics (view) -utilization <i>number_seconds</i> { <i>xt0_speed</i> } { <i>xt1_speed</i> } {& <i>xt2.</i> } { <i>xt3_speed</i> }	View the interface utilization statistics.



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## IP Commands

Use the IP commands to:

- Start and stop the IP trace
- List the trace parameters
- Send an echo or trace a route to an IP node
- Add and delete entries to the IP ARP table
- View the entries of the IP ARP table
- View IP routes, connections, and protocol statistics
- View filter and OSPF routing information
- Dump the IP routing protocol process
- Set up IP for debug collection
- Collect IP debug information

Table 9-33. Abbreviations for IP Commands

Type of term	Term and Abbreviations	
Object	IP	ip
Subobject	arp	a
	connections	connection, con, c
	debug	db
	filters	filter, fil, f
	OSPF	ospf, o
	routes	route, r
	statistics	statistic, stat, s
Action	add	a
	collect	col, c
	delete	d
	dump	du
	echo	e
	list	l
	set	s
	trace	tr
	view	v
Option	-all	
	-cat	-c
	-continuous	-cont, -c
	-general_info	-general, -gen, -gi, -g
	-host_name	-hn
	-hw_address	-hwa, -ha
	-information	-info
	-interface	-intf, -if, -i
	-log	-l
	-lsdb	-ls
	-neighbors	-neighbor, -nbr, -n
	-nopublish	-nop
	-notrcstop	-nts, -no
	-off	
	-on	
	-permanent	-perm
	-publish	-pub
	-route	-routes, -r
	-system	-sys, -s
	-tar	-t
	-temporary	-temp, -tmp
	-trace_log	-tl
	-trace_parameters	-tp

**ip arp add [(-permanent)|-temporary] [(-nopublish)|-publish] *host\_name*  
*hw\_address interface***

**Description:** Add either a permanent or temporary IP ARP table entry to a given interface and publish it, if necessary.

**Parameters:** The host IP address can be used in place of the host name, if known.

The hardware address parameter is in the form:

xx:xx:xx:xx:xx:xx

where xx is any hexadecimal number from 00 to FF.

Use the **ip arp list (-interface)** command to list the possible IP ARP interfaces.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **ip arp delete -all** *interface*

**Description:** Delete all IP ARP table entries on a given peer-capable interface.

**Parameters:** Use the **ip arp list (-interface)** to list the possible IP ARP interfaces.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **ip arp delete (-host\_name)** *host\_name interface*

**Description:** Delete an IP ARP table entry from a given peer-capable interface using the host name.

**Parameters:** The host's IP address can be used in place of the host name, if known.

Use the **ip arp list (-interface)** command to list the possible IP ARP interfaces.  
Use the **ip arp (view) interface** command to view the entries that can be deleted.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **ip arp delete -hw\_address** *hw\_address interface*

**Description:** Delete an IP ARP table entry from a given peer-capable interface using the hardware address.

**Parameters:** The hardware address parameter is in the form:

xx:xx:xx:xx:xx:xx

where xx is any hexadecimal number from 00 to FF.

Use the **ip arp list (-interface)** command to list the possible IP ARP interfaces.  
Use the **ip arp (view) interface** command to view the entries that can be deleted.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **ip arp list (-interface)**

**Description:** List the possible IP ARP interfaces.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **ip arp (view) {-log}** *interface*

**Description:** View the IP ARP table entries on a given peer-capable interface.

**Parameters:** Use the **ip arp list (-interface)** command to list the possible IP ARP interfaces.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **ip connections (view) -information {-log}**

**Description:** View the IP interface connection information.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **ip connections (view) {-log} interface**

**Description:** View the IP interface connections.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for IP.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **ip debug (collect) {-system} {-notrcstop} [(-tar)|-cat] {output\_file}**

**Description:** Collect IP debug information. Specify the -system option to collect additional system debug information. Specify the -notrcstop option to keep the IP trace running while collecting other debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf output\_file** command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the -cat option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** If you do not specify an output file name, the output is placed in the file *pd\_hostname.ip.debug*, where *hostname* is the host name for this 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the output file name. If you specify an output file name, the prefix *pd\_* is added to it. Specify only alphanumeric characters, periods (.), dashes (–), and underscores (–) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

**ip debug set** {*trace\_log\_size*} {*number\_trace\_files*} {*trace\_parameters*}

**Description:** Set up IP for collecting debug information. The output is placed in the file *hostname.IP.setup.db*, where *hostname* is the host name of the 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the setup file name. When you run the **ip debug collect** command, *hostname.IP.setup.db* is combined with the debug collection files and placed in the output file.

The command also starts the IP trace. The trace output is placed in the file *pd\_ip.trc*.

**Parameters:** You can select the location of the trace data, the size of the trace files and how many trace files to keep. If you DO NOT specify either the trace log size or the number of trace files, the trace output is appended to the existing trace file which is allowed to grow indefinitely. If you specify either the trace log size or the number of trace files, a new trace file is started. If the maximum number of IP trace files do not exist, the newly created file is given the name, *pd\_ip.trc.#*, where # is one higher than the largest existing # at the end of an IP trace file name. If the maximum number of IP trace files do exist, the *pd\_ip.trc* file is cleared and used for the current trace file. If you do not specify a trace log size, it will default to 1M. If you specify a trace log size, it must be represented in either kilobytes (K) or megabytes (M). The value of the trace log size must be at least 10K and no larger than 10M. If you do not specify the number of trace files to keep, it will default to two files. If you specify the number of trace files to keep, it must be between two and ten. If you specify a value of zero for the number of trace files to keep, a single trace file is allowed to grow indefinitely. Use the **ip (list) -tp** command to list the valid IP trace parameters. If you do not specify any trace parameters, the trace is started with the **all** parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path only

**ip dump**

**Description:** Dump the IP routing protocol. The output is sent to the transfer directory as *pd\_ip.dump*.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

**ip echo -continuous** *dest\_host\_name* {*packet\_size*} {*interval*}

**Description:** Issue continuous echo requests to another IP node. Press **Ctrl+C** to end the command.

**Parameters:** Either the IP address or host name can be specified for the *dest\_host\_name* parameter.

Specify 1 and 100 bytes for the *packet\_size* parameter. The default is 64.

Specify 1 and 120 seconds for the *interval* parameter. The default is 2. You must specify a packet size if you want to specify an interval.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **ip echo {-log} dest\_host\_name {packet\_size} {number\_echos}**

**Description:** Issue an echo request to another IP node.

**Parameters:** Either the IP address or host name can be specified for the *dest\_host\_name* parameter. Specify 1 and 100 bytes for the *packet\_size* parameter; the default is 64. Specify 1 and 1 000 for the *number\_echos* parameter; the default is 3. You must specify a packet size if you want to specify the number of echoes.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **ip filters (view) {-log} interface**

**Description:** View the IP interface filters.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for IP.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **ip (list) -trace\_parameters {-log}**

**Description:** List the IP protocol trace parameters.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **ip ospf (view) {-log} [(-neighbors)l-interfacel-lsdb-general\_info ]**

**Description:** View the specified OSPF routing information for this 6611 (loopback IP address). You can view OSPF neighbors, interface status, the link state database, and some general OSPF information.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **ip ospf (view) {-log} [ (-neighbors)l-interfacel-lsdb-general\_info ] IP\_address**

**Description:** View the specified OSPF routing information for the specified IP address. You can view OSPF neighbors, interface status, the link state database, and some general OSPF information.

**Parameters:** Specify a dotted decimal address for the *IP\_address* parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

**ip routes trace {-log} dest\_host\_name {packet\_size} {num\_queries} {maximum\_hops} {source\_host\_name}**

**Description:** Trace a route to another IP node.

**Parameters:** Each of the parameters can be defaulted, except the destination host name. The IP address can be used in place of the destination or source host name. The packet size is in bytes from 40 to 2048 with a default of 40. The number of queries is from 1 to 1000 with a default of 3. The maximum number of hops is from 2 to 100, with a default of 30. The source host name or IP address must be defined in this 6611.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

**ip routes (view) -interface {-log} interface**

**Description:** View the IP route table for a given interface.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for IP.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**ip routes (view) (-system) {-log}**

**Description:** View the system IP route table.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**ip statistics (view) (-interface) {-log} interface**

**Description:** View the IP network interface protocol statistics.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for IP.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**ip statistics (view) -route {-log}**

**Description:** View the IP route statistics.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **ip statistics (view) -system {-log}**

**Description:** View the TCP/IP system network protocol statistics.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **ip trace -off**

**Description:** Stop the IP protocol trace. The output is sent to the transfer directory as pd\_ip.trc.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **ip trace (-on) {-trace\_log} {-number\_files} {trace\_log\_size} {number\_trace\_files} {trace\_parameters}**

**Description:** Start the IP protocol trace. You can select the location of the trace data and you can optionally select the size of the trace files and how many trace files to keep. You can also select what type of data to collect from a large number of trace parameters. The trace output can be either appended to the existing IP trace file or a new set of trace files can be started with the *trace\_log\_size* parameter.

**Parameters:** If you specify the *-trace\_log* and *-number\_files* options, you must also specify the corresponding trace parameters. If neither option is specified, the trace output is appended to the existing trace file, which is allowed to grow indefinitely. If either option is specified, a new trace file is started.

If the maximum number of trace files does not exist, a new trace file is created and named pd\_ip.trc.#, where the number sign, #, is one higher than the largest existing trace file number. If the maximum number of trace files does exist, the pd\_ip.trc file is cleared and used for the current trace file. The maximum number of IP trace files is specified with the *-number\_files* option and the *number\_trace\_files* parameter. The default and minimum for the parameter is two; the maximum is 10. If a value of zero is given for the *number\_trace\_files* parameter, the *trace\_log\_size* parameter is ignored and a single trace file is allowed to grow indefinitely. The size of the trace files is given with the *-trace\_log* option and the *trace\_log\_size* parameter. The size can be specified in either kilobytes (K) or megabytes (M). The default size is 1M; the range is from 10K to 10M.

The type of data to trace is specified with the *trace\_parameters*.



The *trace\_parameters* are the last parameters entered. Use the **ip (list) (-trace\_parameters)** command to list the valid trace parameters. The default for the *trace\_parameters* is *all*.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## Summary of IP Commands

Table 9-34 (Page 1 of 2). Summary of IP Commands

Command	Function
ip arp add [(-permanent) -temporary] [(-nopublish) -publish] <i>host_name hw_address interface</i>	Add either a permanent or temporary IP ARP table entry to a given interface and either publish it or not.
ip arp delete -all <i>interface</i>	Delete all IP ARP table entries on a given peer-capable interface.
ip arp delete (-host_name) <i>host_name interface</i>	Delete an IP ARP table entry from a given peer-capable interface using the host name.
ip arp delete -hw_address <i>hw_address interface</i>	Delete an IP ARP table entry from a given peer-capable interface using the hardware address.
ip arp list (-interface)	List the possible IP ARP interfaces.
ip arp (view) {-log} <i>interface</i>	View the IP ARP table entries on a given peer-capable interface.
ip connections (view) -information {-log}	View the IP interface connection information.
ip connections (view) {-log} <i>interface</i>	View the IP interface connections.
ip debug (collect) {-system} {-notrcstop} [(-tar) -cat] <i>{output_file}</i>	Collect the IP protocol debug information.
ip debug set { <i>trace_log_size</i> } { <i>number_trace_files</i> } { <i>trace_parameters</i> }	Set up the IP protocol for collecting debug information.
ip dump	Dump the IP routing protocol.
ip echo -continuous <i>dest_host_name {packet_size}</i> { <i>interval</i> }	Issue an echo request to another IP node.
ip echo {-log} <i>dest_host_name {packet_size}</i> { <i>number_echos</i> }	Issue an echo request to another IP node.
ip filters (view) {-log} <i>interface</i>	View the IP interface filters.
ip (list) -trace_parameters {-log}	List the IP protocol trace parameters.
ip ospf (view) {-log} [(-neighbors) -interface -lsdb -general_info]	View the specified OSPF routing information for this 6611 (loopback IP address).
ip ospf (view) {-log} [(-neighbors) -interface -lsdb -general_info] <i>IP_address</i>	View the specified OSPF routing information for the specified IP address.
ip routes trace {-log} <i>dest_host_name {packet_size}</i> { <i>num_queries</i> } { <i>maximum_hops</i> } { <i>source_host_name</i> }	Trace a route to another IP node.
ip routes (view) -interface {-log} <i>interface</i>	View the IP route table for a given interface.
ip routes (view) (-system) {-log}	View the system IP route table.
ip statistics (view) (-interface) {-log} <i>interface</i>	View the IP network interface protocol statistics.
ip statistics (view) -route {-log}	View the IP route statistics.
ip statistics (view) -system {-log}	View the TCP/IP system network protocol statistics.

Table 9-34 (Page 2 of 2). Summary of IP Commands

Command	Function
ip trace -off	Stop the IP protocol trace.
ip trace (-on) {-trace_log} {-number_files} {trace_log_size}   {number_trace_files} {trace_parameters}	Start the IP protocol trace.

## IPX Commands

Use the IPX commands to:

- Start and stop the IPX protocol trace
- Dump the IPX protocol
- View IPX routes, connections, and protocol statistics
- View filter information
- Collect IPX debugging information

Table 9-35. Abbreviations for IPX Commands

Type of term	Term and Abbreviations	
Object	IPX	ipx
Subobject	connections	connection, con, c
	debug	db
	filters	filter, fil, f
	routes	route, r
	statistics	statistic, stat, s
Action	collect	col, c
	dump	du
	trace	tr, t
	view	v
Option	-cat	-c
	-flood	-fl, -f
	-IBM	-ibm
	-interface	-intf, -if, -i
	-log	-l
	-off	
	-on	
	-system	-sys, -s
	-tar	-t

### ipx connections (view) {-log} interface

**Description:** View the IPX interface connections.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for IPX.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### ipx debug (collect) {-system} [(-tar)|-cat] {output\_file}

**Description:** Collect IPX debug information. Specify the -system option to collect additional system debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf output\_file** command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the -cat option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** If you do not specify an output file name, the output is placed in the file *pd\_hostname.ipx.debug*, where *hostname* is the host name for this 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (-) in the output file name. If you specify an output file name, the prefix *pd\_* is added to it. Specify only alphanumeric characters, periods (.), dashes (-), and underscores (\_) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path only

## **ipx dump**

**Description:** Dump the IPX protocol. The dump is placed in the transfer directory with the file name *pd\_ipxd.tables*.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## **ipx echo (-IBM) {-flood} *dest\_net\_num dest\_host\_num {packet\_size} {num\_echoes}***

**Description:** Issue an echo request to another IPX node. If you specify the -flood option, the 6611 will send all the echo requests to the destination host immediately; otherwise the echo requests will be sent at the rate of one per second.

**Parameters:** Specify a four-byte hexadecimal number (1 to FFFFFFFE) for the *dest\_net\_num* parameter. Specify a six-byte hexadecimal number for the *dest\_host\_num* parameter. The *dest\_host\_num* parameter is the MAC address of the interface that connects to the destination host. Specify 1 to 100 bytes for the *packet\_size* parameter; the default is 64. Specify 1 to 1000 for the *num\_echoes* parameter; the default is 3. You must specify a packet size, if you want to specify the number of echoes.

**System Environment** Fast-path only

## **ipx filters (view) {-log} *interface***

**Description:** View the IPX interface filters.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for IPX.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **ipx filters (view) {-log} -RIP**

**Description:** View the IPX Routing Information Protocol (RIP) filters.

**Parameters:** None

|                   **Authorization:** Controlling and viewing users

|                   **System Environment:** RSH, REXEC, and fast-path

| **ipx filters (view) {-log} -SAP**

|                   **Description:** View the IPX Service Advertisement Protocol (SAP) filters.

|                   **Parameters:** None

|                   **Authorization:** Controlling and viewing users

|                   **System Environment:** RSH, REXEC, and fast-path

| **ipx routes (view) -interface {-log} interface**

|                   **Description:** View the IPX route table for a given interface.

|                   **Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for IPX.

|                   **Authorization:** Controlling and viewing users

|                   **System Environment:** RSH, REXEC, and fast-path

| **ipx routes (view) (-system) {-log}**

|                   **Description:** View the system IPX route table.

|                   **Parameters:** None

|                   **Authorization:** Controlling and viewing users

|                   **System Environment:** RSH, REXEC, and fast-path

| **ipx statistics (view) (-interface) {-log} interface**

|                   **Description:** View the IPX network interface protocol statistics.

|                   **Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for IPX.

|                   **Authorization:** Controlling and viewing users

|                   **System Environment:** RSH, REXEC, and fast-path

| **ipx statistics (view) -system {-log}**

|                   **Description:** View the IPX system network protocol statistics.

|                   **Parameters:** None

|                   **Authorization:** Controlling and viewing users

|                   **System Environment:** RSH, REXEC, and fast-path

| **ipx trace -off**

|                   **Description:** Stop the IPX routing protocol trace. The trace output is in the transfer directory with the file names `pd_ipxd.SAP` and `pd_ipxd.RIP`.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **ipx trace (-on)**

**Description:** Start the IPX routing protocol trace. The trace output is in the transfer directory with the file names `pd_ipxd.SAP` and `pd_ipxd.RIP`.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **Summary of IPX Commands**

Table 9-36. Summary of IPX Commands

Command	Function
<code>ipx connections (view) {-log} interface</code>	View the IPX interface connections.
<code>ipx debug (collect) {-system} [(-tar)-cat] {output_file}</code>	Collect the IPX protocol debug information.
<code>ipx dump</code>	Dump the IPX protocol.
<code>ipx echo (-IBM) {-flood} dest_net_num dest_host_num {packet_size} {num_echoes}</code>	Issue an echo request to an IPX host.
<code>ipx filters (view) {-log} interface</code>	View the IPX interface filters.
<code>ipx filters (view) {-log} -RIP</code>	View the IPX RIP filters.
<code>ipx filters (view) {-log} -SAP</code>	View the IPX SAP filters.
<code>ipx routes (view) -interface {-log} interface</code>	View the IPX route table for a given interface.
<code>ipx routes (view) (-system) {-log}</code>	View the system IPX route table.
<code>ipx statistics (view) (-interface) {-log} interface</code>	View the IPX network interface protocol statistics.
<code>ipx statistics (view) -system {-log}</code>	View the IPX system network protocol statistics.
<code>ipx trace -off</code>	Stop the IPX protocol trace.
<code>ipx trace (-on)</code>	Start the IPX protocol trace.

---

## LED Commands

Use the LED commands to view the current LED display on the operator panel and the explanation of any given 3-digit LED code.

*Table 9-37. Abbreviations for LED Commands*

Type of term	Term and Abbreviations	
Object	LED	led, l, panel, code
Action	view	v
Option	-log	-l

### LED view {-log}

**Description:** View the setting of the 3-digit LED display on the operator panel and give its explanation.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### LED view {-log} LED\_code

**Description:** View the explanation of a given 3-digit LED code.

**Parameters:** A valid code for the 3-digit display.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## Summary of LED Commands

*Table 9-38. Summary of LED Commands*

Command	Function
LED view {-log}	View the setting of the 3-digit display on the operator's panel.
LED view {-log} LED_code	View the explanation of the given 3-digit LED code.

---

## Nameserver Commands

Use the name server commands to:

- Start and stop using remote name service
- List the IP addresses of the configured remote name servers
- Add and delete remote name servers from the list

*Table 9-39. Abbreviations for Nameserver Commands*

Type of term	Term and Abbreviations	
Object	nameserver	name, ns
Action	add	a
	delete	del, d
	list	l
	start	begin, b
	stop	end, e
Option	-log	-l

### **nameserver add** *IP\_address*

**Description:** Add a host to the list of remote host name servers. You must issue the **config apply** or **config commit** command for the name server to be part of the working configuration.

**Parameters:** Specify the IP address of the host to be added.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **nameserver delete** *IP\_address*

**Description:** Delete a host from the list of remote host name servers. You must issue the **config apply** or **config commit** command for this name server to be removed from the working configuration.

**Parameters:** Specify the IP address of the host to be deleted.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **nameserver list** {-log}

**Description:** List the IP addresses of all host name servers.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **nameserver start**

**Description:** Allow this 6611 to use remote host name service. You must issue the **config apply** or **config commit** command for this 6611 to begin using the remote host name service.



**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## nameserver stop

**Description:** Stop this 6611 from using remote host name service. You must issue the **config apply** or **config commit** command for this 6611 to stop using the remote host name service.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## Summary of Nameserver Commands

Table 9-40. Summary of Nameserver Commands

Command	Function
nameserver add <i>IP_address</i>	Add a host to the list of remote host name servers.
nameserver delete <i>IP_address</i>	Delete a host from the list of remote host name servers.
nameserver list {-log}	List the IP addresses of all host name servers.
nameserver start	Allow this 6611 to use remote host name service.
nameserver stop	Stop this 6611 from using remote host name service.

## PPP Command

Use the Point-to-Point Protocol (PPP) command to collect PPP debug information.

Table 9-41. Abbreviations for PPP Command

Type of term	Term and Abbreviations	
Object	PPP	ppp
Subobject	debug	db
Action	collect	col, c
Option	-cat	-c
	-system	-sys, -s
	-tar	-t

### ppp debug (collect) {-system} [(-tar)|-cat] {interface} {output\_file}

**Description:** Collect PPP debug information for a specific serial adapter interface or for all serial interfaces configured for PPP. Specify the -system option to collect additional system debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf *output\_file*** command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the -cat option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for PPP. If you do not specify an output file name, the output is placed in the file *pd\_hostname.ppp.intf.debug*, where *hostname* is the host name for this 6611 and *intf* is the interface name, or in the file *pd\_hostname.ppp.debug* for all PPP interfaces. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the output file name. If you specify an output file name, the prefix *pd\_* is added to it. Specify only alphanumeric characters, periods (.), dashes (–), and underscores (–) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path only

## Summary of PPP Command

Table 9-42. Summary of the PPP Command

Command	Function
ppp debug (collect) {-system} [(-tar) -cat] {interface} {output_file}	Collect PPP protocol debug information.

## Process Commands

Use the process commands to:

- List the active processes, the command issued to start the process, detailed information about the process, the status of the active processes, and process details sorted by protocol
- Dump any active process disruptively
- View the process table information

Table 9-43. Abbreviations for Process Commands

Type of term	Term and Abbreviations	
Object	process	proc, pro, p
Subobject	table	tab, t
Action	dump	du
	list	l
	view	v
Option	-commands	-command, -cmds, -cmd, -c
	-detail	-det, -d
	-log	-l
	-protocol	-proto, -pro, -p
	-status	-stat, -st, -s

### process dump *processID*

**Description:** Take a disruptive core dump of the given active process. The dump is placed in the transfer directory as `pd_dump.process.nnnn.`, where *process* is the process name and *nnnn* is the error log sequence number.

**Parameters:** Use the **process list** command to get the process ID parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### process list

**Description:** List the active processes alphabetically by process name.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### process list -commands {-log}

**Description:** List the commands issued to start the active processes in ascending numerical order by process ID.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **process list -detail {-log}**

**Description:** List detailed information about the active processes alphabetically by process name.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **process list -protocol {-log}**

**Description:** List detailed information about the active processes. The processes are listed by protocol.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **process list -status {-log}**

**Description:** List the status of the active processes in ascending numerical order by process ID.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **process table view**

**Description:** View the process table information.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## **Summary of Process Commands**

*Table 9-44. Summary of Process Commands*

<b>Command</b>	<b>Function</b>
process dump <i>processID</i>	Take a disruptive core dump of the given active process.
process list	List the active processes.
process list -commands {-log}	List the command issued to start the active processes.
process list -detail {-log}	List detailed information about the active processes.
process list -protocol {-log}	List detailed information about the active processes by protocol.
process list -status {-log}	List the status of the active processes.
process table view	View the process table information.

---

## Remote Access Commands

Use the remote access commands to initiate communication with a remote host. The supported remote access commands are:

- **ftp**
- **ping**
- **rlogin**
- **telnet**

**Note:** The ping command deviates from the command structure of the fast-path commands in that parameters follow some of the options.

### **ftp** *dest\_host\_name*

**Description:** Issue FTP to send or receive a file to or from a remote IP station. This is an interactive session. You are prompted for the user ID and password at the remote host. Only files in the transfer or static directories can be sent to a remote host. Files being received from a remote host are placed in the transfer directory. To send a file to a remote host that exists in the transfer directory, issue **put filename**. If it exists in the static directory, issue **lcd /tmp/hold/static** and then **put filename**. The file is placed in the home directory of the user ID at the *dest\_host\_name*. To receive a file from a remote host, change directories to the one containing the file you want to receive and issue **get filename**. The files are sent or received as ascii files, unless you specify them to be transferred as a binary file. Specify **bin** prior to issuing the get or put command.

**Note:** This command deviates from the object-orientated command structure in that:

- Parameters and options are intermixed
- Some options do not start with a dash

**Parameters:** Specify an IP address or host name for the *dest\_host\_name* parameter. An IP address is a dotted decimal number of the form xxx.xxx.xxx.xxx, where xxx can be any number from 1 to 255.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **ftp -c** *user\_id password* **put filename {ascii|bin}** *dest\_host\_name*

**Description:** Issue a non-interactive FTP to send a file to a remote IP station. This type of FTP is only supported on the 6611. The file to be sent must be in the transfer directory. The file is placed in the home directory for the specified user at the remote IP station. Specify the type of file transfer as either ascii or bin.

**Note:** This command deviates from the object-orientated command structure in that:

- Parameters and options are intermixed
- Some options do not start with a dash

**Parameters:** Specify the user ID and password of a user at the remote IP station with the *user\_id* and *password* parameters. Specify the IP address or host name with the *dest\_host\_name* parameter. The IP address is a dotted decimal number of the form xxx.xxx.xxx.xxx, where xxx can be any number from 1 to 255. Specify the file name to be sent with the *filename* parameter.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC and fast-path.

**ftp -c user\_id password get filename {ascii|bin} dest\_host\_name**

**Description:** Issue a non-interactive FTP to receive a file from a remote IP station. This type of FTP is only supported on the 6611. The file to be received must be in the home directory for the specified user at the remote IP station. The file being received is placed in the transfer directory. Specify the type of file transfer as either ascii or bin.

**Note:** This command deviates from the object-orientated command structure in that:

- Parameters and options are intermixed
- Some options do not start with a dash

**Parameters:** Specify the user ID and password of a user at the remote IP station with the *user\_id* and *password* parameters. Specify the IP address or host name with the *dest\_host\_name* parameter. The IP address is a dotted decimal number of the form xxx.xxx.xxx.xxx, where xxx can be any number from 1 to 255. Specify the file name to receive with the *filename* parameter.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC and fast-path

**ping {-d} {-n} {-q} {-r} {-v} {-R}**

**{-fl-i seconds} {-l number\_echos} {-s packet\_size}**

**{-c number\_echos} {-p pattern} dest\_host\_name**

**{packet\_size} {number\_echos}**

**Description:** Test if you can reach another IP node from this 6611. The **ping** command sends an Internet Control Message Protocol (ICMP) echo\_request to obtain an ICMP echo\_response from a remote host. If the remote host is operational and on the network, it responds to the echo.

All the options are optional. The default is to continuously send echo requests to the destination host name (*dest\_host\_name*) until an interrupt is received by pressing **Ctrl+C**. The options are:

- |           |  |
|-----------|--|
| <b>-d</b> | Starts socket-level debugging  |
| <b>-n</b> | Specifies numeric output only. No attempt is made to look up symbolic names for host addresses.  |
| <b>-q</b> | Specifies quiet output. Nothing is displayed except the summary lines at startup time and when finished.   |
| <b>-r</b> | Bypasses the routing tables and sends directly to a host on an attached network. If the host is not on a directly-connected network, the ping command generates an error message. Use the -r option to ping a local host through an interface that no longer has a route through it. |

The IP header is only large enough for nine such routes. Be aware that many hosts ignore this option.

- v** Requests verbose output, which lists ICMP packets that are received in addition to echo responses.
- R** Specifies that the `record_route` option be included in the `echo_request` packet and display the route buffer on returned packets.
- f** Specifies that `echo_requests` be flooded onto the destination host as fast as the responses are received, or 100 times per second, whichever is faster. For every `echo_request` sent, a . (period) is printed. For every `echo_reply` received, a backspace is printed. This provides a rapid display of how many packets are being dropped. Only the root user may use this option.  
  
**Note:** This option can stress a network and should be used with caution. Do not ping the broadcast address unnecessarily. The `-f` option cannot be specified with the `-i seconds` wait option.
- i seconds** Waits the number of seconds specified between the sending of each packet. The default is to wait for one second between each packet. This option cannot be specified with the `-f` option.
- l number\_echos** Floods the number of echoes specified before falling into a normal mode of one per second.
- s packet\_size** Specifies the number of data bytes to be sent. The default is 56, which translates into 64 ICMP data bytes when combined with the 8 bytes of ICMP header data. This option may also be specified as a parameter without the `-s` if it follows the `dest_host_name` parameter.
- c number\_echos** Specifies the number of echo requests to be sent and received. This option may also be specified as a parameter without the `-c` if it follows the `packet_size` parameter, which can follow the `dest_host_name` parameter.  
  
If this option is not specified, you must press **Ctrl+C** to end the pinging.
- p pattern** Specifies hexadecimal pad bytes to fill out the packet you send. This is useful for diagnosing data-dependent problems in a network.

**Parameters:** The host's IP address can be used in place of the destination host name. This parameter is required.

**Note:** The ping command deviates from the fast-path command structure in that parameters follow some of the options.

These parameters have the following recommended ranges:

- i seconds** Integer value of 2 through 5
- l number\_echos** Integer value of 3 through 100

**-l** *number\_echos* Integer value of 3 through 1000  
**-s** *packet\_size* Integer value of 0 through 100  
**-p** *pattern* Hexadecimal value of 1 through 16 bytes

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

**rlogin** *dest\_host\_name userID*

**Description:** Log in to another 6611. This initiates an interactive session. You are prompted for the password of the given user ID.

**Parameters:** The host's IP address can be used in place of the destination host name.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

**telnet** *dest\_host\_name*

**Description:** Log in to another IP node. This initiates an interactive session. You are prompted for a user ID and password at the remote host.

**Parameters:** The host's IP address can be used in place of the destination host name.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

## Summary of the Remote Access Commands

Table 9-45. Summary of Remote Access Commands

Command	Function
<code>ftp dest_host_name</code>	Send or receive a file to or from a remote IP station.
<code>ftp -c user_id password put filename {ascii bin} dest_host_name</code>	Issue a non-interactive FTP to send a file to a remote IP station.
<code>ftp -c user_id password get filename {ascii bin} dest_host_name</code>	Issue a non-interactive FTP to receive a file from a remote IP station.
<code>ping {-d} {-n} {-q} {-r} {-v} {-R} {-fl-i seconds} {-l number_echos} {-s packet_size} {-c number_echos} {-p pattern} dest_host_name {packet_size} {number_echos}</code>	Test if you can reach another IP node from this 6611.
<code>rlogin dest_host_name userID</code>	Log in to another 6611.
<code>telnet dest_host_name</code>	Log in to another IP node.



## Serialport Commands

Use the serial port commands to:

- Set the baud rate for the S1 or S2 serial ports
- Set up a modem connected to either the S1 or S2 serial ports by sending AT commands

Table 9-46. Abbreviations for Serialport Commands

Type of term	Term and Abbreviations	
Object	serialport	sp
Subobject	baud	b
	modem	mod, m
Action	set	s
Option	-s1	
	-s2	

### **serialport (baud) (set) [ (-s1)|-s2 ] baud\_rate**

**Description:** Set the baud rate on the S1 or S2 EIA 232 serial port. Do not issue this command if you are logged in over the serial port. You must issue the **config apply** or **config commit** command for the new baud rate to become part of the working configuration.

**Parameters:** The valid baud rates are 1200, 2400, 9600, 19200, and 38400.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **serialport modem (set) [ (-s1)|-s2 ] AT\_command(s)**

**Description:** Set up the modem on the S1 or S2 EIA 232 serial port by sending it AT command(s). Do not issue this command if you are logged in over the serial port.

**Parameters:** Specify the AT commands that you want to send to the modem.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## Summary of Serialport Commands

Table 9-47. Summary of Serialport Commands

Command	Function
serialport (baud) (set) [ (-s1) -s2 ] baud_rate	Set the baud rate on S1 or S2 EIA 232 serial port.
serialport modem (set) [ (-s1) -s2 ] AT_command(s)	Set up the modem on the S1 or S2 EIA 232 serial port by sending it AT command(s).

## SNMP Commands

Use the SNMP commands to:

- View the SNMP activity log
- List SNMP trace parameters
- Trace the SNMP processes
- Collect SNMP debug information

Table 9-48. Abbreviations for SNMP Commands

Type of term	Term and Abbreviations	
Object	SNMP	snmp
Subobject	debug	db
Action	collect	col, c
	list	l
	trace	tr, t
	view	v
Option	-activity_log	-act, -al, -a
	-cat	-c
	-log	-l
	-off	
	-on	
	-process	-proc, -pro, -p
	-system	-sys, -s
	-tar	-t

### **snmp debug (collect) {-system} [(-tar)l-cat] {output\_file}**

**Description:** Collect SNMP debug information. Specify the -system option to collect additional system debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf output\_file** command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the -cat option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** If you do not specify an output file name, the output is placed in the file *pd\_hostname.snmp.debug*, where *hostname* is the host name for this 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the output file name. If you specify an output file name, the prefix *pd\_* is added to it. Specify only alphanumeric characters, periods (.), dashes (–), and underscores (\_) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path only

## **snmp list (-process)**

**Description:** List the SNMP process names used as parameters for the SNMP trace.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **snmp trace -off process**

**Description:** Stop the SNMP trace on a specified process.

The trace output is gathered in the transfer directory in one of these files:

- pd\_snmpd.log
- pd\_cfgd.log
- pd\_dlsd.log
- pd\_pppd.log
- pd\_r66d.log
- pd\_rs960d.log
- pd\_r960d.log
- pd\_tld.log
- pd\_trapd.log

**Parameters:** Use the **snmp list (-process)** command for the SNMP process name parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## **snmp trace (-on) process**

**Description:** Start the SNMP trace on a specified process.

**Parameters:** Use the **snmp list (-process)** command for the SNMP process name parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## **snmp (view) -activity\_log {-log}**

**Description:** View the SNMP process activity log.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## Summary of SNMP Commands

Table 9-49. Summary of SNMP Commands

Command	Function
snmp debug (collect) {-system} [(-tar) -cat] {output_file}	Collect SNMP debug information.
snmp list (-process)	List SNMP process names used as parameters for the SNMP trace.
snmp trace -off process	Stop the SNMP trace on a specified process.
snmp trace (-on) process	Start the SNMP trace on a specified process.
snmp (view) -activity_log {-log}	View the SNMP process activity log.

---

## Software Commands

Use the software commands to:

- View the updates, history, product identification, and dependents
- Cancel a pending installation
- Start or stop remote installations of software updates
- Apply, commit, and reject software updates
- List software updates
- View the descriptions of the problems fixed by a software update
- List the software that exists in the transfer directory or on a diskette or tape
- Transfer installation files from a remote host
- Transfer (receive) the software from the diskette or tape to the transfer directory
- Clean up after a software installation failure
- Lock the software before selling the 6611 to a third party

Table 9-50. Abbreviations for Software Commands

Type of term	Term and Abbreviations	
Object	software	sw
Subobject	state updates	st update, upd, u
Action	apply cancel cleanup commit list lock precheck receive reinstall reject remove rimon rinstall ristop view	app, a can clnp, clup com, c l  pre rcv, rec, r rein rej rem  rinst  v
Option	-all -commit -com_prev -dependents -diskette -files -fixes -force -ftp -history -log -nocommit -noprecheck -output -prerequisites -product_ID -quiet -rej_dptf -remote -tape -time -transfer -updates -verbose	-com -cp -dep, -d -disk -file, -f -fix    -his, -h -l -noc, -n -nop -out -pre, -p -pid, -pi, -id -q -rd -rem   -trans, -tr -update, -upd, -u -v

### software cancel {-force}

**Description:** Cancel a pending installation of a software update.

If you do not specify the -force option and an installation phase is in progress, the installation **will not** be cancelled. If you specify the -force option, and an installation phase is in progress, the installation **will** be cancelled anyway.

Using the -force option is not recommended, and could lead to unpredictable results. If you use the -force option, you should restart the 6611 afterwards.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## software cleanup

**Description:** Remove all incomplete pieces of software after a failed install.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## software (list) [-diskette|-tape] {-log}

**Description:** List all the software on a diskette or tape, or in the transfer directory.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## software lock

**Description:** Lock the Multiprotocol Network Program, when selling the 6611 to a third party.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## software receive [(-diskette)|-tape] -all

**Description:** Import all the software from diskette or tape to the transfer directory.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## software receive [(-diskette)|-tape] software\_name

**Description:** Import the given software from diskette or tape to the transfer directory.

**Parameters:** The software must be either an mpnp.obj or mpnp.data software update. Use the **software (list) [-diskette|-tape]** command to see the list of software on the requested medium.

The *software\_name* parameter can be:

- mpnp (the same as specifying all)
- mpnp.obj vv.rr.mmmm.ffff.ppppppp
- mpnp.data vv.rr.mmmm.ffff.ppppppp

Where:

- vv is the version number
- rr is the release number
- mmmm is the modification level
- ffff is the fix level

- *ppppppp* is the fix ID

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

**software receive -ftp** *host\_name userID passwd software\_files*

**Description:** Transfer the given software files from a remote host to the transfer directory using the noninteractive version of FTP.

**Parameters:** Specify the host name or IP address of the remote host with the *host\_name* parameter. Specify the user ID and its associated password on the remote host with the *userID* and *passwd* parameters, respectively. Specify the software files to be transferred with the *software\_files* parameter. The software files must reside in the home directory of the user identified with the *userID* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

**software rimon** *control\_file\_name*

**Description:** Start monitoring of all client 6611s listed in the remote installation control file. Press **Ctrl+C** to stop the rimon script.

**Parameters:** The *control\_file\_name* contains the instructions for the network installation process. It is an ASCII file that must reside in the transfer directory of the 6611. See “Using Control Files as Part of the Installation Process” on page 7-41 for more information on the writing and use of control files.

**Authorization:** Controlling and viewing users

**Note:** The user must know the controlling password for the client 6611 to perform the function. Specify any client 6611 password in the .netrc file. See “Using the .netrc File” on page 7-40 for more information.

**System Environment:** RSH, REXEC, and fast-path

**software rinstall** **{-quiet} {-verbose}** *control\_file\_name*

**Description:** Start the remote installation (from a single control point) of a software update on the multiple client 6611s specified in the control file.

The -quiet option specifies that the command is not interactive. It results in no prompting for needed information during the installation process. If you specify -quiet, and needed information is unavailable, the installation process is stopped.

The -verbose option specifies there will be full progress reporting throughout the installation procedure.

**Parameters:** The *control\_file\_name* in the transfer directory contains the instructions for the network installation process. It is an ASCII file that must reside in the transfer directory of the 6611. See “Using Control Files as Part of the Installation Process” on page 7-41 for more information on the writing and use of control files.



**Authorization:** Controlling and viewing users

**Note:** The user must know the controlling password for the client 6611 to perform the function. Specify any client 6611 password in the .netrc file. See “Using the .netrc File” on page 7-40 for more information.

**System Environment:** RSH, REXEC, and fast-path

### **software ristop *control\_file\_name***

**Description:** Stop a pending remote installation of a software update on one or multiple client 6611s involved in the installation process.

**Parameters:** The *control\_file\_name* in the transfer directory containing the instructions for the network installation process. It is an ASCII file that must reside in the transfer directory of the 6611. See “Using Control Files as Part of the Installation Process” on page 7-41 for more information on the writing and use of control files.

**Authorization:** Controlling and viewing users

**Note:** The user must know the controlling password for the client 6611 to perform the function.

**System Environment:** RSH, REXEC, and fast-path

### **software state view {-output}**

**Description:** Display the installation state of the 6611.

Use the -output option to display the output log of the last installation phase.

See “Installation States and Phases” on page 7-41 for descriptions of the different installation phases.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **software update apply (-transfer) {-commit} {-com\_prev} {-rej\_dptf}**

**{-all} {-time} {time} {update\_name}**

**Description:** Apply the software updates from the transfer directory.

Use the -commit option to immediately commit the software updates that are now being applied with this command.

Use the -com\_prev option to automatically commit the PTFs that were applied, but not yet committed, before issuing this command.

Use the -rej\_dptf option to automatically reject any applied development PTFs before installation. This option is ignored if you are applying only development PTFs.

Use the -time option to start the apply process at a later time. When you use the -time option, you must also use the *time* parameter.

**Parameters:** The *time* parameter is only used if the *-time* option is specified. The time to apply the update may be specified as an absolute value (whose format is MMDDhhmm{.ss}) or as a relative value (+mm) of minutes from the time at which all 6611s are prechecked.

When you do not specify the *-all* option, you can specify the *update\_name* of the update to install. The *update\_name* parameter can be:

- *mpnp* (the same as all)
- *mpnp.obj* (all updates for *mpnp.obj*)
- *mpnp.data* (all updates for *mpnp.data*)
- *mpnp vv.rr.mmmm.ffff.ppppppp*
- *mpnp.obj vv.rr.mmmm.ffff.ppppppp*
- *mpnp.data vv.rr.mmmm.ffff.ppppppp*
- *mpnp ppppppp*
- *mpnp.obj ppppppp*
- *mpnp.data ppppppp*

Where:

- *vv* is the version number
- *rr* is the release number
- *mmm* is the modification level
- *ffff* is the fix level
- *pppppp* is the fix ID

Specify the **software (list) -transfer** command to see the list of software in the transfer directory.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

**software update apply (-transfer) -noprecheck {-commit} {-time} {time}**

**Description:** Apply software update or updates from the transfer directory without running the update precheck.

(This is software that was previously specified with the **software update precheck** command.)

The *-noprecheck* option signals that no prechecking be performed. The *-transfer* option specifies the transfer directory as the location of the software update.

Use the *-commit* option to immediately commit the software updates that are now being applied with this command.

Use the *-all* option to apply all the updates on the medium specified.

Use the *-time* option to start the apply process at a later time. When you use the *-time* option, you must also use the *time* parameter.

**Parameters:** The *time* parameter is only used if the *-time* option is specified. The time to apply the update may be specified as an absolute value (whose format is MMDDhhmm{.ss}) or as a relative value (+mm) in minutes from the time at which all client 6611s are prechecked.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

**software update commit *update\_name***

**Description:** Commit the given software update that has been applied.

**Parameters:** Use the **software update list -nocommit** command to list the uncommitted updates. The *update\_name* parameter can be specified as:

- mpnp.obj vv.rr.mmmm.ffff.ppppppp
- mpnp.data vv.rr.mmmm.ffff.ppppppp

Where:

- vv is the version number
- rr is the release number
- mmmm is the modification level
- ffff is the fix level
- ppppppp is the fix ID

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

**software update commit -all**

**Description:** Commit all the software updates that have been applied.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

**software update list {-log}**

**Description:** List the installed software updates.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**software update list -nocommit {-log}**

**Description:** List software updates that have been applied, but not committed.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

**software update precheck {-com\_prev} {-rej\_dptf} {*update\_name*}**

**Description:** Performs the precheck function for software updates in the transfer directory.

Use the -com\_prev option to automatically commit the PTFs that were applied, but not yet committed, before issuing this command.

Use the -rej\_dptf option to automatically reject any applied development PTFs before installation. This option is ignored if you are prechecking only development PTFs.

**Parameters:** The updates to precheck are defaulted to all, unless you specify an update name.

The *update\_name* parameter can be:

- mpnp (the same as all)
- mpnp.obj (all updates for mpnp.obj)
- mpnp.data (all updates for mpnp.data)
- mpnp vv.rr.mmmm.ffff.ppppppp
- mpnp.obj vv.rr.mmmm.ffff.ppppppp
- mpnp.data vv.rr.mmmm.ffff.ppppppp
- mpnp ppppppp
- mpnp.obj ppppppp
- mpnp.data ppppppp

Where:

- vv is the version number
- rr is the release number
- mmmm is the modification level
- ffff is the fix level
- ppppppp is the fix ID

Use the **software (list) -transfer** command to list the software in the transfer directory.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **software update reject *update\_name***

**Description:** Reject the given software update that has been applied, but not committed.

**Parameters:** Use the **software update list -nocommit** command to list the uncommitted updates. Specify the *update\_name* parameter as either:

- mpnp.obj vv.rr.mmmm.ffff.ppppppp
- mpnp.data vv.rr.mmmm.ffff.ppppppp

Where:

- vv is the version number
- rr is the release number
- mmmm is the modification level
- ffff is the fix level
- ppppppp is the fix ID

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **software update (view) (-fixes) -all {-log}**

**Description:** View the problems fixed by all the software updates in the transfer directory.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **software update (view) (-fixes) {-log} update\_name**

**Description:** View the problems fixed by the given software update in the transfer directory.

**Parameters:** Use the **software (list) -transfer** command to list the software in the transfer directory.

Specify the *update\_name* parameter as either:

- mpnp.obj vv.rr.mmmm.ffff.ppppppp
- mpnp.data vv.rr.mmmm.ffff.ppppppp

Where:

- *vv* is the version number
- *rr* is the release number
- *mmm* is the modification level
- *fff* is the fix level
- *pppppp* is the fix ID

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **software view -dependents {-log}**

**Description:** View the list of software updates dependent on previously installed software updates.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **software view -files {-log}**

**Description:** View the list of files included with the Multiprotocol Network Program.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **software view -history {-log}**

**Description:** View the entire installation history for the Multiprotocol Network Program. The installation history consists of all installation actions taken since the current release was installed on the 6611.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **software view -prerequisites {-log}**

**Description:** View the list of software updates that are prerequisites to other software updates.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **software (view) -product\_ID {-log}**

**Description:** View the product information for the Multiprotocol Network Program.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **software view (-updates) {-log}**

**Description:** View the list of software updates for the level of Multiprotocol Network Program currently installed on the 6611.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **Summary of Software Commands**

Table 9-51 (Page 1 of 2). Summary of Software Commands

Command	Function
software cancel {-force}	Cancel a pending installation of a software update.
software cleanup	Remove all incomplete pieces of software after a failed installation.
software (list) [-diskette -tape] {-log}	List all the software on the diskette or tape, or in the transfer directory.
software lock	Locks the Multiprotocol Network Program, when selling the 6611 to a third party.
software receive [(-diskette) -tape] -all	Import all the software from diskette or tape to the transfer directory.
software receive [(-diskette) -tape] <i>software_name</i>	Import the software from diskette or tape to the transfer directory.
software receive -ftp <i>host_name userID passwd software_files</i>	Transfers the given software from a remote host to the transfer directory using the noninteractive version of FTP.
software rimon <i>control_file_name</i>	Start monitoring the installation status of all client 6611s listed in the remote installation control file.
software rinstall {-quiet} {-verbose} <i>control_file_name</i>	Start the remote installation (from a single control point) of a software update on multiple client 6611s. specified in the remote installation control file.
software ristop <i>control_file_name</i>	Cancel a pending remote installation of a software update on one or multiple client 6611s involved in the installation process.
software state view {-output}	Displays the installation state of the 6611.

Table 9-51 (Page 2 of 2). Summary of Software Commands

Command	Function
software update apply (-transfer) {-commit} {-com_prev}   {-rej_dptf} {-all} {-time} {time} {update_name}	Apply the software updates from the transfer directory.
software update apply (-transfer) -noprecheck {-commit}   {-time} {time}	Apply the software updates from the transfer directory without running the update precheck.
software update commit <i>update_name</i>	Commit the given software update that has been applied.
software update commit -all	Commit all the software updates that have been applied.
software update list {-log}	List the installed software updates.
software update list -nocommit {-log}	List software updates that have been applied, but not committed.
software update precheck {-com_prev} {-rej_dptf}   {update_name}	Perform the precheck function for software updates in the transfer directory.
software update reject <i>update_name</i>	Reject the given software update that has been applied, but not committed.
software update (view) (-fixes) -all {-log}	View the problems fixed by all the software updates in the transfer directory.
software update (view) (-fixes) {-log} <i>update_name</i>	View the problems fixed by the given software update in the transfer directory.
software view -dependents {-log} 	View the list of software updates dependent on previously installed software.
software view -files {-log} 	View the list of files included with the Multiprotocol Network Program.
software view -history {-log} 	View the entire installation history of the Multiprotocol Network Program.
software view -prerequisites {-log} 	View the list of software updates that are prerequisite to other software updates.
software view -product_ID {-log} 	View the product information for the Multiprotocol Network Program.
software view (-updates) {-log} 	View the list of all software updates for the Multiprotocol Network Program.

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## System Commands

Use the system commands to:

- Stop and restart the 6611
- Run the system trace
- Produce a system trace report
- Dump the base operating system
- View information about the dump
- Format the system dump
- Extract error log and trace log entries from the dump
- Transfer the dump from the dump device to the transfer directory
- View the system route tables
- Monitor system protocol and interface statistics
- View many kinds of system statistics and connection information
- Run an interactive program to back up the 6611 on tape
- Collect system debug information



Table 9-52. Abbreviations for System Commands

Type of term	Term and Abbreviations	
Object	system	sys, s
Subobject	connections	connection, con, c
	debug	db
	dump	du, d
	routes	route, r
	statistics	statistic, stat, s
	trace	tr, t
Action	backup	bu, b
	collect	col, c
	dump	du
	extract	ext, ex
	list	l
	monitor	mon, m
	stop	end, e
	trace	tr, t
	transfer	trans
	view	v
Option	-activity	-act, -a
	-all	
	-cat	-c
	-dump_device	-dd
	-error_log	-el
	-format	-for, -f
	-input_output	-io
	-interface	-intf, -if, -i
	-log	-l
	-memory_management	-mm
	-minutes	-min, -m
	-norestart	-nor, -n
	-off	
	-on	
	-paging_space	-ps
	-previous_dump_info	-pdi, -p
	-protocol	-proto, -pro, -p
	-restart	-res, -r
	-socket_info	-sock, -si, -s
	-status	-stat
	-time	-t
	-trace_buffer	-tb
	-trace_ID	-tid, -ti, -id
	-trace_log	-tl
	-trace_mode	-tm
	-traffic	-trf
	-transfer	-trans, -tr
	-virtual_memory	-vm

## system backup

**Description:** Backup the 6611 Multiprotocol Network Program onto a tape. This is an interactive command.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** Fast-path only

## **system connections (view) {-log}**

**Description:** View the system network connections.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **system debug (collect) {-paging\_space} [(-tar)|-cat] {output\_file}**

**Description:** Collect system usage information to assist when solving paging space problems. **Do not use this command unless directed by IBM service personnel.** This command should be used approximately 20 minutes after a system restart if a paging space problem is suspected.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf** *output\_file* command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the -cat option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** If you do not specify an output file name, the output is placed in the file *pd\_hostname.pagingspace.debug*, where *hostname* is the host name for this 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the output file name. If you specify an output file name, the prefix *pd\_* is added to it. Specify only alphanumeric characters, periods (.), dashes (–), and underscores (\_) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## **system debug (collect) [(-tar)|-cat] {number\_days\_errlog\_clear} {output\_file}**

**Description:** Collect system debug information and clear the error log.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf** *output\_file* command to restore the individual files. The individual files can be viewed with most workstation editors.

| Specify the `-cat` option to combine the individual files into an ASCII file specified by  
| `output_file`. Transfer the `output_file` to any workstation using the ASCII mode of ftp.  
| The `output_file` can be viewed with most workstation editors.

| **Parameters:** You can specify the number of days worth of entries to clear from  
| the error log. If you do not use the `number_days_errlog_clear` parameter, the error  
| log will be cleared of all errors occurring more than two days prior to issuing this  
| command.

| If you do not specify an output file name, the output is placed in the file  
| `pd_hostname.system.debug`, where `hostname` is the host name for this 6611. If the  
| `hostname` contains a colon (:), it will be replaced with a dash (–) in the output file  
| name. If you specify an output file name, the prefix `pd_` is added to it. Specify only  
| alphanumeric characters, periods (.), dashes (–), and underscores (\_) in the output  
| file name.

| **Authorization:** Controlling users only

| **System Environment:** RSH, REXEC, and fast-path only

## system dump

**Description:** Dump the main operating system. This command does not return  
and the system must be restarted. The dump goes to the dump device.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## system dump extract (-error\_log)

**Description:** Extract error log records from the system dump.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## system dump extract -trace\_log

**Description:** Extract trace log records from the system dump.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## system dump format [ (-dump\_device)-transfer ]

**Description:** Format the system dump that is in the either the dump device or the  
transfer directory and place it in the transfer directory as `pd_system.fdump`.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **system dump transfer**

**Description:** Transfer the system dump to the transfer directory from the dump device. The system dump is placed in the transfer directory as pd\_system.dump.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **system dump (view) -previous\_dump\_info {-log}**

**Description:** View the information about the previous system dump.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **system routes (view) {-log} {-all}**

**Description:** View the system route table for all protocols.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **system statistics monitor [(-protocol)-interface] number\_seconds**

**Description:** Monitor either protocol or interface packet traffic statistics continuously. Specify the -protocol option to monitor protocol statistics. Specify the -interface option to monitor interface statistics. The statistics are periodically updated until you end the command. The period between updates is set with the *number\_seconds* parameter. Press **Ctrl+C** to end the command.

**Parameters:** Specify the number of seconds between updating the statistics with the *number\_seconds* parameter. The number of seconds must be between 10 and 300; the default is 10.

**Authorization:** Controlling users only

**System Environment:** Fast-path only

### **system statistics (view) (-activity) {-log} number\_seconds number\_samples**

**Description:** View system activity statistics. Use the *number\_seconds* parameter to determine the time period between updating the statistics. Use the *number\_samples* parameter to specify how many updates to display.

**Parameters:** Specify a number between 1 and 5 for the *number\_seconds* parameter. Specify a number between 1 and 5 for the *number\_samples* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

**system statistics (view) -input\_output {-log} number\_seconds number\_samples**

**Description:** View statistics for input and output activities. Use the *number\_seconds* parameter to determine the time period between updating the statistics. Use the *number\_samples* parameter to specify how many updates to display.

**Parameters:** Specify a number between 1 and 5 for the *number\_seconds* parameter. Specify a number between 1 and 5 for the *number\_samples* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

**system statistics (view) -memory\_management {-log}**

**Description:** View the memory management statistics.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**system statistics (view) -paging\_space {-log}**

**Description:** View the characteristics of the system paging spaces.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

**system statistics (view) -socket\_info {-log}**

**Description:** View information about the domain sockets.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**system statistics (view) -traffic interface number\_seconds**

**Description:** View the packet traffic information for the given interface gathered by the MPNP. Use the *number\_seconds* parameter to specify the time interval between updates. Press **Ctrl+C** to end the command.

**Parameters:** Use the **interface list** command to list the active interfaces. All the interfaces are valid, except for the mpq# interfaces.

Specify a number between 1 and 5 for the *number\_seconds* parameter.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **system statistics (view) -virtual\_memory {-log} *number\_seconds number\_samples***

**Description:** View system virtual memory statistics. Use the *number\_seconds* parameter to specify the time interval between updating the statistics. Use the *number\_samples* parameter to specify how many updates to display.

**Parameters:** Specify a number between 1 and 5 for the *number\_seconds* parameter. Specify a number between 1 and 5 for the *number\_samples* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **system stop [(-restart)|-norestart] [(-minutes)|-time] [*number\_minutes|time*]**

**Description:** Stop the 6611 and Multiprotocol Network Program. Specify the -restart option to perform an automatic reboot. Specify the -norestart option if you want to power off the 6611.

Specify the -minutes option to stop the 6611 in the number of minutes indicated by the *number\_minutes* parameter. Specify the -time option to stop the 6611 at the system time indicated by the *time* parameter.

**Parameters:** Specify a number between 0 and 59 for the *number\_minutes* parameter. If you specify 0, the system stop will begin immediately.

Specify a time in the format *hh:mm* for the *time* parameter. *hh* must be between 0 and 23; *mm* must be between 0 and 59.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **system trace -format (-all) *start\_time end\_time***

**Description:** Format a system trace for all trace IDs logged during a given time period. The output is sent to the transfer directory as *pd\_trace.report*.

**Parameters:** If a start time is specified, trace records with earlier time stamps are excluded from the report. If an end time is specified, trace records with later time stamps are excluded from the report. If no times are specified, no trace records are excluded from the report. The start time and end time format is MMDDhhmmssYY.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **system trace -format -trace\_ID *trace\_IDs***

**Description:** Format a system trace for the given trace IDs. The output is sent to the transfer directory as *pd\_trace.report*.

**Parameters:** Use the **system trace (list) (-trace\_ID)** command to list the valid trace IDs. Specify one or more three digit uppercase hexadecimal numbers for the *trace\_IDs* parameter.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **system trace (list) (-trace\_ID) {-log}**

**Description:** List the system trace IDs.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **system trace -off**

**Description:** Stop the system trace.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **system trace -on {-trace\_mode} {-trace\_buffer} {-trace\_log}**

**{trace\_mode} {trace\_buffer\_size} {trace\_log\_size} {trace\_IDs}**

**Description:** Start a system trace with the specified trace parameters.

**Parameters:** The -trace\_mode, -trace\_buffer, and -trace\_log options are optional. If any are specified, then their corresponding parameters must be specified. If both the -trace\_buffer and -trace\_log options are given, then the trace\_buffer\_size parameter must *precede* the trace\_log\_size parameter.

The trace\_mode is either:

- c (circular),
- a (alternate), or
- s (single)

with alternate being the default.

The trace\_buffer\_size is between 8192 and 524288 bytes with a default of 131072 bytes. The trace\_log\_size is between 1048576 and 10485760 bytes with a default of 1048576 bytes. The trace IDs must be at the end of the parameter list after the trace\_mode, trace\_buffer\_size, or trace\_log\_size parameters, if any are specified.

Use the **system trace list (-trace\_ID)** command to list the valid trace IDs. Specify one or more three digit uppercase hexadecimal numbers for the *trace\_IDs* parameter. The trace is started for all trace IDs specified and the global trace IDs 001, 002, 106, 10C, 134, and 139.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **system trace -status**

**Description:** Display the status of system and protocol traces.

The output is displayed in three columns. The first column lists the process or protocol name. The second column shows **ON** if the trace is running and **OFF** if the trace is not running. The third column contains the file name of any file in the transfer directory related to the trace.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## Summary of System Commands

Table 9-53 (Page 1 of 2). Summary of System Commands

Command	Function
system backup	Backup the 6611 Multiprotocol Network Program onto a tape.
system connections (view) {-log}	View the system network connections.
system debug (collect) [(-tar) -cat] {-paging_space} {output_file}	Collect system paging space debug information
system debug (collect) [(-tar) -cat] {number_days_errlog_clear} {output_file}	Collect system debug information.
system dump	Dump the main operating system.
system dump extract (-error_log)	Extract error log records from the system dump.
system dump extract -trace_log	Extract trace log records from the system dump.
system dump format [ (-dump_device) -transfer ]	Format the system dump that is in the either the dump device or the transfer directory and place it in the transfer directory.
system dump transfer	Transfer the system dump to the transfer directory from the dump device.
system dump (view) -previous_dump_info {-log}	View the information about the previous system dump.
system routes (view) {-log} (-all)	View the system route table.
system statistics monitor [(-protocol) -interface] number_seconds	Monitor the protocol and interface packet traffic statistics.
system statistics (view) (-activity) {-log} number_seconds number_samples	View system activity.
system statistics (view) -input_output {-log} number_seconds number_samples	View the input and output statistics.
system statistics (view) -memory_management {-log}	View the memory management statistics.
system statistics (view) -paging_space {-log}	View the characteristics of the system paging spaces.
system statistics (view) -socket_info {-log}	View information about the domain sockets.
system statistics (view) -traffic interface number_seconds	View the packet traffic information for the given interface gathered by the main operating system.
system statistics (view) -virtual_memory {-log} number_seconds number_samples	View system virtual memory statistics.



Table 9-53 (Page 2 of 2). Summary of System Commands

Command	Function
system stop [(-restart) -norestart] [(-minutes) -time] [ <i>number_minutes</i>   <i>time</i> ]	Stop and optionally restart the system in a given number of minutes or at a certain time.
system trace -format (-all) <i>start_time end_time</i>	Format the system trace for all trace IDs logged during a given time period.
system trace -format -trace_ID <i>trace_IDs</i>	Format the system trace for the given trace IDs.
system trace (list) (-trace_ID) {-log}	List the system trace IDs.
system trace -off	Stop the system trace.
system trace -on {-trace_mode} {-trace_buffer}   {-trace_log} { <i>trace_mode</i> } { <i>trace_buffer_size</i> }   { <i>trace_log_size</i> } { <i>trace_IDs</i> }	Start a system trace with the specified trace parameters.
system trace -status	Display the status of process and protocol traces.

---

## Terminal Commands

Use the terminal commands to:

- Set an interrupt key
- Set a backspace key

*Table 9-54. Abbreviations for Terminal Commands*

Type of term	Term and Abbreviations	
Object	terminal	term
Subobject	backspace	bs, b
	interrupt	int, i
Action	set	s

### terminal backspace (set) character

**Description:** Set the terminal backspace to the given character. The specified key performs a backspace and erase character function, when pressed.

**Parameters:** The *character* parameter is any character chosen to be used as the backspace key.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### terminal interrupt (set) character

**Description:** Set the terminal interrupt to the given character. Use this key sequence whenever a function specifies that **Ctrl+C** is needed to end an operation.

**Parameters:** The *character* parameter is any character chosen to be used as the interrupt key.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

## Summary of Terminal Commands

*Table 9-55. Summary of Terminal Commands*

Command	Function
terminal backspace (set) character	Set the terminal backspace to the given character.
terminal interrupt (set) character	Set the terminal interrupt to the given character.

---

## Timeofday Commands

Use the time of day commands to:

- View the current date and time
- Set the current date and time

*Table 9-56. Abbreviations for Timeofday Commands*

Type of term	Term and Abbreviations	
Object	timeofday	tod, t
Action	set	s
	view	v

### timeofday set *date-time*

**Description:** Set the time and date for the 6611. Log out and log back in to observe the time change.

**Parameters:** The *date-time* parameter has the format YYMMDDhhmm.ss, where:

YY is the year (88-99)  
MM is the month (1-12)  
DD is the day (1-31)  
hh is the hour (0-23)  
mm is the minute (0-59)  
ss is the second (0-59)

The .ss is optional.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### timeofday view

**Description:** View the time and date in the 6611.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## Summary of Timeofday Commands

*Table 9-57. Summary of Timeofday Commands*

Command	Function
timeofday set <i>date-time</i>	Set the time and date for the 6611.
timeofday view	View the time and date in the 6611.

---

## Timeserver Commands

Use the time server commands to:

- Start and stop using remote time service
- List the IP addresses of the configured remote time servers
- Add and delete remote time servers from the list

The time service function has these restrictions:

- It is allowed only over a LAN, not a WAN, connection.
- It does not work across one LAN to another.
- Another 6611 cannot be used as a time server.

Table 9-58. Abbreviations for Timeserver Commands

Type of term	Term and Abbreviations	
Object	timeserver	ts
Action	add	a
	delete	del, d
	list	l
	start	begin, b
	stop	end, e
Option	-log	-l

### timeserver add *IP\_address*

**Description:** Add a host to the list of time servers. A time server host must be connected to the 6611 over a LAN, not a WAN, connection. You must issue the **config apply** or **config commit** command for the new host to become part of the working configuration.

**Parameters:** Specify a dotted decimal address for the *IP\_address* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### timeserver delete *IP\_address*

**Description:** Delete a host from the list of time servers. You must issue the **config apply** or **config commit** command for the host to be deleted from the working configuration.

**Parameters:** Specify a dotted decimal address for the *IP\_address* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### timeserver list {-log}

**Description:** List the IP addresses of all time servers.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## timeserver start

**Description:** Allow this 6611 to use remote time service. You must issue the **config apply** or **config commit** command before this 6611 will use remote time service.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## timeserver stop

**Description:** Stop this 6611 from using remote time service. You must issue the **config apply** or **config commit** command before this 6611 will stop using the remote time service.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## Summary of Timeserver Commands

Table 9-59. Summary of Timeserver Commands

Command	Function
timeserver add <i>IP_address</i>	Add a host to the list of time servers.
timeserver delete <i>IP_address</i>	Delete a host from the list of time servers.
timeserver list {-log}	List the IP addresses of all time servers.
timeserver start	Allow this 6611 to use remote time service.
timeserver stop	Stop this 6611 from using remote time service.

---

## User Commands

Use the user commands to:

- List, add, and delete user IDs
- Change a user's password
- List the current users who are logged on
- Obtain a history of users who have logged on

Table 9-60. Abbreviations for User Commands

Type of term	Term and Abbreviations	
Object	user	users, u
Subobject	id	i
	password	pass, p
Action	add	a
	change	chg, c
	delete	del, d
	list	l
	view	v
Option	-controlling	-ctrl, -c
	-history	-his, -h
	-log	-l
	-logged_in	-li
	-viewing	-view, -v

### **user (id) add [(-controlling)-viewing] userID passwd**

**Description:** Add a user ID to the list of users and set the password. Specify the -controlling option to add a controlling user ID. Specify the -viewing option to add a viewing user ID.

You must issue the **config apply** or **config commit** command to add the user ID to the working configuration.

**Parameters:** Specify 1 to 8 lowercase alphanumeric characters for the *userID* parameter. Specify 1 to 8 lowercase alphanumeric characters for the *passwd* parameter.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **user (id) delete userID**

**Description:** Delete a user ID from the list of users. You must issue the **config apply** or **config commit** command to delete the user ID from the working configuration.

**Parameters:** Use the **user (id) list** command to list the configured user IDs.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **user (id) list {-log}**

**Description:** List all the configured users.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **user (id) view -history {-log}**

**Description:** View a history of login and system restart activity. For each log in or restart, this information is displayed:

- User ID
- Terminal
- Host (if Telnet was used)
- Login time
- Session duration

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **user (id) view (-logged\_in) {-log}**

**Description:** View the users that are currently logged in. For each user, this information is displayed:

- User ID
- Login terminal
- Time of login
- Host (if Telnet was used)
- Type of user (controlling or viewing)

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **user password change *userID passwd new\_passwd***

**Description:** Change the password for a specific user ID. You must issue the **config apply** or **config commit** command for the password change to become part of the working configuration.

**Parameters:** Use the **user (id) list** command to list the configured user IDs.

Specify the current password with the *passwd* parameter. Specify 1 to 8 alphanumeric lowercase characters for the *new\_passwd* parameter.

**Authorization:** Controlling users only, unless you are changing your own password.

**System Environment:** RSH, REXEC, and fast-path

## Summary of User Commands

Table 9-61. Summary of User Commands

Command	Function
<code>user (id) add [(-controlling) -viewing ] <i>userID passwd</i></code>	Add a controlling or viewing user.
<code>user (id) delete <i>userID</i></code>	Delete a user.
<code>user (id) list {-log}</code>	List all the configured users.
<code>user (id) view -history {-log}</code>	View a history of login and system restart activity.
<code>user (id) view (-logged_in) {-log}</code>	View the users that are currently logged in.
<code>user password change <i>userID passwd new_passwd</i></code>	Change a user's password.



---

## VINES Commands

Use the VINES commands to:

- Turn the VINES trace on or off
- Send an ICP echo to a VINES node
- View VINES routes, connections, and protocol statistics
- View VINES filter information
- Dump the VINES process
- View VINES ARP table entries for the system and interfaces
- List possible VINES ARP interface names
- View the VINES server name and network address
- Collect VINES debug information

*Table 9-62. Abbreviations for VINES Commands*

Type of term	Term and Abbreviations	
Object	VINES	vines, vin, vn, v
Subobject	arp	a
	connections	connection, con, c
	debug	db
	filters	filter, fil, f
	id	i
	neighbors	neighbor, nbr, n
	routes	route, r
	statistics	statistic, stat, s
Action	collect	col, c
	delete	del, d
	dump	du
	echo	e
	list	l
	trace	tr, t
	view	v
Option	-all	
	-cat	-c
	-flood	-fl, -f
	-interface	-intf, -if, -i
	-log	-l
	-off	
	-on	
	-RTP	-rtp, -r
	-system	-sys, -s
	-tar	-t

### **vines arp list (-interface)**

**Description:** List the possible VINES ARP interfaces.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **vines arp (view) (-interface) {-log} interface**

**Description:** View the VINES ARP table for a given peer-capable interface.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for VINES.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **vines connections (view) {-log} interface**

**Description:** View the VINES interface connections.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for VINES.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **vines debug (collect) {-system} [(-tar)|-cat] {output\_file}**

**Description:** Collect VINES debug information. Specify the -system option to collect additional system debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf output\_file** command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the -cat option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** If you do not specify an output file name, the output will be placed in the file *pd\_hostname.vines.debug*, where *hostname* is the host name for this 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the output file name. If you specify an output file name, the prefix *pd\_* added to it. Specify only alphanumeric characters, periods (.), dashes (–), and underscores (\_) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path only

### **vines dump**

**Description:** Dump the VINES routing protocol. The dump is placed in the transfer directory as *pd\_route\_vines.dump*.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **vines echo {-flood} {-log} dest\_net\_num {packet\_size} {num\_echoes}**

**Description:** Issue an ICP echo request to another VINES node.

If the -flood option is not specified, the echo requests will be sent at the rate of one per second. If -flood is specified, the 6611 will send all the echo request to the destination host immediately.

**Parameters:** Specify a 4-byte hexadecimal number (X'1' to X'FFFFFFE') for the *dest\_net\_num* parameter. Specify 1 to 100 bytes for the *packet\_size* parameter; the default is 64 bytes. Specify a number between 1 and 1000 for the *num\_echoes* parameter; the default is three echoes. You must specify a packet size if you want to specify the number of echoes.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **vines filters (view) {-log} interface**

**Description:** View the VINES interface filters.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for VINES.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **vines filters (view) (-RTP) {-log}**

**Description:** View the VINES RouTing update Protocol (RTP) filters.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **vines id (view)**

**Description:** View the VINES server name and network address.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **vines neighbors delete net\_number**

**Description:** Delete an entry from the VINES neighbor table.

**Parameters:** The *net\_number* parameter is a 4-byte hexadecimal number.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **vines neighbors (view) -all {-log}**

**Description:** View the whole VINES neighbor table.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **vines neighbors (view) interface**

**Description:** View the VINES neighbor table entries for a given interface.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for VINES.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **vines routes (view) -interface {-log} interface**

**Description:** View the VINES route table for a given interface.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for VINES.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **vines routes (view) (-system) {-log}**

**Description:** View the VINES system route table.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **vines statistics (view) (-interface) {-log} interface**

**Description:** View the VINES network interface protocol statistics.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for VINES.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **vines statistics (view) (-RTP) {-log}**

**Description:** View the VINES RouTing update Protocol (RTP) statistics.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **vines statistics (view) (-system) {-log}**

**Description:** View the VINES system network protocol statistics.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

## **vines trace -off**

**Description:** Stop the VINES routing protocol trace. The trace output is in pd\_vines.trc in the transfer directory.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## **vines trace (-on)**

**Description:** Start the VINES routing protocol trace. The trace output is placed in pd\_vines.trc in the transfer directory.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## **Summary of VINES Commands**

Table 9-63 (Page 1 of 2). Summary of VINES Commands

Command	Function
vines arp list (-interface)	View the possible VINES ARP interfaces.
vines arp (view) (-interface) {-log} <i>interface</i>	View the VINES ARP table for a given peer-capable interface.
vines connections (view) {-log} <i>interface</i>	View the VINES interface connections.
vines debug (collect) {-system} [(-tar) -cat] { <i>output_file</i> }	Collect VINES debug information.
vines dump	Dump the VINES routing protocol.
vines echo {-flood} {-log} <i>dest_net_num</i> { <i>packet_size</i> } { <i>num_echoes</i> }	Issue an ICP echo request to another VINES node.
vines filters (view) {-log} <i>interface</i>	View the VINES interface filters.
vines filters (view) -RTP {-log}	View the VINES Routing update Protocol (RTP) filters.
vines id (view)	View the VINES server name and network address.
vines neighbors delete <i>net_number</i>	Delete an entry from the VINES neighbor table.
vines neighbors (view) -all {-log}	View the whole VINES neighbor table.
vines neighbors (view) <i>interface</i>	View the VINES neighbor table entries for a given interface.
vines routes (view) -interface {-log} <i>interface</i>	View the VINES route table for a given interface.

Table 9-63 (Page 2 of 2). Summary of VINES Commands

Command	Function
vines routes (view) (-system) {-log}	View the VINES system route table.
vines statistics (view) (-interface) {-log} <i>interface</i>	View the VINES network interface protocol statistics.
vines statistics (view) (-RTP) {-log}	View the VINES RouTing update Protocol (RTP) statistics.
vines statistics (view) (-system) {-log}	View the VINES system network protocol statistics.
vines trace -off	Stop the VINES routing protocol trace.
vines trace (-on)	Start the VINES routing protocol trace.

## XNS Commands

Use the Xerox Network Systems\*\* (XNS\*\*) commands to:

- Send an echo to an XNS node
- View XNS routes, connections, and protocol statistics
- View XNS filter information
- Collect XNS debug information
- Start and stop the XNS trace

Table 9-64. Abbreviations for XNS Commands

Type of term	Term and Abbreviations	
Object	XNS	xns, x
Subobject	connections	connection, con, c
	debug	db
	filters	filter, fil, f
	routes	route, r
	statistics	statistic, stat, s
Action	collect	col, c
	echo	e
	trace	tr, t
	view	v
Option	-cat	-c
	-flood	-fl, -f
	-interface	-intf, -if, -i
	-log	-l
	-off	
	-on	
	-RIP	-rip, -r
	-system	-sys, -s
	-tar	-t

### xns connections (view) {-log} interface

**Description:** View the XNS interface connections.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for XNS.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### xns debug (collect) {-system} [(-tar)-cat] {output\_file}

**Description:** Collect XNS debug information. Specify the -system option to collect additional system debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf output\_file** command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the `-cat` option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** If you do not specify an output file name, the output will be placed in the file `pd_hostname.xns.debug`, where *hostname* is the host name for this 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the output file name. If you specify an output file name, the prefix `pd_` is added to it. Specify only alphanumeric characters, periods (.), dashes (–), and underscores (\_) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path only

### **xns echo {-flood} {-log} dest\_net\_num dest\_host\_addr {packet\_size} {num\_echoes}**

**Description:** Issue an echo request to another XNS node. If the `-flood` option is not specified, the echo requests will be sent at the rate of one per second. If `-flood` is specified, the echo requests will be flooded on the destination host.

**Parameters:** The *dest\_net\_num* parameter is a 4-byte hexadecimal number. The *dest\_host\_addr* parameter is a 6-byte hexadecimal number. Together, the *dest\_net\_num* and *dest\_host\_addr* uniquely identify the XNS node to which the echo request is sent.

The packet size is in bytes from 1 to 100. The default is 64 bytes.

The number of echoes is from 1 to 1000. The default is three echoes.

**Authorization:** Controlling and viewing users

**System Environment:** Fast-path only

### **xns filters (view) {-log} interface**

**Description:** View the XNS interface filters.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for XNS.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **xns filters (view) -RIP {-log}**

**Description:** View the configured XNS RIP filters.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **xns routes (view) -interface {-log} interface**

**Description:** View the XNS route table for a given interface.



**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for XNS.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **xns routes (view) (-system) {-log}**

**Description:** View the system XNS route table.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **xns statistics (view) (-interface) {-log} interface**

**Description:** View the XNS network interface protocol statistics.

**Parameters:** Use the **interface list** command to list the active interfaces. Choose only the interfaces configured for XNS.

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **xns statistics (view) -system {-log}**

**Description:** View the XNS system network protocol statistics.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

### **xns trace -off**

**Description:** Stop the XNS routing protocol trace. The trace output is placed in the file `pd_XNSrouted.RIP`.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

### **xns trace -on**

**Description:** Start the XNS routing protocol trace. The trace output is placed in the file `pd_XNSrouted.RIP`.

**Parameters:** None

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path

## Summary of XNS Commands

Table 9-65. Summary of XNS Commands

Command	Function
xns connections (view) {-log} <i>interface</i>	View the XNS interface connections.
xns debug (collect) {-system} [(-tar) -cat] { <i>output_file</i> }	Collect XNS debug information.
xns echo {-flood} {-log} <i>dest_net_num dest_host_addr packet_size num_echoes</i>	Issue an echo request to another XNS node.
xns filters (view) {-log} <i>interface</i>	View the XNS interface filters.
xns filters (view) -RIP {-log}	View the XNS RIP filters.
xns routes (view) -interface {-log} <i>interface</i>	View the XNS route table for a given interface.
xns routes (view) (-system) {-log}	View the system XNS route table.
xns statistics (view) (-interface) {-log} <i>interface</i>	View the XNS network interface protocol statistics.
xns statistics (view) -system {-log}	View the XNS system network protocol statistics.
xns trace -off	Stop the XNS routing protocol trace.
xns trace -on	Start the XNS routing protocol trace.

## X.25 Commands

Use the X.25 commands to:

- Send test data to an X.25 node using the X.25 talk function
- Manage and monitor the X.25 nodes on your network
- Collect X.25 debugging information

Table 9-66. Abbreviations for X.25 Commands

Type of term	Term and Abbreviations	
Object	X25	x25
Subobject	debug	db
Action	collect	col, c
	list	l
	monitor	mon, m
Option	-adapter	-adp, -a
	-cat	-c
	-frame	-fr, -f
	-packet	-pack, -p
	-system	-sys, -s
	-tar	-t

### x25 debug (collect) {-system} [(-tar)l-cat] {output\_file}

**Description:** Collect X.25 debug information. Specify the -system option to collect additional system debug information.

This command creates several output files in the transfer directory. These output files are combined into one file to facilitate the transfer from the 6611 to a remote host.

Specify the -tar option to archive the individual files to a binary file specified by *output\_file*. Transfer the *output\_file* to an AIX or UNIX workstation using the binary mode of ftp. Use the **tar -xvf output\_file** command to restore the individual files. The individual files can be viewed with most workstation editors.

Specify the -cat option to combine the individual files into an ASCII file specified by *output\_file*. Transfer the *output\_file* to any workstation using the ASCII mode of ftp. The *output\_file* can be viewed with most workstation editors.

**Parameters:** If you do not specify an output file name, the output is placed in the file *pd\_hostname.x25.debug*, where *hostname* is the host name for this 6611. If the *hostname* contains a colon (:), it will be replaced with a dash (–) in the output file name. If you specify an output file name, the prefix *pd\_* is added to it. Specify only alphanumeric characters, periods (.), dashes (–), and underscores (\_) in the output file name.

**Authorization:** Controlling users only

**System Environment:** RSH, REXEC, and fast-path only

### x25 list (-adapter)

**Description:** List the X.25 adapter names.

**Parameters:** None

**Authorization:** Controlling and viewing users

**System Environment:** RSH, REXEC, and fast-path

**x25 monitor [(-packet) &| -frame] adapter**

**Description:** Monitor HDLC frame and packet activity on an X.25 adapter. The trace runs continuously until you choose to stop it. Press **Ctrl+C** to end the monitor. The monitor output will be placed in the file `pd_x25mon.trc`.

**Parameters:** Use the **x25 list (-adapter)** command to list the installed X.25 adapters.

**Authorization:** Controlling users only

**System Environment:** Fast-path only

## Summary of X.25 Commands

Table 9-67. Summary of X.25 Commands

Command	Function
x25 debug (collect) {-system} [(-tar) -cat] {output_file}	Collect X.25 debug information.
x25 list (-adapter)	List the X.25 adapter names.
x25 monitor [(-packet) &  -frame] adapter	Monitor the activity on an X.25 adapter.



---

## Appendix A. Viewing and Modifying APPN COS Files

The 6611 enables you to modify the architected COS files provided for APPN routing. These files reside on the 6611 and are used by the APPN network node when calculating a route for an LU-LU session.

Each COS file defines acceptable ranges for node and TG characteristics. When an LU requests a session, it specifies the *mode* to use for the session. The mode specifies the parameters desired for the session, including the COS to be used. When the APPN network node calculates a route for the session, it compares the requested COS against the actual values assigned to intermediate nodes and TGs on paths to the destination node. The comparison determines the desirability of routing the session through specific nodes and node TGs. Each possible path is assigned a weight and the APPN network node selects the best (least-weight) route for the session.

You can view and modify a COS file on the 6611 by using System Manager fast-path commands. You also can transfer a COS file to a remote workstation and edit the file using a standard text editor. This appendix describes each of these options.

To ensure that all 6611 network nodes in an APPN network use the same criteria to make routing decisions, each of the network nodes should have identical COS files. Consequently, any changes to a COS file should be made on each 6611 network node in the network. This can be done manually or by using remote shell (**rsh**) commands to execute the appropriate fast-path commands on each of the 6611 network nodes in your network. See "Using Remote Shell Commands to Execute the Fast-Path Command Options" on page A-10 for more information.

### Notes:

1. For a detailed discussion of APPN mode names and COS files, refer to the *IBM Systems Network Architecture Type 2.1 Node Reference*.
2. When configuring APPN on a 6611, you have the option of modifying the TG characteristics that define a connection between the 6611 and an adjacent node. See the *IBM Multiprotocol Network Program Configuration Guide* for more information.

## Fast-Path Command Options for APPN COS Files

Using the fast-path commands on the 6611, you can:

- View the contents of an APPN COS file.
- Set the minimum and maximum values for the user-defined TG characteristics within an APPN COS file.
- Add a mode name to an APPN COS file.

To avoid introducing editing errors into a COS file, it is recommended that you use the fast-path commands, when possible, to modify the contents of a file.

Within the fast-path commands, COS names are referred to by number. Table A-1 shows the associated COS number for each COS name.

**Note:** Each mode name must be mapped to a corresponding COS name. APPN allows one or more mode names to map to the same COS name. The APPN architecture has defined a set of mode names that map to the architected COS names. This mapping is shown in Table A-1.

Table A-1. Architected COS and Mode Names

Mode Name	Corresponding COS Name	Corresponding COS Number Used in Fast-Path Commands
#BATCH	#BATCH	1
#BATCHSC	#BATCHSC	2
None (default)	#CONNECT	3
#INTER	#INTER	4
#INTERSC	#INTERSC	5
CPSVCMG	CPSVCMG	6
SNASVCMG	SNASVCMG	7

For a description of all APPN fast-path commands and command abbreviations, see "Fast-Path Commands."

## Viewing the Contents of an APPN COS File

This section describes fast-path commands that enable you to view:

- An entire APPN COS file
- A specific TG row in a COS file
- All mode names in a COS file

The commands can be issued by viewing and controlling users.

- To view an entire COS file, use the fast-path command:

**appn view (-COS) {-log} COS\_number**

Figure A-1 on page A-5 shows a sample COS file (#INTER).

**Example:** The following command displays the contents of the #INTER COS file and stores the contents in the fast-path log.

**appn view -log 4**

- To view a specific TG row in a COS file, use the fast-path command:

**appn view (-COS) -transmission\_group** *COS\_number TG\_row*

You can specify a value of 1 to 8 for the *TG\_row* parameter.

**Example:** The following command displays the contents of TG row 2 in the #INTER COS file.

**appn view -transmission\_group 4 2**

- To view all mode names in a COS file, use the fast-path command:

**appn view (-COS) -mode\_name** *COS\_number*

**Example:** The following command displays the mode names associated with the #INTER COS file.

**appn view -mode\_name 4**

## Modifying User-Defined TG Characteristics

The following fast-path command enables you set the minimum and maximum ranges for the user-defined TG characteristics within an APPN COS file:

**appn set (-COS) [-user1|-user2|-user3] {-restart}** *COS\_number TG\_row min\_user\_char max\_user\_char*

This command can be issued only by a controlling user. You can specify a value of 0 to 255 for the *min\_user\_char* and *max\_user\_char* parameters. The value of the *min\_user\_char* parameter cannot be greater than the value of the *max\_user\_char* parameter.

**Example:** The following command sets the minimum and maximum values for the first user-defined TG characteristic in TG row 2 of the #INTER COS file. The new minimum is 5; the new maximum is 100.

**appn set -user1 4 2 5 100**

**Note:** The change is effective when the APPN function on the 6611 is restarted. To restart the APPN function immediately, use the **-restart** option. To restart the APPN function at a later time, use the **appn restart** command.

## Adding a Mode Name

The following fast-path command enables you to add a mode name to an APPN COS file:

**appn set (-COS) (-mode\_name) {-restart}** *COS\_number mode\_name*

This command can be issued only by a controlling user. The mode name can be a string of up to 8 characters in length, including special characters. In general, this command is used to add a non-architected mode name to a COS file.

**Example:** The following command adds the mode name QPCSUPP to the #CONNECT COS file.

**appn set 3 QPCSUPP**

**Note:** The change is effective when the APPN function on the 6611 is restarted. To restart the APPN function immediately, use the **-restart** option. To restart the APPN function at a later time, use the **appn restart** command.



---

## Retrieving and Editing an APPN COS File

As an alternative to using the System Manager fast-path commands, you can retrieve an APPN COS file from the 6611 and edit it using a standard text editor. As a rule, you should not edit a COS file manually unless you need to change a characteristic in the file that cannot be changed through the System Manager. An error introduced into a COS file can negatively impact the routing of traffic in your APPN network.

**Note:** This procedure can be performed only by a controlling user.

To retrieve a COS file from the 6611, do the following:

1. Move the COS file from the APPN directory on the 6611 to the transfer directory using the following fast-path command:

**appn transfer (-to) *COS\_number***

2. Send the file to a remote workstation. You can use FTP or the System Manager to send the file. (See "Send Transfer Directory File" on page 4-43 for more information.)
3. Edit the file on the remote workstation. "Editing a COS File" provides guidelines for editing the file.
4. After modifying the file, return it to the 6611's transfer directory.
5. Move the file from the transfer directory to the APPN directory using the following fast-path command:

**appn transfer -from *COS\_number***

The APPN function on the 6611 automatically restarts after the COS file is moved from the transfer directory to the APPN directory.

## Editing a COS File

Figure A-1 on page A-5 shows a sample COS file. An architected COS file contains a set of COS entries (including transmission priority and mode name), one to eight rows of node characteristics, and one to eight rows of TG characteristics. Each node and TG row in the file consists of two lines. The top line of the row specifies the minimum values for each of the row characteristics. The bottom line of the row specifies the maximum values for each of the row characteristics. The minimum and maximum values for a COS characteristic represent the range of acceptable values for that characteristic.

Node and TG rows are arranged by weight, with the lowest-weight row appearing first and the highest-weight row appearing last. When actual node or TG values are compared against the contents of a COS file, the values are first compared to the lowest-weight node or TG row in the file, respectively. If the actual values fall within the ranges of acceptable values for the characteristics in the row, the weight associated with the row is assigned to the node or TG. If the actual values do not fall within the ranges of acceptable values for the row, the comparison continues with the next highest-weight row.

```

| def_cos:
|   cos_name:          #INTER
|   store_weights:     YES
|   transmission_priority: HIGH
|   mode_name:         #INTER
|
|           (congestion  resistance  weight)
|   node_row: 1  (min)      NO         0         5
|                 (max)      NO         31
|   node_row: 2      NO         0        10
|                 NO         63
|   node_row: 3      NO         0        20
|                 NO         95
|   node_row: 4      NO         0        40
|                 NO        127
|   node_row: 5      NO         0        60
|                 NO        159
|   node_row: 6      NO         0        80
|                 NO        191
|   node_row: 7      NO         0       120
|                 YES        223
|   node_row: 8      NO         0       160
|                 YES        255
|
|           (time  byte  security  prop.  capacity  user_defined  weight)
|           (cost  cost          delay )
|   tg_row:  1    0    0  MINIMAL  MINIMUM    76      0  0  0    30
|                0    0  RAD_GUARDED NEGLIGIBLE  FF      255 255 255
|   tg_row:  2    0    0  MINIMAL  MINIMUM    44      0  0  0    60
|                0    0  RAD_GUARDED TERRESTRIAL FF      255 255 255
|   tg_row:  3    0    0  MINIMAL  MINIMUM    44      0  0  0    90
|           128 128  RAD_GUARDED TERRESTRIAL FF      255 255 255
|   tg_row:  4    0    0  MINIMAL  MINIMUM    38      0  0  0   120
|                0    0  RAD_GUARDED TERRESTRIAL FF      255 255 255
|   tg_row:  5    0    0  MINIMAL  MINIMUM    38      0  0  0   150
|           128 128  RAD_GUARDED PACKET    FF      255 255 255
|   tg_row:  6    0    0  MINIMAL  MINIMUM    30      0  0  0   180
|                0    0  RAD_GUARDED PACKET    FF      255 255 255
|   tg_row:  7    0    0  MINIMAL  MINIMUM    30      0  0  0   210
|           196 196  RAD_GUARDED MAXIMUM    FF      255 255 255
|   tg_row:  8    0    0  MINIMAL  MINIMUM    00      0  0  0   240
|           255 255  RAD_GUARDED MAXIMUM    FF      255 255 255
|
| edef_cos:
| Figure A-1. Sample APPN COS File (#INTER)

```

## Node Characteristics

As shown in Figure A-1, each row of node characteristics contains minimum and maximum values for *congestion* and *resistance*, and a weight for the row. The valid values for congestion are **YES** and **NO**, and the following combinations are allowed:

- Both minimum and maximum congestion values are **NO**. In this case, only nodes with no congestion fall within the acceptable range for the row.
- The minimum congestion value is **NO** and the maximum congestion value is **YES**. In this case, all nodes fall within the acceptable range for the row.
- The minimum and maximum congestion values are **YES**. In this case, only congested nodes fall within the acceptable range for the row.

The resistance value must be an integer in the range of 0 to 255. The resistance value indicates the desirability of routing a session through a node. Lower values represent higher levels of desirability. The weight associated with a row must be an integer in the range of 0 to 255. The weights for successive rows cannot decrease.

## TG Characteristics

As shown in Figure A-1, each TG row contains minimum and maximum values for the TG characteristics described in Table A-2 on page A-7. Each TG row also contains a weight. The weight associated with a row must be an integer in the range of 0 to 255. The weights for successive rows cannot decrease.

Table A-2. TG Characteristics

Characteristic	Description	Valid Range
Cost per connect time (time cost)	The relative cost of maintaining a connection over a TG	0 to 255 (0 is the minimum cost)
Cost per byte (byte cost)	The relative cost of transmitting a byte over a TG	0 to 255 (0 is the minimum cost)
Security	Architecturally-defined security values	<ul style="list-style-type: none"> <li>• MINIMAL (nonsecure)</li> <li>• PUBLIC_SWCH (public-switched)</li> <li>• UNDERGROUND (underground cable)</li> <li>• SECURE (secure conduit - not guarded)</li> <li>• PHYS_GUARDED (guarded conduit - protected against physical tapping)</li> <li>• ENCRYPTED (link-level encryption provided)</li> <li>• RAD_GUARDED (guarded conduit - protected against physical and radiation tapping)</li> </ul>
Propagation delay (prop. delay)	The length of time it takes for a signal to propagate from one end of a TG to the other end	<ul style="list-style-type: none"> <li>• MINIMUM</li> <li>• NEGLIGIBLE (less than .48 ms)</li> <li>• TERRESTRIAL (.48 to 49.152 ms)</li> <li>• PACKET (packet-switched - 49.152 to 245.76 ms)</li> <li>• LONG (greater than 245.76 ms)</li> <li>• MAXIMUM</li> </ul>
Effective capacity (capacity)	The highest bit transmission rate a TG is allowed to obtain before being considered overloaded.	Table A-3 on page A-8 maps the effective capacity settings (X'00' to X'FF') to link speeds
User-defined	Three additional user-defined characteristics that describes a TG	0 to 255

Table A-3 (Page 1 of 2). Effective Capacity Representations

COS Value	Kbps	COS Value	Kbps	COS Value	Kbps	COS Value	Kbps
X'00'	MINIMUM	X'40'	38.4	X'80'	9830.4	X'C0'	2516582.4
X'01'	0.16875	X'41'	43.2	X'81'	11059.2	X'C1'	2831155.2
X'02'	0.18750	X'42'	48.0	X'82'	12288.0	X'C2'	3145728.0
X'03'	0.20625	X'43'	52.8	X'83'	13516.8	X'C3'	3460300.8
X'04'	0.22500	X'44'	57.6	X'84'	14745.6	X'C4'	3774873.6
X'05'	0.24375	X'45'	62.4	X'85'	15974.4	X'C5'	4089446.4
X'06'	0.26250	X'46'	67.2	X'86'	17203.2	X'C6'	4404019.2
X'07'	0.28125	X'47'	72.0	X'87'	18432.0	X'C7'	4718592.0
X'08'	0.30000	X'48'	76.8	X'88'	19660.8	X'C8'	5033164.8
X'09'	0.33750	X'49'	86.4	X'89'	22118.4	X'C9'	5662310.4
X'0A'	0.37500	X'4A'	96.0	X'8A'	24576.0	X'CA'	6291456.0
X'0B'	0.41250	X'4B'	105.6	X'8B'	27033.6	X'CB'	6920601.6
X'0C'	0.45000	X'4C'	115.2	X'8C'	29491.2	X'CC'	7549747.2
X'0D'	0.48750	X'4D'	124.8	X'8D'	31948.8	X'CD'	8187892.8
X'0E'	0.52500	X'4E'	134.4	X'8E'	34406.4	X'CE'	8808038.4
X'0F'	0.56250	X'4F'	144.0	X'8F'	36864.0	X'CF'	9437184.0
X'10'	0.60000	X'50'	153.6	X'90'	39321.6	X'D0'	10066329.6
X'11'	0.67500	X'51'	172.8	X'91'	44236.8	X'D1'	11324620.8
X'12'	0.75000	X'52'	192.0	X'92'	49152.0	X'D2'	12582912.0
X'13'	0.82500	X'53'	211.2	X'93'	54067.2	X'D3'	13841203.2
X'14'	0.90000	X'54'	230.4	X'94'	58982.4	X'D4'	15099494.4
X'15'	0.97500	X'55'	249.6	X'95'	63897.6	X'D5'	16357785.6
X'16'	1.05000	X'56'	268.8	X'96'	68812.8	X'D6'	17616076.8
X'17'	1.12500	X'57'	288.0	X'97'	73728.0	X'D7'	18874368.0
X'18'	1.20000	X'58'	307.2	X'98'	78643.2	X'D8'	20132659.2
X'19'	1.35000	X'59'	345.6	X'99'	88473.6	X'D9'	22649241.6
X'1A'	1.50000	X'5A'	384.0	X'9A'	98304.0	X'DA'	25165824.0
X'1B'	1.65000	X'5B'	422.4	X'9B'	108134.4	X'DB'	27682406.4
X'1C'	1.80000	X'5C'	460.8	X'9C'	117964.8	X'DC'	30198988.8
X'1D'	1.95000	X'5D'	499.2	X'9D'	127795.2	X'DD'	32715517.2
X'1E'	2.10000	X'5E'	537.6	X'9E'	137625.6	X'DE'	35232153.6
X'1F'	2.25000	X'5F'	576.0	X'9F'	147456.0	X'DF'	37748736.0
X'20'	2.40000	X'60'	614.4	X'A0'	157286.4	X'E0'	40265318.4
X'21'	2.70000	X'61'	691.2	X'A1'	176947.2	X'E1'	45298483.2
X'22'	3.00000	X'62'	768.0	X'A2'	196608.0	X'E2'	50331648.0
X'23'	3.30000	X'63'	844.8	X'A3'	216268.8	X'E3'	55364812.8
X'24'	3.60000	X'64'	921.6	X'A4'	235929.6	X'E4'	60397977.6
X'25'	3.90000	X'65'	998.4	X'A5'	255590.4	X'E5'	65431142.4
X'26'	4.20000	X'66'	1075.2	X'A6'	275251.2	X'E6'	70464307.2
X'27'	4.50000	X'67'	1152.0	X'A7'	294912.0	X'E7'	75497472.0
X'28'	4.80000	X'68'	1228.8	X'A8'	314572.8	X'E8'	80530636.8
X'29'	5.40000	X'69'	1382.4	X'A9'	353894.4	X'E9'	90596966.4
X'2A'	6.00000	X'6A'	1536.0	X'AA'	393216.0	X'EA'	100663296.0

Table A-3 (Page 2 of 2). Effective Capacity Representations

COS Value	Kbps	COS Value	Kbps	COS Value	Kbps	COS Value	Kbps
X'2B'	6.6	X'6B'	1 689.6	X'AB'	432 537.6	X'EB'	110 729 625.6
X'2C'	7.2	X'6C'	1 843.2	X'AC'	471 859.2	X'EC'	120 725 955.2
X'2D'	7.8	X'6D'	1 996.8	X'AD'	511 180.8	X'ED'	130 862 284.8
X'2E'	8.4	X'6E'	2 150.4	X'AE'	550 502.4	X'EE'	140 928 614.4
X'2F'	9.0	X'6F'	2 304.0	X'AF'	589 824.0	X'EF'	150 994 944.0
X'30'	9.6	X'70'	2 457.6	X'B0'	629 145.6	X'F0'	161 061 273.6
X'31'	10.8	X'71'	2 764.8	X'B1'	707 788.8	X'F1'	181 192 932.8
X'32'	12.0	X'72'	3 072.0	X'B2'	786 432.0	X'F2'	201 326 592.0
X'33'	13.2	X'73'	3 379.2	X'B3'	865 075.2	X'F3'	221 459 251.2
X'34'	14.4	X'74'	3 686.4	X'B4'	943 718.4	X'F4'	241 591 910.4
X'35'	15.6	X'75'	3 993.6	X'B5'	1 022 361.6	X'F5'	261 724 569.6
X'36'	16.8	X'76'	4 300.8	X'B6'	1 101 004.8	X'F6'	281 857 228.8
X'37'	18.0	X'77'	4 608.0	X'B7'	1 179 648.0	X'F7'	301 989 888.0
X'38'	19.2	X'78'	4 915.2	X'B8'	1 258 291.2	X'F8'	322 122 547.2
X'39'	21.6	X'79'	5 529.6	X'B9'	1 415 577.6	X'F9'	362 387 865.6
X'3A'	24.0	X'7A'	6 144.0	X'BA'	1 572 864.0	X'FA'	402 653 184.0
X'3B'	26.4	X'7B'	6 758.4	X'BB'	1 730 150.4	X'FB'	422 918 502.4
X'3C'	28.8	X'7C'	7 372.8	X'BC'	1 887 436.8	X'FC'	483 183 820.8
X'3D'	31.2	X'7D'	7 987.2	X'BD'	2 044 723.2	X'FD'	523 449 139.2
X'3E'	33.6	X'7E'	8 601.6	X'BE'	2 202 009.6	X'FE'	563 714 457.6
X'3F'	36.0	X'7F'	9 216.0	X'BF'	2 359 296.0	X'FF'	MAXIMUM

## Verifying the Format of a COS File

Use the following guidelines to verify the format of a COS file that you have edited.

- The file contains a set of *tags* that identify different elements in the file. The last character of each tag must be a : (colon).
- The first tag in the file must be **def\_cos:**. The last tag in the file must be **edef\_cos:**.
- Each tag in the file, except for **def\_cos:** and **edef\_cos:**, must be followed by one or more values.
- No line in the file can contain more than one tag (although a tag and its associated values can span more than one line).
- Comments are enclosed in parentheses.
- The file must contain a **cos\_name:** tag. This tag cannot be placed among the **node\_row:** or **tg\_row:** tags. To improve error reporting, it is recommended that the **cos\_name:** tag be included as the first tag following the **def\_cos:** tag. When APPN finds an error in a COS file tag, it stops processing the COS file and reports the error. If the tag with the error is processed before the **cos\_name:** tag, APPN will not know the name of the COS file being processed when it reports the error.
- The file must also contain at least one row of node characteristics and one row of TG characteristics.

## Using Remote Shell Commands to Execute the Fast-Path Command Options

Figure A-2 illustrates how remote shell commands can be used to execute a series of APPN fast-path commands on multiple 6611 routers. The general form for an **rsh** command that executes a fast-path command is:

```
rsh hostname -l userid passwd fast-path_command
```

where:

- *Hostname* is the host name of the 6611 to which the command is sent. An IP address can be used in place of the host name.
- *UserId* is a user ID defined on the 6611 to which the command is sent.
- *Passwd* is the password for the user ID.
- *Fast-path\_command* is the fast-path command to be executed.

When the **rsh** commands are included in an executable file, the resulting file can be run from an IP workstation that supports the **rsh** daemon. The file enables you to make changes to COS files on multiple 6611 routers without logging onto a 6611. (See Chapter 3 for more information on using remote shell commands.)

---

```
⋮  
rsh 8.9.9.1 -l IBM6611C IBM6611C appn set -user1 -restart 4 2 5 100  
rsh 8.9.9.1 -l IBM6611C IBM6611C appn set -mode_name -restart 3 QPCSUPP  
rsh 9.67.46.129 -l IBM6611C IBM6611C appn set -user1 -restart 4 2 5 100  
rsh 9.67.46.129 -l IBM6611C IBM6611C appn set -mode_name -restart 3 QPCSUPP  
rsh 6611HQ -l IBM6611C IBM6611C appn set -user1 -restart 4 2 5 100  
rsh 6611HQ -l IBM6611C IBM6611C appn set -mode_name -restart 3 QPCSUPP  
⋮
```

---

*Figure A-2. Sample Remote Shell Commands*

The fast-path commands shown in Figure A-2:

- Set the range for the first user-defined TG characteristic in TG row 2 of the #INTER COS file to a minimum value of 5 and a maximum value of 100.
- Add the mode name QPCSUPP to the #CONNECT COS file.

### Notes:

1. For the purposes of this sample, the default 6611 user ID and password are shown for each router.
2. To execute an **appn set** fast-path command, the user ID contained in the **rsh** command must be a controlling user.

---

## Appendix B. License Program Specification

This appendix contains license information about the IBM Multiprotocol Network Program Version 1 Release 3. The product identifier for this product is 5648-016.

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### Description

The Multiprotocol Network Program Version 1 Release 3 provides bridging and routing software for the IBM 6611 Network Processor Model 120, Model 125, Model 140, Model 145, Model 170, and Model 175. All models are shipped with the Multiprotocol Network Program installed.

The basic functions of the Multiprotocol Network Program include:

- The ability to route a variety of protocols such as IP, IPX, XNS, AppleTalk, APPN, DECnet, and Banyan VINES
- The ability to bridge packets using source route bridging, transparent bridging, or translational bridging
- The ability to transport Systems Network Architecture (SNA), Advanced Peer to Peer Networking (APPN), and Network Basic Input/Output Systems (NetBIOS) traffic using data link switching (DLSw) in a bridged or routed environment
- A Simple Network Management Protocol (SNMP) network management agent

Included with the Multiprotocol Network Program are two other programs, which complete the software product:

- The IBM Multiprotocol Network Program System Manager is an interactive user interface designed to perform system management and operation tasks. It displays a hierarchy of menus that lead to interactive dialogs. System Manager is installed on all models of the IBM 6611 Network Processor.
- The IBM Multiprotocol Network Program Configuration Program is a graphical user interface designed to configure the IBM 6611 Network Processor. The Configuration Program diskettes are shipped with the 6611. Store the Configuration Program diskettes in the binder for this book. See "Programming Requirements" on page B-2 for the Configuration Program software and hardware requirements.

---

### Specified Operating Environment

#### Machine Requirements

The Multiprotocol Network Program is designed to operate on all models of the 6611. The minimal machine configuration consists of an 6611 and the communication adapters required to implement the user's configuration.

To run diagnostics after installing or servicing the 6611, it is required that the user make an ASCII terminal such as the IBM 3161 or an equivalent available to IBM service personnel. In normal operating mode, the 6611 and the Multiprotocol Network Program will not use the ASCII terminal.



IBM will provide optional remote service capability for 6611 users. Customers who want to establish this service must provide a modem such as the IBM 5853, or an equivalent, and a communications line.

## Programming Requirements

Initial configuration of the Multiprotocol Network Program and subsequent configuration changes can be performed using the IBM Multiprotocol Network Program Configuration Program or the IBM Multiprotocol Network Program System Manager.

You will need one of the following workstations and related equipment and software to run the IBM Multiprotocol Network Program Configuration Program:

- IBM RISC System/6000 POWERstation\* equipped with:
  - IBM AIX Version 3.1.5 or later with TCP/IP enabled
  - IBM AIXwindows\* Environment/6000
  - 16 MB of memory
  - 3.5-inch diskette drive that can read and write 1.44 MB-formatted diskettes
  - 10 MB of available space of the fixed disk drive
  - Graphics display that supports 640x480 resolution and 16 colors or gray scales
  - Mouse
- An IBM Personal System/2\* (PS/2) workstation that has an Intel\*\* 80386\*\* or higher processor or a compatible system which has an Intel 80386 or higher processor. For workstations running Windows\*\*, the following is required:
  - IBM DOS 3.3 or later, MS-DOS\*\* 3.3 or later
  - Microsoft Windows\*\* 3.0 or 3.1
  - 8 MB of memory
  - 3.5-inch diskette drive that can read and write 1.44 MB-formatted diskettes
  - 10 MB of available space on the fixed disk drive
  - Graphics display that supports 640x480 resolution and 16 colors or gray scales
  - Mouse
- For workstations running OS/2\*, the following is required:
  - Operating System/2\* (OS/2) 2.1
  - 10 MB of memory
  - 3.5-inch diskette drive that can read and write 1.44 MB-formatted diskettes
  - 10 MB of available space on the fixed disk drive
  - Graphics display that supports 640x480 resolution and 16 colors or gray scales
  - Mouse

## Licensed Program Materials Availability

Yes. This licensed program is available with some licensed program materials designated as "RESTRICTED MATERIALS OF IBM." The remaining licensed program materials are available and are not designated as "RESTRICTED MATERIALS OF IBM."

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## Supplemental Terms

### Testing Period

None

### Installation/Location License

Not applicable. A separate license is required for each machine on which the license program will be used.

#### Selling to a Third Party

When the 6611 is sold to a third party, the original owner must lock the Multiprotocol Network Program using either the Configuration Program or a fast-path command primitive. The software is locked by the original owner and unlocked by the customer to whom it was sold.

### Usage License

Not applicable.

### Type/Duration of Program Services

Central Service, including the IBM Support Center, will be available until discontinued by IBM with a minimum of six months written notice.

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## Warranty

IBM warrants that:

1. IBM has the right to license this program.
2. The IBM program conforms to its specifications.

The warranty period for this program expires when its program services are no longer available. During the warranty period, IBM will provide warranty service, without charge, through Program Services. Program Services are available for a warranty program for at least one year following the program's general availability.

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## Additional Information

Any other documentation with respect to this licensed program, including any documentation referenced herein, is provided for reference purposes only and does not extend or modify these specifications.



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## Abbreviations, Glossary, Bibliography, and Index

<b>List of Abbreviations</b> . . . . .	X-3
<b>Glossary</b> . . . . .	X-9
<b>Bibliography</b> . . . . .	X-33
IBM 6611 Network Processor and Multiprotocol Network Program	
Publications . . . . .	X-33
Related IBM Product Publications . . . . .	X-33
Other Publications . . . . .	X-34
Internet Requests for Comments (RFCs) . . . . .	X-35
Obtaining RFCs . . . . .	X-35
RFCs Implemented by the IBM 6611 and the IBM Multiprotocol Network Program . . . . .	X-35
<b>Index</b> . . . . .	X-39



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## List of Abbreviations

<b>A</b>	ampere	<b>bps</b>	bits per second
<b>AARP</b>	AppleTalk Address Resolution Protocol	<b>BS</b>	British Standard
<b>AC</b>	alternating current	<b>BSCRW</b>	binary synchronous read/write
<b>ACLST</b>	AC logic self-test	<b>BTU</b>	British thermal unit
<b>ADCCP</b>	advanced data communication control procedures	<b>B8ZS</b>	binary 8 zero suppression coding scheme
<b>AEP</b>	AppleTalk Echo Protocol	<b>C</b>	Celsius
<b>AIPGM</b>	array initialization program	<b>CBA</b>	common on-chip-processor bus address
<b>AIX</b>	Advanced Interactive Executive	<b>CCITT</b>	Consultative Committee on International Telegraph and Telephone
<b>AMA</b>	arbitrary MAC addressing	<b>CD-ROM</b>	compact disk read-only memory
<b>AMI</b>	alternate mark inversion	<b>CEE</b>	International Commission for Conformity Certification of Electrical Equipment
<b>AMT</b>	address mapping table	<b>CEI</b>	Comitato Elettrotecnico Italiano
<b>ANSI</b>	American National Standards Institute	<b>CEPT</b>	Conference of European Post and Telecommunications Associations
<b>APAR</b>	Authorized Program Analysis Report	<b>CIO</b>	common input/output
<b>API</b>	application programming interface	<b>cm</b>	centimeter
<b>APPN</b>	Advanced Peer-to-Peer Networking	<b>COS</b>	class of service
<b>ARP</b>	Address Resolution Protocol	<b>CP</b>	control point
<b>AS</b>	Australian standard	<b>CPMS</b>	control point management services
<b>ASCII</b>	American National Standard Code for Information Interchange	<b>CP-MSU</b>	control point management services unit
<b>ASE</b>	autonomous system externals	<b>CPS</b>	call progress signal
<b>ASN</b>	Autonomous System Number	<b>CPU</b>	central processing unit
<b>ASN</b>	abstract syntax notation	<b>CR</b>	carriage return
<b>AST</b>	array self test	<b>CRC</b>	cyclic redundancy check
<b>ASYNC</b>	asynchronous	<b>CRS</b>	configuration report server
<b>AT</b>	Attention	<b>CRT</b>	cathode ray tube
<b>ATE</b>	Asynchronous Terminal Emulation	<b>CSA</b>	Canadian Standards Association
<b>ATP</b>	AppleTalk Transaction Protocol	<b>CSMA/CD</b>	carrier sense multiple access with collision detection
<b>AUI</b>	attachment unit interface	<b>CSU</b>	channel service unit
<b>AWG</b>	American Wire Gauge	<b>CTS</b>	clear to send
<b>BCR</b>	branch-on-condition register	<b>CUG</b>	closed user group
<b>BECN</b>	backward explicit congestion notification	<b>DA</b>	destination address; diagnostic application
<b>BER</b>	basic encoding rules	<b>dB</b>	decibel
<b>BER</b>	Bit error rate	<b>DC</b>	direct current
<b>BIOS</b>	basic input/output system	<b>DCD</b>	data carrier detect
<b>BGP</b>	Border Gateway Protocol	<b>DCE</b>	data circuit-terminating equipment
<b>BIST</b>	built-in self-test	<b>DCLST</b>	DC logic self-test
<b>BIU</b>	basic information unit		
<b>BPDU</b>	bridge protocol data unit		

<b>DDCMP</b>	Digital Data Communications Message Protocol	<b>FCS</b>	frame check sequence
<b>DDN</b>	Defense Data Network	<b>FDDI</b>	Fiber Distributed Data Interface
<b>DDP</b>	Datagram Delivery Protocol	<b>FDL</b>	facilities data link
<b>DIS</b>	draft international standard	<b>FDX</b>	full duplex
<b>DISC</b>	disconnect character	<b>FECN</b>	forward explicit congestion notification
<b>DLC</b>	data link control	<b>FFC</b>	failing function code
<b>DLCI</b>	data link connection identifier	<b>FP</b>	focal point
<b>DLSw</b>	data link switching	<b>FRP</b>	Fragmentation Protocol
<b>DM</b>	data mode	<b>FRU</b>	field replaceable unit
<b>DMA</b>	direct memory access	<b>FSCK</b>	File System Check
<b>DNA</b>	Digital Network Architecture	<b>ft</b>	foot, feet
<b>DoD</b>	Department of Defense	<b>FTP</b>	File Transfer Protocol
<b>DOS</b>	Disk Operating System	<b>GDS</b>	general data stream
<b>DRAM</b>	dynamic random access memory	<b>HDLC</b>	high-level data link control
<b>DS</b>	directory services	<b>HVPD</b>	hardware vital product data
<b>DSAP</b>	destination service access point	<b>Hz</b>	hertz
<b>DSE</b>	data switching equipment	<b>I</b>	information
<b>DSE</b>	data switching exchange	<b>IAB</b>	Internet Architecture Board
<b>DSPU</b>	downstream physical unit	<b>IANA</b>	Internet Assigned Numbers Authority
<b>DSR</b>	data set ready	<b>ICMP</b>	Internet Control Message Protocol
<b>DSU</b>	data service unit	<b>ICP</b>	Internet Control Protocol
<b>DTE</b>	data terminal equipment	<b>ID</b>	identification
<b>DTR</b>	data terminal ready	<b>IDP</b>	Internet Datagram Protocol
<b>DUSCC</b>	dual universal serial communications controller	<b>IEC</b>	International Electrotechnical Commission
<b>EC</b>	engineering change	<b>IEEE</b>	Institute of Electrical and Electronics Engineers
<b>ECC</b>	error correcting code	<b>IETF</b>	Internet Engineering Task Force
<b>EGP</b>	Exterior Gateway Protocol	<b>IGP</b>	Interior Gateway Protocol
<b>EIA</b>	Electronics Industries Association	<b>in.</b>	inch
<b>EIB</b>	error information block	<b>InARP</b>	Inverse Address Resolution Protocol
<b>ELAP</b>	EtherTalk Link Access Protocol	<b>IML</b>	initial machine load
<b>EMEA</b>	Europe/Middle East/Africa	<b>I/O</b>	input/output
<b>EMI</b>	electromagnetic interference	<b>IOCC</b>	input/output channel control
<b>EN</b>	end node	<b>ICP</b>	Internet Control Protocol
<b>EP</b>	entry point	<b>IP</b>	Internet Protocol
<b>EPOW</b>	early power on warning	<b>IPC</b>	Interprocess Communications Protocol
<b>EPROM</b>	erasable programmable read-only memory	<b>IPCP</b>	IP Control Protocol
<b>ESD</b>	electrostatic discharge	<b>IPL</b>	initial program load
<b>ESF</b>	extended super frame	<b>IPRTS</b>	permanent request to send
<b>ETX</b>	end of text	<b>IPX</b>	Internetwork Packet Exchange
<b>F</b>	Fahrenheit	<b>IRTF</b>	Internet Research Task Force

<b>ISDN</b>	integrated services digital network	<b>MILNET</b>	military network
<b>ISO</b>	International Organization for Standardization	<b>MLTG</b>	multi-link transmission group
<b>ISR</b>	intermediate session routing	<b>mm</b>	millimeter
<b>KB</b>	kilobyte	<b>MPNP</b>	Multiprotocol Network Program
<b>Kbps</b>	kilobits per second	<b>ms</b>	millisecond
<b>kg</b>	kilogram	<b>MTU</b>	maximum transmission unit
<b>KHz</b>	kilohertz	<b>NAU</b>	network addressable unit
<b>kVA</b>	kilovolt ampere	<b>NAUN</b>	nearest active upstream neighbor
<b>LAN</b>	local area network	<b>NBP</b>	Name Binding Protocol
<b>LAPB</b>	link access protocol-balanced	<b>NCP</b>	Network Control Program
<b>LAPD</b>	link access procedure for D-channel of ISDN	<b>NCP</b>	Network Control Protocol
<b>lb</b>	pound	<b>NCP</b>	Network Core Protocol
<b>LBO</b>	line build out	<b>NCTE</b>	Network Customer Equipment
<b>LBS</b>	LAN bridge server	<b>NEMA</b>	National Electrical Manufacturers Association
<b>LCN</b>	logical channel number	<b>NetBIOS</b>	Network Basic Input/Output System
<b>LCP</b>	Link Control Protocol	<b>NetRPC</b>	Network Remote Procedure Calls
<b>LED</b>	light-emitting diode	<b>NFS</b>	Network File System
<b>LEN</b>	low-entry networking	<b>NI</b>	network interface
<b>LF</b>	line feed	<b>NIC</b>	Network Information Center
<b>LLC</b>	logical link control	<b>NIC</b>	network interface card
<b>LMI</b>	local management interface	<b>NICE</b>	Network Information and Control Exchange
<b>LNM</b>	LAN Network Manager	<b>NIO</b>	native input/output
<b>LpAm</b>	level pressure A-weighted mean	<b>NL</b>	new line
<b>LRM</b>	LAN reporting mechanism	<b>NLPID</b>	network layer protocol ID
<b>LU</b>	logical unit	<b>NMVT</b>	network management vector transport
<b>LVM</b>	logical volume manager	<b>NN</b>	network node
<b>LWAd</b>	level watts A-weighted declared	<b>NOC</b>	network operations center
<b>m</b>	meter	<b>NRM</b>	normal response mode
<b>MAC</b>	medium access control	<b>NRZ</b>	non-return-to-zero
<b>MAN</b>	metropolitan area network	<b>NRZI</b>	non-return-to-zero inverted
<b>MAP</b>	maintenance analysis procedure	<b>NS/2</b>	Networking Services/2
<b>MAP</b>	Manufacturing Automation Protocol	<b>NSFNET</b>	National Science Foundation NETwork
<b>Mb</b>	megabit	<b>NUA</b>	network user address
<b>MB</b>	megabyte	<b>NUI</b>	network user identification
<b>Mbps</b>	megabits per second	<b>NVRAM</b>	non-volatile random access memory
<b>MBps</b>	megabytes per second	<b>NZS</b>	New Zealand Standard
<b>MDS</b>	multiple domain support	<b>OA</b>	Outgoing Access
<b>MDS-MU</b>	multiple domain support message unit	<b>OCS</b>	outboard communication server; on-card sequencer
<b>MES</b>	Miscellaneous Equipment Specifications	<b>ODI</b>	Open Datalink Interface
<b>MHz</b>	megahertz	<b>ODM</b>	object data manager
<b>MIB</b>	Management Information Base		



<b>OEM</b>	original equipment manufacturer	<b>RLBT</b>	remote loopback test
<b>OS/2</b>	Operating System/2	<b>RLSD</b>	received line signal detector
<b>OSI</b>	open systems interconnection	<b>RNN</b>	reporting network node
<b>OSPF</b>	Open Shortest Path First	<b>RNR</b>	receive not ready
<b>OSPFase</b>	Open Shortest Path First autonomous system external	<b>ROM</b>	read-only memory
<b>PAL</b>	programmable array logic	<b>ROS</b>	read-only storage
<b>PAP</b>	Password Authentication Protocol	<b>RPOA</b>	Recognized Private Operating Agency
<b>PAP</b>	Printer Access Protocol	<b>RPS</b>	ring parameter server
<b>PC</b>	personal computer	<b>RPQ</b>	request for price quotation
<b>PCSA</b>	Personal Computing Systems Architecture	<b>RR</b>	receive ready
<b>PdAt</b>	Predefined Attributes	<b>RSCV</b>	route selection control vector
<b>PDU</b>	protocol data unit	<b>RSH</b>	Remote Shell Protocol
<b>PIU</b>	path information unit	<b>RSN</b>	resource sequence number
<b>PMX</b>	Presentation Management X-Server	<b>RTMP</b>	Routing Table Maintenance Protocol
<b>POR</b>	power-on reset	<b>RTP</b>	RouTing update Protocol
<b>POS</b>	programmable option select	<b>RU</b>	request/response unit
<b>POST</b>	power-on self-test	<b>SA</b>	source address
<b>PPP</b>	Point-to-Point Protocol	<b>SABS</b>	South African Bureau of Standards
<b>PROM</b>	programmable read-only memory	<b>SAP</b>	service access point
<b>PRPQ</b>	programming request for price quotation	<b>SAP</b>	Service Advertising Protocol
<b>PRTS</b>	permanent request to send	<b>SABME</b>	set asynchronous balanced mode extended
<b>PS/2</b>	Personal System/2	<b>SCRLL</b>	scroll
<b>PSDN</b>	packet switching data network	<b>SCSI</b>	small computer systems interface
<b>PSE</b>	packet switching equipment	<b>SDLC</b>	synchronous data link control
<b>PSP</b>	portable service platform	<b>SELV</b>	safety extra low voltage
<b>PSS</b>	packet switch stream	<b>SEV</b>	Schweizerischer Elektrotechnischer Verein
<b>PTF</b>	program temporary fix	<b>SII</b>	Standards Institution of Israel
<b>PTY</b>	pseudo teletype port	<b>SIMM</b>	single inline memory module
<b>PU</b>	physical unit	<b>SIO</b>	serial input/output
<b>PVC</b>	permanent virtual circuit	<b>SIP</b>	single inline package
<b>QLLC</b>	qualified link level control	<b>SLA</b>	serial link adapter
<b>RAM</b>	random access memory	<b>SLSS</b>	System Library Subscription Service
<b>REM</b>	ring error monitor	<b>SMI</b>	Structure of Management Information
<b>REXEC</b>	Remote Execution Protocol	<b>SNA</b>	Systems Network Architecture
<b>RFC</b>	Request for Comments	<b>SNA/MS</b>	Systems Network Architecture Management Services
<b>RFI</b>	radio frequency interference	<b>SNAP</b>	Subnetwork Access Protocol
<b>RH</b>	request header	<b>SNMP</b>	Simple Network Management Protocol
<b>RI</b>	routing information	<b>SOC</b>	sphere of control
<b>RIP</b>	Routing Information Protocol	<b>SPP</b>	Sequenced Packet Protocol
<b>RISC</b>	reduced instruction-set computer	<b>SPX</b>	Sequenced Packet Exchange

<b>SRAM</b>	static random access memory
<b>SRN</b>	service request number
<b>SRT</b>	source routing transparent (bridging)
<b>SRTB</b>	source routing to transparent bridging
<b>SR-TB</b>	source routing to transparent bridging
<b>SSAP</b>	source service access point
<b>SSCP</b>	system services control point
<b>STP</b>	spanning tree protocol
<b>STP</b>	shielded twisted pair
<b>SVC</b>	switched virtual circuit
<b>TCP</b>	Transmission Control Protocol
<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol
<b>TDU</b>	topology database update
<b>TG</b>	transmission group
<b>TLAP</b>	TokenTalk Link Access Protocol
<b>TR</b>	terminal ready
<b>TRB</b>	transparent bridging
<b>TT</b>	terminal timing
<b>UA</b>	unnumbered acknowledgment

<b>UDP</b>	User Datagram Protocol
<b>UI</b>	unnumbered information
<b>UL</b>	Underwriter's Laboratories
<b>UPS</b>	uninterruptible power supply
<b>V AC</b>	volts alternating current
<b>VAX</b>	virtual address extension
<b>VCCI</b>	Voluntary Control Council for Interference
<b>VGA</b>	video graphics adapter
<b>VINES</b>	Virtual NETworking System
<b>VMS</b>	virtual memory system
<b>VPD</b>	vital product data
<b>VRN</b>	virtual routing node
<b>VTAM</b>	Virtual Telecommunications Access Method
<b>WAN</b>	wide area network
<b>X.25</b>	packet-switched networks
<b>XID</b>	exchange identification
<b>XNS</b>	Xerox Network Systems
<b>ZIP</b>	Zone Information Protocol
<b>ZIT</b>	Zone Information Table



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# Glossary

This glossary includes terms and definitions from:

- The *American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI). Copies may be purchased from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036. Definitions are identified by the symbol (A) after the definition.
- The ANSI/EIA Standard—440-A, *Fiber Optic Terminology*. Copies may be purchased from the Electronic Industries Association, 2001 Pennsylvania Avenue, N.W., Washington, DC 20006. Definitions are identified by the symbol (E) after the definition.
- The *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1). Definitions of published parts of this vocabulary are identified by the symbol (I) after the definition; definitions taken from draft international standards, committee drafts, and working papers being developed by ISO/IEC JTC1/SC1 are identified by the symbol (T) after the definition, indicating that final agreement has not yet been reached among the participating National Bodies of SC1.
- The Network Working Group Request for Comments: 1208.
- The *IBM Dictionary of Computing*, New York: McGraw-Hill, 1994.

The following cross-references are used in this glossary:

**Contrast with:** This refers to a term that has an opposed or substantively different meaning.

**Synonym for:** This indicates that the term has the same meaning as a preferred term, which is defined in its proper place in the glossary.

**Synonymous with:** This is a backward reference from a defined term to all other terms that have the same meaning.

**See:** This refers the reader to multiple-word terms that have the same last word.

**See also:** This refers the reader to terms that have a related, but not synonymous, meaning.

**Deprecated term for:** This indicates that the term should not be used. It refers to a preferred term, which is defined in its proper place in the glossary.

## A

**AARP.** AppleTalk Address Resolution Protocol.

**abstract syntax.** A data specification that includes all distinctions that are needed in data transmissions, but that omits (abstracts) other details such as those that depend on specific computer architectures. See also *abstract syntax notation 1 (ASN.1)* and *basic encoding rules (BER)*.

**abstract syntax notation 1 (ASN.1).** The Open Systems Interconnection (OSI) method for abstract syntax specified in ISO 8824. See also *basic encoding rules (BER)*.

**ACCESS.** In the Simple Network Management Protocol (SNMP), the clause in a Management Information Base (MIB) module that defines the minimum level of support that a managed node provides for an object.

**access method.** A technique, implemented in software, that controls the flow of information through a network.

**acknowledgment.** (1) The transmission, by a receiver, of acknowledge characters as an affirmative response to a sender. (T) (2) An indication that an item sent was received.

**active.** (1) Operational. (2) Pertaining to a node or device that is connected or is available for connection to another node or device.

**adapter.** A part that electrically or physically connects a device to a computer or to another device.

**address.** In data communication, the unique code assigned to each device or workstation connected to a network.

**address mapping table (AMT).** A table, maintained within the AppleTalk router, that provides a current mapping of node addresses to hardware addresses.

**address mask.** For internet subnetworking, a 32-bit mask used to identify the subnetwork address bits in the host portion of an internet address. Synonymous with *subnet mask* and *subnetwork mask*.

**address resolution.** A method for mapping network-layer addresses to media-specific addresses. See also *Address Resolution Protocol (ARP)* and *AppleTalk Address Resolution Protocol (AARP)*.

**Address Resolution Protocol (ARP).** In the Internet suite of protocols, the protocol that dynamically maps between Internet addresses and the addresses used by a supporting metropolitan or local area network such as Ethernet or token-ring.

**addressing.** In data communication, the way in which a station selects the station to which it is to send data.

**Advanced Peer-to-Peer Networking (APPN).** An extension to SNA featuring (a) greater distributed network control that avoids critical hierarchical dependencies, thereby isolating the effects of single points of failure; (b) dynamic exchange of network topology information to foster ease of connection, reconfiguration, and adaptive route selection; (c) dynamic definition of network resources; and (d) automated resource registration and directory lookup. APPN extends the LU 6.2 peer orientation for end-user services to network control and supports multiple LU types, including LU 2, LU 3, and LU 6.2.

**Advanced Peer-to-Peer Networking (APPN) end node.** A node that provides a broad range of end-user services and supports sessions between its local control point (CP) and the CP in an adjacent network node. It uses these sessions to dynamically register its resources with the adjacent CP (its network node server), to send and receive directory search requests, and to obtain management services. An APPN end node can also attach to a subarea network as a peripheral node or to other end nodes.

**Advanced Peer-to-Peer Networking (APPN) network.** A collection of interconnected network nodes and their client end nodes.

**Advanced Peer-to-Peer Networking (APPN) network node.** A node that offers a broad range of end-user services and that can provide the following:

- Distributed directory services, including registration of its domain resources to a central directory server
- Topology database exchanges with other APPN network nodes, enabling network nodes throughout the network to select optimal routes for LU-LU sessions based on requested classes of service
- Session services for its local LUs and client end nodes
- Intermediate routing services within an APPN network

**Advanced Peer-to-Peer Networking (APPN) node.** An APPN network node or an APPN end node.

**AEP.** AppleTalk Echo Protocol.

**agent.** A system that assumes an agent role.

**AIX.** Advanced Interactive Executive.

**all-stations address.** Synonym for *broadcast address*.

**AMA.** Arbitrary MAC addressing.

**American National Standards Institute (ANSI).** An organization consisting of producers, consumers, and general interest groups, that establishes the procedures by which accredited organizations create and maintain voluntary industry standards in the United States. (A)

**AMT.** Address mapping table.

**analog.** (1) Pertaining to data consisting of continuously variable physical quantities. (A)  
(2) Contrast with *digital*.

**ANSI.** American National Standards Institute.

**API.** (1) Application program interface. (2) Application programming interface.

**AppleTalk.** A network protocol developed by Apple Computer, Inc. This protocol is used to interconnect network devices, which can be a mixture of Apple and non-Apple products.

**AppleTalk Address Resolution Protocol (AARP).** In AppleTalk networks, a protocol that a) translates AppleTalk node addresses into hardware addresses and b) reconciles addressing discrepancies in networks that support more than one set of protocols.

**AppleTalk Echo Protocol (AEP).** In AppleTalk networks, a protocol that provides a node destination test function by means of a send and receive transaction where the packet received at the source node is identical to the packet sent to the destination node.

**AppleTalk Transaction Protocol (ATP).** In AppleTalk networks, a protocol that provides client/server request and response functions for hosts accessing the Zone Information Protocol (ZIP) for zone information.

**application.** A collection of software components used to perform specific types of user-oriented work on a computer.

**application program interface (API).** A functional interface used by an executing application program to access the specific functions and services provided by an underlying operating system or service program.

**application programming interface (API).** (1) The set of programming language constructs or statements that can be coded in an application program to obtain the specific functions and services provided by an underlying operating system or service program. (2) In VTAM, the language structure used in control blocks so

that application programs can reference them and be identified to VTAM.

**APPN.** Advanced Peer-to-Peer Networking.

**APPN network.** See *Advanced Peer-to-Peer Networking (APPN) network*.

**APPN network node.** See *Advanced Peer-to-Peer Networking (APPN) network node*.

**APPN node.** See *Advanced Peer-to-Peer Networking (APPN) node*.

**arbitrary MAC addressing (AMA).** In DECnet architecture, an addressing scheme used by DECnet Phase IV-Prime that supports universally administered addresses and locally administered addresses.

**area.** In Internet and DECnet routing protocols, a subset of a network or gateway grouped together by definition of the network administrator. Each area is self-contained; knowledge of an area's topology remains hidden from other areas.

**ARP.** Address Resolution Protocol.

**ASCII (American National Standard Code for Information Interchange).** The standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), that is used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control characters and graphic characters. (A)

**ASN.1.** Abstract syntax notation 1.

**ASYNCR.** Asynchronous.

**asynchronous (ASYNCR).** Pertaining to two or more processes that do not depend upon the occurrence of specific events such as common timing signals. (T)

**ATP.** AppleTalk Transaction Protocol.

**attachment unit interface (AUI).** In a local area network, the interface between the medium attachment unit and the data terminal equipment within a data station. (I) (A)

**AUI.** Attachment unit interface.

**autonomous system.** In TCP/IP, a group of networks and routers under one administrative authority. These networks and routers cooperate closely to propagate network reachability (and routing) information among themselves using an interior gateway protocol of their choice.

**autonomous system number.** In TCP/IP, a number assigned to an autonomous system by the same central authority that also assigns IP addresses. The autonomous system number makes it possible for automated routing algorithms to distinguish autonomous systems.

## B

**basic encoding rules (BER).** The rules specified in ISO 8825 for encoding data units described in abstract syntax notation 1 (ASN.1). The rules specify the encoding technique, not the abstract syntax.

**basic information unit (BIU).** In SNA, the unit of data and control information passed between half-sessions. It consists of a request/response header (RH) followed by a request/response unit (RU).

**Basic Input/Output System (BIOS).** Code that controls basic hardware operations, such as interactions with diskette drives, hard disk drives, and the keyboard.

**baud.** (1) A unit of signaling speed equal to the number of discrete conditions or signal events per second; for example, one baud equals one-half dot cycle per second in Morse code, one bit per second in a train of binary signals, and one 3-bit value per second in a train of signals each of which can assume one of eight different states. (A) (2) In asynchronous transmission, the unit of modulation rate corresponding to one unit interval per second; that is, if the duration of the unit interval is 20 milliseconds, the modulation rate is 50 baud. (A)

**BER.** Basic encoding rules.

**BGP.** Border Gateway Protocol.

**BGP group.** An autonomous system made up of neighbors that be configured or learned. The neighbors have the same group type, such as external, test, internal, or Interior Gateway Protocol.

**BIOS.** Basic Input/Output System. See also *NetBIOS*.

**bit map.** (1) A coded representation in which each bit, or group of bits, represents or corresponds to an item; for example, a configuration of bits in main storage in which each bit indicates whether a peripheral device or a storage block is available or in which each group of bits corresponds to one pixel of a display image. (2) A pixmap with a depth of one bit plane.

**BIU.** Basic information unit.

**block.** A string of data elements recorded or transmitted as a unit. The elements may be characters, words, or physical records. (T)

**Border Gateway Protocol (BGP).** An Internet Protocol (IP) routing protocol used between domains and autonomous systems. Contrast with *Exterior Gateway Protocol (EGP)*.

**border router.** In Internet communications, a router, positioned at the edge of an autonomous system, that communicates with a router that is positioned at the edge of a different autonomous system.

**bps.** Bits per second.

**bridge.** A functional unit that interconnects multiple LANs (locally or remotely) that use the same logical link control protocol but that can use different medium access control protocols. A bridge forwards a frame to another bridge based on the medium access control (MAC) address.

**bridging.** In LANs, the forwarding of a frame from one LAN segment to another. The destination is specified by the medium access control (MAC) sublayer address encoded in the destination address field of the frame header.

**broadcast.** (1) Transmission of the same data to all destinations. (T) (2) Simultaneous transmission of data to more than one destination. Contrast with *multicast*.

**broadcast address.** In SDLC, a station address (eight 1's) reserved as an address common to all stations on a link. Synonymous with *all-stations address*.

**bus.** (1) A facility for transferring data between several devices located between two end points, only one device being able to transmit at a given moment. (T) (2) A computer configuration in which processors are interconnected in series.

**button.** A word or picture on the screen that can be selected. Once selected and activated, a button begins an action in the same manner that pressing a key on the keyboard can begin an action.

## C

**cache.** (1) A special-purpose buffer storage, smaller and faster than main storage, used to hold a copy of instructions and data obtained from main storage and likely to be needed next by the processor. (T) (2) A buffer storage that contains frequently accessed instructions and data; it is used to reduce access time. (3) An optional part of the directory database in network nodes where frequently used directory information may be stored to speed directory searches. (4) To place, hide, or store in a cache.

**calling.** (1) The process of transmitting selection signals in order to establish a connection between data

stations. (I) (A) (2) In X.25 communications, pertaining to the location or user that makes a call.

**CALLOUT.** The logical channel type on which the data terminal equipment (DTE) can send a call, but cannot receive one.

**carrier.** An electric or electromagnetic wave or pulse train that may be varied by a signal bearing information to be transmitted over a communication system. (T)

**carrier sense.** In a local area network, an ongoing activity of a data station to detect whether another station is transmitting. (T)

**carrier sense multiple access with collision detection (CSMA/CD).** A protocol that requires carrier sense and in which a transmitting data station that detects another signal while transmitting, stops sending, sends a jam signal, and then waits for a variable time before trying again. (T) (A)

**CCITT.** International Telegraph and Telephone Consultative Committee. An organization (one of four permanent organs of the International Telecommunication Union [ITU], headquartered in Geneva, Switzerland) that is concerned with the problems relating to international telephony and telegraphy. The CCITT Plenary Assembly meets at regular intervals to prepare a list of technical questions related to telephone and telegraph services. The Assembly assigns these questions to study groups, which then prepare recommendations to be presented at the next plenary meeting. Approved recommendations are published for the use of engineers, scientists, and manufacturers around the world.

**central processing unit (CPU).** The part of a computer that includes the circuits that control the interpretation and execution of instructions.

**Note:** A CPU is the circuitry and storage that executes instructions. Traditionally, the complete processing unit was often regarded as the CPU, whereas today the CPU is often a microchip. In either case, the centrality of a processor or processing unit depends on the configuration of the system or network in which it is used.

**change management.** The process of planning (for example, scheduling) and controlling (for example, distributing, installing, and tracking) changes in an SNA network.

**channel.** (1) A path along which signals can be sent, for example, data channel, output channel. (A) (2) A functional unit, controlled by the processor, that handles the transfer of data between processor storage and local peripheral equipment. See *input/output channel*.

**channel service unit (CSU).** A unit that provides the interface to a digital network. The CSU provides line conditioning (or equalization) functions, which keep the signal's performance consistent across the channel bandwidth; signal reshaping, which constitutes the binary pulse stream; and loopback testing, which includes the transmission of test signals between the CSU and the network carrier's office channel unit. See *data service unit (DSU)*.

**checksum.** (1) The sum of a group of data associated with the group and used for checking purposes. (T) (2) In error detection, a function of all bits in a block. If the written and calculated sums do not agree, an error is indicated. (3) On a diskette, data written in a sector for error detection purposes; a calculated checksum that does not match the checksum of data written in the sector indicates a bad sector. The data are either numeric or other character strings regarded as numeric for the purpose of calculating the checksum.

**circuit.** (1) One or more conductors through which an electric current can flow. See *physical circuit* and *virtual circuit*. (2) A logic device.

**circuit switching.** (1) A process that, on demand, connects two or more data terminal equipment (DTEs) and permits the exclusive use of a data circuit between them until the connection is released. (I) (A) (2) Synonymous with *line switching*.

**class.** In object-oriented design or programming, a group of objects that share a common definition and that therefore share common properties, operations, and behavior. Members of the group are called instances of the class.

**client.** (1) A functional unit that receives shared services from a server. (T) (2) A user.

**closed user group (CUG).** In data communication, a group of users who can communicate with other users in the group, but not with users outside the group.

**Note:** A data terminal equipment (DTE) may belong to more than one closed user group.

**collision.** An unwanted condition that results from concurrent transmissions on a channel. (T)

**collision detection.** In carrier sense multiple access with collision detection (CSMA/CD), a signal indicating that two or more stations are transmitting simultaneously.

**community.** In the Simple Network Management Protocol (SNMP), an administrative relationship between entities.

**community name.** In the Simple Network Management Protocol (SNMP), a string of octets identifying a community.

**component.** Hardware or software that is part of a functional unit.

**configuration.** (1) The manner in which the hardware and software of an information processing system are organized and interconnected. (T) (2) The devices and programs that make up a system, subsystem, or network.

**configuration file.** A file that specifies the characteristics of a system device or network.

**configuration parameter.** A variable in a configuration definition, the values of which can characterize the relationship of a product to other products in the same network or can define characteristics of the product itself.

**congestion.** See *network congestion*.

**connection.** In data communication, an association established between functional units for conveying information. (I) (A)

**connectivity.** (1) The capability of a system or device to be attached to other systems or devices without modification. (T) (2) The capability to attach a variety of functional units without modifying them.

**control point (CP).** (1) A component of an APPN or LEN node that manages the resources of that node. In an APPN node, the CP is capable of engaging in CP-CP sessions with other APPN nodes. In an APPN network node, the CP also provides services to adjacent end nodes in the APPN network. (2) A component of a node that manages resources of that node and optionally provides services to other nodes in the network. Examples are a system services control point (SSCP) in a type 5 subarea node, a network node control point (NNCP) in an APPN network node, and an end node control point (ENCP) in an APPN or LEN end node. An SSCP and an NNCP can provide services to other nodes.

**control point management services (CPMS).** A component of a control point, consisting of management services function sets, that provides facilities to assist in performing problem management, performance and accounting management, change management, and configuration management. Capabilities provided by the CPMS include sending requests to physical unit management services (PUMS) to test system resources, collecting statistical information (for example, error and performance data) from PUMS about the system resources, and analyzing and presenting test results and statistical information collected about the



system resources. Analysis and presentation responsibilities for problem determination and performance monitoring can be distributed among multiple CPMSs.

**control point management services unit (CP-MSU).**

The message unit that contains management services data and flows between management services function sets. This message unit is in general data stream (GDS) format. See also *management services unit (MSU)* and *network management vector transport (NMVT)*.

**CP.** Control point.

**CP-MSU.** Control point management services unit.

**CPMS.** Control point management services.

**CPU.** Central processing unit.

**CSMA/CD.** Carrier sense multiple access with collision detection.

**CSU.** Channel service unit.

**CUG.** Closed user group.

## D

**daemon.** A program that runs unattended to perform a standard service. Some daemons are triggered automatically to perform their task; others operate periodically.

**DASD.** Direct access storage device.

**data circuit.** (1) A pair of associated transmit and receive channels that provide a means of two-way data communication. (l) (2) In SNA, synonym for *link connection*. (3) See also *physical circuit* and *virtual circuit*.

**Notes:**

1. Between data switching exchanges, the data circuit may include data circuit-terminating equipment (DCE), depending on the type of interface used at the data switching exchange.
2. Between a data station and a data switching exchange or data concentrator, the data circuit includes the data circuit-terminating equipment at the data station end, and may include equipment similar to a DCE at the data switching exchange or data concentrator location.

**data circuit-terminating equipment (DCE).** In a data station, the equipment that provides the signal conversion and coding between the data terminal equipment (DTE) and the line. (l)

**Notes:**

1. The DCE may be separate equipment or an integral part of the DTE or of the intermediate equipment.
2. A DCE may perform other functions that are usually performed at the network end of the line.

**data communication.** (1) Transfer of data among functional units by means of data transmission according to a protocol. (T) (2) The transmission, reception, and validation of data. (A)

**data link connection identifier (DLCI).** The numeric identifier of a frame-relay subport or PVC segment in a frame-relay network. Each subport in a single frame-relay port has a unique DLCI. The following table, excerpted from the American National Standards Institute (ANSI) Standard T1.618 and the International Telegraph and Telephone Consultative Committee (CCITT) Standard Q.922, indicates the functions associated with certain DLCI values:

DLCI Values	Function
0	in-channel signaling
1–15	reserved
16–991	assigned using frame-relay connection procedures
992–1007	layer 2 management of frame-relay bearer service
1008–1022	reserved
1023	in-channel layer management

**data link control (DLC).** A set of rules used by nodes on a data link (such as an SDLC link or a token ring) to accomplish an orderly exchange of information.

**data link control (DLC) layer.** In SNA, the layer that consists of the link stations that schedule data transfer over a link between two nodes and perform error control for the link. Examples of data link control are SDLC for serial-by-bit link connection and data link control for the System/370 channel.

**Note:** The DLC layer is usually independent of the physical transport mechanism and ensures the integrity of data that reaches the higher layers.

**data link layer.** In the Open Systems Interconnection reference model, the layer that provides services to transfer data between entities in the network layer over a communication link. The data link layer detects and possibly corrects errors that may occur in the physical layer. (T) See also *Open Systems Interconnection (OSI) reference model*.

**data link level.** (1) In the hierarchical structure of a data station, the conceptual level of control or processing logic between high level logic and the data link that maintains control of the data link. The data link

level performs such functions as inserting transmit bits and deleting receive bits; interpreting address and control fields; generating, transmitting, and interpreting commands and responses; and computing and interpreting frame check sequences. See also *packet level* and *physical level*. (2) In X.25 communications, synonym for *frame level*.

**data link switching (DLSw).** A method of transporting network protocols that use IEEE 802.2 logical link control (LLC) type 2. SNA and NetBIOS are examples of protocols that use LLC type 2. See also *encapsulation* and *spoofing*.

**data network.** An arrangement of data circuits and switching facilities for establishing connections between data terminal equipment. (I)

**data service unit (DSU).** A device that provides a digital data service interface directly to the data terminal equipment. The DSU provides loop equalization, remote and local testing capabilities, and a standard EIA/CCITT interface.

**data stream.** A continuous stream of data elements being transmitted, or intended for transmission, in character or binary-digit form, using a defined format.

**data switching exchange (DSE).** The equipment installed at a single location to provide switching functions, such as circuit switching, message switching, and packet switching. (I)

**data terminal equipment (DTE).** That part of a data station that serves as a data source, data sink, or both. (I) (A)

**data terminal ready (DTR).** A signal to the modem used with the EIA 232 protocol.

**datagram.** (1) In packet switching, a self-contained packet, independent of other packets, that carries information sufficient for routing from the originating data terminal equipment (DTE) to the destination DTE without relying on earlier exchanges between the DTEs and the network. (I) (2) In TCP/IP, the basic unit of information passed across the Internet environment. A datagram contains a source and destination address along with the data. An Internet Protocol (IP) datagram consists of an IP header followed by the transport layer data. See also *packet* and *segment*.

**Datagram Delivery Protocol (DDP).** In AppleTalk networks, a protocol that provides network connectivity by means of connectionless socket-to-socket delivery service on the internet layer.

**DCE.** Data circuit-terminating equipment.

**DDP.** Datagram Delivery Protocol.

**DECnet.** A network architecture that defines the operation of a family of software modules, databases, and hardware components typically used to tie Digital Equipment Corporation systems together for resource sharing, distributed computation, or remote system configuration. DECnet network implementations follow the Digital Network Architecture (DNA) model.

**designated router.** A router that informs end nodes of the existence and identity of other routers. The selection of the designated router is based upon the router with the highest priority. When several routers share the highest priority, the router with the highest station address is selected.

**destination node.** The node to which a request or data is sent.

**destination service access point (DSAP).** In SNA and TCP/IP, a logical address that allows a system to route data from a remote device to the appropriate communications support. Contrast with *source service access point (SSAP)*.

**device.** A mechanical, electrical, or electronic contrivance with a specific purpose.

**digital.** (1) Pertaining to data that consist of digits. (T) (2) Pertaining to data in the form of digits. (A) (3) Contrast with *analog*.

**Digital Network Architecture (DNA).** The model for all DECnet hardware and software implementations.

**direct access storage device (DASD).** A device in which access time is effectively independent of the location of the data.

**direct memory access (DMA).** The system facility that allows a device on the Micro Channel bus to get direct access to the system or bus memory without the intervention of the system processor.

**directory.** A table of identifiers and references to the corresponding items of data. (I) (A)

**directory service (DS).** An application service element that translates the symbolic names used by application processes into the complete network addresses used in an OSI environment. (T)

**directory services (DS).** A control point component of an APPN node that maintains knowledge of the location of network resources.

**disabled.** (1) Pertaining to a state of a processing unit that prevents the occurrence of certain types of interruptions. (2) Pertaining to the state in which a transmission control unit or audio response unit cannot accept incoming calls on a line.

**DLC.** Data link control.

**DLCI.** Data link connection identifier.

**DLSw.** Data link switching.

**DMA.** Direct memory access.

**DNA.** Digital Network Architecture.

**DNS.** Domain name system.

**domain.** (1) That part of a computer network in which the data processing resources are under common control. (T) (2) In the Internet, a part of a naming hierarchy in which the domain name consists of a sequence of names (labels) separated by periods (dots). (3) In Open Systems Interconnection (OSI), a part of a distributed system or a set of managed objects to which a common policy applies.

**domain name system (DNS).** The online distributed database system used to map domain names to internet addresses.

**DR.** In SNA, definite response.

**DS.** (1) Directory service. (2) Directory services.

**DSAP.** Destination service access point.

**DSE.** Data switching exchange.

**DSU.** Data service unit.

**DTE.** Data terminal equipment. (A)

**DTR.** Data terminal ready.

**dump.** (1) Data that has been dumped. (T) (2) To copy the contents of all or part of virtual storage for the purpose of collecting error information.

## E

**EBCDIC.** Extended binary-coded decimal interchange code. A coded character set of 256 8-bit characters.

**echo.** In data communication, a reflected signal on a communications channel. On a communications terminal, each signal is displayed twice, once when entered at the local terminal and again when returned over the communications link. This allows the signals to be checked for accuracy.

**EGP.** Exterior Gateway Protocol.

**EIA.** Electronic Industries Association.

**EIA 232.** In data communications, a specification of the Electronic Industries Association (EIA) that defines

the interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE), using serial binary data interchange.

**Electronic Industries Association (EIA).** An organization of electronics manufacturers that advances the technological growth of the industry, represents the views of its members, and develops industry standards.

**enable.** To make functional.

**enabled.** (1) Pertaining to a state of the processing unit that allows the occurrence of certain types of interruptions. (2) Pertaining to the state in which a transmission control unit or an audio response unit can accept incoming calls on a line.

**encapsulation.** In communications, a technique used by layered protocols by which a layer adds control information to the protocol data unit (PDU) from the layer it supports. In this respect, the layer encapsulates the data from the supported layer. In the Internet suite of protocols, for example, a packet would contain control information from the physical layer, followed by control information from the network layer, followed by the application protocol data. See also *data link switching*.

**entry point (EP).** In SNA, a type 2.0, type 2.1, type 4, or type 5 node that provides distributed network management support. It sends network management data about itself and the resources it controls to a focal point for centralized processing, and it receives and executes focal-point initiated commands to manage and control its resources.

**EP.** Entry point.

**ER.** (1) Explicit route. (2) Exception response.

**Ethernet.** A 10-Mbps baseband local area network that allows multiple stations to access the transmission medium at will without prior coordination, avoids contention by using carrier sense and deference, and resolves contention by using collision detection and delayed retransmission. Ethernet uses carrier sense multiple access with collision detection (CSMA/CD).

**exception.** An abnormal condition such as an I/O error encountered in processing a data set or a file.

**exception response (ER).** In SNA, a protocol requested in the form-of-response-requested field of a request header that directs the receiver to return a response only if the request is unacceptable as received or cannot be processed; that is, a negative response, but not a positive response, can be returned. Contrast with *definite response* and *no response*.

**exchange identification (XID).** A specific type of basic link unit that is used to convey node and link

characteristics between adjacent nodes. XIDs are exchanged between link stations before and during link activation to establish and negotiate link and node characteristics, and after link activation to communicate changes in these characteristics.

**explicit route (ER).** In SNA, a series of one or more transmission groups that connect two subarea nodes. An explicit route is identified by an origin subarea address, a destination subarea address, an explicit route number, and a reverse explicit route number. Contrast with *virtual route (VR)*.

**exterior gateway.** In Internet communications, a gateway on one autonomous system that communicates with another autonomous system. Contrast with *interior gateway*.

**Exterior Gateway Protocol (EGP).** In the Internet suite of protocols, a protocol, used between domains and autonomous systems, that enables network reachability information to be advertised and exchanged. IP network addresses in one autonomous system are advertised to another autonomous system by means of EGP-participating routers. Contrast with *Border Gateway Protocol (BGP)*.

## F

**FDDI.** Fiber Distributed Data Interface.

**Fiber Distributed Data Interface (FDDI).** An American National Standards Institute (ANSI) standard for a 100-megabit-per-second LAN using optical fiber cables.

**field replaceable unit (FRU).** An assembly that is replaced in its entirety when any one of its components fails. In some cases, a field replaceable unit may contain other field replaceable units.

**File Transfer Protocol (FTP).** In the Internet suite of protocols, an application layer protocol that uses TCP and Telnet services to transfer bulk-data files between machines or hosts.

**filter.** A device or program that separates data, signals, or material in accordance with specified criteria. (A)

**focal point (FP).** See *management services focal point (MSFP)*.

**FP.** Focal point.

**fragmentation.** The process of dividing a datagram into smaller parts, or fragments, to match the

capabilities of the physical medium over which it is to be transmitted. See also *segmenting*.

**frame.** (1) In Open Systems Interconnection architecture, a data structure pertaining to a particular area of knowledge and consisting of slots that can accept the values of specific attributes and from which inferences can be drawn by appropriate procedural attachments. (T) (2) The unit of transmission in some local area networks, including the IBM Token-Ring Network. It includes delimiters, control characters, information, and checking characters. (3) In SDLC, the vehicle for every command, every response, and all information that is transmitted using SDLC procedures.

**frame level.** See *link level*.

**frame relay.** (1) An interface standard describing the boundary between a user's equipment and a fast-packet network. In frame-relay systems, flawed frames are discarded; recovery comes end-to-end rather than hop-by-hop. (2) A technique derived from the integrated services digital network (ISDN) D channel standard. It assumes that connections are reliable and dispenses with the overhead of error detection and control within the network.

**frequency.** The rate of signal oscillation, expressed in hertz.

**FRU.** Field replaceable unit.

**FTP.** File Transfer Protocol.

## G

**gateway.** (1) A functional unit that interconnects two computer networks with different network architectures. A gateway connects networks or systems of different architectures. A bridge interconnects networks or systems with the same or similar architectures. (T) (2) In the IBM Token-Ring Network, a device and its associated software that connect a local area network to another local area network or a host that uses different logical link protocols.

**GDS.** General data stream.

**general data stream (GDS).** The data stream used for conversations in LU 6.2 sessions.

**general data stream (GDS) variable.** A type of RU substructure that is preceded by an identifier and a length field and includes either application data, user control data, or SNA-defined control data.

## H

**hard disk.** (1) A rigid magnetic disk such as the internal disks used in the system units of personal computers and in external hard disk drives. (2) A rigid disk used in a hard disk drive.

**HDLC.** High-level data link control.

**header.** (1) System-defined control information that precedes user data. (2) The portion of a message that contains control information for the message such as one or more destination fields, name of the originating station, input sequence number, character string indicating the type of message, and priority level for the message.

**hierarchy.** The resource types, display types, and data types that make up the organization, or levels, in a network.

**high-level data link control (HDLC).** In data communication, the use of a specified series of bits to control data links in accordance with the International Standards for HDLC: ISO 3309 Frame Structure and ISO 4335 Elements of Procedures.

**hop.** (1) In APPN, a portion of a route that has no intermediate nodes. It consists of only a single transmission group connecting adjacent nodes. (2) To the routing layer, the logical distance between two nodes in a network.

**host.** In the Internet suite of protocols, an end system. The end system can be any workstation; it does not have to be a mainframe.

## I

**i-node.** In the AIX operating system, the internal structure that describes the individual files in the operating system; there is one i-node for each file. An i-node contains the node, type, owner, and location of a file. A table of i-nodes is stored near the beginning of a file system.

**I/O.** Input/output.

**IAB.** Internet Architecture Board.

**ICMP.** Internet Control Message Protocol.

**ICP.** Internet Control Protocol.

**IEEE.** Institute of Electrical and Electronics Engineers.

**IETF.** Internet Engineering Task Force.

**IGP.** Interior Gateway Protocol.

**InARP.** Inverse Address Resolution Protocol.

**inbound.** In communications, data that is received from the network.

**information (I) frame.** A frame in I format used for numbered information transfer.

**inoperative.** The condition of a resource that has been active but is not currently active. A resource may be inoperative for reasons such as the following: a) it may have failed, b) it may have received an INOP request, or c) it may be suspended while a reactivate command is being processed. See also *inactive*.

**input/output channel.** In a data processing system, a functional unit that handles transfer of data between internal and peripheral equipment. (I) (A)

**insert.** In LANs, to make an attaching device an active part of the LAN.

**integrated services digital network (ISDN).** A digital end-to-end telecommunication network that supports multiple services including, but not limited to, voice and data.

**Note:** ISDNs are used in public and private network architectures.

**interface.** (1) A shared boundary between two functional units, defined by functional characteristics, signal characteristics, or other characteristics, as appropriate. The concept includes the specification of the connection of two devices having different functions. (T) (2) Hardware, software, or both, that links systems, programs, or devices.

**interior gateway.** In Internet communications, a gateway that communicates only with its own autonomous system. Contrast with *exterior gateway*.

**Interior Gateway Protocol (IGP).** In the Internet suite of protocols, a protocol used to propagate network reachability and routing information within an autonomous system. Examples of IGPs are Routing Information Protocol (RIP) and Open Shortest Path First (OSPF).

**intermediate session routing (ISR).** A type of routing function within an APPN network node that provides session-level flow control and outage reporting for all sessions that pass through the node but whose end points are elsewhere.

**International Organization for Standardization (ISO).** An organization of national standards bodies from various countries established to promote development of standards to facilitate international exchange of goods and services, and develop

cooperation in intellectual, scientific, technological, and economic activity.

**internet.** A collection of networks interconnected by a set of routers that allow them to function as a single, large network. See also *Internet*.

**Internet.** The internet administered by the Internet Architecture Board (IAB), consisting of large national backbone networks and many regional and campus networks all over the world. The Internet uses the Internet suite of protocols.

**Internet address.** See *IP address*.

**Internet Architecture Board (IAB).** The technical body that oversees the development of the Internet suite of protocols that are known as TCP/IP.

**Internet Control Message Protocol (ICMP).** The protocol used to handle errors and control messages in the Internet Protocol (IP) layer. Reports of problems and incorrect datagram destinations are returned to the original datagram source. ICMP is part of the Internet Protocol.

**Internet Control Protocol (ICP).** The Virtual NEtworking System (VINES) protocol that provides exception notifications, metric notifications, and PING support. See also *RouTing update Protocol (RTP)*.

**Internet Engineering Task Force (IETF).** The task force of the Internet Architecture Board (IAB) that is responsible for solving the short-term engineering needs of the Internet.

**Internet Protocol (IP).** A connectionless protocol that routes data through a network or interconnected networks. IP acts as an intermediary between the higher protocol layers and the physical network. However, this protocol does not provide error recovery and flow control and does not guarantee the reliability of the physical network.

**Internetwork Packet Exchange (IPX).** The network protocol used to connect Novell's servers, or any workstation or router that implements IPX, with other workstations. Although similar to the Internet Protocol (IP), IPX uses different packet formats and terminology. See also *Xerox Network Systems (XNS)*.

**Inverse Address Resolution Protocol (InARP).** In the Internet suite of protocols, the protocol used for locating a protocol address through the known hardware address. In a frame-relay context, the data link connection identifier (DLCI) is synonymous with the known hardware address.

**IP.** Internet Protocol.

**IP address.** The 32-bit address defined by the Internet Protocol, standard 5, Request for Comment (RFC) 791. It is usually represented in dotted decimal notation.

**IP router.** A device in an IP internet that is responsible for making decisions about the paths over which network traffic will flow. Routing protocols are used to gain information about the network and to determine the best route over which the datagram should be forwarded toward the final destination. The datagrams are routed based on IP destination addresses.

**IPX.** Internetwork Packet Exchange.

**ISDN.** Integrated services digital network.

**ISO.** International Organization for Standardization.

**ISR.** Intermediate session routing.

## K

**Kbps.** Kilobits per second.

## L

**LAN.** Local area network.

**LAPB.** Link access protocol-balanced.

**layer.** (1) In network architecture, a group of services that is complete from a conceptual point of view, that is one out of a set of hierarchically arranged groups, and that extends across all systems that conform to the network architecture. (T) (2) In the Open Systems Interconnection reference model, one of seven conceptually complete, hierarchically arranged groups of services, functions, and protocols, that extend across all open systems. (T) (3) In SNA, a grouping of related functions that are logically separate from the functions in other groups. Implementation of the functions in one layer can be changed without affecting functions in other layers.

**LEN.** Low-entry networking.

**line switching.** Synonym for *circuit switching*.

**link.** The combination of the link connection (the transmission medium) and two link stations, one at each end of the link connection. A link connection can be shared among multiple links in a multipoint or token-ring configuration.

**link access protocol-balanced (LAPB).** A protocol used for accessing an X.25 network at the link level. LAPB is a duplex, asynchronous, symmetric protocol, used in point-to-point communication.

**link-attached.** Pertaining to devices that are connected to a controlling unit by a data link. Contrast with *channel-attached*. Synonymous with *remote*.

**link connection.** The physical equipment providing two-way communication between one link station and one or more other link stations; for example, a telecommunication line and data circuit-terminating equipment (DCE). Synonymous with *data circuit*.

**link level.** A part of Recommendation X.25 that defines the link protocol used to get data into and out of the network across the full-duplex link connecting the subscriber's machine to the network node. LAP and LAPB are the link access protocols recommended by the CCITT. See *data link level*.

**link-state.** In routing protocols, the advertised information about the usable interfaces and reachable neighbors of a router or network. The protocol's topological database is formed from the collected link-state advertisements.

**LLC.** Logical link control.

**LMI.** Local management interface.

**local.** Pertaining to a device accessed directly without use of a telecommunication line. Synonym for *channel-attached*.

**local area network (LAN).** (1) A computer network located on a user's premises within a limited geographical area. Communication within a local area network is not subject to external regulations; however, communication across the LAN boundary may be subject to some form of regulation. (T) (2) A network in which a set of devices are connected to one another for communication and that can be connected to a larger network. See also *Ethernet* and *token ring*. (3) Contrast with *metropolitan area network (MAN)* and *wide area network (WAN)*.

**local management interface (LMI).** See *local management interface (LMI) protocol*.

**local management interface (LMI) protocol.** In NCP, a set of frame-relay network management procedures and messages used by adjacent frame-relay nodes to exchange line status information over DLCI X'00'. NCP supports both the American National Standards Institute (ANSI) and International Telegraph and Telephone Consultative Committee (CCITT) versions of LMI protocol. These standards refer to LMI protocol as *link integrity verification tests (LIVT)*.

**locally administered address.** In a local area network, an adapter address that the user can assign to override the universally administered address. Contrast with *universally administered address*.

**lock.** The means by which integrity of data is ensured by preventing more than one user from accessing or changing the same data or object at the same time.

**logical channel.** In packet mode operation, a sending channel and a receiving channel that together are used to send and receive data over a data link at the same time. Several logical channels can be established on the same data link by interleaving the transmission of packets.

**logical link.** A pair of link stations, one in each of two adjacent nodes, and their underlying link connection, providing a single link-layer connection between the two nodes. Multiple logical links can be distinguished while they share the use of the same physical media connecting two nodes. Examples are 802.2 logical links used on local area network (LAN) facilities and LAP E logical links on the same point-to-point physical link between two nodes. The term logical link also includes the multiple X.25 logical channels that share the use of the access link from a DTE to an X.25 network.

**logical link control (LLC).** The data link control (DLC) LAN sublayer that provides two types of DLC operation for the orderly exchange of information. The first type is connectionless service, which allows information to be sent and received without establishing a link. The LLC sublayer does not perform error recovery or flow control for connectionless service. The second type is connection-oriented service, which requires establishing a link prior to the exchange of information. Connection-oriented service provides sequenced information transfer, flow control, and error recovery.

**logical link control (LLC) protocol.** In a local area network, the protocol that governs the exchange of transmission frames between data stations independently of how the transmission medium is shared. (T)

**Note:** The LLC protocol was developed by the IEEE 802 committee and is common to all LAN standards.

**logical link control (LLC) protocol data unit.** A unit of information exchanged between link stations in different nodes. The LLC protocol data unit contains a destination service access point (DSAP), a source service access point (SSAP), a control field, and user data.

**logical unit (LU).** A type of network accessible unit that enables end users to gain access to network resources and communicate with each other.

**low-entry networking (LEN).** A capability of nodes to attach directly to one another using basic peer-to-peer protocols to support multiple and parallel sessions between logical units.

**low-entry networking (LEN) end node.** A LEN node receiving network services from an adjacent APPN network node.

**low-entry networking (LEN) node.** A node that provides a range of end-user services, attaches directly to other nodes using peer protocols, and derives network services implicitly from an adjacent APPN network node, that is, without the direct use of CP-CP sessions.

**LU.** Logical unit.

## M

**MAC.** Medium access control.

**MAN.** Metropolitan area network.

**Management Information Base (MIB).** (1) A collection of objects that can be accessed by means of a network management protocol. (2) A definition for management information that specifies the information available from a host or gateway and the operations allowed. (3) In OSI, the conceptual repository of management information within an open system.

**management services (MS).** Services that assist in the management of systems and networks in areas such as problem management, performance management, business management, operations management, configuration management, and change management.

**management services focal point (MSFP).** For any given management services discipline (for example, problem determination or response time monitoring), the control point that is responsible for that type of network management data for a sphere of control. This responsibility may include collecting, storing or displaying the data or all of these. (For example, a problem determination focal point is a control point that collects, stores, and displays problem determination data.)

**management station.** In Internet communications, the system responsible for managing all, or a portion of, a network. The management station communicates with network management agents that reside in the managed node by means of a network management protocol, such as the Simple Network Management Protocol (SNMP).

**manager.** A system that assumes a manager role.

**mapping.** The process of converting data that is transmitted in one format by the sender into the data format that can be accepted by the receiver.

**mask.** (1) A pattern of characters used to control retention or elimination of portions of another pattern of characters. (I) (A) (2) To use a pattern of characters to control retention or elimination of portions of another pattern of characters. (I) (A)

**maximum transmission unit (MTU).** In LANs, the largest possible unit of data that can be sent on a given physical medium in a single frame. For example, the MTU for Ethernet is 1500 bytes.

**Mbps.** One million bits per second.

**MDS.** Multiple-domain support.

**MDS-MU.** Multiple-domain support message unit.

**medium access control (MAC).** In LANs, the sublayer of the data link control layer that supports medium-dependent functions and uses the services of the physical layer to provide services to the logical link control (LLC) sublayer. The MAC sublayer includes the method of determining when a device has access to the transmission medium.

**medium access control (MAC) protocol.** In a local area network, the protocol that governs access to the transmission medium, taking into account the topological aspects of the network, in order to enable the exchange of data between data stations. (T) See also *logical link control protocol*.

**medium access control (MAC) sublayer.** In a local area network, the part of the data link layer that applies a medium access method. The MAC sublayer supports topology-dependent functions and uses the services of the physical layer to provide services to the logical link control sublayer. (T)

**metric.** In Internet communications, a value, associated with a route, which is used to discriminate between multiple exit or entry points to the same autonomous system. The route with the lowest metric is preferred.

**metropolitan area network (MAN).** A network formed by the interconnection of two or more networks which may operate at higher speed than those networks, may cross administrative boundaries, and may use multiple access methods. (T) Contrast with *local area network (LAN)* and *wide area network (WAN)*.

**MIB.** (1) MIB module. (2) Management Information Base.

**MIB module.** In the Simple Network Management Protocol (SNMP), a collection of objects relating to a common management area. See also *Management Information Base (MIB)* and *MIB object*.



**MIB object.** In the Simple Network Management Protocol (SNMP), an object contained in the Management Information Base (MIB). Synonymous with *MIB variable*.

**MIB variable.** In the Simple Network Management Protocol (SNMP), a specific instance of a specific data object in a MIB module. Synonym for *MIB object*.

**MILNET.** The military network that was originally part of ARPANET. It was partitioned from ARPANET in 1984. MILNET provides a reliable network service for military installations.

**modem (modulator/demodulator).** (1) A functional unit that modulates and demodulates signals. One of the functions of a modem is to enable digital data to be transmitted over analog transmission facilities. (T) (A) (2) A device that converts digital data from a computer to an analog signal that can be transmitted on a telecommunication line, and converts the analog signal received to data for the computer.

**monitor.** (1) A device that observes and records selected activities within a data processing system for analysis. Possible uses are to indicate significant departure from the norm, or to determine levels of utilization of particular functional units. (T) (2) Software or hardware that observes, supervises, controls, or verifies operations of a system. (A) (3) The function required to initiate the transmission of a token on the ring and to provide soft-error recovery in case of lost tokens, circulating frames, or other difficulties. The capability is present in all ring stations.

**MPNP.** Multiprotocol Network Program.

**MS.** Management services.

**MSFP.** Management services focal point.

**MTU.** Maximum transmission unit.

**multicast.** (1) Transmission of the same data to a selected group of destinations. (T) (2) A special form of broadcast in which copies of a packet are delivered to only a subset of all possible destinations.

**multiple-domain support (MDS).** A technique for transporting management services data between management services function sets over LU-LU and CP-CP sessions. See also *multiple-domain support message unit (MDS-MU)*.

**multiple-domain support message unit (MDS-MU).** The message unit that contains management services data and flows between management services function sets over the LU-LU and CP-CP sessions used by multiple-domain support. This message unit, as well as the actual management services data that it contains, is

in general data stream (GDS) format. See also *control point management services unit (CP-MSU)*, *management services unit (MSU)*, and *network management vector transport (NMVT)*.

**Multiprotocol Network Program (MPNP).** The IBM software that controls the functions of the IBM 6611 Network Processor. It is a licensed program made up of base code and the Configuration Program.

## N

**Name Binding Protocol (NBP).** In AppleTalk networks, a protocol that provides name translation function from the AppleTalk entity (resource) name (character string) into an AppleTalk internet address (16-bit number) on the transport layer.

**name resolution.** In Internet communications, the process of mapping a machine name to the corresponding Internet Protocol (IP) address. See also *domain name system (DNS)*.

**name server.** In Internet communications, the station that translates host names into their respective internet addresses when requested by the stations on the network.

**NAU.** (1) Network accessible unit.

**NAUN.** Nearest active upstream neighbor.

**NBP.** Name Binding Protocol.

**NCP.** Network Control Program.

**nearest active upstream neighbor (NAUN).** In the IBM Token-Ring Network, the station sending data directly to a given station on the ring.

**neighbor.** A router on a common subnetwork that has been designated by a network administrator to receive routing information.

**NetBIOS.** (1) Network Basic Input/Output System. A standard interface to networks, IBM personal computers (PCs), and compatible PCs, that is used on LANs to provide message, print-server, and file-server functions. Application programs that use NetBIOS do not need to handle the details of LAN data link control (DLC) protocols. (2) See also *BIOS*.

**network.** (1) A configuration of data processing devices and software connected for information interchange. (2) A group of nodes and the links interconnecting them.

**network accessible unit (NAU).** A logical unit (LU), physical unit (PU), control point (CP), or system services control point (SSCP). It is the origin or the

destination of information transmitted by the path control network. Synonymous with *network addressable unit*.

**network address.** According to ISO 7498-3, a name, unambiguous within the OSI environment, that identifies a set of network service access points.

**network addressable unit (NAU).** Synonym for *network accessible unit*.

**network architecture.** The logical structure and operating principles of a computer network. (T)

**Note:** The operating principles of a network include those of services, functions, and protocols.

**network congestion.** An undesirable overload condition caused by traffic in excess of what a network can handle.

**Network Information Center (NIC).** In Internet communications, local, regional, and national groups throughout the world who provide assistance, documentation, training, and other services to users.

**network layer.** In Open Systems Interconnection (OSI) architecture, the layer that is responsible for routing, switching, and link-layer access across the OSI environment.

**network management.** The process of planning, organizing, and controlling a communication-oriented data processing or information system.

**network management vector transport (NMVT).** A management services request/response unit (RU) that flows over an active session between physical unit management services and control point management services (SSCP-PU session).

**network manager.** A program or group of programs that is used to monitor, manage, and diagnose the problems of a network.

**network node (NN).** Synonym for *Advanced Peer-to-Peer Networking (APPN) network node*.

**network operations center (NOC).** Any center that has responsibility for the operational aspects of a production network. Examples of NOC tasks are monitoring and control, troubleshooting, and user assistance.

**network operator.** In a multiple-domain network, a person or program responsible for controlling all domains. Contrast with *domain operator*.

**network user address (NUA).** In X.25 communications, the X.121 address containing up to 15 binary code digits.

**NIC.** Network Information Center.

**NMVT.** Network management vector transport.

**NN.** Network node.

**NOC.** Network operations center.

**node.** (1) In a network, a point at which one or more functional units connect channels or data circuits. (I)  
(2) Any device, attached to a network, that transmits and receives data.

**nonseed router.** In AppleTalk networks, a router that acquires network number range and zone list information from a seed router attached to the same network.

**notification.** An unscheduled, spontaneously generated report of an event that has occurred.

**NRZ.** Non-return-to-zero recording.

**NRZ-1.** Non-return-to-zero change-on-ones recording. (I) (A)

**NRZI.** Non-return-to-zero (inverted) recording. Deprecated term for *non-return-to-zero change-on-ones recording (NRZ-1)*.

**NUA.** Network user address.

## O

**object.** In object-oriented design or programming, an abstraction consisting of data and the operations associated with that data. See also *class*.

**open.** (1) A break in an electrical circuit. (2) To make an adapter ready for use.

**Open Shortest Path First (OSPF).** In the Internet suite of protocols, a function that provides intradomain information transfer. An alternative to the Routing Information Protocol (RIP), OSPF allows the lowest-cost routing and handles routing in large regional or corporate networks.

**Open Systems Interconnection (OSI).** (1) The interconnection of open systems in accordance with standards of the International Organization for Standardization (ISO) for the exchange of information. (T) (A) (2) The use of standardized procedures to enable the interconnection of data processing systems.

**Note:** OSI architecture establishes a framework for coordinating the development of current and future standards for the interconnection of computer systems. Network functions are divided into seven layers. Each layer represents a group of related data processing and

communication functions that can be carried out in a standard way to support different applications.

**Open Systems Interconnection (OSI) architecture.**

Network architecture that adheres to that particular set of ISO standards that relates to Open Systems Interconnection. (T)

**Open Systems Interconnection (OSI) reference model.**

A model that describes the general principles of the Open Systems Interconnection, as well as the purpose and the hierarchical arrangement of its seven layers. (T)

**OSI.** Open Systems Interconnection.

**OSPF.** Open Shortest Path First.

**outbound.** In communications, data that is transmitted to the network.

## P

**packet.** In data communication, a sequence of binary digits, including data and control signals, that is transmitted and switched as a composite whole. The data, control signals, and, possibly, error control information are arranged in a specific format. (I)

**packet internet groper (PING).** (1) In Internet communications, a program used in TCP/IP networks to test the ability to reach destinations by sending the destinations an Internet Control Message Protocol (ICMP) echo request and waiting for a reply. (2) In communications, a test of reachability.

**packet mode operation.** Synonym for *packet switching*.

**packet switching.** (1) The process of routing and transferring data by means of addressed packets so that a channel is occupied only during transmission of a packet. On completion of the transmission, the channel is made available for transfer of other packets. (I) (2) Synonymous with *packet mode operation*. See also *circuit switching*.

**page.** (1) In a virtual storage system, a fixed-length block that has a virtual address and is transferred as a unit between real storage and auxiliary storage. (I) (A) (2) The information displayed at the same time on the screen of a display device. (3) To replace the information displayed on the screen with prior or subsequent information from the same file.

**parallel port.** An access point through which a computer transmits or receives data that consists of several bits sent simultaneously on separate wires. Contrast with *serial port*.

**parallel transmission groups.** Multiple transmission groups between adjacent nodes, with each group having a distinct transmission group number.

**path.** (1) In a network, any route between any two nodes. A path may include more than one branch. (T) (2) The series of transport network components (path control and data link control) that are traversed by the information exchanged between two network accessible units. See also *explicit route (ER)*, *route extension*, and *virtual route (VR)*.

**path control (PC).** The function that routes message units between network accessible units in the network and provides the paths between them. It converts the basic information units (BIUs) from transmission control (possibly segmenting them) into path information units (PIUs) and exchanges basic transmission units containing one or more PIUs with data link control. Path control differs by node type: some nodes (APPN nodes, for example) use locally generated session identifiers for routing, and others (subarea nodes) use network addresses for routing.

**path cost.** In link-state routing protocols, the sum of the link costs along the path between two nodes or networks.

**path information unit (PIU).** A message unit consisting of a transmission header (TH) alone, or a TH followed by a basic information unit (BIU) or a BIU segment. See also *transmission header*.

**pattern-matching character.** A special character such as an asterisk (\*) or a question mark (?) that can be used to represent one or more characters. Any character or set of characters can replace a pattern-matching character. Synonymous with *global character* and *wildcard character*.

**PC.** Path control.

**PDU.** Protocol data unit.

**permanent virtual circuit (PVC).** In X.25 and frame-relay communications, a virtual circuit that has a logical channel permanently assigned to it at each data terminal equipment (DTE). Call-establishment protocols are not required. Contrast with *switched virtual circuit (SVC)*.

**physical circuit.** A circuit established without multiplexing. See also *data circuit*. Contrast with *virtual circuit*.

**physical unit (PU).** The component that manages and monitors the resources (such as attached links and adjacent link stations) associated with a node, as requested by an SSCP via an SSCP-PU session. An SSCP activates a session with the physical unit in order

to indirectly manage, through the PU, resources of the node such as attached links. This term applies to type 2.0, type 4, and type 5 nodes only. See also *peripheral PU* and *subarea PU*.

**PING.** Packet internet groper.

**PIU.** Path information unit.

**Point-to-Point Protocol (PPP).** A protocol that provides a method for encapsulating and transmitting packets over serial point-to-point links.

**polling.** (1) On a multipoint connection or a point-to-point connection, the process whereby data stations are invited, one at a time, to transmit. (I)  
(2) Interrogation of devices for such purposes as to avoid contention, to determine operational status, or to determine readiness to send or receive data. (A)

**port.** (1) An access point for data entry or exit. (2) A connector on a device to which cables for other devices such as display stations and printers are attached. Synonymous with *socket*. (3) The representation of a physical connection to the link hardware. A port is sometimes referred to as an adapter; however, there can be more than one port on an adapter. There may be one or more ports controlled by a single DLC process. (4) In the Internet suite of protocols, a 16-bit number used to communicate between TCP or the User Datagram Protocol (UDP) and a higher-level protocol or application. Some protocols, such as File Transfer Protocol (FTP) and Simple Mail Transfer Protocol (SMTP), use the same well-known port number in all TCP/IP implementations. (5) An abstraction used by transport protocols to distinguish among multiple destinations within a host machine.

**port number.** In Internet communications, the identification of an application entity to the transport service.

**PPP.** Point-to-Point Protocol.

**preferential closed user group (CUG).** In X.25 communications, the default closed user group.

**problem determination.** The process of determining the source of a problem; for example, a program component, machine failure, telecommunication facilities, user or contractor-installed programs or equipment, environmental failure such as a power loss, or user error.

**processor.** In a computer, a functional unit that interprets and executes instructions. A processor consists of at least an instruction control unit and an arithmetic and logic unit. (T)

**protocol.** (1) A set of semantic and syntactic rules that determine the behavior of functional units in

achieving communication. (I) (2) In Open Systems Interconnection architecture, a set of semantic and syntactic rules that determine the behavior of entities in the same layer in performing communication functions. (T) (3) In SNA, the meanings of, and the sequencing rules for, requests and responses used for managing the network, transferring data, and synchronizing the states of network components. Synonymous with *line control discipline* and *line discipline*. See *bracket protocol* and *link protocol*.

**protocol data unit (PDU).** A unit of data specified in a protocol of a given layer and consisting of protocol control information of this layer, and possibly user data of this layer. (T)

**PU.** Physical unit.

**PVC.** Permanent virtual circuit.

## R

**read-only memory (ROM).** Memory in which stored data cannot be modified by the user except under special conditions.

**receive not ready (RNR).** In communications, a data link command or response that indicates a temporary condition of being unable to accept incoming frames.

**receive not ready (RNR) packet.** See *RNR packet*.

**received line signal detector (RLSD).** A signal defined in the EIA-232 standard that indicates to the data terminal equipment (DTE) that it is receiving a signal from the remote data circuit-terminating equipment (DCE).

**Recognized Private Operating Agency (RPOA).** Any individual, company, or corporation, other than a government department or service, that operates a telecommunication service and is subject to the obligations undertaken in the Convention of the International Telecommunication Union and in the Regulations; for example, a communication common carrier.

**Recommendation X.21.** See *X.21*.

**Recommendation X.25.** See *X.25*.

**reduced instruction-set computer (RISC).** A computer that uses a small, simplified set of frequently used instructions for rapid execution.

**remote.** Pertaining to a system, program, or device that is accessed through a telecommunication line. Contrast with *local*. Synonym for *link-attached*.

**Remote Execution Protocol (RExec).** A protocol that allows the execution of a command or program on any host in the network. The local host receives the results of the command execution.

**remote procedure call (RPC).** A facility that a client uses to request the execution of a procedure call from a server. This facility includes a library of procedures and an external data representation.

**Request for Comments (RFC).** In Internet communications, the document series that describes a part of the Internet suite of protocols and related experiments. All Internet standards are documented as RFCs.

**reset.** On a virtual circuit, reinitialization of data flow control. At reset, all data in transit are eliminated.

**Reverse Address Resolution Protocol (RARP).** A TCP/IP protocol that maintains a database of mappings between physical hardware addresses and IP addresses. Contrast with *Address Resolution Protocol (ARP)*.

**REX.** Route extension.

**RExec.** Remote Execution Protocol.

**RFC.** Request for Comments.

**RH.** Request/response header.

**ring.** See *ring network*.

**ring network.** (1) A network in which every node has exactly two branches connected to it and in which there are exactly two paths between any two nodes. (T)  
(2) A network configuration in which devices are connected by unidirectional transmission links to form a closed path.

**RIP.** Routing Information Protocol.

**RISC.** Reduced instruction-set computer.

**rlogin (remote login).** A service, offered by Berkeley UNIX-based systems, that allows authorized users of one machine to connect to other UNIX systems across an internet and interact as if their terminals were connected directly. The rlogin software passes information about the user's environment (for example, terminal type) to the remote machine.

**RLSD.** Received line signal detector.

**RNR.** Receive not ready.

**RNR packet.** A packet used by a data terminal equipment (DTE) or by a data circuit-terminating equipment (DCE) to indicate a temporary inability to

accept additional packets for a virtual call or permanent virtual circuit.

**ROM.** Read-only memory. (A)

**route.** (1) An ordered sequence of nodes and transmission groups (TGs) that represent a path from an origin node to a destination node traversed by the traffic exchanged between them. (2) The path that network traffic uses to get from source to destination.

**route bridge.** A function of an IBM bridge program that allows two bridge computers to use a telecommunication link to connect two LANs. Each bridge computer is connected directly to one of the LANs, and the telecommunication link connects the two bridge computers.

**route extension (REX).** In SNA, the path control network components, including a peripheral link, that make up the portion of a path between a subarea node and a network addressable unit (NAU) in an adjacent peripheral node. See also *explicit route (ER)*, *path*, and *virtual route (VR)*.

**Route Selection control vector (RSCV).** A control vector that describes a route within an APPN network. The RSCV consists of an ordered sequence of control vectors that identify the TGs and nodes that make up the path from an origin node to a destination node.

**router.** (1) A computer that determines the path of network traffic flow. The path selection is made from several paths based on information obtained from specific protocols, algorithms that attempt to identify the shortest or best path, and other criteria such as metrics or protocol-specific destination addresses. (2) An attaching device that connects two LAN segments, which use similar or different architectures, at the reference model network layer. Contrast with *bridge* and *gateway*. (3) In OSI terminology, a function that determines a path by which an entity can be reached.

**routing.** (1) The assignment of the path by which a message is to reach its destination. (2) In SNA, the forwarding of a message unit along a particular path through a network, as determined by parameters carried in the message unit, such as the destination network address in a transmission header.

**Routing Information Protocol (RIP).** In the Internet suite of protocols, an interior gateway protocol used to exchange intradomain routing information and to determine optimum routes between internet hosts. RIP determines optimum routes on the basis of route metrics, not link transmission speed.

**routing protocol.** A technique used by a router to find other routers and to remain up to date about the best way to get to reachable networks.

**routing table.** A collection of routes used to direct datagram forwarding or to establish a connection. The information is passed among routers to identify network topology and destination feasibility.

**Routing Table Maintenance Protocol (RTMP).** In AppleTalk networks, a protocol that provides routing information generation and maintenance on the transport layer by means of the AppleTalk routing table. The AppleTalk routing table directs packet transmission through the internet from source socket to destination socket.

**RouTing update Protocol (RTP).** The Virtual NETworking System (VINES) protocol that maintains the routing database and allows the exchange of routing information between VINES nodes. See also *Internet Control Protocol (ICP)*.

**RPC.** Remote procedure call.

**RPOA.** Recognized Private Operating Agency.

**RSCV.** Route Selection control vector.

**rsh.** A variant of the rlogin command that invokes a command interpreter on a remote UNIX machine and passes the command-line arguments to the command interpreter, skipping the login step completely.

**RTMP.** Routing Table Maintenance Protocol.

**RTP.** RouTing update Protocol.

**RU.** Request/response unit.

## S

**SAP.** (1) Service access point. (2) Service Advertising Protocol.

**SCSI.** Small computer system interface.

**SDLC.** Synchronous Data Link Control.

**seed router.** In AppleTalk networks, a router that maintains configuration data (network range numbers and zone lists, for example) for the network. Each network must have at least one seed router. The seed router must be initially set up using the configurator tool. Contrast with *nonseed router*.

**segment.** (1) A section of cable between components or devices. A segment may consist of a single patch cable, several patch cables that are connected, or a combination of building cable and patch cables that are connected. (2) In Internet communications, the unit of transfer between TCP functions in different machines. Each segment contains control and data fields; the current byte-stream position and actual data bytes are

identified along with a checksum to validate received data.

**segmenting.** In OSI, a function performed by a layer to map one protocol data unit (PDU) from the layer it supports into multiple PDUs.

**sequence number.** In communications, a number assigned to a particular frame or packet to control the transmission flow and receipt of data.

**serial port.** An access point through which a computer transmits or receives data, one bit at a time. Contrast with *parallel port*.

**server.** A functional unit that provides shared services to workstations over a network; for example, a file server, a print server, a mail server. (T)

**service access point (SAP).** (1) In Open Systems Interconnection (OSI) architecture, the point at which the services of a layer are provided by an entity of that layer to an entity of the next higher layer. (T) (2) A logical point made available by an adapter where information can be received and transmitted. A single service access point can have many links terminating in it.

**Service Advertising Protocol (SAP).** In Internetwork Packet Exchange (IPX), a protocol that provides the following:

- A mechanism that allows IPX servers on an internet to advertise their services by name and type. Servers using this protocol have their name, service type, and internet address recorded in all file servers running NetWare.
- A mechanism that allows a workstation to broadcast a query to discover the identities of all servers of all types, all servers of a specific type, or the nearest server of a specific type.
- A mechanism that allows a workstation to query any file server running NetWare to discover the names and addresses of all servers of a specific type.

**session.** (1) In network architecture, for the purpose of data communication between functional units, all the activities which take place during the establishment, maintenance, and release of the connection. (T) (2) A logical connection between two network accessible units (NAUs) that can be activated, tailored to provide various protocols, and deactivated, as requested. Each session is uniquely identified in a transmission header (TH) accompanying any transmissions exchanged during the session.

**Simple Network Management Protocol (SNMP).** In the Internet suite of protocols, a network management protocol that is used to monitor routers and attached networks. SNMP is an application layer protocol.

Information on devices managed is defined and stored in the application's Management Information Base (MIB).

**small computer system interface (SCSI).** A standard hardware interface that enables a variety of peripheral devices to communicate with one another.

**SMI.** Structure of Management Information.

**SNA.** Systems Network Architecture.

**SNA management services (SNA/MS).** The services provided to assist in management of SNA networks.

**SNA/MS.** SNA management services.

**SNAP.** Subnetwork Access Protocol.

**SNMP.** Simple Network Management Protocol.

**SOC.** Sphere of control.

**socket.** The abstraction provided by Berkeley Software Distribution (BSD) that serves as an endpoint for communication between processes or applications.

**source route bridging.** In LANs, a bridging method that uses the routing information field in the IEEE 802.5 medium access control (MAC) header of a frame to determine which rings or token-ring segments the frame must transit. The routing information field is inserted into the MAC header by the source node. The information in the routing information field is derived from explorer packets generated by the source host.

**source service access point (SSAP).** In SNA and TCP/IP, a logical address that allows a system to send data to a remote device from the appropriate communications support. Contrast with *destination service access point (DSAP)*.

**spanning tree.** In LAN contexts, the method by which bridges automatically develop a routing table and update that table in response to changing topology to ensure that there is only one route between any two LANs in the bridged network. This method prevents packet looping, where a packet returns in a circuitous route back to the sending router.

**sphere of control (SOC).** The set of control point domains served by a single management services focal point.

**sphere of control (SOC) node.** A node directly in the sphere of control of a focal point. A SOC node has exchanged management services capabilities with its focal point. An APPN end node can be a SOC node if it supports the function to exchange management services capabilities.

**spoofing.** For data links, a technique in which a protocol initiated from an end station is acknowledged and processed by an intermediate node on behalf of the final destination. In IBM 6611 data link switching, for example, SNA frames are encapsulated into TCP/IP packets for transport across a non-SNA wide area network, unpacked by another IBM 6611, and passed to the final destination. A benefit of spoofing is the prevention of end-to-end session timeouts.

**SSAP.** Source service access point.

**station.** An input or output point of a system that uses telecommunication facilities; for example, one or more systems, computers, terminals, devices, and associated programs at a particular location that can send or receive data over a telecommunication line.

**StreetTalk.** In the Virtual Networking System (VINES), a unique network-wide naming and addressing system that allows users to locate and access any resource on the network without knowing the network topology. See also *Internet Control Protocol (ICP)* and *RouTing update Protocol (RTP)*.

**Structure of Management Information (SMI).** (1) In the Simple Network Management Protocol (SNMP), the rules used to define the objects that can be accessed by means of a network management protocol. (2) In OSI, the set of standards relating to management information. The set includes the *Management Information Model* and the *Guidelines for the Definition of Managed Objects*.

**subnet.** (1) In TCP/IP, a part of a network that is identified by a portion of the Internet address.

(2) Synonym for *subnetwork*.

**subnet mask.** Synonym for *address mask*.

**subnetwork.** (1) Any group of nodes that have a set of common characteristics, such as the same network ID. (2) Synonymous with *subnet*.

**Subnetwork Access Protocol (SNAP).** In LANs, a 5-byte protocol discriminator that identifies the non-IEEE standard protocol family to which a packet belongs. The SNAP value is used to differentiate between protocols that use \$AA as their source access point (SAP) value.

**subnetwork mask.** Synonym for *address mask*.

**subsystem.** A secondary or subordinate system, usually capable of operating independently of, or asynchronously with, a controlling system. (T)

**SVC.** Switched virtual circuit.

**switched connection.** A mode of operating a data link in which a circuit or channel is established to switching

facilities as, for example, in a public switched network. (T)

**switched virtual circuit (SVC).** An X.25 circuit that is dynamically established when needed. The X.25 equivalent of a switched line.

**synchronous.** (1) Pertaining to two or more processes that depend upon the occurrence of specific events such as common timing signals. (T)  
(2) Occurring with a regular or predictable time relationship.

**Synchronous Data Link Control (SDLC).** A discipline conforming to subsets of the Advanced Data Communication Control Procedures (ADCCP) of the American National Standards Institute (ANSI) and High-level Data Link Control (HDLC) of the International Organization for Standardization, for managing synchronous, code-transparent, serial-by-bit information transfer over a link connection. Transmission exchanges may be duplex or half-duplex over switched or nonswitched links. The configuration of the link connection may be point-to-point, multipoint, or loop. (I) Contrast with *binary synchronous communication (BSC)*.

**SYNTAX.** In the Simple Network Management Protocol (SNMP), a clause in the MIB module that defines the abstract data structure that corresponds to a managed object.

**system.** In data processing, a collection of people, machines, and methods organized to accomplish a set of specific functions. (I) (A)

**system configuration.** A process that specifies the devices and programs that form a particular data processing system.

**Systems Network Architecture (SNA).** The description of the logical structure, formats, protocols, and operational sequences for transmitting information units through, and controlling the configuration and operation of, networks. The layered structure of SNA allows the ultimate origins and destinations of information, that is, the end users, to be independent of and unaffected by the specific SNA network services and facilities used for information exchange.

## T

**TCP.** Transmission Control Protocol.

**TCP/IP.** Transmission Control Protocol/Internet Protocol.

**Telnet.** In the Internet suite of protocols, a protocol that provides remote terminal connection service. It

allows users of one host to log on to a remote host and interact as directly attached terminal users of that host.

**TG.** Transmission group.

**threshold.** (1) In IBM bridge programs, a value set for the maximum number of frames that are not forwarded across a bridge due to errors, before a "threshold exceeded" occurrence is counted and indicated to network management programs. (2) An initial value from which a counter is decremented to 0, or a value to which a counter is incremented or decremented from an initial value.

**time to live (TTL).** A technique used by best-effort delivery protocols to inhibit endlessly looping packets. The packet is discarded if the TTL counter reaches 0.

**timeout.** (1) An event that occurs at the end of a predetermined period of time that began at the occurrence of another specified event. (I) (2) A time interval allotted for certain operations to occur; for example, response to polling or addressing before system operation is interrupted and must be restarted.

**token.** (1) In a local area network, the symbol of authority passed successively from one data station to another to indicate the station temporarily in control of the transmission medium. Each data station has an opportunity to acquire and use the token to control the medium. A token is a particular message or bit pattern that signifies permission to transmit. (T) (2) In LANs, a sequence of bits passed from one device to another along the transmission medium. When the token has data appended to it, it becomes a frame.

**token ring.** (1) According to IEEE 802.5, network technology that controls media access by passing a token (special packet or frame) between media-attached stations. (2) A FDDI or IEEE 802.5 network with a ring topology that passes tokens from one attaching ring station (node) to another. (3) See also *local area network (LAN)*.

**token-ring network.** (1) A ring network that allows unidirectional data transmission between data stations, by a token passing procedure, such that the transmitted data return to the transmitting station. (T) (2) A network that uses a ring topology, in which tokens are passed in a circuit from node to node. A node that is ready to send can capture the token and insert data for transmission.

**topology.** In communications, the physical or logical arrangement of nodes in a network, especially the relationships among nodes and the links between them.

**TP.** Transaction program.

**trace.** (1) A record of the execution of a computer program. It exhibits the sequences in which the



instructions were executed. (A) (2) For data links, a record of the frames and bytes transmitted or received.

**Transmission Control Protocol (TCP).** A communications protocol used in Internet and in any network that follows the U.S. Department of Defense standards for internetwork protocol. TCP provides a reliable host-to-host protocol between hosts in packet-switched communications networks and in interconnected systems of such networks. It assumes that the Internet Protocol is the underlying protocol.

**Transmission Control Protocol/Internet Protocol (TCP/IP).** A set of communications protocols that support peer-to-peer connectivity functions for both local and wide area networks.

**transmission group (TG).** (1) A connection between adjacent nodes that is identified by a transmission group number. See also *parallel transmission groups*. (2) In a subarea network, a single link or a group of links between adjacent nodes. When a transmission group consists of a group of links, the links are viewed as a single logical link, and the transmission group is called a *multilink transmission group (MLTG)*. A *mixed-media multilink transmission group (MMMLTG)* is one that contains links of different medium types (for example, token-ring, switched SDLC, nonswitched SDLC, and frame-relay links). (3) In an APPN network, a single link between adjacent nodes.

**transmission header (TH).** Control information, optionally followed by a basic information unit (BIU) or a BIU segment, that is created and used by path control to route message units and to control their flow within the network. See also *path information unit*.

**transparent bridging.** In LANs, a method for tying individual local area networks together through the medium access control (MAC) level. A transparent bridge stores the tables that contain MAC addresses so that frames seen by the bridge can be forwarded to another LAN if the tables indicate to do so.

**trap.** In the Simple Network Management Protocol (SNMP), a message sent by a managed node (agent function) to a management station to report an exception condition.

**TTL.** Time to live.

**T1.** In the United States, a 1.544-Mbps public access line. It is available in twenty-four 64-Kbps channels. The European version (E1) transmits 2.048 Mbps. The Japanese version (J1) transmits 1.544 Mbps.

## U

**UA.** Unnumbered acknowledgment.

**UDP.** User Datagram Protocol.

**universally administered address.** In a local area network, the address permanently encoded in an adapter at the time of manufacture. All universally administered addresses are unique. Contrast with *locally administered address*.

**User Datagram Protocol (UDP).** In the Internet suite of protocols, a protocol that provides unreliable, connectionless datagram service. It enables an application program on one machine or process to send a datagram to an application program on another machine or process. UDP uses the Internet Protocol (IP) to deliver datagrams.

## V

**V.35.** In data communications, a specification of the CCITT that defines the list of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) at various data rates.

**variable.** In the Simple Network Management Protocol (SNMP), a match of an object instance name with an associated value.

**version.** A separately licensed program that usually has significant new code or new function.

**VINES.** Virtual NEtworking System.

**virtual circuit.** (1) In packet switching, the facilities provided by a network that give the appearance to the user of an actual connection. (T) See also *data circuit*. Contrast with *physical circuit*. (2) A logical connection established between two DTEs.

**Virtual NEtworking System (VINES).** The network operating system and network software from Banyan Systems, Inc. In a VINES network, virtual linking allows all devices and services to appear to be directly connected to each other, when they may actually be thousands of miles apart. See also *StreetTalk*.

**virtual route (VR).** In SNA, either a) a logical connection between two subarea nodes that is physically realized as a particular explicit route or b) a logical connection that is contained wholly within a subarea node for intranode sessions. A virtual route between distinct subarea nodes imposes a transmission priority on the underlying explicit route, provides flow control through virtual route pacing, and provides data integrity through sequence numbering of path

information units (PIUs). See also *explicit route (ER)*, *path*, and *route extension (REX)*.

**vital product data (VPD).** Information that uniquely defines system, hardware, software, and microcode elements of a processing system.

**VPD.** Vital product data.

**VR.** Virtual route.

## W

**WAN.** Wide area network.

**wide area network (WAN).** (1) A network that provides communication services to a geographic area larger than that served by a local area network or a metropolitan area network, and that may use or provide public communication facilities. (T) (2) A data communications network designed to serve an area of hundreds or thousands of miles; for example, public and private packet-switching networks, and national telephone networks. Contrast with *local area network (LAN)* and *metropolitan area network (MAN)*.

**wildcard character.** Synonym for *pattern-matching character*.

## X

**X.21.** An International Telegraph and Telephone Consultative Committee (CCITT) recommendation for a general-purpose interface between data terminal equipment and data circuit-terminating equipment for synchronous operations on a public data network.

**X.25.** An International Telegraph and Telephone Consultative Committee (CCITT) recommendation for the interface between data terminal equipment and packet-switched data networks. See also *packet switching*.

**Xerox Network Systems (XNS).** The suite of internet protocols developed by the Xerox Corporation. Although similar to TCP/IP protocols, XNS uses different packet formats and terminology. See also *Internetwork Packet Exchange (IPX)*.

**XID.** Exchange identification.

**XNS.** Xerox Network Systems.

## Z

**ZIP.** Zone Information Protocol.

**ZIT.** Zone information table.

**zone.** In AppleTalk networks, a subset of nodes within an internet.

**Zone Information Protocol (ZIP).** In AppleTalk networks, a protocol that provides zone management service by maintaining a mapping of the zone names and network numbers across the internet on the session layer.

**zone information table (ZIT).** A listing of network numbers and their associated zone name mappings in the internet. This listing is maintained by each internet router in an AppleTalk internet.



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The following list of publications contains information concerning IBM products related to the use of the IBM 6611 Network Processor and the Multiprotocol Network Program:

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*6611 Configuration Program and System Manager*, G325-6507

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The following list is of known publications that contain information about internetworking, network design, and the protocols that the IBM 6611 supports. Other useful publications may already exist or may be published after the date of this book.

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*Networking with Banyan VINES*, Laubach, Edwin G., McGraw-Hill, Inc., 1991

*Specification of Abstract Syntax Notation One (ASN.1)*, Information technology—Open Systems Interconnection, International Standard ISO/IEC 8824, December 1991

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*The Simple Book: An Introduction to Management of TCP/IP-based Internets*, Marshall T. Rose, Prentice Hall, 1991

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## Internet Requests for Comments (RFCs)

### Obtaining RFCs

This section describes three methods for obtaining copies of Internet RFCs.

**Electronic Copies via FTP:** If you have FTP running on a workstation that is connected to the Internet, you may retrieve RFCs from the Network Information Center by following this procedure:

1. Use FTP to connect to host ds.internic.net.
2. Issue the command **user anonymous** to identify yourself to the host.
3. When prompted for a password, type **guest**.
4. Type the command **cd rfc** to change to the RFC directory.

5. Type the command **get rfc.nnn.txt**, where *nnn* represents the requested RFC number.

### Electronic Copies via Electronic Mail:

The Network Information Center provides an automated service called service@ds.internic.net. This service allows you to access RFCs (and other documents) via ordinary electronic mail. This is especially useful for users who do not have access to the Network Information Center via a direct Internet link. Follow this procedure to obtain an RFC via electronic mail:

1. Send a mail message to service@ds.internic.net.
2. In the Subject field, type **rfc.nnn.**, where *nnn* is the RFC number. To obtain a list of all of the RFCs available, substitute the word *index* for *nnn*.

Large files will be broken into smaller separate messages. The information you request will be sent back to you as soon as possible.

**Printed Copies:** Printed copies of RFCs are available for a fee from:

SRI International, Room EJ291  
333 Ravenswood Avenue  
Menlo Park, CA 94025  
(415) 859-3695  
(415) 859-6387  
FAX (415) 859-6028

## RFCs Implemented by the IBM 6611 and the IBM Multiprotocol Network Program

This section provides a list of Internet RFCs and drafts that relate to the IBM 6611 and the IBM Multiprotocol Network Program.

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791	<i>Internet Protocol</i> , Postel, J.B., September 1981
792	<i>Internet Control Message Protocol</i> , Postel, J.B., September 1981
793	<i>Transmission Control Protocol</i> , Postel, J.B., September 1981
826	<i>Ethernet Address Resolution Protocol: Or Converting Network Protocol Addresses to 48 Bit Ethernet Address for Transmission on Ethernet Hardware</i> , D.C. Plummer, November 1982
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- 855 *Telnet Option Specifications*, Postel, J.; Reynolds J., May 1983
- 862 *Echo Protocol*, Postel, J., May 1983
- 868 *Time Protocol*, Postel, J.; Harrenstien, K., May 1983
- 877 *Standard for the Transmission of IP Datagrams over Public Data Networks*, Korb, J.T., September 1983
- 891 *DCN Local-Network Protocols*, Mills, D.L., December 1983
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- 904 *Exterior Gateway Protocol Formal Specification*, Mills, D.L., April 1984
- 919 *Broadcasting Internet Datagrams*, Mogul, J., October 1984
- 922 *Broadcasting Internet Datagrams in the Presence of Subnets*, Mogul, J., October 1984
- 950 *Internet Standard Subnetting Procedure*, Mogul, J.; Postel, J., August 1985
- 951 *Bootstrap Protocol*, Croft, W., Gilmore, J., September 1985
- 959 *File Transfer Protocol*, Postel, J.B.; Reynolds J.K., October 1985
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- 1219 *On the Assignment of Subnet Numbers*, Tsuchiya, P, April 1991
- 1220 *Point-to-Point Protocol Extensions for Bridging*, Baker, F. (editor), April 1991
- 1229 *Extensions to the Generic-Interface MIB*, McCloghrie, K. (editor), May 1991
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- 1243 *AppleTalk Management Information Base*, Waldbusser, S. (editor), July 1991
- 1245 *OSPF Protocol Analysis*, Moy, J. (editor), July 1991
- 1247 *OSPF Version 2*, Moy, J., July 1991
- 1253 *OSPF Version 2: Management Information Base*, Baker, F.; Coltun, R., August 1991
- 1267 *A Border Gateway Protocol 3 (BGP-3)*, Loughheed, K.; Rekhter, Y., October 1991
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- 1638 *PPP Bridging Control Protocol (BCP)*, Baker, F.; Bowen, R., June 1994





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# Index

## A

- access
  - local 3-2
  - logging in 3-13
  - remote
    - description 3-2
    - fast-path commands 9-104
    - modem 3-12
    - rexec, remote execution 3-9
    - rlogin, remote login 3-6, 3-8
    - rsh, remote shell 3-10
    - telnet 3-4
- adapter debug
  - dump memory 5-54
  - read memory 5-51
  - start line trace 5-53
  - view registers 5-52
- adapter fast-path commands 9-11
- adapter, X.25
  - fast-path commands 9-150
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-80
  - trace
    - status 5-49
    - view 5-48
  - traffic monitor 5-59
- aix-like commands 9-8
- AppleTalk
  - ARP table management 4-35
  - echo 3-13, 4-20
  - fast-path commands 9-13
  - network management information 4-37
  - network statistics 4-27
  - port filters 4-36
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-62
    - set up 5-59
  - route table 4-9
  - trace
    - start 5-46
    - status 5-49
    - stop 5-47
    - view 5-48
  - zone information table 4-11
- apply software update 7-27
- APPN
  - class-of-service (COS) files A-1
  - configuration objects 6-6
  - dump
    - start 5-38

- APPN (*continued*)
  - dump (*continued*)
    - view 5-39
  - fast-path commands 9-18
  - network management information 4-37
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-63
    - set up 5-59
  - trace
    - start 5-46
    - status 5-49
    - stop 5-47
    - view 5-48
- ARP table management
  - AppleTalk 4-35
  - description 4-31
  - IP 4-32, 4-33
- automating software installation
  - description 7-37
  - sending changes to multiple 6611s 7-47
  - using 6611-provided commands and scripts 7-39
  - using your own commands and scripts 7-38

## B

- backup utility 7-50
- Banyan VINES
  - dump
    - start 5-38
    - view 5-39
  - fast-path commands 9-140
  - filters 4-36
  - ICP echo 3-13, 4-21
  - neighbor tables 4-12
  - network management information 4-37
  - network statistics 4-27
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-78
  - route table 4-9
  - trace
    - start 5-46
    - status 5-49
    - stop 5-47
    - view 5-48
- bridge, LAN
  - fast-path commands 9-25
  - network statistics 4-29
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-71

- building commands and scripts to automate software installation
  - description 7-38
  - using noninteractive FTP 7-38
  - using rexec 7-39
  - using rsh 7-39

## C

- characteristics, device 8-5
- class of user
  - controlling 3-15
  - viewing 3-15
- class-of-service (COS) files, APPN A-1
- clean up after a failed software installation 7-28
- codes, LED 5-21
- command status screen 2-8
- commands to automate software installation
  - building your own 7-38
  - using those provided with the 6611 7-39
- commands, fast-path
  - abbreviation 9-4
  - adapter 9-11
  - AppleTalk 9-13
  - APPN 9-18
  - bridge
    - LAN 9-25
    - source route 9-25
    - translational 9-25
    - transparent 9-25
  - configuration 9-36
  - DECnet 9-39
  - diskette 9-48
  - DLSw 9-50
  - error 9-58
  - files 9-65
  - frame relay 9-74
  - hardware 9-75
  - help 9-5
  - hostname 9-79
  - interface 9-81
  - IP 9-84
  - IPX 9-94
  - LAN Network Manager 9-28
  - LED 9-98
  - nameserver 9-99
  - notation 9-3
  - output 9-4
  - PPP 9-101
  - process 9-102
  - remote access 9-104
  - serial port 9-108
  - SNMP 9-109
  - software 9-112
  - syntax 9-3
  - system 9-123

- commands, fast-path (*continued*)
  - terminal 9-133
  - time of day 9-134
  - timeserver 9-135
  - user 9-137
  - VINES, Banyan 9-140
  - X.25 9-150
  - XNS 9-146
- commit software update 7-29
- configuration
  - changes
    - apply 6-20
    - commit 6-21
    - hardware VPD 8-7
    - reject 6-22
  - files 6-3
  - minimal 6-15
  - receive 6-24
  - reinstate 6-26
  - send 6-26
  - troubleshooting 6-3
  - updating parameters 6-4
- configuration (config) fast-path commands 9-36
- Configuration menu
  - apply changes 6-20
  - commit changes 6-21
  - configuration report 6-22
  - receive and apply configuration 6-24
  - reject uncommitted changes 6-22
  - restore a saved configuration 6-26
  - send configuration 6-26
  - System Manager configuration utility 6-7
  - user IDs 6-17
- configuration utility, System Manager 6-7
- connection statistics 4-22
- connection verification 3-13
- contextual help screen 2-3
- controlling user
  - default ID and password 3-15
  - description 3-15
  - restricted tasks 3-16
- correct software installation failures 7-19

## D

- data link switching
  - dump
    - start 5-38
    - view 5-39
  - fast-path commands 9-50
  - general debug information 5-58
  - network management information 4-37
  - partners 4-13
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-65
    - set up 5-59

- data link switching (*continued*)
  - trace
    - start 5-46
    - status 5-49
    - stop 5-47
    - view 5-48
- date, set or view 4-61
- DECnet
  - fast-path commands 9-39
  - network management information 4-37
  - network statistics 4-27
  - port filters 4-36
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-64
    - set up 5-59
  - route table 4-9
  - routing information 4-13
  - trace
    - start 5-46
    - status 5-49
    - stop 5-47
    - view 5-48
- dependents, software 7-36
- device
  - characteristics 8-5
  - installed 8-4
- dialog screen 2-7
- directory, transfer
  - automatic pruning 4-63
  - files 4-41
  - trace logs 4-63
- diskette
  - format 4-50
  - list files 4-49
- diskette fast-path commands 9-48
- DLSw, data link switching
  - dump
    - start 5-38
    - view 5-39
  - fast-path commands 9-50
  - general debug information 5-58
  - network management information 4-37
  - partners 4-13
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-65
    - set up 5-59
  - trace
    - start 5-46
    - status 5-49
    - stop 5-47
    - view 5-48
- dump
  - process (disruptive)
    - start 5-39
    - view 5-40

- dump (*continued*)
  - protocol (nondisruptive)
    - start 5-38
    - view 5-39
  - system
    - copy 5-34
    - extract records, error log 5-36
    - extract records, trace log 5-37
    - format 5-35
    - start 5-32
    - view 5-34
- dump adapter memory 5-54

## E

- echo, remote host
  - AppleTalk 3-13, 4-20
  - IP 3-13, 4-19
  - VINES 3-13, 4-21
  - XNS 3-13, 4-20
- EIA 232 serial ports 3-12, 4-54
- environment, fast-path
  - aix-like commands 9-8
  - commands
    - abbreviation 9-4
    - notation 9-3
    - output 9-4
    - syntax 9-3
  - description 2-15
  - help
    - global 9-5
    - object-specific 9-6
  - log 9-4
  - more facility 9-7
  - old fast-path command formats 9-9
  - retrieval key 9-8
- error
  - log
    - clear 5-31
    - copy to transfer directory 5-30
    - extract from system dump 5-36
    - view 5-27
  - menu 5-23
  - report 5-24, 5-28
- error log fast-path commands 9-58
- error message screen 2-3

## F

- fast-path commands
  - abbreviation 9-4
  - adapter 9-11
  - AppleTalk 9-13
  - APPN 9-18
  - bridge
    - LAN 9-25
    - source route 9-25

## fast-path commands (*continued*)

- bridge (*continued*)
  - translational 9-25
  - transparent 9-25
- configuration 9-36
- DECnet 9-39
- diskette 9-48
- DLSw 9-50
- error 9-58
- files 9-65
- frame relay 9-74
- hardware 9-75
- help 9-5
- hostname 9-79
- interface 9-81
- IP 9-84
- IPX 9-94
- LAN Network Manager 9-28
- LED 9-98
- nameserver 9-99
- notation 9-3
- output 9-4
- PPP 9-101
- process 9-102
- remote access 9-104
- serial port 9-108
- SNMP 9-109
- software 9-112
- syntax 9-3
- system 9-123
- terminal 9-133
- time of day 9-134
- timeserver 9-135
- user 9-137
- VINES, Banyan 9-140
- X.25 9-150
- XNS 9-146

## fast-path environment

- aix-like commands 9-8
- commands
  - abbreviation 9-4
  - notation 9-3
  - output 9-4
  - syntax 9-3
- description 2-15
- help
  - global 9-5
  - object-specific 9-6
- log 9-4
- more facility 9-7
- old fast-path command formats 9-9
- retrieval key 9-8

## fast-path log

- clear 4-47
- description 9-4

field edit screen 2-3

file and diskette operations menu 4-41

file systems 4-40

File Transfer Protocol, FTP

- description 4-67

- from a 6611 to a 6611 7-11

- from a RISC System/6000 workstation to a 6611 7-8

- transfer software update 7-4

files fast-path commands 9-65

files, static directory

- send 4-48

- view 4-47

files, transfer directory

- checksum 4-46

- compress 4-46

- delete 4-43

- description 4-41

- receive 4-45

- rename 4-43

- scan 4-46

- send 4-43

- view 4-42

files, transferring

- diskette 7-5, 7-7

- File Transfer Protocol, FTP 4-67, 7-8, 7-11

- tape 7-6, 7-7

- Xmodem 4-69, 7-10

fix software installation failures 7-19

frame relay

- fast-path commands 9-74

- network management information 4-37

- Protocol Debug Collection Facility

- collection 5-60

- files 5-66

FTP, File Transfer Protocol

- description 4-67

- from a 6611 to a 6611 7-11

- from a RISC System/6000 workstation to a 6611 7-8

- transfer software update 7-4

function keys 2-11

## G

general help screen 2-3

## H

Hardware Maintenance menu

- configuration change VPD update 8-7

- device characteristics 8-5

- hardware vital product data (VPD) 8-3, 8-6

- installed devices 8-4

- model number 8-9

- serial number 8-8

- hardware.
  - diagnostics 5-81
  - fast-path commands 9-75
  - vital product data (VPD) 8-3, 8-6

- help
  - command status screens 2-8
  - dialog screens 2-7
  - fast-path
    - global 9-5
    - object-specific 9-6
  - function keys 2-11
  - list choices 2-14
  - menu screens 2-3
  - selector screens 2-6
  - System Manager
    - contextual 2-10
    - general 2-10
- hostname fast-path commands 9-79

- I**
  - information message screen 2-3
  - initial configuration
    - locally, with diskette 6-11
    - remotely, without diskette 6-11
  - input statistics 5-16
  - installation, software
    - apply updates 7-27
    - automating 7-37
    - clean up after a failed installation 7-28
    - commit updates 7-29
    - correct installation problems 7-19
    - description 7-4
    - interruptions to installation 7-18
    - list applied updates 7-29
    - list installation files 7-26
    - list problems fixed 7-27
    - messages
      - when applying PTFs 7-17
      - when receiving files in the transfer directory 7-16
    - post installation functions 7-28
    - pre-installation actions
      - check for corrupt data 7-19
      - clean up the transfer directory 7-19
      - handle development PTFs 7-20
      - stop trace activity 7-20
    - receive files 7-25
    - reject updates 7-31
    - storage space management 7-14
    - transferring files 7-4
  - installed devices 8-4
  - interface
    - fast-path commands 9-81
    - monitor
      - packet traffic 4-4
      - utilization 4-25

- interface (*continued*)
  - network management information 4-37
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-68
    - status 4-23
- Internet connection statistics 5-21
- Internet Protocol
  - ARP table management 4-32, 4-33
  - dump
    - start 5-38
    - view 5-39
  - echo 3-13, 4-19
  - fast-path commands 9-84
  - network management information 4-37
  - network statistics 4-27
  - port filters 4-36
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-68
    - set up 5-59
  - route table 4-9
  - route trace 4-21
  - trace
    - start 5-46
    - status 5-49
    - stop 5-47
    - view 5-48
- interruptions to software installation procedure 7-18
- IP
  - ARP table management 4-32, 4-33
  - dump
    - start 5-38
    - view 5-39
  - echo 3-13, 4-19
  - fast-path commands 9-84
  - network management information 4-37
  - network statistics 4-27
  - port filters 4-36
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-68
    - set up 5-59
  - route table 4-9
  - route trace 4-21
  - trace
    - start 5-46
    - status 5-49
    - stop 5-47
    - view 5-48
- IPX
  - dump
    - start 5-38
    - view 5-39
  - fast-path commands 9-94
  - network management information 4-37

## IPX (*continued*)

- network statistics 4-27
- port filters 4-36
- Protocol Debug Collection Facility
  - collection 5-60
  - files 5-70
- route table 4-9
- trace
  - start 5-46
  - status 5-49
  - stop 5-47
  - view 5-48

## L

### LAN bridge

- fast-path commands 9-25
- network statistics 4-29
- Protocol Debug Collection Facility
  - collection 5-60
  - files 5-71

### LED code fast-path commands 9-98

### LED codes 5-21

### list applied software update 7-29

### list choices 2-14

### list installed software updates 7-33

### list problems fixed by a software update 7-27

### list software update files 7-26

### log

#### error

- clear 5-31
- copy to transfer directory 5-30
- extract from system dump 5-36
- view 5-27

#### fast-path

- clear 4-47
- description 9-4
- view

#### System Manager

- clear 4-47
- description 2-14
- start 2-13, 2-14, 4-4
- stop 2-13, 2-14, 4-4

### logging in 3-13

### login information

- current users 4-51
- history 4-52

## M

### memory management statistics 5-18

### menu

- Configuration 6-2
- Hardware Maintenance 8-2
- Operations 4-3
- Problem Determination 5-3

## menu (*continued*)

- Software Installation and Maintenance 7-3
- System Manager 1-2
- System Manager Help 2-2
- menu screen 2-3
- messages
  - when applying PTFs 7-17
  - when receiving files in the transfer directory 7-16
- minimal configuration 6-15
- model number 8-9
- modem 3-12
- modem commands 3-12, 4-54
- monitor
  - interface utilization 4-25
  - packet traffic
    - interface 4-4
    - protocol 4-4
- more facility 9-7

## N

### nameserver fast-path commands 9-99

### netrc file 7-40

### network management information 4-37

### network statistics

#### AppleTalk 4-27

#### bridge

- LAN bridge 4-29
- menu 4-29
- source route bridge 4-29
- translational bridge 4-29
- transparent bridge 4-29

#### connection 4-22

#### DECnet 4-27

#### interface status 4-23

#### interface utilization monitor 4-25

#### IP 4-27

#### IPX 4-27

#### menu 4-22

#### packet traffic 4-26

#### VINES 4-27

#### XNS 4-27

## O

### old fast-path command formats 9-9

### Operations menu

#### ARP table management 4-31

#### date and time 4-61

#### EIA 232 serial ports 4-54

#### file and diskette operations 4-41

#### file systems 4-40

#### IP route trace 4-21

#### login information 4-51

#### network management information 4-37

#### network statistics 4-22

#### Operations menu *(continued)*

- packet traffic monitor
  - interface 4-4
  - protocol 4-4
- port filters 4-36
- remote access 3-3
- remote host echo 4-18
- routing information 4-8
- system activity report 4-53
- system shutdown 4-58

#### OSPF

- general information 4-17
- interface status 4-15
- link state database 4-16
- neighbors 4-16
- network management information 4-37

output statistics 5-16

## P

#### packet traffic

- monitor 4-4
- network statistics 4-26

paging space statistics 5-19

password 3-15

pop-up list screen 2-3

#### port filters

- AppleTalk 4-36
- DECnet 4-36
- IP 4-36
- IPX 4-36
- source route bridge 4-36
- transparent bridge 4-36
- VINES 4-36
- XNS 4-36

post software installation functions 7-28

#### PPP

- fast-path commands 9-101
- network management information 4-37
- Protocol Debug Collection Facility
  - collection 5-60
  - files 5-72
- trace
  - status 5-49
  - view 5-48

#### pre-installation actions, software updates

- check for corrupt data 7-19
- clean up the transfer directory 7-19
- handle development PTFs 7-20
- stop trace activity 7-20

prerequisites, software 7-35

#### Problem Determination menu

- adapter debug 5-50
- error log 5-22
- error report 5-24
- hardware diagnostics 5-81

#### Problem Determination menu *(continued)*

- LED codes 5-21
- process and protocol dump 5-37
- process information 5-4
- protocol and process trace 5-45
- protocol debug 5-54
- system dump 5-32
- system statistics 5-14
- system trace 5-41

#### process

- dump (disruptive)
  - start 5-39
  - view 5-40
- information
  - commands 5-6
  - detail 5-7
  - listed by protocol 5-11
  - menu 5-4
  - status 5-9
  - summary 5-4
  - table 5-12

process table 5-12

software installation 7-14, 7-21

process fast-path commands 9-102

product ID 7-36

#### protocol

- dump (nondisruptive)
  - start 5-38
  - view 5-39
- packet traffic monitor 4-4
- trace
  - start 5-46
  - status 5-49
  - stop 5-47
  - view 5-48

#### protocol debug

- DLSw general information 5-58
- network management subsystem 5-57
- Protocol Debug Collection Facility
  - collection 5-60
  - files 5-61
  - set up 5-59
- source route bridge adapter table 5-55
- X.25 traffic monitor 5-59

#### Protocol Debug Collection Facility

- collection 5-60
- description 5-59
- files 5-61
- set up 5-59

protocol monitor 4-4

## R

read adapter memory 5-51

receive software update files 7-25



reject applied software update 7-31

remote access

description 3-2

fast-path commands 9-104

modem 3-12

remote execution, rexec 3-9

remote login, rlogin 3-6, 3-8

remote shell, rsh 3-10

telnet 3-4

remote execution, rexec 3-9

remote host echo

AppleTalk 3-13, 4-20

IP 3-13, 4-19

VINES 3-13, 4-21

XNS 3-13, 4-20

remote login, rlogin 3-6, 3-8

remote shell, rsh 3-10

report

configuration 6-22

error 5-24

restore utility 7-50

retrieval key 9-8

rexec, remote execution 3-9

rlogin, remote login 3-6, 3-8

route tables

AppleTalk 4-9

DECnet 4-9

IP 4-9

IPX 4-9

VINES 4-9

XNS 4-9

route trace, IP 4-21

routing information

AppleTalk zone information table 4-11

DECnet 4-13

DLsw partners 4-13

menu 4-8

OSPF 4-14

route tables 4-9

VINES Neighbor tables 4-12

rsh, remote shell 3-10

## S

screen, System Manager

command status 2-8

contextual help 2-3

dialog 2-7

error message 2-3

field edit 2-3

general help 2-3

information message 2-3

menu 2-3

pop-up list 2-3

selector 2-6

scripts to automate software installation

building your own 7-38

using those provided with the 6611 7-39

selector screen 2-6

serial number 8-8

serial port fast-path commands 9-108

serial ports, EIA 232 3-12, 4-54

SNMP

fast-path commands 9-109

network management information 4-37

Protocol Debug Collection Facility

collection 5-60

files 5-73

trace

start 5-46

status 5-49

stop 5-47

view 5-48

socket, system statistics 5-20

software dependents 7-36

software fast-path commands 9-112

software history 7-32

software installation

apply updates 7-27

automating 7-37

clean up after a failed installation 7-28

commit updates 7-29

correct installation problems 7-19

description 7-4

interruptions to installation 7-18

list applied updates 7-29

list installation files 7-26

list problems fixed 7-27

messages

when applying PTFs 7-17

when receiving files in the transfer directory 7-16

post installation functions 7-28

pre-installation actions

check for corrupt data 7-19

clean up the transfer directory 7-19

handle development PTFs 7-20

stop trace activity 7-20

receive files 7-25

reject updates 7-31

storage space management 7-14

transferring files 7-4

Software Installation and Maintenance menu

apply software updates 7-27

clean up after a failed installation 7-28

commit applied software 7-29

list applied software 7-29

list installation files 7-26

list problems fixed 7-27

receive installation files 7-25

reject applied software 7-31

software vital product data (VPD) 7-32

- software installation procedure 7-14, 7-21
- software prerequisites 7-35
- software product ID 7-36
- software update procedure 7-14, 7-21
- software updates
  - apply updates 7-27
  - automating 7-37
  - clean up after a failed installation 7-28
  - commit updates 7-29
  - correct installation problems 7-19
  - description 7-4
  - interruptions to installation 7-18
  - list applied updates 7-29
  - list installation files 7-26
  - list problems fixed 7-27
  - messages
    - when applying PTFs 7-17
    - when receiving files in the transfer directory 7-16
  - post installation functions 7-28
  - pre-installation actions
    - check for corrupt data 7-19
    - clean up the transfer directory 7-19
    - handle development PTFs 7-20
    - stop trace activity 7-20
  - receive files 7-25
  - reject updates 7-31
  - storage space management 7-14
  - transferring files 7-4
- software vital product data 7-32
- source route bridge
  - adapter table 5-55
  - fast-path commands 9-25
  - network management information 4-37
  - network statistics 4-29
  - port filters 4-36
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-74
  - trace
    - start 5-46
    - status 5-49
    - stop 5-43, 5-47
    - view 5-48
- start line trace 5-53
- static directory files
  - send 4-48
  - view 4-47
- stop the system 4-58
- storage space management, software updates 7-14
- system
  - dump
    - copy 5-34
    - extract records, error log 5-36
    - extract records, trace log 5-37
    - format 5-35
    - menu 5-32
    - start 5-32
- system (*continued*)
  - dump (*continued*)
    - view 5-34
  - fast-path commands 9-123
  - network management information 4-37
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-75
  - trace
    - format 5-43
    - menu 5-42
    - start 5-42
    - status 5-49
    - stop 5-43
  - system activity report 4-53
  - system configuration information 2-4, 2-12
  - system ID 2-4, 2-12
  - System Manager Configuration Utility 6-7
  - System Manager Help menu
    - command status screens 2-8
    - dialog screens 2-7
    - fast-path 2-15
    - function keys 2-11
    - list choices 2-14
    - menu screens 2-3
    - selector screens 2-6
  - System Manager log
    - clear 4-47
    - description 2-14
    - start 2-13, 2-14, 4-4
    - stop 2-13, 2-14, 4-4
  - System Manager menu 1-2
  - System Manager screen
    - command status 2-8
    - contextual help 2-3
    - dialog 2-7
    - error message 2-3
    - field edit 2-3
    - general help 2-3
    - information message 2-3
    - menu 2-3
    - pop-up list 2-3
    - selector 2-6
  - system monitor process trace
    - status 5-49
    - view 5-48
  - system shutdown 4-58
  - system socket statistics 5-20
  - system statistics
    - input/output 5-16
    - Internet connection 5-21
    - memory management 5-18
    - menu 5-15
    - paging space 5-19
    - system socket 5-20
    - virtual memory 5-15

## T

- table management, ARP
  - AppleTalk 4-35
  - description 4-31
  - IP 4-32, 4-33
- telnet 3-4
- terminal fast-path commands 9-133
- time of day fast-path commands 9-134
- time, set or view 4-61
- timeserver fast-path commands 9-135
- trace
  - protocol
    - start 5-46
    - status 5-49
    - stop 5-47
    - view 5-48
  - system
    - format 5-43
    - start 5-42
    - status
    - stop
  - system monitor process
    - status 5-49
    - view 5-48
- traffic, packet
  - monitor 4-4
  - network statistics 4-26
- transfer directory
  - automatic pruning 4-63
  - files 4-41
  - trace logs 4-63
- transfer directory files
  - checksum 4-46
  - compress 4-46
  - delete 4-43
  - description 4-41
  - receive 4-45
  - rename 4-43
  - scan 4-46
  - send 4-43
  - view 4-42
- transferring files
  - diskette 7-5, 7-7
  - File Transfer Protocol, FTP 4-67, 7-8, 7-11
  - tape 7-6, 7-7
  - Xmodem 4-69, 7-10
- transferring software updates
  - from a 6611 to a 6611 using FTP 7-11
  - from a diskette to a 6611 7-5
  - from a RISC System/6000 workstation to a 6611 using FTP 7-8
  - from a RISC System/6000 workstation to a 6611 using Xmodem 7-10
  - from a tape to a 6611 7-6
  - from diskette to a RISC System/6000 workstation 7-7

- transferring software updates (*continued*)
  - from tape to a RISC System/6000 workstation 7-7
- translational bridge
  - fast-path commands 9-25
  - network statistics 4-29
  - Protocol Debug Collection Facility
    - collection 5-60
    - files
  - trace
    - start 5-46
    - status 5-49
    - stop 5-47
    - view 5-48
- transparent bridge
  - fast-path commands 9-25
  - network management information 4-37
  - network statistics 4-29
  - port filters 4-36
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-75, 5-77
  - trace
    - status 5-49
    - view 5-48
- troubleshooting configuration 6-3

## U

- updating configuration parameters 6-4
- user class
  - controlling 3-15
  - viewing 3-15
- user fast-path commands 9-137
- user ID 3-15
- user information
  - current users 4-51
  - history 4-52
- using 6611-provided commands and scripts to automate software installation
  - .netrc file 7-40
  - control file
    - description 7-41
    - keywords 7-42, 7-43
    - sample 7-44
  - description 7-39
  - installation states and phases 7-41
  - obtaining output 7-45
  - sending software changes to multiple 6611s 7-47

## V

- verifying a connection 3-13
- view adapter registers 5-52
- viewing user
  - default ID and password 3-15
  - description 3-15

- VINES, Banyan
  - dump
    - start 5-38
    - view 5-39
  - fast-path commands 9-140
  - filters 4-36
  - ICP echo 3-13, 4-21
  - neighbor tables 4-12
  - network management information 4-37
  - network statistics 4-27
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-78
  - route table 4-9
  - trace
    - start 5-46
    - status 5-49
    - stop 5-47
    - view 5-48
  - virtual memory statistics 5-15
  - vital product data (VPD)
    - hardware 8-3, 8-6
    - software 7-32

## X

- X.25 adapter
  - fast-path commands 9-150
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-80
  - trace
    - status 5-49
    - view 5-48
  - traffic monitor 5-59
- Xmodem protocol
  - description 4-69
  - transfer software update 7-10
- XNS
  - echo 3-13, 4-20
  - fast-path commands 9-146
  - network management information 4-37
  - network statistics 4-27
  - port filters 4-36
  - Protocol Debug Collection Facility
    - collection 5-60
    - files 5-79
  - route table 4-9
  - trace
    - start 5-46
    - status 5-49
    - stop 5-47
    - view 5-48

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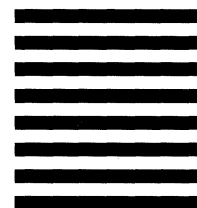
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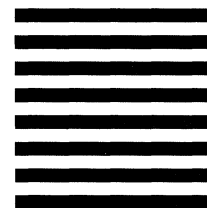
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