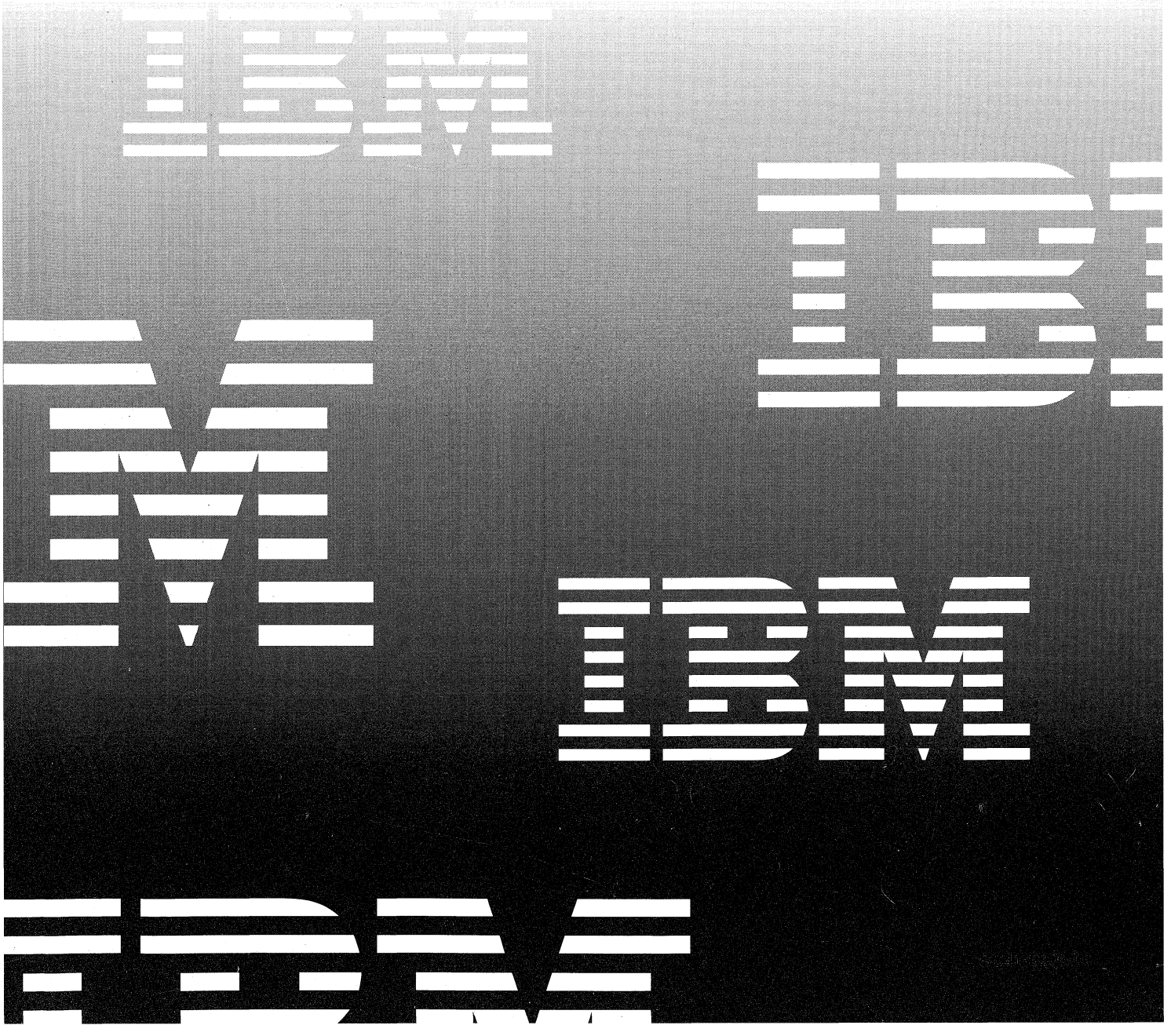
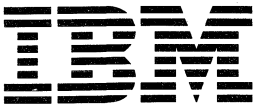
AS/400e series

Basic System Operation, Administration, and Problem Handling

Version 4



AS/400e series



Basic System Operation, Administration, and Problem Handling

Version 4

SC41-5206-01

Note

Before using this information and the product it supports, be sure to read the information in "Safety and Environmental Notices" on page xiii and "Notices" on page X-1.

Second Edition (February 1998)

This edition replaces SC41-5206-00. This edition applies only to reduced instruction set computer (RISC) systems.

Contents

Safety and Environmental Notices xiii
Product Recycling and Disposal xiii
Battery Return Program xiii
Environmental Design xiii

Basic System Operation, Administration, and Problem Handling, (SC41-5206) xv
Who should read this book xvi
System/36 Environment Users xvi
Multiple Operating System Users xvi
Conventions and terminology used in this book xvi
AS/400 Operations Navigator xvii
Prerequisite and related information xviii
Information available on the World Wide Web xviii
How to send your comments xviii

Chapter 1. Basic Tasks Fast Path 1-1
Instructions on Using the Fast Path 1-1
Assistance Level 1-2
  Changing Assistance Level 1-2
Controlling Devices 1-2
  Changing the Device Name 1-2
  Checking the Device Status 1-2
  Making Devices Available (Varying On) 1-2
  Printing Local Device Addresses 1-2
Controlling Jobs 1-3
  Changing the Logging Level for a Batch Job 1-3
  Changing the Priority of a Batch Job on the Job Queue 1-3
  Changing the Run Priority of an Active Batch Job 1-3
  Scheduling Batch Jobs 1-3
  Submitting Batch Jobs 1-4
  Working with Interactive Jobs 1-4
  Working with Job Queues 1-4
Finding Information about the AS/400 System 1-4
  Using the Information Assistant* Options 1-4
  Using the InfoSeeker Option 1-4
  Using the Online Help Information 1-4
Handling Messages 1-5
  Changing Message Notification 1-5
  Changing a Printer's Message Queue 1-5
  Printing Displayed Messages 1-5
  Printing Message Descriptions 1-5
  Removing Messages from Message Queues 1-5
  Removing Messages from the System Operator Message Queue 1-6
  Removing Messages from Your Personal Message Queue 1-6
  Removing Messages from Your Workstation Message Queue 1-6
  Sending a Message to All Signed-On Users 1-6
  Sending a Message that Interrupts Another User 1-6
Managing the System 1-6
  Changing Support Contact Information 1-6

Changing System Date and Time 1-6
Changing System Values 1-6
Cleaning Up the System 1-7
Collecting Disk Space Information 1-7
Deleting Save Files 1-7
Displaying Performance Status 1-7
Printing Disk Space Information 1-7
Removing Printer Messages Manually 1-7
Removing Printer Output 1-7
Signing Users Off the System 1-7
Problem Handling 1-8
Ordering PTFs and PTF Information 1-8
Running Problem Analysis 1-8
Working with a Problem 1-9
Restoring Information 1-9
Restoring Documents and Folders 1-9
Restoring an Entire User Library 1-9
Restoring Individual Objects 1-9
Restoring Objects in Directories 1-9
Saving Information 1-9
Saving Documents and Folders 1-9
Saving an Entire User Library 1-9
Saving Individual Objects 1-9
Saving Objects in Directories 1-10
Starting and Stopping the System 1-10
Changing the Power On and Off Schedule 1-10
Powering Off the System 1-10
Powering On the System 1-10
Setting Automatic Power On after a Power Failure 1-11
Using Communications 1-11
Configuring Remote Communications 1-11
Starting Printer Emulation 1-11
Starting 3270 Device Emulation 1-11
Working with Directory Entries 1-11
Working with Network Files 1-12
Working with a Remote Job Entry Session 1-12
Using Tape and Diskette 1-12
Finding Out What Is on a Diskette 1-12
Finding Out What Is on a Tape 1-12
Initializing a Tape or Tape Set 1-12
Working with Printer Output 1-12
Working with or Changing a Printer 1-12
Changing Characteristics of Printer Output 1-12
Changing Characteristics of Printer Output before It Is Created 1-12
Changing the Priority of a Spooled File 1-13
Checking Status of Printer Output 1-13
Common Printer Problems and Solutions 1-13
Responding to Printer Messages 1-13
Restarting a Printer 1-13
Sending a Spooled File 1-13
Working with Security 1-14
Changing IBM-Supplied Passwords 1-14
Changing Your Own Password 1-14
Adding a New User 1-14

Removing Users 1-14
Helping Users with Problems Signing On 1-14

Chapter 2. What You Need to Know About Your AS/400 System 2-1
AS/400 System Units 2-1
System Unit Control Panels 2-2
Control Panels for the System Units 2-2
Control Panel Details 2-5
System Expansion Tower Control Panel 2-8
Address and Fault Displays 2-9
Battery Power Unit for the AS/400 System Units 2-10
Starting and Stopping the System 2-11
Starting the System 2-11
Stopping the System 2-32
Using Removable Media 2-35
Using Tapes and Tape Units 2-35
General Tape Usage Information 2-61
Storage Device Ready Conditions 2-66
Using CD-ROM 2-67
Using Optical Media Libraries 2-69

Chapter 3. Handling and Reporting System Problems 3-1
Before You Begin 3-1
Getting Help with Problems 3-6
Calling IBM Marketing or Business Partner 3-7
Calling Your Software Service Representative 3-7
Calling Your Hardware Service Representative 3-7
Analyzing a New Problem 3-8
Reporting hardware and software problems 3-9
Reporting problems detected by the system 3-10
Sending a service request immediately 3-10
Sending a service request later 3-11
Reporting problems by voice 3-12
Adding notes to your problem record 3-12
Automatic problem reporting 3-13
Querying problem status 3-13
Finding a previously reported problem 3-14
Enabling Automated Remote System Reporting Options 3-14
Remote Access to Dedicated Service Tools (DST) and Remote Control Panel 3-15
Problem Handling Tables and Procedures 3-15
Analyzing Problems With a Symptom 3-15
Performing a Main Storage Dump 3-22
Determining the Primary or Alternative Consoles 3-25
Finding the Primary Console When System Power is Off 3-27
Problem Summary Forms 3-27
Problem Summary Form—System Model 150, 600, 620, S10, and S20 (Single Processor Capability) 3-27
Problem Summary Form—System 170 3-30
Problem Summary Form—System Model 4xx 3-33
Problem Summary Form—System Model 5xx 3-35
Problem Summary Form—System Model 620 and S20 (Multiple Processor Capability) 3-37
Problem Summary Form—System Models 64x, S30, S40, and 65x 3-39
Control Panel Status Forms 3-40

System Models 150, 600 and Some 620, and S20 Control Panel Status Form . . . 3-41
System Models 620 and S20 Control Panel Status Form . . . 3-42
System Model 170 Control Panel Status Form . . . 3-43
System Model 4xx Control Panel Status Form . . . 3-44
System Model 5xx Control Panel Status Form . . . 3-45
System Models 64x, S30, S40, and 65x Control Panel Status Form . . . 3-46
Replacing Battery Power Unit on Models 5xx and Tower FC507x and FC508X . . . 3-47

Chapter 4. Tips for Customizing Your System . . . 4-1
Using Automatic Configuration to Configure Local Devices . . . 4-1
Adding Additional Local Controllers and Devices at a Later Time . . . 4-1
Printing a Copy of Your System Configuration . . . 4-2
"Work with..." Configuration Displays . . . 4-2
How to Change the Text Description of Your Devices . . . 4-3
How to Change the Name of Your Devices . . . 4-3
How to Change Your Configuration Naming Convention . . . 4-4
How Do I Configure Devices at Remote Locations? . . . 4-4
Using Configuration Menus for Manual Configuration . . . 4-4
Configuration Tasks You Can Perform . . . 4-5
"Work with..." Configuration Displays . . . 4-5
Authority Needed for Configuration . . . 4-12
Configuring Disk Units . . . 4-13
Controlling Initial Program Load (IPL) . . . 4-14
Changing the IPL Start-Up Program . . . 4-14
Source for CL Start-up Program . . . 4-14
QSTRUPPGM System Value . . . 4-16
Miscellaneous Tips . . . 4-16
Getting Job Logs in One Output Queue . . . 4-16
Stopping a Job Log From Being Created . . . 4-16

Chapter 5. Tips for Managing Your System . . . 5-1
Printing System Information . . . 5-1
Printing a List of Hardware Devices . . . 5-2
Cleaning Up Your System . . . 5-3
Setting Up Automatic Cleanup . . . 5-3
Cleaning Up Obsolete User Profiles . . . 5-4
Cleaning Up Obsolete Objects . . . 5-6
Cleaning Up Licensed Programs . . . 5-6
Cleaning Up Your Hardware Configuration . . . 5-7
Additional Cleanup Tasks . . . 5-8
Tips for Improving IPL Performance . . . 5-9
Cleanup Activities That Affect IPL Performance . . . 5-9
System Settings That Affect IPL Performance . . . 5-10
How Access Paths and Journaling Affect IPL Performance . . . 5-12
What are PTFs and Why Do I Need Them? . . . 5-13
AS/400 Program Maintenance Strategy . . . 5-13
Ordering PTFs and PTF Information . . . 5-14
Installing PTFs . . . 5-24
Advanced PTF Topics . . . 5-34
Backing Up Your System . . . 5-50
What Do You Need to Save and How Often? . . . 5-51
Obtaining Further Information . . . 5-57

Automatic System Management Functions 5-57
Performance Tuning 5-57

Notices X-1
Programming Interface Information X-2
Trademarks X-2

Bibliography X-3

Index X-5

Figures

0-1. Types of AS/400 Displays . . . xvii
0-2. AS/400 Operations Navigator Display . . . xvii
2-1. Model 1xx, 4xx, 5xx, 6xx, and Sxx . . . 2-1
2-2. Control panels for the Models 5xx (Left),Models 4xx (Right) and Model 150 (Bottom) . . . 2-2
2-3. Control panel for the Model 170 . . . 2-3
2-4. Control panel for the Models 600, 620, S10, and S20 . . . 2-3
2-5. Control panel for the Models 620 and S20 . . . 2-4
2-6. Control panel for the Models 640/650/S30/S40 . . . 2-4
2-7. Control panel for the Models 640/650/S30/S40/SB1 . . . 2-5
2-8. Expansion Tower Control Panels for the Models 5xx, 620, 64x, 65x, S20, S30, and S40 . . . 2-9
2-9. SPCN Address Display . . . 2-10
2-10. SPCN Fault Display . . . 2-10
2-11. Sign On Display . . . 2-13
2-12. Change Power On and Off Defaults Display . . . 2-15
2-13. Change Power On and Off Schedule Display . . . 2-16
2-14. Select Products to Work with PTFs Display . . . 2-19
2-15. IPL Options Display . . . 2-19
2-16. Set Major System Options Display . . . 2-20
2-17. Edit Rebuild of Access Paths Display . . . 2-25
2-18. Display Access Path Status Display . . . 2-26
2-19. Edit Check Pending Constraints Display . . . 2-27
2-20. Display Constraint Status . . . 2-27
2-21. Overview of IPL System Reference Codes and Time Displayed . . . 2-30
2-22. Confirm Power Off of System Display for Immediate Power Down . . . 2-34
2-23. Confirm Power Off of System Display for Immediate Power On . . . 2-34
2-24. 1/4-Inch Tape Cartridge . . . 2-39
2-25. The QIC-5010 tape unit . . . 2-43
2-26. Status lights on the QIC-5010 tape unit . . . 2-44
2-27. Write-Protect Positions for a 1/4-Inch Tape Cartridge (QIC-525 and QIC-120) . . . 2-45
2-28. Write-Protect Positions for a 1/4-Inch Tape Cartridge (QIC-1000 and QIC-2GB, QIC-2GB(DC), QIC-4GB-DC, and QIC-5010) . . . 2-46
2-29. Write-Protect Positions for a 1/4-Inch Tape Cartridge (QIC-3040) . . . 2-46
2-30. The 8MM 5.0GB or 7.0GB tape unit . . . 2-48
2-31. Status lights on the 8MM 5.0GB or 7.0GB tape units . . . 2-50
2-32. Write Protection of 8-mm Tape Cartridges . . . 2-53
2-33. Preparing a Tape Leader . . . 2-59
2-34. 1/2-Inch Tape Reel Write Protection . . . 2-60
2-35. Work with Lifetime Statistics Display . . . 2-64
2-36. CD-ROM drives on the System Model 4xx (left) and System Model 5xx (right) . . . 2-67
3-1. Main Storage Dump Manager . . . 3-22
3-2. Main Storage Dump Manager . . . 3-23
4-1. Work with Device Descriptions Display . . . 4-3
5-1. Display Description Label Locations . . . 5-3
5-2. Change Cleanup Options . . . 5-4
5-3. Cleanup Instructions – Sample . . . 5-6
5-4. Display Job Tables Display . . . 5-10

5-5. Change IPL Attributes Display 5-10
5-6. Sample PTF Cover Letter 5-19
5-7. Display PTF Status 5-33
5-8. General Information display 5-33
5-9. Display Spooled File display 5-46
5-10. Display Spooled File display - screen 2 5-47
5-11. Select PTF CD-ROM File display 5-48

Tables

1-1. Powering On the System 1-10
1-2. Common Printer Problems and Solutions 1-13
2-1. IPL Summary 2-12
2-2. Compatibility Between Tape Cartridges and Tape Units 2-39
2-3. Retension Times for 1/4-Inch Tape Cartridges 2-41
2-4. Environment Ranges for 1/4-Inch and 1/4-Inch Mini Tape Cartridges 2-47
2-5. Cleaning the 1/2-Inch Tape Reel Unit 2-60
2-6. Storage Device Ready Conditions 2-66
3-1. List of System Reference Codes 3-16
4-1. Source for CL Start-up Program 4-15
5-1. System-created spooled files 5-2
5-2. Getting PTFs and PTF Information 5-14
5-3. Overview of Parts of the System 5-51

Safety and Environmental Notices

Product Recycling and Disposal

Components of the system, such as structural parts and circuit cards, can be recycled where recycling facilities exist. IBM does not currently collect and recycle used IBM products from customers in the United States other than those products that are involved in trade-in programs. Companies are available to disassemble, reutilize, recycle, or dispose of electronic products. Contact an IBM account representative for more information.

The system unit contains batteries and circuit boards with lead solder. Before you dispose of this unit, these batteries and circuit boards must be removed and discarded according to local regulations or recycled where facilities exist. This book contains specific information on each battery type where applicable.

Battery Return Program

In the United States, IBM has established a collection process for reuse, recycling, or proper disposal of used IBM batteries and battery packs. For information on proper disposal of the batteries in this unit, please contact IBM at 1-800-426-4333. Please have the IBM part number that is listed on the battery available when you make your call. For information on battery disposal outside the United States, contact your local waste disposal facility.

Environmental Design

The environmental efforts that have gone into the design of the system signifies IBM's commitment to improve the quality of its products and processes. Some of these accomplishments include the elimination of the use of Class I ozone-depleting chemicals in the manufacturing process, reductions in manufacturing wastes, and increased product energy efficiency. For more information, contact an IBM account representative.

Basic System Operation, Administration, and Problem Handling, (SC41-5206)

This basic operations book provides different sections such as:

- A fast path for performing basic system tasks
- A what you need to know about your AS/400 section
- A problem handling section
- Tips on customizing your system
- Tips on managing your system

Use Chapter 1, "Basic Tasks Fast Path" on page 1-1 to refer to menu options or commands and for instructions to complete the tasks. This fast path does not define terms, describe system concepts, or show the purpose for each task. It is designed to help system operators, administrators, programmers, and service personnel do their jobs quickly. Before using the fast path, you should be familiar with basic functions of the AS/400 system.

Chapter 2, "What You Need to Know About Your AS/400 System" on page 2-1 describes the control panels for the different models, covers the basics of starting and stopping your system, and describes the different types of media (tape, CD-ROM, and optical media libraries) that you can use with your system.

Chapter 3, "Handling and Reporting System Problems" on page 3-1 covers such things as:

- How to handle common problems
- How to handle and report system problems
- Using problem handling tables and procedures
- Using problem summary forms and control panel status forms
- Replacing the battery power unit

Chapter 4, "Tips for Customizing Your System" on page 4-1 provides helpful hints on configuring your system, setting up message replies and queues, and working with job logs.

Chapter 5, "Tips for Managing Your System" on page 5-1 provides tips on system documentation, system housekeeping, what PTFs are and why they are important to you, setting up backup and recovery schedules, and using automatic system management functions.

For information about other AS/400 publications, see either of the following:

- The *Publications Reference*, SC41-5003, in the AS/400 Softcopy Library.
- The *Advanced 36 Information Directory*, a unique, multimedia interface to a searchable database containing descriptions of titles available from IBM or from selected other publishers.

Who should read this book

This guide is intended for, but not limited to, a system operator or administrator who is operating the AS/400 system.

To use this book, you should already know how to operate the following:

- Display stations
- Printers
- Tape devices
- CD-ROM devices
- Optical libraries

You should already know how to do the following AS/400 system tasks:

- Sign on and off your display station
- Use function keys on your display station keyboard
- Use displays and menus, including:
  - Online help information
  - Send and receive messages

System/36 Environment Users

If you are using your AS/400 system in a System/36 environment, start the AS/400 system using an attended initial program load (IPL), and select the kind of environment you want to use. When you have completed the IPL, see the following manuals for information about the System/36 environment:

- *System/36 Environment Programming*, SC41-4730
- *System/36 Environment Reference*, SC41-4731

Multiple Operating System Users

If you are using an AS/400 system with multiple operating systems, see *Operator Tasks - Multiple Operating Systems*, SC21-8384.

Conventions and terminology used in this book

The AS/400 displays in this book could be shown as they are presented through Graphical Access for AS/400, which is part of Client Access on the personal computer. The example displays in this book could also be shown without Graphical Access for AS/400 available. Figure 0-1 on page xvii shows both types of displays.

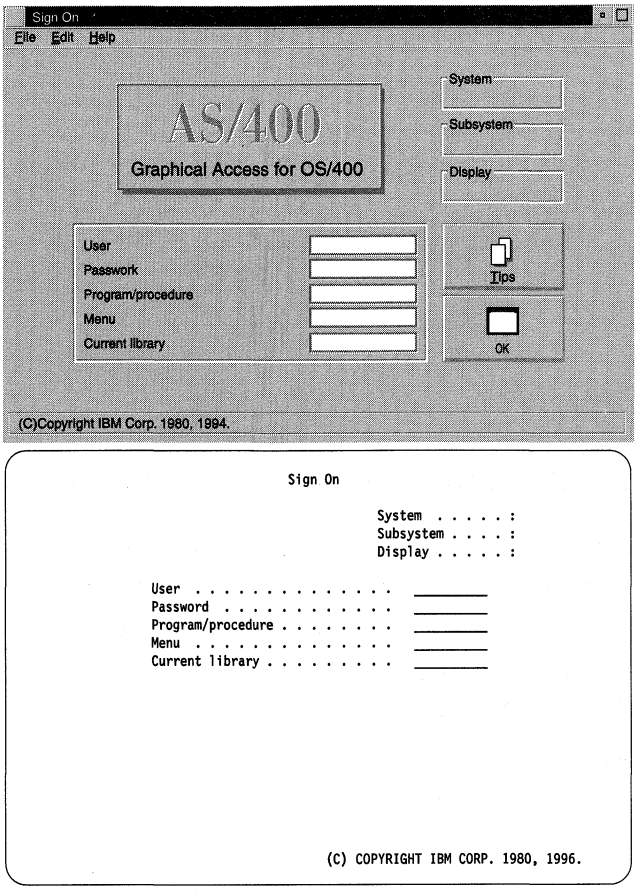


Figure 0-1. Types of AS/400 Displays

AS/400 Operations Navigator

AS/400 Operations Navigator is a powerful graphical interface for Windows 95/NT clients. With AS/400 Operations Navigator, you can use your Windows 95/NT skills to manage and administer your AS/400 systems. You can work with database administration, file systems, Internet network administration, users, and user groups. You can even schedule regular system backups and display your hardware and software inventory. Figure 0-2 shows an example of the display.

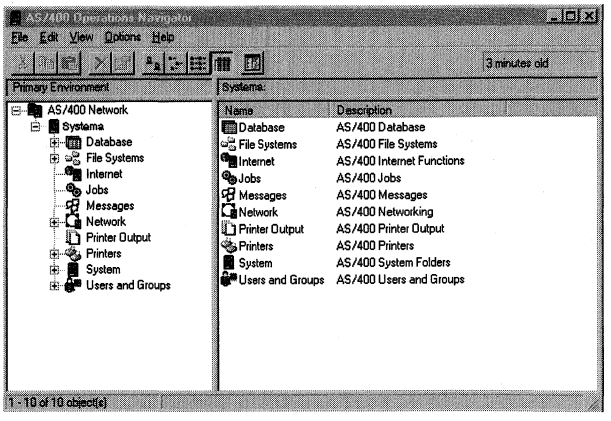


Figure 0-2. AS/400 Operations Navigator Display

IBM recommends that you use this new interface. It is simple to use and has great online information to guide you.

You can access the AS/400 Operations Navigator from the Client Access folder by double-clicking the AS/400 Operations Navigator icon. You can also drag this icon to your desktop for even quicker access.

While we develop this interface, you will still need to use the familiar AS/400 "green screens" to do some of your tasks. You can find information to help you in this book and online.

Prerequisite and related information

For information about Advanced 36 publications, see the *Advanced 36 Information Directory*, SC21-8292, in the AS/400 Softcopy Library.

For information about other AS/400 publications (except Advanced 36), see either of the following:

- The *Publications Reference*, SC41-5003, in the AS/400 Softcopy Library.
- The AS/400 online library is available on the World Wide Web at the following uniform resource locator (URL) address:

  `http://as400bks.rochester.ibm.com/`

For a list of related publications, see the "Bibliography" on page X-3.

Information available on the World Wide Web

In addition to the AS/400 online library on the World Wide Web, you can access other information from the AS/400 Technical Studio at the following URL address:

`http://www.as400.ibm.com/techstudio`

How to send your comments

Your feedback is important in helping to provide the most accurate and high-quality information. If you have any comments about this book or any other AS/400 documentation, fill out the readers' comment form at the back of this book.

- If you prefer to send comments by mail, use the readers' comment form with the address that is printed on the back. If you are mailing a readers' comment form from a country other than the United States, you can give the form to the local IBM branch office or IBM representative for postage-paid mailing.
- If you prefer to send comments by FAX, use either of the following numbers:
  - United States and Canada: 1-800-937-3430
  - Other countries: 1-507-253-5192
- If you prefer to send comments electronically, use this network ID:
  - IBMMAIL, to IBMMAIL(USIB56RZ)
  - IDCLERK@RCHVMW2.VNET.IBM.COM

Be sure to include the following:

- The name of the book.
- The publication number of the book.
- The page number or topic to which your comment applies.

Chapter 1. Basic Tasks Fast Path

This topic includes system tasks that are used daily, weekly, or maybe only once in a while. Basic assistance level is assumed unless otherwise noted. See "Assistance Level" on page 1-2 for more information on changing assistance levels. This fast path provides some of the more common operator tasks, but certainly not all the tasks that are available on your system.

On the IBM AS/400 system, a task can be completed in different ways. This fast path shows two possible methods for each task: a menu path and a control language (CL) command.

Instructions on Using the Fast Path

The first method gives a list of menu options to select to accomplish the task. The menu path shows the name of the starting menu, followed by one or more option numbers and function keys. Be sure to type the word **go** before each menu name. For example, to work with job queues, the menu path listed is:

Menu Path: ASSIST 2 F22

To reach the first menu:

1. Type **go assist** on any command line and press the Enter key.
2. Select option 2 (Work with jobs) and on the next display.
3. Press F22 (Work with job queues).

This second method involves typing CL commands on the command line. For example, to work with job queues, the command listed is:

Command: WRKJOBQ

To use the command:

1. Type **wrkjobq** and press the Enter key.

If there is a required parameter value, a prompt display is shown where you can fill in the required parameters.

Although the commands are shown in uppercase letters, you can type them in both lowercase and uppercase.

Note: Sometimes additional information to help you perform the task is provided in this section of the reference box.

Assistance Level

Changing Assistance Level

Menu Path: From any display (where available) F21

Command: CHGPRF ASTLVL(*BASIC, *INTERMED, or *ADVANCED)

Notes:

1. The assistance level (ASTLVL) parameter is available on several CL commands to determine which level of the display you see. For example, if you type `wrksplf astlvl(*intermed)` you see the intermediate assistance level of the Work with All Spooled Files display.
2. F21 (Select assistance level) changes the assistance level for the individual display.
3. The Change Profile (CHGPRF) command sets the assistance level for all commands that have assistance levels.

Controlling Devices

Changing the Device Name

Menu Path: DEVICESTS (1, 2, 3, or 4) 8 7

Command: RNMOBJ

Checking the Device Status

Menu Path: DEVICESTS (1, 2, 3, or 4) check *Status* column

Command: WRKCFGSTS

Making Devices Available (Varying On)

Menu Path: DEVICESTS (1, 2, 3, or 4) 1

Command: WRKCFGSTS

Printing Local Device Addresses

Menu Path: DEVICESTS 10

Command: PRTDEVADR

Note: The menu path prints a configuration table of addresses for all local workstation controllers attached to your system.

Controlling Jobs

Changing the Logging Level for a Batch Job

Menu Path: JOB 1 2

Command:

Temporary: WRKUSRJOB JOBTYPE(*BATCH)

Permanent: CHGJOBD

Notes:

1. If you temporarily change the logging level, it only affects the current job. When the job is run again, it runs with the original logging level.
2. You can change only the logging level for a batch job using the intermediate assistance level.

Changing the Priority of a Batch Job on the Job Queue

Menu Path: JOB 5 5 2

Command: WRKJOBQ

Note: Reducing a batch job's priority number causes the job to process earlier. Increasing the priority number causes the batch job to process later.

Changing the Run Priority of an Active Batch Job

Menu Path: JOB 1 2

Command: WRKUSRJOB STATUS(*ACTIVE) JOBTYPE(*BATCH)

Notes:

1. Jobs with lower run priorities (for example, 1) process before jobs with higher run priorities (for example, 99).
2. You can change only the run priority of an active batch job with intermediate assistance level.

Scheduling Batch Jobs

Menu Path: JOB2 8

Command: WRKJOBSCDE

Submitting Batch Jobs

Menu Path: JOB 7

Command: SBMJOB

Working with Interactive Jobs

Menu Path: MANAGESYS 12

Command:

WRKUSRJOB USER(*ALL) STATUS (*ACTIVE)
JOBTYPE(*INTERACTIVE) ASTLVL(*BASIC)

Working with Job Queues

Menu Path: ASSIST 2 F22

Command: WRKJOBQ

Finding Information about the AS/400 System

Using the Information Assistant* Options

Menu Path: INFO

Command: Not available.

Note: The Information Assistant Options (INFO) menu allows you to find out where to look for information about your AS/400 system, how to comment on that information, and what is new in this release of the AS/400 system.

You can also select options on this menu to search for AS/400 publications (InfoSeeker), start online education if an online course is installed on the system, and work with problems.

Using the InfoSeeker Option

Menu Path: INFO 20

Command: STRINFSKR

Note: The InfoSeeker option allows you to display, search, and organize online books.

Using the Online Help Information

Menu Path:

Position the cursor at the appropriate field on any system menu or display and press F1 or the Help key.

Command: Not available.

Tip: In case you didn't read "Instructions on Using the Fast Path" on page 1-1, be sure to type the word **go** in front of the menu you are trying to display.

Handling Messages

Changing Message Notification

Menu Path: MESSAGE 6 (enter message queue name or *ALL) 2

Command: CHGMSGQ

Changing a Printer's Message Queue

Menu Path: CMDPRT 1

Command: CHGDEVPRT

Note: The default for printer messages is the system operator queue (QSYSOPR). The message queue for a printer can be determined by using the Work with Device Descriptions (WRKDEVD) command.

Printing Displayed Messages

Menu Path: ASSIST 3 Print

Command: DSPMSG MSGQ (message queue) OUTPUT(*PRINT)

Notes:

1. The menu path prints only the current display. The command prints all messages in the specified message queue.
2. To print additional information about a message that is displayed, put the cursor on the message, press the Help key, then F6 (Print). On the Work with Messages display, use option 5 (Display details and reply) and use F6 (Print).

Printing Message Descriptions

Menu Path: CMDMSGF 8 (message file) 12 6

Command: DSPMSGD MSGF(message file) OUTPUT(*PRINT)

Removing Messages from Message Queues

Menu Path: MESSAGE 3 (message queue) 4

Command: WRKMSG (message queue) 4 or F16

Removing Messages from the System Operator Message Queue

Menu Path: MESSAGE 3 (*SYSOPR) 4 or F16

Command: WRKMSG QSYSOPR 4 or F16

Removing Messages from Your Personal Message Queue

Menu Path: MESSAGE 3 (*USRPRF) 4 or F16

Command: WRKMSG *USRPRF 4 or F16

Removing Messages from Your Workstation Message Queue

Menu Path: MESSAGE 3 (*WRKSTN) 4 or F16

Command: WRKMSG *WRKSTN 4 or F16

Sending a Message to All Signed-On Users

Menu Path: MANAGESYS 12 F10

Command: SNDMSG TOUSR(*ALLACT)

Sending a Message that Interrupts Another User

Menu Path: ASSIST 4 (Interrupt user = Y)

Command: SNDBRKMSG

Tip: In case you didn't read "Instructions on Using the Fast Path" on page 1-1, be sure to type the word **go** in front of the menu you are trying to display.

Managing the System

Changing Support Contact Information

Menu Path: DEFINE 4

Command: WRKCNTINF

Changing System Date and Time

Menu Path: SETUP 1

Command: WRKSYSVAL QDATE WRKSYSVAL QTIME

Changing System Values

Menu Path: SETUP 1

Command: WRKSYSVAL

Cleaning Up the System

Menu Path: CLEANUP 1, 2, or 3

Command: CHGCLNUP and STRCLNUP

Note: This function allows regular automatic cleanup of user message queues, system and workstation message queues, job logs and other system output, system journals and logs, and OfficeVision calendars.

Collecting Disk Space Information

Menu Path: DISKTASKS 1

Command: RTVDSKINF

Deleting Save Files

Menu Path: FILE 1 (file) 4

Command: WRKF *ALL SAVF

Displaying Performance Status

Menu Path: MANAGESYS 1

Command: DSPSYSSTS

Printing Disk Space Information

Menu Path: DISKTASKS 2

Command: PRTDSKINF

Removing Printer Messages Manually

Menu Path: QSYSOPR messages: ASSIST 3 F6 4

Command: QSYSOPR messages: DSPMSG QSYSOPR

Note: If you do not use automatic cleanup, or if your printer messages go to a special message queue, remove printer messages by displaying the appropriate message queue and deleting them.

Removing Printer Output

Menu Path: ASSIST 1 4

Command: WRKSPLF ASTLVL(*BASIC)

Signing Users Off the System

Menu Path: MANAGESYS 12 4

Command: ENDJOB

Tip: In case you didn't read "Instructions on Using the Fast Path" on page 1-1, be sure to type the word **go** in front of the menu you are trying to display.

Problem Handling

Ordering PTFs and PTF Information

Menu Path: PTF 6

Command: SNDPTFORD

Notes:

1. Use the SNDPTFORD command with the following parameters to order the PTFs and PTF information you want.

   PTFs and cover letters SNDPTFORD *nnnnnnn* (up to 20)

   Cover letters SNDPTFORD *nnnnnnn* PTFPART(*CVRLTR)

   PTF cross-reference summary list

   V3R2M0 to V4R2M0 SNDPTFORD SF97022

   V3R7M0 to V4R2M0 SNDPTFORD SF97051

   V4R1M0 to V4R2M0 SNDPTFORD SF97056

   Cumulative PTF packages SNDPTFORD SF99*vrm*

   Software PSP SNDPTFORD SF98*vrm*

   Hardware PSP SNDPTFORD MF98*vrm*

   PTF summary list SNDPTFORD SF97*vrm*

2. You must have a modem installed before you can use the SNDPTFORD command.

In the previous examples, *nnnnnnn* is the PTF number, *v* is the version, *r* is the release, and *m* is the modification level.

Running Problem Analysis

Menu Path: MESSAGE 3 F14

Command: DSPMSG QSYSOPR F14

Notes:

1. If a message in the QSYSOPR message queue has an * by it, analyze the problem using F14 (Work with problem).
2. If a message in the QSYSOPR message queue is highlighted, use option 5 (Display details and reply) and press F14.

Working with a Problem

Menu Path: TECHHELP 10

Command: WRKPRB

Restoring Information

Restoring Documents and Folders

Menu Path: RESTORE 3

Command: RSTDLO DLO

Note: The Restore Document Library Object (RSTDLO) command restores mail if it was saved previously.

Restoring an Entire User Library

Menu Path: RESTORE 2

Command: RSTLIB

Restoring Individual Objects

Menu Path: RESTORE 5

Command: RSTOBJ

Restoring Objects in Directories

Menu Path: RESTORE 9

Command: RST

Saving Information

Saving Documents and Folders

Menu Path: SAVE 3

Command: SAVDLO DLO

Saving an Entire User Library

Menu Path: SAVE 2

Command: SAVLIB

Saving Individual Objects

Menu Path: SAVE 5

Command: SAVOBJ

Saving Objects in Directories

Menu Path: SAVE 11

Command: SAV

Tip: In case you didn't read "Instructions on Using the Fast Path" on page 1-1, be sure to type the word **go** in front of the menu you are trying to display.

Starting and Stopping the System

Changing the Power On and Off Schedule

Menu Path: POWER 2

Command: CHGPWRSCD

Powering Off the System

Menu Path: POWER 3 or 4

Command: PWRDWNSYS

Powering On the System

Table 1-1. Powering On the System

System State	Unattended IPL	Attended IPL
Running	1. Set the mode to **Normal**. 2. Type `PWRDWNSYS *IMMED RESTART(*YES)` on any command line and press the Enter key.	1. Set the mode to **Manual**. 2. Type `PWRDWNSYS *IMMED RESTART(*YES)` on any command line and press the Enter key. 3. Follow the displays on the console to complete the IPL. 4. Set the mode to **Normal**.
Not Running	1. Set the mode to **Normal**. 2. Power on all devices. 3. Press the Power pushbutton to **Power On**.	1. Set the mode to **Manual**. 2. Power on all devices. 3. Press the Power pushbutton to **Power On**. 4. Follow the displays on the console to complete the IPL. 5. Set the mode to **Normal**.
Note: Always set the mode to **Normal** after the IPL is finished.		

Setting Automatic Power On after a Power Failure

Menu Path: DEFINE 8

Command: WRKSYSVAL QPWRRSTIPL

Using Communications

Configuring Remote Communications

Menu Path: CMNCFG

Command: Not available.

Note: This menu allows you to configure an AS/400 system for communications with remote workstation controllers, other AS/400 systems, and System/36s.

Starting Printer Emulation

Menu Path: REMOTE 5

Command: STRPRTEML

Note: This command starts 3270 printer emulation using a binary synchronous communications (BSC) or Systems Network Architecture (SNA) emulation printer device and a printer device file.

Starting 3270 Device Emulation

Menu Path: REMOTE 1

Command: STREML3270

Note: This command starts a 3270 device emulation session to a binary synchronous communications (BSC) or Systems Network Architecture (SNA) host system.

Working with Directory Entries

Menu Path: NETCFG 1

Command: WRKDIRE

Notes:

1. Use this command to maintain your system distribution directory, which is a list of user IDs and identifying information used to send distributions.
2. You need to be a security officer or have *SECADM authority to work with all directory entries.

Working with Network Files

Menu Path: CMDNETF 4

Command: WRKNETF

Working with a Remote Job Entry Session

Menu Path: RJE 1

Command: WRKRJESSN

Using Tape and Diskette

Finding Out What Is on a Diskette

Menu Path: DISKETTE 1

Command: DSPDKT

Finding Out What Is on a Tape

Menu Path: TAPE 1

Command: DSPTAP

Initializing a Tape or Tape Set

Menu Path: BACKUP 20 or 21

Command: INZTAP

Tip: In case you didn't read "Instructions on Using the Fast Path" on page 1-1, be sure to type the word **go** in front of the menu you are trying to display.

Working with Printer Output

Working with or Changing a Printer

Menu Path: PRINTER

Command: Not available.

Changing Characteristics of Printer Output

Menu Path: ASSIST 1 2

Command: WRKSPLF

Changing Characteristics of Printer Output before It Is Created

Menu Path: FILE 1 (file) 2

Command: CHGPRTF or OVRPRTF

Changing the Priority of a Spooled File

Menu Path: CMDSPLF 1

Command: WRKSPLF ASTLVL(*INTERMED)

Checking Status of Printer Output

Menu Path: ASSIST 1 check *Status* column

Command: WRKSPLF

Common Printer Problems and Solutions

Table 1-2. Common Printer Problems and Solutions

Problem	Menu Path	Command
Printer messages are unanswered.	ASSIST 1 7 Use F14 to select printer output with messages waiting.	WRKSPLF
Printer is not started.	ASSIST 1 10	STRPRTWTR
Printer output is not assigned to a printer.	ASSIST 1 2 Use F14 to select only unassigned printer output.	To assign a spooled file: WRKSPLF To assign the entire output queue to a printer: STRPRTWTR
Printer output has a form type that has not been started for the printer.	ASSIST 1 F22 4 1 Stop the printer, then start it with the desired form type.	CHGWTR
Printer output has a value of *JOBEND in the *Schedule* field and the job has not finished.	ASSIST 1 F21 2 2	To change this parameter to *FILEEND: CHGSPLFA
Printer output is held.	ASSIST 1 6	WRKSPLF
Nothing is printing on any printers on the system.	ASSIST 1 F22 1 Starting a printer starts the QSPL subsystem if it is not already started. ASSIST 3 F6 Look for messages relating to QSPL.	WRKSBS DSPMSG QSYSOPR
Printer status says *MSGW* but you can't find the message.	ASSIST 1 F22 7	WRKWTR

Note: For technical details on printing problems, use option 9 (Work with printing status) on the Work with Printer Output display.

Responding to Printer Messages

Menu Path: ASSIST 1 F22 7

Command: WRKWTR

Restarting a Printer

Menu Path: ASSIST 1 F22 11

Command: WRKWTR

Sending a Spooled File

Menu Path: CMDSPLF 7

Command: SNDNETSPLF

Working with Security

Changing IBM-Supplied Passwords

Menu Path: SETUP 11

Command: CHGUSRPRF

Changing Your Own Password

Menu Path: CMDPWD 2

Command: CHGPWD

Adding a New User

Menu Path: SETUP 10 1

Command: CRTUSRPRF

Removing Users

Menu Path: SETUP 10 4

Command: DLTUSRPRF

Helping Users with Problems Signing On

Menu Path: Not Available

Command: CHGUSRPRF USRPRF(user-profile-name) STATUS(*ENABLED)

Note: This problem was caused by the system changing the status of the user's profile to *DISABLED. This occurs when the user exceeds the limit that is set in the QMAXSIGN (maximum sign-on attempts) system value and usually occurs because of a miskeyed or forgotten password. You need *SECADM special authority to change the user profile.

Use the following command if the user does not remember his or her password.

Menu Path: Not Available

Command:

```
CHGUSRPRF USRPRF(user-profile-name)
PASSWORD(temporary-value) PWDEXP(*YES)
```

Notes:

- You need *SECADM special authority to change the user profile.
- By specifying PWDEXP(*YES), you require the user to set a new password during the next sign-on attempt.

AS/400 passwords are one-way encrypted. No one (not even a service specialist from IBM) can display the current password. The solution is to assign a temporary password to the user profile and require the user to reset it.

Chapter 2. What You Need to Know About Your AS/400 System

This chapter contains information about what the knobs, lights, displays, and push-buttons are for on the control panels of the AS/400 System Units for Version 4 Release 2.

AS/400 System Units

The AS/400 system units for Version 4 Release 2 are shown in Figure 2-1.

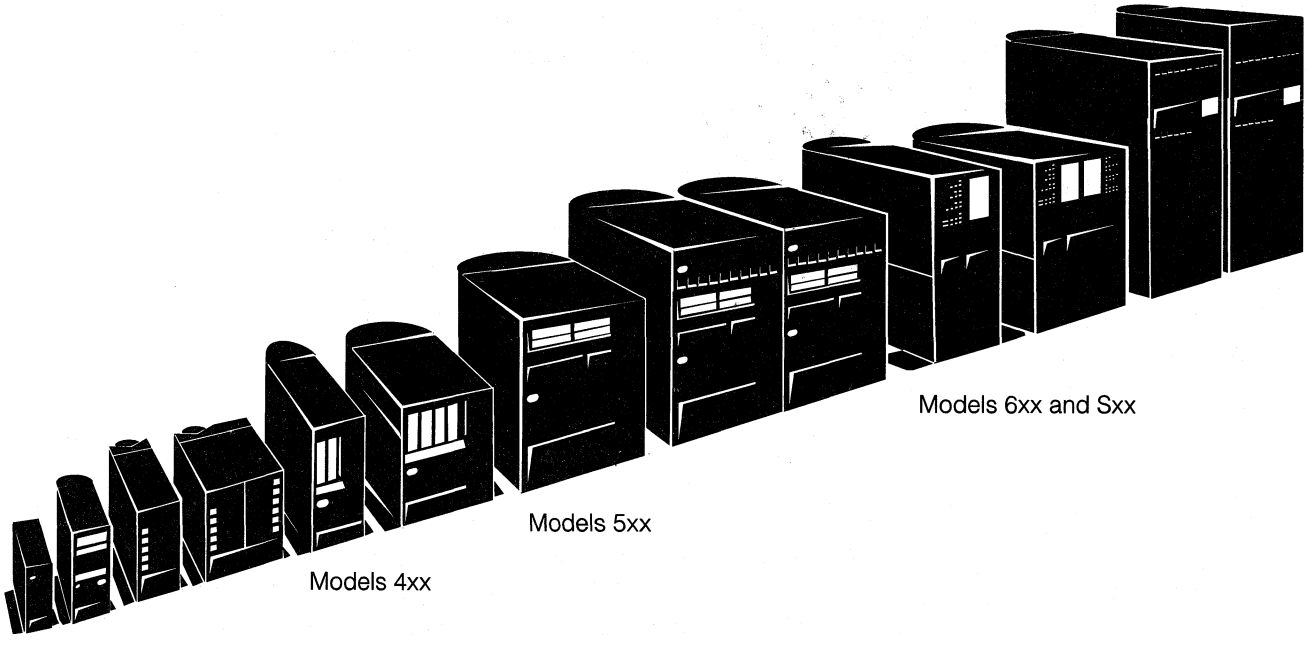


Figure 2-1. Model 1xx, 4xx, 5xx, 6xx, and Sxx

The following devices can be attached to your system:

- Printers
- Work stations
- Tape units
- Optical media libraries
- Remote controllers
- Personal computers

Your system receives data (input) from each work station, disk, diskette, tape, CD-ROM, optical library, and communications line. The processing unit (in the system unit) processes the data and saves the data on disk, diskette, tape, or optical storage. The processed data (output) can also be directed to a printer or a work station.

The system unit contains the main storage that is used for processing and has a control panel to control the way your system starts and stops. If you have a Model 5xx, 62x, 64x, 65x, S20, S30, or S40 you may also have the expansion units and expansion towers, which are additional racks of equipment for expanding your system function.

Model xxS, S20, S10, S30, and S40 System Units are specifically designed for server applications. Because of this design, a program running in batch may perform better than the same program running interactively.

System Unit Control Panels

The control panel is used by system operators and service representatives. You can use the control panel to do an initial program load (IPL) and problem analysis. The details of the control panels are described following the illustrations.

Control Panels for the System Units

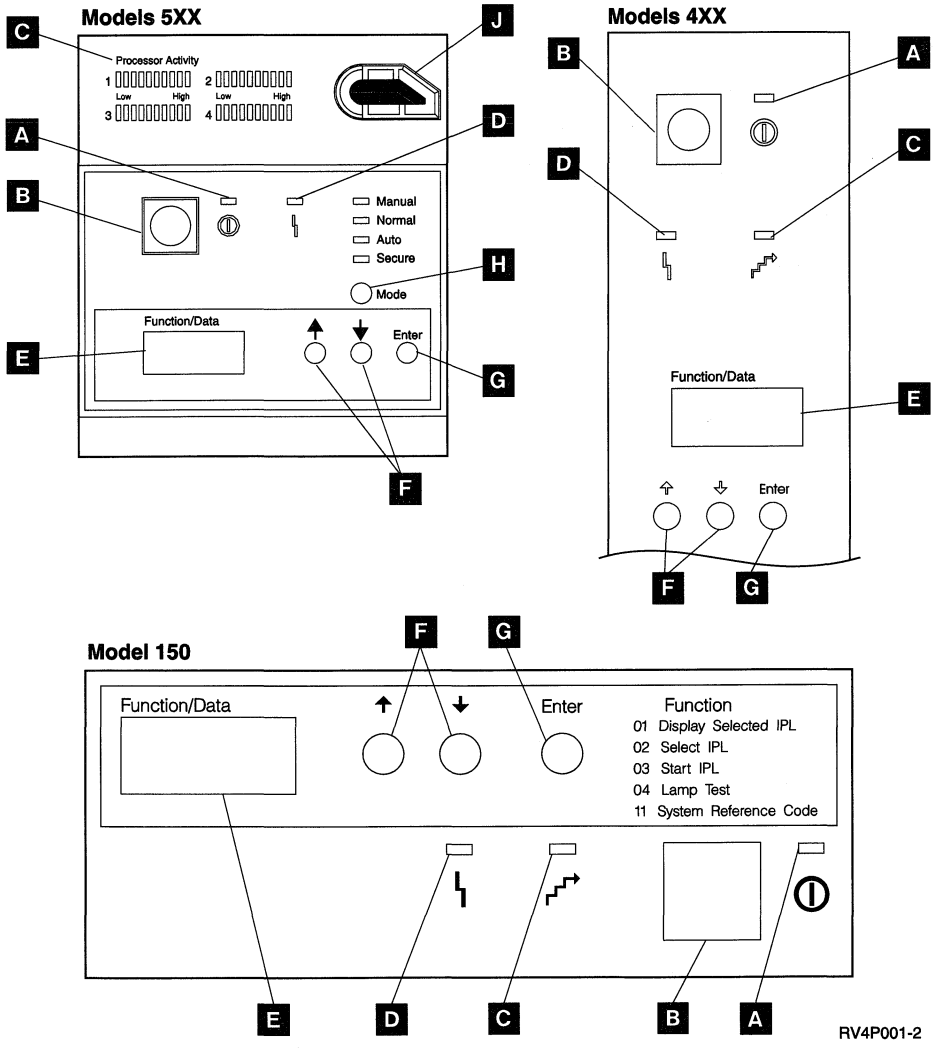


Figure 2-2. Control panels for the Models 5xx (Left),Models 4xx (Right) and Model 150 (Bottom)

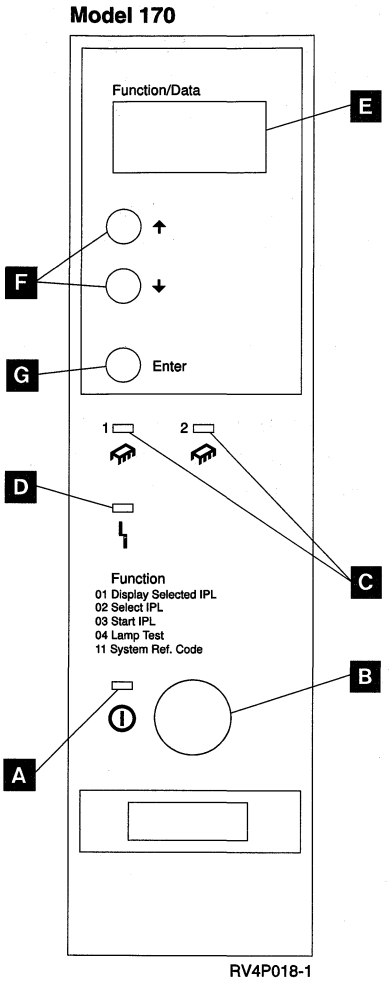


Figure 2-3. Control panel for the Model 170

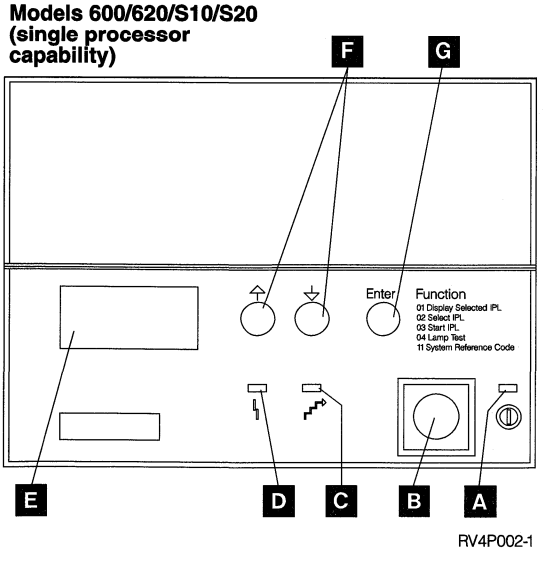


Figure 2-4. Control panel for the Models 600, 620, S10, and S20

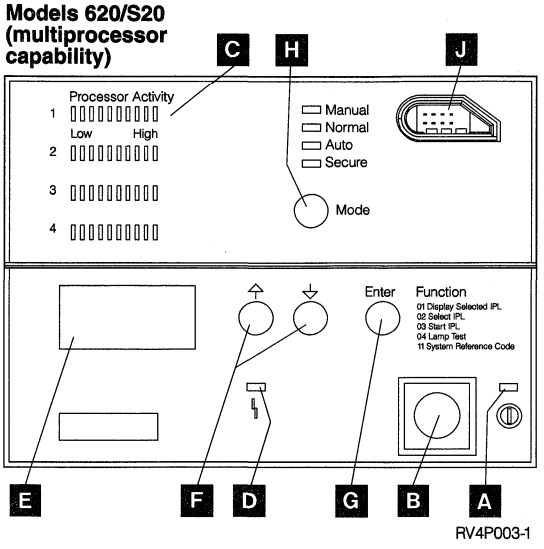


Figure 2-5. Control panel for the Models 620 and S20

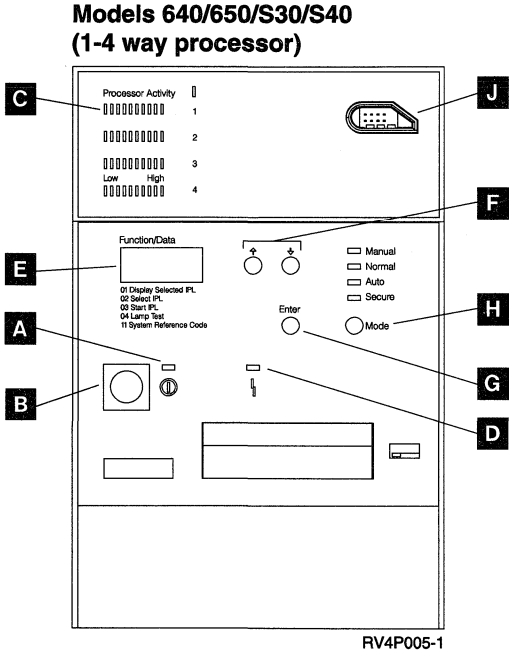


Figure 2-6. Control panel for the Models 640/650/S30/S40

Models 640/650/S30/S40/SB1)
(4+ processors)

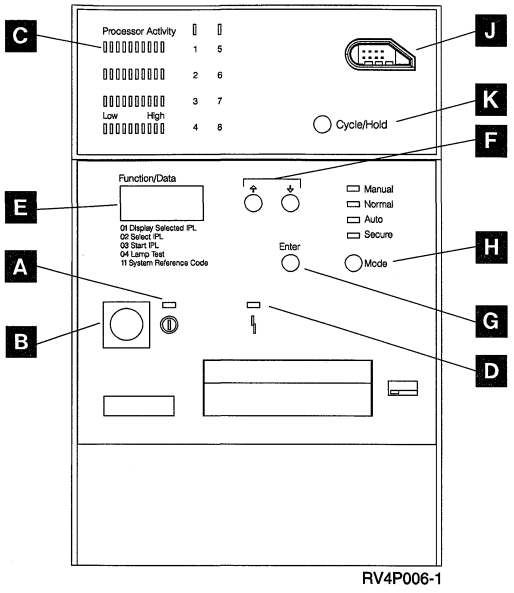


Figure 2-7. Control panel for the Models 640/650/S30/S40/SB1

Control Panel Details

A **Power On:** The light comes on when there is power to the system unit.

Note: The Power On light blinks when the system is being started up and when the system is manually turned off. When the Power Down System (PWRDWNSYS) command or the options on the Power On and Off Tasks (POWER) menu are used, the Power On light does not blink.

B **Power pushbutton:** You can press the pushbutton to start the system; press it twice to stop the system.

Note:

- Power on using the Power Pushbutton is allowed in Manual or Normal mode, and Power off using the Power Pushbutton is allowed in Manual mode only.
- In most cases, use the Power Down System (PWRDWNSYS) command on any command line of your display station to stop the system. If you use the Power pushbutton to turn off your system, errors may occur with your data files. For more information on stopping the system, see "Stopping the System" on page 2-32.

C **Processor Activity** or **Processor Active**: Models 15x, 4xx, 60x, and some 62x System Units have one Processor Active light, and the light is on when programs are running. Models 5xx, 64x, 65x, and some 62x

System Units have the Processor Activity lights that provide a graphical display of the processor activity.

D **System Attention:** This light comes on when the system requires operator attention, such as correcting a severe system failure. For information about correcting system problems, see Chapter 3, Handling and Reporting System Problems .

E **Function/Data display:** You can use this 8–character LCD display to:

- Display System Reference Codes (SRC's) when errors occur.
- Display valid functions to be performed.
- Display results of selected functions.

F **Increment/Decrement buttons:** The Increment/Decrement buttons are used to cycle through the functions that are available in the current operating environment. If functions require additional input, these buttons also cycle through the valid selections within the function once the function is selected, and the Enter key is pressed.

G **Enter pushbutton:** The Enter pushbutton is used to process the function or subfunction that is displayed in the Function/Data display.

H **Mode:** The mode button (only on systems with an electronic keystick) allows you to scroll through the four operating modes (Manual, Normal, Secure, and Auto) when the keystick is engaged. Which of the four lights is lit indicates the active mode on these systems. For systems with keysticks, see **Electronic Keystick Slot** below.

To change modes for systems without keysticks, do the following:

1. Use the Increment/Decrement buttons to select Function 02, and press the Enter pushbutton.
2. Use the Increment/Decrement buttons to select the mode, then press Enter. The Increment/Decrement buttons are also used to select IPL type.

For additional information on the Manual, Normal, Auto, and Secure mode settings see "Mode Descriptions" on page 2-7.

J **Electronic keystick slot:** This slot accepts an electronic keystick that, when engaged, allows you to change operating modes. A system operator can prevent unwanted operations by selecting the appropriate mode and removing the keystick.

K **Cycle/Hold button:** Up to four processors activity can be reported in the processor activity light bank. Systems with greater than four processors have a Cycle/Hold button to control which bank of processor activity is reported. In the normal cycling mode, processor activity is reported on the first four processors. Then, after a delay, the reporting is cycled to report on the next set of processors. Once the last set of processors has been reported, the first set of processors activity is again reported. This cycling continues until the Cycle/Hold button is selected. Once the Cycle/Hold button is selected, cycling stops and only the currently selected set of processors will resume the cycling reporting.

Mode Descriptions

You can also display the kind of IPL the system is set to do when the system is in any mode. The following table summarizes the tasks you can perform in the Manual, Normal, Auto, or Secure modes:

Operation	Manual Mode	Normal Mode	Auto Mode	Secure Mode
Turn on system (Power push-button)	Allowed	Allowed	Not allowed	Not allowed
Power off (Power push-button)	Allowed	Not allowed	Not allowed	Not allowed
Display Selected IPL	Allowed	Allowed	Allowed	Allowed
Select IPL	Allowed	Not allowed[1]	Not allowed	Not allowed
Start IPL	Allowed	Not allowed	Not allowed	Not allowed
Display system reference code	Allowed	Allowed	Allowed	Allowed
Remote IPL	Not allowed	Program control allowed	Program control allowed	Not allowed
Timed IPL	Not allowed	Program control allowed	Program control allowed	Not allowed
Restart IPL (after power failure)	Not allowed	Program control allowed	Program control allowed	Not allowed
Power Down System command	Program control allowed	Program control allowed	Program control allowed	Program control allowed
1 Allowed for Models 150, 170, 4xx, 600, S10, and some 620 and S20				

Manual: When the mode is set to Manual, the system allows you to do all manual IPLs, such as an operator-attended IPL from disk or tape, and manual control functions, such as select an IPL or display the kind of IPL that the system is set to run. However, you cannot do a remote IPL, an IPL by date and time, or an IPL after a power failure.

Note: You should only set the mode to Manual when necessary. This will ensure that no one accidentally presses the Power pushbutton and causes the system to stop.

Normal: The Normal mode allows you to manually turn the power on and to do each of the automatic operations. That is, you can start the system by doing a manual or remote IPL, an IPL by date and time, or an IPL after a power failure.

If you want to stop the system when the mode is set to Normal, use the Power Down System (PWRDWNSYS) command at any display station.

You must have QSYSOPR authority to use the Power Down System (PWRDWNSYS) command.

Auto: The Auto (automatic) mode allows a remote IPL, an IPL by date and time, and an IPL after a power failure.

When the mode is set to Auto, you cannot:

- Start the system by doing an IPL manually.
- Stop the system by using the Power pushbutton.
- Select a different IPL type by using the Increment/Decrement buttons.

For more information about the types of IPLs, see Starting and Stopping the System.

Secure: The Secure mode locks the control panel on the system unit. You can only stop the system from a display station byusing the Power Down System (PWRDWNSYS) command.

System Expansion Tower Control Panel

The expansion control panel allows the system power control network (SPCN) to display power fault information for the unit. The SPCN is an asynchronous communications network that gives the Operating System/400* (OS/400*) licensed program control of electrical power.

Figure 2-8 on page 2-9 shows the expansion tower control panels for the Models 5xx, 620, 64x, 65x, S20, S30, and S40.

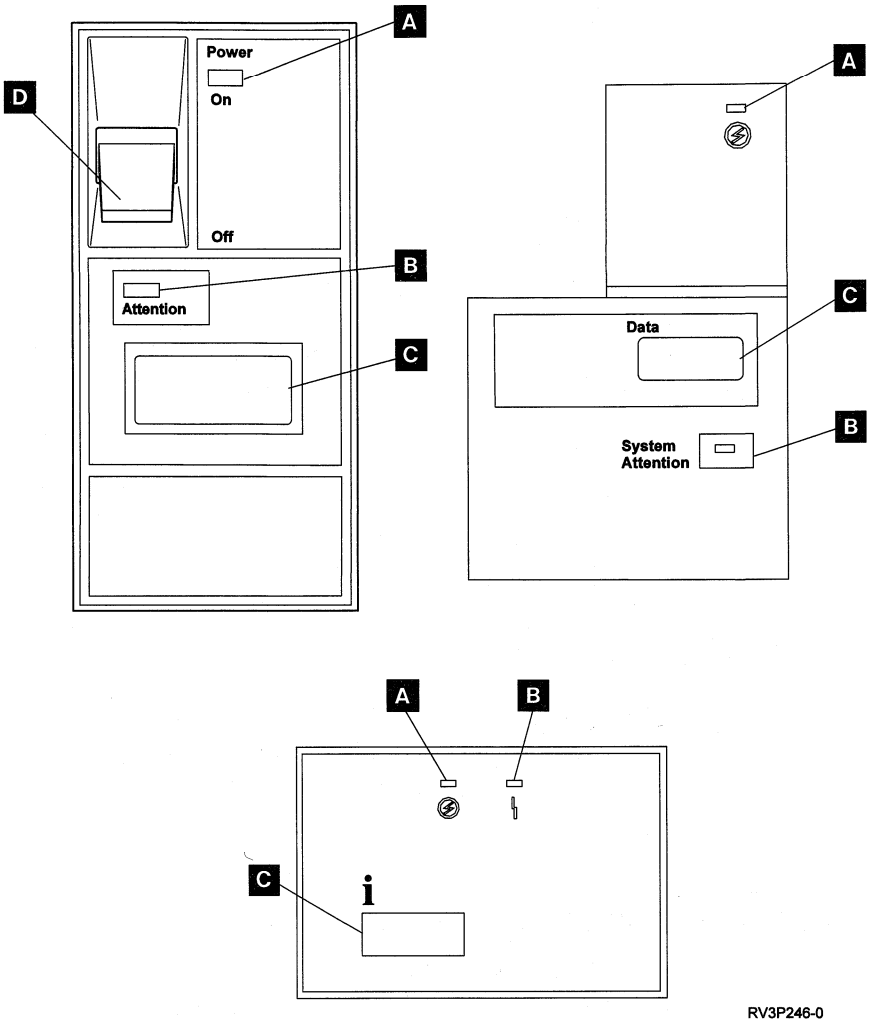


Figure 2-8. Expansion Tower Control Panels for the Models 5xx, 620, 64x, 65x, S20, S30, and S40

The following are components of these panels:

- **A** **Power on light**: Indicates when power is available to the unit.
- **B** **Attention light**: Used by the SPCN to indicate that a power fault has been detected.
- **C** **8-digit LCD**: Used to display the SPCN address, power status, or an SPCN reference code.
- **D** **Power switch**: Controls the power for everything that is installed in the unit.

Address and Fault Displays

The expansion control panel is used by the system power control network to display the unit's power address during normal conditions and a system reference code during a power failure.

Figure 2-9 on page 2-10 shows the normal running display with `*rru`. `rr` is the rack address and ranges from 01 to 63 and `u` indicates which SPCN port the unit is connected to, and ranges from 1 to A (1 through 10).

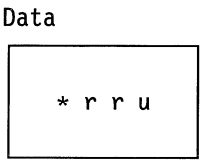


Figure 2-9. SPCN Address Display

When a power error occurs, the SPCN node displays an error code on the unit control panel and sends a message to the operating system. Figure 2-10 shows that this system reference code always starts with a 1 followed by the rr (rack address) and u (unit address) that is followed by the four digit reference code cccc.

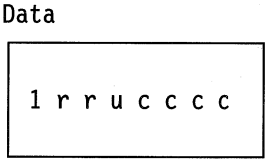


Figure 2-10. SPCN Fault Display

Use the message in the system operator's message queue (QSYSOPR) rather than the error code that is displayed on the unit control panel to solve the problem. For information on how to begin solving a system problem, see Chapter 3, Handling and Reporting System Problems.

Battery Power Unit for the AS/400 System Units

When the utility power is lost on the AS/400 Model 5xx, the following power sources may be used to protect the System Units from losing data.

- Continuously Powered Mainstore (CPM): An internal battery power source for Model 5xx that is automatically activated in the event of utility power loss. CPM provides full operating power for a short time to allow a system shut-down procedure. This is indicated by system reference code D6xx xxxx on the control panel.
- Battery Power Unit (BPU): An internal battery power source for Model 5xx that is automatically activated in the event of utility power loss. The battery power unit provides full operating power for a short time to all components within the system unit, but not to any external components.

  Since the battery power unit has a limited life span, you will need to replace the battery when the system reference code (SRC), 1xxx D101 or 1xxx D102 is shown on the system control panel. The order number for the battery power unit for Model 5xx is 86G8040. For information about replacing the battery, see Replacing Battery Power Unit on Models 5xx and Tower FC507x and FC508X.
- Uninterruptible Power Supply (UPS): An external power source for all models that is automatically activated in the event of utility power loss. The UPS provides full operating power for a short time to all system components.

For more information on power loss recovery, see the *Backup and Recovery*, SC41-5304 book.

Starting and Stopping the System

To start the system, turn the system power on and do an initial program load (IPL). During an IPL, system programs are loaded from the system auxiliary storage, and the system hardware is checked. When the IPL is finished, the Sign On display is shown on all available display stations.

You can stop the system (turn the power off) using the Power On and Off Tasks (POWER) menu. To get to the Power On and Off Tasks (POWER) menu, type `go power` on any command line and press the Enter key. You can also stop the system by using the Power pushbutton. However, using the Power pushbutton is not recommended because of the errors that may occur with your data files.

You can set up a schedule that automatically powers your system on and off. You can determine the time of day you want the system powered on and off. You can also specify special circumstances that change that normal daily schedule, such as a holiday or special closing.

This topic is divided into two parts. Basic information about starting your system and setting up the power on and off schedule can be found in Starting the System. Information on different ways to stop your system is included in "Stopping the System" on page 2-32.

Starting the System

When you start your system by turning the power on, an IPL is done for the system to reset storage and recognize changes to certain system characteristics.

Important: A license authorization code (also referred to as a license key) must be installed on your system. Each system is assigned a unique license authorization code. This authorization code must be installed within 70 days of installing OS/00.

Starting with Version 4 Release 2, OS/400 will not IPL after the 70 day grace period without a valid key. Without a valid key, a message is sent to you (and possibly other users depending on how your system is set up) every four hours during the 70 day grace period. Messages stop when you enter a valid key.

After the 70 day grace period, a message is sent every hour to you and to the QSYSMSG message queue. All high priority messages in the system are sent to the QSYSMSG message queue. Messages stop when you enter a valid key.

A valid key must be entered, or the system will not complete the IPL process after the end of the 70 day grace period.

You can enter the key by using the Add License Key (ADDLICKEY) command from any OS/400 command line before the grace period expires. If the grace period has expired or if you need a new OS/400 software license key, contact your IBM marketing representative or IBM business partner.

There are four different situations that typically require an initial program load: starting normal operations, starting a remote system, changing configuration

options, and recovering after a power failure. When your system is sent to you, it is set to do a normal or unattended IPL. An **unattended IPL** is done automatically by the system after the power is turned on; then the Sign On display is shown on all available display stations. An **attended IPL** shows displays on the display station you are using for a console. This allows you to change the configuration options such as how the system does an IPL and how the system runs.

Table 2-1 shows a summary of how to do IPLs from the operator panel. The following sections explain these steps in more detail.

Table 2-1. IPL Summary

System State	Unattended IPL	Attended IPL
Running	1. Set the mode to **Normal**. 2. Type `PWRDWNSYS *IMMED RESTART(*YES)` on any command line and press the Enter key.	1. Set the mode to **Manual**. 2. Type `PWRDWNSYS *IMMED RESTART(*YES)` on any command line and press the Enter key. 3. Follow the displays on the console to complete the IPL. 4. Set the mode to **Normal**.
Not Running	1. Set the mode to **Normal**. 2. Power on all devices. 3. Press the Power pushbutton to **Power On**.	1. Set the mode to **Manual**. 2. Power on all devices. 3. Press the Power pushbutton to **Power On**. 4. Follow the displays on the console to complete the IPL. 5. Set the mode to **Normal**.

Note: Always set the mode to **Normal** after the IPL is finished.

Normal Operations (Unattended IPL)

Before You Start

- The mode must be set to Normal (unattended IPL).
- The QIPLTYPE system value must be set to 0 (unattended IPL). See "System Values That Control IPL" on page 2-22 for information on how to set this system value. If this is the first time you are doing an IPL, the QIPLTYPE system value is already set to 0.

  Note: The system must be powered on, and the IPL complete before you can display or change the QIPLTYPE system value.

To do an unattended IPL:

1. Turn on the power of any display stations, printers, tape devices, and controllers you or others may want to use.
2. Make sure that the mode is set to Normal. Use the Power pushbutton to turn on the system.
3. When the unattended IPL is done, the Sign On display appears on the display station.

Signing On the System

To sign on the system:

```
                                Sign On
                                                System . . . . . :   SYSTEM01
                                                Subsystem . . . . :   QBASE
                                                Display . . . . . :   DSP01

                        User . . . . . .
                        Password . . . . . .
                        Program/procedure . . . . . .
                        Menu . . . . . .
                        Current library . . . . . .
```

Figure 2-11. Sign On Display

1. Type your user ID, your password (if security is active), and fill in any of the optional entry fields you want to use. Use the Tab key to move the cursor from field to field on the display.

   Note:

   - The *Password* field is displayed only if password security is active on the system.
   - In the top right corner of the Sign On display, the name of the system you are using, the subsystem the system is using, and the display station identifier (ID) are shown.

2. Press the Enter key.

   If this is an unattended IPL, (depending on what options you select on this display or what is defined in your user profile), one or more of the following occurs:

   - The AS/400 Main Menu is displayed.
   - Another menu is displayed.
   - A program or procedure is run.
   - A current library is inserted into your library list.

If you specify a program or procedure to run and a menu to be displayed, the program or procedure is run first and then the menu is shown.

Now that your system is up and running be aware that:

- The Operational Assistant* displays are now the default.
- The system cleanup functions are automatically started with default values. See chapter 8 of the *System Operation*, SC41-4203 book for more information about customizing the cleanup function.
- The Attention key program defaults to display the Operational Assistant (ASSIST) menu.

Note: If this is an attended IPL, the IPL Options display is shown. Go to step 6 on page 2-19.

Setting Up Your Automatic Power On and Off Schedule

You can plan when you want to power on and off the system by setting the power on and off schedule. To work with the power on and off schedule, go to the Power On and Off Tasks (POWER) menu.

Tip: You can also display this menu from the Customize your system, users, and devices (SETUP) menu by selecting option 3 (Power on and off tasks).

Displaying the Power On and Off Schedule: The power on and off schedule ensures that the system is powered on and off at specific times during the day or night. To view this schedule, type `go power` on any command line and press the Enter key. Select option 1 (Display power on and off schedule) on the Power On and Off Tasks menu.

The power on and off schedule shows the date, day, and time (using the 24-hour clock) that the system will be powered on and off. The *Description* column includes comments about those days that have been changed from the system's regular schedule. Any user can display this schedule.

Changing Power On and Off Schedule Defaults: To set up your own power on and off schedule, select option 2 (Change power on and off schedule) on the Power On and Off Tasks (POWER) menu. On the Change Power On/Off Schedule display, press F10 (Change power on/off defaults). Figure 2-12 on page 2-15 shows the Change Power On/Off Defaults display.

```
                  Change Power On/Off Defaults
                                                        System:   SYSTEM01
Type choices below, then press Enter.

First day of week . . . . . .  .  1    1=Sunday, 2=Monday, 3=Tuesday,
                                       4=Wednesday, 5=Thursday, 6=Friday,
                                       7=Saturday

Minutes before power off to send
message . . . . . .  .  .  .  .  .  .  20   0-60

Default      Default
Week                      Power        Power
Day                       On           Off
Sunday                    07:30:00     20:00:00
Monday                    05:30:00     ________
Tuesday                   ________     ________
Wednesday                 ________     ________
Thursday                  ________     ________
Friday                    ________     23:00:00
Saturday                  07:30:00     20:00:00

F1=Help   F3=Exit   F12=Cancel
```

Figure 2-12. Change Power On and Off Defaults Display

On this display, you can change the first day of the week by typing a number in the *First day of week* field. Also, the system automatically sends users a message telling them when the system will be powered off. You can indicate how many minutes before power off you want the system to send this message in the *Minutes before power off to send* field.

When the system sends the power off message, you can delay the scheduled time for powering off from 30 minutes to 3 hours when you reply to the message. Then the system will wait the time specified before powering off. You do not have another chance to delay the time.

For example, as shown in Figure 2-12, on Mondays you want the system powered on at 5:30 a.m. and off on Fridays at 11:00 p.m. On Saturdays and Sundays you want the system powered on at 7:30 a.m. and off at 8:00 p.m. Type the new times in the *Default Power On* and *Default Power Off* columns next to Saturday and Sunday. When you press the Enter key, your changes are shown on the Display Power On/Off Schedule and the Change Power On/Off Schedule displays.

Remember: To make sure that the system powers on completely after being powered off, check to see if the mode is set to Normal.

Changing a Day in the Power On and Off Schedule: Figure 2-13 on page 2-16 shows the Change Power On/Off Schedule display where you can change the power on and off schedule for a single day.

```
                  Change Power On/Off Schedule                  SYSTEM01
3/13/95  20:17:05
Start list at . . . . . . . . 04/30/95       Date

Change times and descriptions below, then press Enter.  To change defaults,
press F10.

Power      Power
Date       Day        On         Off        Description
04/30/95   Sun        07:30:00   20:00:00   _____________________________
05/01/95   Mon        05:30:00   ________   _____________________________
05/02/95   Tue        ________   ________   _____________________________
05/03/95   Wed        ________   14:30:00   Closing - company picnic
05/04/95   Thu        05:30:00   ________   _____________________________
05/05/95   Fri        ________   23:00:00   _____________________________
05/06/95   Sat        06:40:00   20:00:00   _____________________________

05/07/95   Sun        07:30:00   20:00:00   _____________________________
05/08/95   Mon        05:30:00   ________   _____________________________
05/09/95   Tue        ________   ________   _____________________________
05/10/95   Wed        ________   ________   _____________________________
More...
F1=Help    F3=Exit    F10=Change power on/off defaults    F12=Cancel
```

Figure 2-13. Change Power On and Off Schedule Display

For example, to change the power on and off time for the plant's company picnic on Wednesday, May 3:

1. Type `14:30` in the *Power Off* column to power the system off at 2:30 p.m. so the employees can attend the picnic.
2. Type the reason for the change, `Closing - Company picnic`, in the *Description* column across from the date and time and press the Enter key.
3. Type the start time `5:30` in the *Power On* column to power the system back on Thursday, May 4.

To display the schedule starting on a different date, type the date you want to start with in the *Start list at* field and press the Enter key. The information that is displayed begins with the date you specify.

Solving Problems with the Automatic Power Schedule: If the power schedule is not working:

- Make sure that the Start Cleanup (STRCLNUP) command is part of your startup program.

  The automatic power scheduler uses a job called QSYSSCD to process the requests for schedule changes. The Start Cleanup (STRCLNUP) command must be run to start the QSYSSCD job. The IBM*-supplied startup program includes the Start Cleanup (STRCLNUP) command. If you have your own startup program from a previous release, it may not contain the Start Cleanup (STRCLNUP) command.

- Make sure that you specify `Yes` on the Change Cleanup (CHGCLNUP) command to allow automatic cleanup. The QSYSSCD job will not start if you do not allow automatic cleanup.

- Make sure that the Start Cleanup Command (STRCLNUP) command submits the QSYSSCD job to the job queue specified in the Change Cleanup (CHGCLNUP) command.
- Check to see if the QSYSSCD job is running; it could be on a held job queue.
- Make sure that the job queue that the Start Cleanup (STRCLNUP) command is submitted to has the maximum jobs parameter set to *NOMAX or a number greater than 1. Because the QSYSSCD job always runs, the other jobs that perform automatic cleanup and power off functions are not able to start if the maximum jobs parameter is set to 1. To change the maximum jobs parameter, use the Change Subsystem Description (CHGSBSD) command.
- Make sure the mode is set to Normal or Auto.

Starting a Remote System

To start the remote system automatically using a telephone and modem, you need to set system value QRMTIPL to 1 (see "System Values That Control IPL" on page 2-22).

Before You Start:

- Set the mode on the control panel to Normal or Auto and turn the system off.
- After the system is turned off and is made ready for remote IPL, do not turn the modem on or off. Otherwise, the system may start unexpectedly, although it will turn itself off in a few minutes.

To start the remote system:

1. Dial the telephone number that is assigned to the electronic customer support modem and line of the remote system.

   Attention: If you hang up before the silence, the IPL may not complete.

2. Wait about 20 to 40 seconds while the telephone rings. You will hear a modem tone and then silence. At this time, the communication is being established from the modem to the control panel to start the IPL sequence.
3. Hang up the telephone. The system does an IPL and the Sign On display is shown.
4. Go to "Signing On the System" on page 2-13.

Changing Your System IPL From Your System Control Panel

The Increment/Decrement buttons are used to change the IPL type and mode on systems without a mode button. Use Function 02 to select the IPL type (A, B, C, or D) and Mode (Normal, Manual). To select IPL type and mode, do the following:

1. Use the Increment/Decrement buttons to select Function 02, and press the Enter pushbutton.
2. Use the Increment/Decrement buttons to select the IPL type and mode you want, and then press the Enter pushbutton to save.
3. You can also specify a fast or slow IPL that can only be set one time at the console panel when the system is powered off. Select Function 02 and press

the Enter key twice. Then, use the Increment/Decrement buttons to select F(Fast), S(Slow), or V(Value from IPL attributes).

The IPL attribute determines subsequent IPLs. *MIN is the recommended setting, however, if you anticipate any hardware problems, specify *ALL on the Hardware diagnostics parameter. Use the Change IPL Attributes (CHGIPLA) command to change the IPL attribute.

Changing Your System During IPL (Attended IPL)

To change IPL options, install the operating system, use dedicated service tools, or recover from a system failure, do an attended IPL.

Before You Start:

- Set the mode to Manual, or
- Set the QIPLTYPE system value to 1. For information on how to set this system value, see "System Values That Control IPL" on page 2-22.

  Note: The system must be on and the IPL complete before you can display or change the QIPLTYPE system value.

Doing an Attended IPL When the Power Is Off:

1. Make sure that the power for the display station you are using as the console is turned on. The power should be turned on for display stations, printers, tape devices, and controllers you or others may want to use.
2. Use the control panel to do the following:
   a. Make sure that Manual mode is selected on the control panel.
   b. Use the Power pushbutton to turn on the power.

Note: When you have completed the attended IPL, you may want to set the mode to Normal.

Doing an Attended IPL When the Power Is On: If the system is running and you are able to enter commands, set the mode to Manual. Type the following on any command line and press the Enter key:

```
PWRDWNSYS OPTION(*IMMED) RESTART(*YES)
```

If you cannot enter commands, start the IPL from the operator panel, as follows:

1. Use the Power pushbutton to turn off the system. For information on how to use the Power pushbutton, see "Using the Power Pushbutton" on page 2-35.
2. Press the Power pushbutton to start an IPL.

   During the attended IPL, the IPL or Install the System display is shown on the console.
3. On the IPL or Install the System display, select option 1 (Perform an IPL) and press the Enter key.

   The IPL Sign On display is shown. You may have to wait 30 or more minutes for this display to appear.

4. Sign on to the system using the Sign On display (see "Signing On the System" on page 2-13). The Select Products to Work with PTFs display is shown.
5. On the Select Products to Work with PTFs display, select the product for which you want to apply the PTF and continue with the attended IPL.

   If you do not want to apply a PTF, press F3 (Exit) on the Select Products to Work with PTFs display and continue with the IPL.

```
                    Select Products to Work with PTFs
System:   SYSNAMXX
Position to . . . . . .              Product

Type options, press Enter. Press F21 to select All.
1=Select


Opt  Product   Option  Release
     5769999   *BASE   V4R2M0
     5769SS1   *BASE   V4R2M0
     0TSTPRD   *BASE   V4R2M0
     0TSTPRD   *BASE   V4R2M0
     0TSTPRD   *BASE   V4R2M0
```

Figure 2-14. Select Products to Work with PTFs Display

6. The IPL Options display is shown next. See "Changing IPL Options" on page 2-19 to select options to change system attributes.

Changing IPL Options: To change IPL options, you need to do an attended IPL. See "Changing Your System During IPL (Attended IPL)" on page 2-18 for information on how to do an attended IPL.

When you select option 1 (Perform an IPL) on the IPL or Install the System display, the IPL Options display is shown as in Figure 2-15.

```
                              IPL Options

Type choices, press the Enter key.

System date  . . . . . .  XX / XX / XX   MM / DD / YY
System time  . . . . . .  XX : XX : XX   HH : MM : SS
Clear job queues . . . . . .  N          Y=Yes,  N=No
Clear output queues  . . . . .  N        Y=Yes,  N=No
Clear incomplete job logs  . . . . .  N  Y=Yes,  N=No
Start print writers  . . . . . .  Y      Y=Yes,  N=No
Start system to restricted state . . . .  N  Y=Yes,  N=No
Run #STRTUP1 procedure . . . . . .  Y    Y=Yes,  N=No
Run #STRTUP2 procedure . . . . . .  Y    Y=Yes,  N=No
Set major system options . . . . . .  N  Y=Yes,  N=No
Define or change system at IPL . . . . .  N  Y=Yes,  N=No
```

Figure 2-15. IPL Options Display

Note: The values shown on your IPL Options display may be different from those shown here if you changed any of the default attributes.

To change an IPL option, type the new option over the existing information and press the Enter key.

Depending on what you selected, one of the following displays is shown next:

- If you typed Y (Yes) in the *Set major system options* field, the Set Major System Options display is shown. See "Setting Major System Options" on page 2-20.

Note: If you also typed Y (Yes) in the *Define or change system at IPL* field, the Define or Change the System at IPL menu is shown after the Set Major Options display.

- If you typed Y (Yes) in the *Define or change system at IPL* field and N (No) in the *Set major system options* field, the Define or Change System at IPL menu is shown. See "Defining or Changing the System at IPL" on page 2-21.
- If you typed N (No) for both the *Set major system options* field and the *Define or change system at IPL* field, the menu, program, or procedure you defined on the Sign On display or in your user profile is shown.

Setting Major System Options: Figure 2-16 shows the Set Major System Options display where you can select automatic configuration, the type of device configuration naming, and the special environment in which you want to run. This display is shown when you type a Y (Yes) in the *Set major system options* field on the IPL Options display.

```
                          Set Major System Options

Type choices, press the Enter key.

Enable automatic configuration . . . . . .  Y          Y=Yes, N=No
Device configuration naming  . . . . . . .  *NORMAL    *NORMAL, *S36,*DEVAD
Default special environment  . . . . . . .  *NONE      *NONE, *S36
```

Figure 2-16. Set Major System Options Display

Using the following information, type the new values over the existing values in the following fields:

Enable automatic configuration:

Y (Yes) automatically configures local devices.
N (No) indicates no automatic configuration.

Device configuration naming:

*NORMAL uses a naming convention unique to the AS/400 system, for example, DSP01 and PRT01 for displays and printers, TAP01 and DKT01 for tape and diskette devices.
*S36 uses a naming convention similar to System/36, for example, W1 for workstations, P1 for printers, and T1 and I1 for tape and diskette devices.
*DEVADR uses a naming convention which is obtained from the device resource name, for example, DSP010203 for a display station, PRT010203 for a printer, TAP01 and DKT01 for tape and diskette devices.

Default special environment:

*NONE indicates there is no special environment.
*S36 sets up the System/36 environment that is used if you are migrating from the System/36.

Press the Enter key. Depending on what you selected on the IPL Options display, the following is shown next:

- If you typed an N (No) in the *Define or change the system at IPL* field, the menu, program, or procedure you defined on the Sign On display is shown next.
- If you typed a Y (Yes) in the *Define or change system at IPL* field, the Define or Change System at IPL menu is displayed. See Defining or Changing the System at IPL.

Defining or Changing the System at IPL: On the Define or Change the System at IPL display, you can change the configuration of the system, change system values, network attributes, user profiles, and object or file attributes. This display is shown when you type a Y (Yes) in the *Define or change the system at IPL* field on the IPL Options display.

1. Do one of the following:
   - To change the way the system starts, select option 3 (System value commands) and go to "Changing System Values During IPL."
   - If you selected option 1, 2, 4, 5, or 6, continue to select options and use the displays until you are finished.
2. When you are finished using the options on this display, press F3 (Exit and continue IPL) to continue the IPL.

Changing System Values During IPL: **System values** control information that affects the operation of certain parts of the system. Some system values that you change do not take effect until the next IPL; other system values take effect immediately.

On the System Value Commands display, you can change system values that affect IPL or other areas of the system. This display is shown when you type a Y (Yes) in the *Define or change the system at IPL* field on the IPL Options display (see step 6 on page 2-19).

To change system values during an IPL:

1. Select option 3 (System value commands) on the Define or Change System at IPL display (see "Defining or Changing the System at IPL").
2. Select option 3 (Work with system values).
3. Select option 2 (Change) on the Work with System Values display.
4. Type the new system value over the current value and press the Enter key.
5. Press F3 (Exit) to return to the System Value Commands display.
6. Press F3 (Exit) to return to the Define or Change the System at IPL display, and press F3 again to continue the IPL.

Security Considerations: To change system values, you must be signed on as QPGMR, QSYSOPR, or QSRV, or have all object (*ALLOBJ) authority. Certain system values can be changed only by a security officer (someone with all object (*ALLOBJ) and security administrator (*SECADM) special authorities).

System Values That Control IPL: The system values listed below let you control the type of IPL and the way the system does an IPL. Change these system values using option 2 (Change) on the Work with System Values (WRKSYSVAL) display.

QIPLDATTIM The IPL date and time system value lets you specify the IPL date and time for starting the system automatically. The default value *NONE indicates that no timed automatic IPL is desired.

The date format used by your system for date and time is defined in the system value QDATFMT. You need to know your system date format for step 1. Use option 5 (Display) to determine the format.

To specify the IPL date and time:

1. Type the new date over the current date as follows:
   - MM/DD/YY where MM is the month, DD is the day, and YY is the year.

     For example, to start the system on June 26, 1997, type 06/26/97.
   - YY/MM/DD where YY is the year, MM is the month, and DD is the day.

     For example, to start the system on June 26, 1997, type 97/06/26.
   - DD/MM/YY where DD is the day, MM is the month, and YY is the year.

     For example, to start the system on June 26, 1997, type 26/06/97.
   - YY/DDD where YY is the year and DDD is the Julian date.

     For example, to start the system on June 26, 1997, type 97/178. June 26 is the 178th day of the year.

     Note: The format is set with the system value QDATFMT. The separator is set with the system value QDATSEP. The separator is optional.
2. Type the time in the format HH:MM:SS where HH is the hour, MM is the minute, and SS is the second. Use the 24-hour clock.

   For example, if you want to start the system at 8:16 a.m., type `08:16:00`, or if you want to start the system at 8:16 p.m., type `20:16:00`.

Notes:

1. The time separator format is set with the system value QTIMSEP. The separator is optional.
2. If you are using the automatic power schedule, you can force the power schedule to update the QIPLDATTIM system value by entering the following command on any command line.

   ```
   CHGPWRSCDE DAY(*TODAY) PWRONTIME(*SAME) PWROFFTIME(*SAME)
   ```

QIPLSTS The IPL status system value displays the way the system did the last IPL. You cannot change this system value. Use option 5 (Display) on the Work with System Values display to display it.

- **0** An IPL from the control panel of the system unit.
- **1** An unattended IPL automatically after a power failure (QPWRRSTIPL set to 1).
- **2** An unattended IPL after using the Power Down System (PWRDWNSYS) command with the Restart after power down (RESTART) parameter set to *YES.
- **3** A unattended scheduled IPL (QIPLDATTIM set to the date and time for the IPL to occur).
- **4** An unattended remote IPL from another location (QRMTIPL set to 1).

QIPLTYPE The IPL type system value defines the type of IPL the system does from the control panel.

- **0** An unattended IPL. Start the system without an operator (see "Normal Operations (Unattended IPL)" on page 2-12). If the mode is set to Manual, an attended IPL is performed instead.
- **1** An attended IPL with Dedicated Service Tools (DST) Start the system with an operator (see "Changing Your System During IPL (Attended IPL)" on page 2-18.) An unattended IPL is done if it is done remotely, by date and time, or after power failure.
- **2** An attended IPL in debug mode. Start the system with an operator. The console description, QCONSOLE, is left varied on. You should only use this for problem analysis because it prevents other devices on the work station controller from being used.

QPWRRSTIPL The automatic IPL system value allows the system to start automatically when power is restored after a power failure.

- **0** Does not do an automatic IPL after a power failure.
- **1** Does an automatic IPL after a power failure.

QRMTIPL The remote IPL system value allows you to start the remote system by using your telephone and a modem or the SPCN signal.

- **0** Does not allow a remote IPL.

1 Allows a remote IPL.

Note: If you are using a modem eliminator, your system will power up every time PWRDWNSYS RESTART(*NO) is issued.

QUPSDLYTIM The uninterruptible power supply delay time system value controls the length of time the system will wait, before saving main storage and power down the system. If utility power is restored before the time ends, the system ends the timer. If the timer ends first, the system begins to save main storage or goes into CPM.

There are three choices for the QUPSDLYTIM value.

***BASIC or *CALC** The default value for QUPSDLYTIM is *CALC. Leaving QUPSDLYTIM set to *CALC may defeat the purpose of having a UPS. *BASIC or *CALC provide the same function in systems using PowerPC technology. After a fixed interval delay (typically 45 seconds), high end systems enter CPM, while entry systems equipped with a UPS perform a controlled shutdown. Users with a UPS who prefer a shorter IPL may wish to use a numeric value.

***NOMAX** *NOMAX is used when a user supplied program is controlling the power down of the system or a generator is providing unlimited UPS power.

0 Automatic system power down when the system utility power fails.

1 — 99999 Specifies delay time in seconds before the system powers down.

See the *Backup and Recovery*, SC41-5304 book, for more detailed information about QUPSDLYTIM.

QUPSMSGQ The uninterruptible power supply message queue system value allows you to specify where you want your messages sent when the power to the system is interrupted.

Note: QWCISCFR clears the message queue specified for the system values QUPSMSGQ.

QSYS/QSYSOPR Sends the messages to the system operator's message queue when power to the system is interrupted.

message queue Specifies another message queue (in addition to the system operator's message queue) where messages are sent when power to the system is interrupted.

library Specifies the library where the other message queue is located.

Editing Access Paths During Attended IPL: You can have the system turn the power on and restart an IPL automatically after a power failure. The system value QPWRRSTIPL should be set to 1 (see "System Values That Control IPL" on page 2-22).

Note: The mode must be set to Normal or Auto for the system to do an IPL automatically.

When power is restored, there may be access paths to rebuild. **Access paths** define the order that records in a database file are organized for processing by a program. If there are access paths to rebuild, the Edit Rebuild of Access Paths display is shown as in Figure 2-17 after the IPL Options display (Figure 2-15 on page 2-19).

```
                    Edit Rebuild of Access Paths                SYSNAMXX
05/11/94  13:49:34

IPL threshold . . . . . . . . . . . . . 50   0-99

Type sequence, press Enter.
Sequence:  1-99, *OPN, *HLD

-----------Access Paths----------  Unique  Rebuild
Seq   Status      File        Library     Member      Keyed   Time
25__  IPL         QAPZSYM2    QSYS        QAPZSYM2    NO      00:00:01
25__  IPL         QAPZREQ2    QSYS        QAPZREQ2    NO      00:00:01
25__  IPL         QAPZPTF3    QSYS        QAPZPTF3    NO      00:00:01
25__  IPL         QAPZPTF2    QSYS        QAPZPTF2    NO      00:00:01
25__  IPL         QAPZOBJ2    QSYS        QAPZOBJ2    NO      00:00:01
*OPN  OPEN        QTWALL      QSYS        QTWALL      NO      00:00:06
*OPN  OPEN        QASULTEL    QSYS        QASULTEL    NO      00:00:01
*OPN  OPEN        QASULE05    QSYS        QASULE05    NO      00:00:01
*OPN  OPEN        QASULE03    QSYS        QASULE03    NO      00:00:01
*OPN  OPEN        QASULE01    QSYS        QASULE01    NO      00:00:01
More...
F5=Refresh   F11=Display member text   F13=Change multiple  F15=Sort by
F16=Repeat position to   F17=Position to
```

Figure 2-17. Edit Rebuild of Access Paths Display

Tip: Use the online help information on this display to learn more about each column and field.

A message is sent notifying you that there is access path recovery to be performed by a **journal**. Any access path which can be recovered because it was recorded will not be shown on this display. A journal is a system object used to record entries in a journal receiver when a change is made to the database files associated with the journal. The **IPL threshold** is a value from 1 through 99 that can be set (default is 50), which indicates that access paths with a sequence less than or equal to the number specified will be rebuilt at IPL time. If the IPL threshold changes, all access paths with a status of IPL and AFTIPL will be changed to reflect the new status of the IPL threshold.

To change the sequence of access paths that will be rebuilt, make any changes to the *Seq* column and press the Enter key.

If you do not want to change the sequence, press the Enter key and the Display Access Path Status display is shown (Figure 2-18 on page 2-26) if there are access paths left to be rebuilt.

Tip: Press the Enter key to continue with the IPL from the Edit Rebuild of Access Paths display.

If no access paths need to be rebuilt, the IPL continues.

```
                          Display Access Path Status

IPL Threshold . . . . . . : 88

----------Access Paths----------   Rebuild     Current
Status    File        Library    Member      Build Time  Run Time
RUN       F123456789  L123456789 MBR4567890              00:00:01
JRN       F123456789  L123456789 MBR4567890
JRN       F123456789  L123456789 MBR4567890
JRN       F123456789  L123456789 MBR4567890
JRN       F123456789  L123456789 MBR4567890
JRN       F123456789  L123456789 MBR4567890
JRN       F123456789  L123456789 MBR4567890
SYS       F123456789  L123456789 MBR4567890  12:34:56
SYS       F123456789  L123456789 MBR4567890  12:34:56
IPL       F123456789  L123456789 MBR4567890  12:34:56
More...
```

Figure 2-18. Display Access Path Status Display

If you press F3 (Exit and continue IPL) the access paths will be rebuilt while the IPL continues. If you press F12 (Cancel), you return to the Edit Rebuild of Access Paths display.

Every 5 seconds, the display is updated with the current run time. After all the access paths have been rebuilt (access paths with a sequence less than or equal to the IPL threshold), the IPL continues.

Editing Check Pending Constraints During Attended IPL: During an attended IPL, the Edit Check Pending Constraints display is shown if there are constraints to be verified. A **constraint** is an attribute that places restriction or limitation on a physical file.

```
                    Edit Check Pending Constraints              SYSNAMXX
05/12/94  13:49:34

IPL threshold . . . . . . . . . . . . . 50   0-99

Type sequence, press Enter.
Sequence:  1-99, *OPN, *HLD

-----------Constraints-----------  Verify    Elapsed
Seq   Status       Constraint  File        Library     Time      Time
75__  AFTIPL       CSTFIELD1   FILE567890  LIB4567890  00:00:56  00:00:00
75__  AFTIPL       CSTFIELD2   FILE567890  LIB4567890  00:00:56  00:00:00
75__  AFTIPL       CSTFIELD3 > FILE567890  LIB4567890  00:00:56  00:00:00
75__  AFTIPL       CSTFIELD4 > FILE567890  LIB4567890  00:00:56  00:00:00
*HLD  INVAP        CSTFIELD5   FILE567890  LIB4567890  10:30:06  00:00:00
*HLD  CHKPND       CSTFIELD6   FILE567890  LIB4567890  09:30:06  00:00:00
*HLD  HELD         CSTFIELD7   FILE567890  LIB4567890  08:30:06  00:00:00
More...


F5=Refresh  F13=Repeat all   F15=Sort by  F16=Repeat position to
F17=Position to   F22=Display constraint name
```

Figure 2-19. Edit Check Pending Constraints Display

Tip: Use the online help information on this display to learn more about each column and field.

On the Edit Check Pending Constraints display, You can change the sequence (1 through 99) of the constraints to be verified. If the constraint has a sequence less than or equal to the IPL threshold, it is verified during the IPL. If a constraint has a sequence greater than the IPL threshold, it is verified after IPL. The sequence *HLD indicates that the constraint is not verified until it is changed to a number from 1 through 99. When the IPL threshold changes, all constraints with a status of IPL or AFTIPL are changed to reflect the new status of the IPL threshold.

To change the sequence of check pending constraints, make any changes to the *Seq* column and press the Enter key.

If you do not want to change the sequence, press the Enter key. The Display Constraint Status display is shown if there are constraints left to be verified.

```
                        Display Constraint Status

IPL Threshold . . . . . . : 50

----------Constraints-----------   Verify      Elapsed
Status    Constraint  File       Library     Time        Time
RUN       CST1111111  L123456789 MBR4567890  00:00:04    00:00:01
RUN       CST2222222  L123456789 MBR4567890  00:00:04    00:00:01
IPL       CST3333333  L123456789 MBR4567890  00:00:04    00:00:00
```

Figure 2-20. Display Constraint Status

If you press F3 (Exit and continue IPL) the constraints are verified while the IPL continues. Every five seconds, the display is updated with the current run time. After all constraints with IPL status have been verified, the IPL continues. If you press F12 (Cancel), you return to the Edit Check Pending Constraints display.

System Password

When you install the OS/400 licensed program, the licensed program runs a check to detect system model changes, certain service conditions, and ownership changes. If the licensed program detects these changes or conditions, you are prompted to enter the system password before the IPL can continue. If no changes or conditions are recognized, the IPL continues without a request for the system password.

You must enter the correct system password to complete the IPL. If the system password is not available, you or your service representative may temporarily bypass entering the system password for a limited time. When the bypass period starts, immediately contact your marketing representative, who will have IBM send you the correct system password. To order the system password, ask your marketing representative to order nonstandard RPQ S40345 if you are in the United States, Asia Pacific, Canada, Latin America, or Japan. If you are in Europe, Middle East, or Asia, request nonstandard RPQ S40346. For more information, see "Bypassing the System Password" on page 2-29.

Changing the System Password: If you have just installed new hardware, you may need to change the system password during the first IPL. To do this:

1. Select option 1 (Change the system password) on the Verification of System Password Failed display.
2. The following system information on the Change the System Password display is shown:
   - System serial number
   - System type number
   - System model number
   - System password version
   - Processor card serial number

   If you do not know the system password, use F12 (Cancel) and select option 2 (Bypass the system password) on the Verification of System Password Failed display. See "Bypassing the System Password" on page 2-29 for information on how to do this.
3. Type the password in the blank field and press the Enter key.

To change the system password when your system is operational:

1. Perform an attended IPL.
2. Select option 1 (Change the system password) on the Verification of System Password Failed display.
3. Type the password in the blank field and press the Enter key.

Bypassing the System Password: Use the Verification of System Password Failed display to bypass the system password when:

- You do not know or cannot find the system password.
- You guess the system password and get a message telling you the password you entered is incorrect.

Tip: If you type the password incorrectly five times, you must do the IPL again.

To bypass the system password during the first IPL:

1. Select option 2 (Bypass the system password) on the Verification of System Password Failed display.
2. Read the information on the Bypass the System Password display. Remember to contact your marketing representative immediately to obtain the system password before the bypass period runs out.
3. Press F9 (Bypass) to continue the IPL.

When the IPL has finished, you will receive daily messages telling you how much time is left in the bypass period.

When you receive the password, you can enter it by:

- Doing an attended IPL and selecting option 1 (Change the system password) on the Verification of System Password Failed display.
- Doing an attended IPL and selecting option 1 (Change the system password) on the Bypass Period has Ended display.

IPL Overview

Figure 2-21 on page 2-30 shows the system reference codes that are displayed and approximately how long they remain displayed while the IPL is progressing. If you notice a code being displayed longer than it should or a code not listed, see Chapter 3, Handling and Reporting System Problems.

Note: In the diagram, x can be any number 0 through 9 or letter A through F.

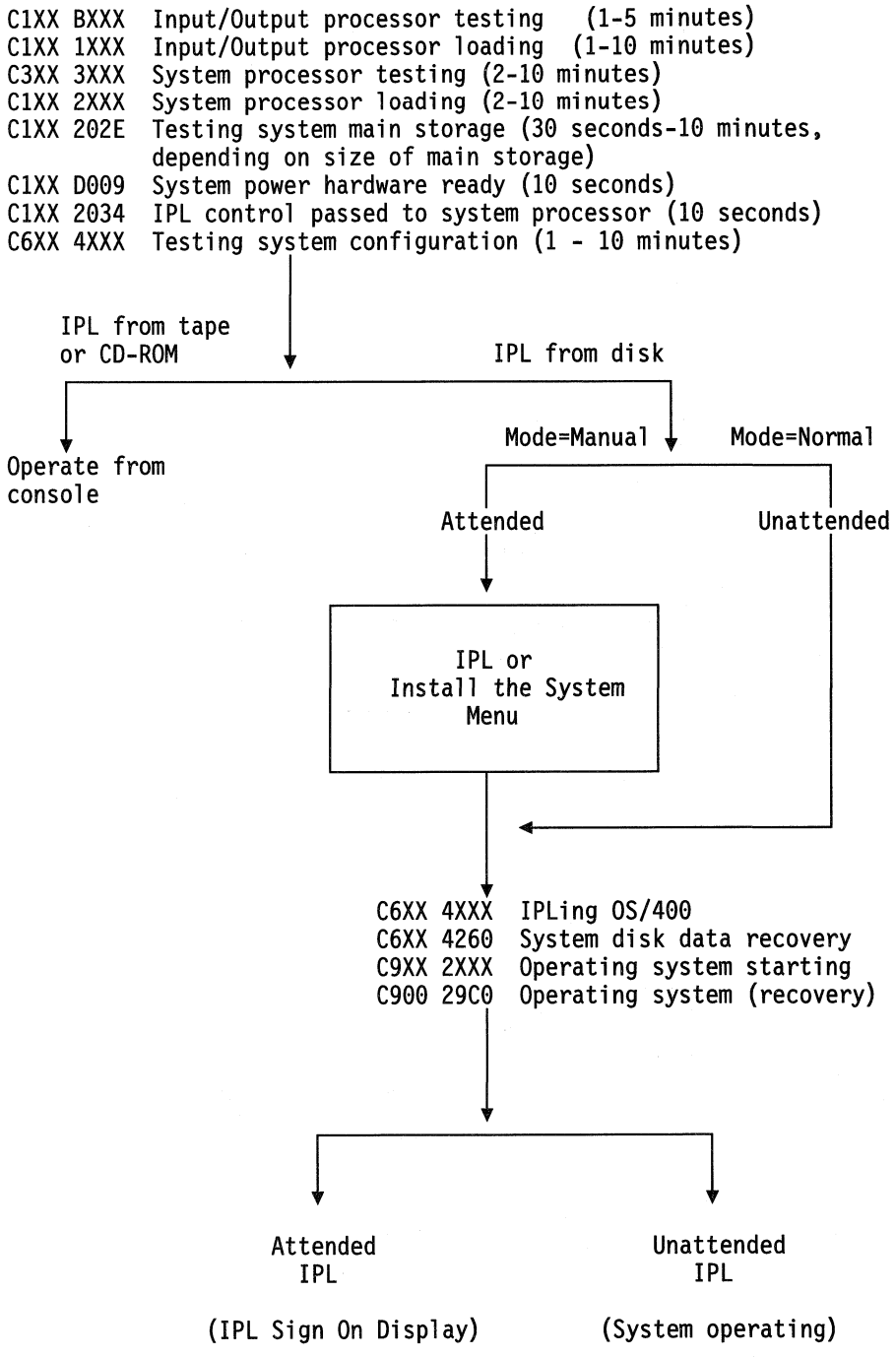


Figure 2-21. Overview of IPL System Reference Codes and Time Displayed

Note: After the Signon display or command entry display appears, the IPL may still be completing some processing in the background. The IPL is considered complete, but the system may be performing asynchronous clean up. Some functions, such as accessing folders and document library objects (DLOs) may not be available until this clean up is complete.

You should allow sufficient time for an IPL to complete before attempting such functions. The time of completion for an IPL depends on such factors as your system model and configuration.

What Causes an Abnormal IPL?

An abnormal IPL can be caused by any of the following:

- Using the End Job Abnormal (ENDJOBABN) command. To see if this command has been used, look for message CPC1124 in the job log.
- Using option 8 (Perform automatic installation of the operating system) on the Dedicated Service Tools (DST) menu
- Using the Power pushbutton instead of the PWRDWNSYS command.
- A power failure occurring before all data is written from main storage to disk.
- Any B900 xxxx system reference code (where xxxx is any number or letter) during the start of the operating system phase of the IPL.
- A Power Down System (PWRDWNSYS) command that did not complete, ending with a system reference code of B900 3F10.
- Any function check in the controlling subsystem causing the system to end.
- The system going down when database recovery has not completed during the IPL.
- If the ENDJOBABN command was issued, message CPI0990 will be in QHST. For all other reasons, message CPI091D will be in QHST stating why the IPL was abnormal.

Working with Subsystems

A **subsystem** is an operating environment where the system coordinates processing of jobs and resources for the jobs. If you use one of the default subsystem configurations supplied by IBM, all of your subsystems are automatically started when you do an IPL.

Once your system is successfully powered on, you may need to start additional subsystems to make your system ready to use if:

- You created a subsystem which is not automatically started, such as a subsystem which runs only at night.
- You ended all but the controlling subsystem to bring your system to a restricted state to back it up.

To start or end subsystems or display subsystem descriptions, use the Work with Subsystem Descriptions (WRKSBSD) command.

Starting Subsystems: To start a subsystem on the Work with Subsystem Descriptions display, use option 9 (Start subsystem). A message is displayed telling you the subsystem has started.

Ending Subsystems: To end a subsystem, on the Work with Subsystem Descriptions display, use option 10 (End subsystem). On the End Subsystem (ENDSBS) display, in the *How to end* field, type one of the following:

***CNTRLD** Jobs are ended in a controlled manner. This allows programs that are running to perform cleanup and finish completely, which may take 600 seconds or more.

***IMMED** Jobs are ended immediately. This can cause problems if data has been partially updated. Use this option only if you have attempted a controlled end unsuccessfully.

Press the Enter key. A message is displayed indicating that the system has started to end the subsystem. Another message is sent when the subsystem has ended.

Displaying Subsystem Descriptions: To display a subsystem description, on the Work with Subsystem Descriptions display, use option 5 (Display). The Display Subsystem Description menu is shown on which you can select options that give you more information about that subsystem.

Stopping the System

Before you stop the system:

- Make sure all batch jobs are finished and users are signed off the system:
  1. Send a message that interrupts all users signed on the system telling them to sign off.
     a. Type `go managesys` and press the Enter key.
     b. Select option 12 (Work with signed-on users) on the Manage Your System, Users, and Devices (MANAGESYS) menu.

Note: If the Work with User Jobs display is shown, you need to switch to basic assistance level using F21 (Select assistance level).

     c. Press F10 (Send message to all) on the Work with Signed-On Users display.
     d. Type the message in the *Message text* field on the Send a Message display and press F10 (Send).
  2. Wait for the users to sign off.
  3. Check to make sure all users have signed off by pressing F5 (Refresh) on the Work with Signed-On Users display. When everyone is signed off the system, the display will show only your job. To sign someone off the system, use option 4 (Sign off).

Note: If you have separate interactive subsystems, other than the controlling subsystem, you may want to stop the interactive subsystems once the users have signed off. This prevents them from signing on again before you have stopped the system. See "Ending Subsystems" on page 2-31 for information on how to end a subsystem.

- Check the status of any batch jobs that might be affected if the system is powered down:
  1. Type `go managesys` on any command line and press the Enter key.

2. Select option 11 (Work with jobs) on the Manage Your System, Users, and Devices (MANAGESYS) menu.

Note: If the Work with User Jobs display is shown, you need to switch to basic assistance level using F21 (Select assistance level).

3. Press F14 (Select other jobs) on the Work with Jobs display.
4. Type `*all` in the *User* field.
5. Type an `N` in every field except the *Message waiting*, *Running*, and *Running job held* fields. The Work with Jobs display is shown again with the batch jobs listed.
6. If any job queues have jobs waiting to run, press F22 (Work with job queues) to see the Work with Job Queues display.
7. Hold any job queues that have jobs waiting to run on the Work with Job Queues display.

Tip: Do not forget to release these job queues when you start the system again.

8. Press F12 (Cancel) to return to the Work with Jobs display.
9. Press F5 (Refresh) every few minutes until all batch jobs have completed processing.

- Make sure there are no tapes in any of the tape units and no diskettes in any of the diskette units.

Powering Off the System Immediately

You can stop the system by using the Power Down System (PWRDWNSYS) command on any command line when the system is in any mode. Type PWRDWNSYS and press the F4 prompt key to view the power down options. You must have QSYSOPR authority to use the Power Down System (PWRDWNSYS) command. If this command does not work on your system, use the following methods.

- To power off the system immediately:
  1. Type `go power` on any command line to display the Power on and Off Tasks (POWER) menu.
  2. Select option 3 (Power off the system immediately) if you want to keep the power off until the next time the system is scheduled to power on. Figure 2-22 on page 2-34 shows the Confirm Power Off of System display.

```
                              Confirm Power Off of System
System:   SYSTEM01
Next scheduled power on:
Date . . . . . . . . . . . :   05/19/95
Time . . . . . . . . . . . :   05:40:00


To confirm immediate power off, press F16.
To cancel, press F12.
```

Figure 2-22. Confirm Power Off of System Display for Immediate Power Down

When you press F16 (Confirm), an immediate power down occurs that causes the subsystems to end all active jobs.

- To power off the system and restart immediately:

  To restart the system right after the power is turned off, select option 4 (Power off the system immediately and then power on) on the Power On and Off Tasks (POWER) menu. Figure 2-23 shows the Confirm Power Off of System display.

```
                          Confirm Power Off of System

To confirm immediate power off and then immediate power on, press F16.
To cancel, press F12.
```

Figure 2-23. Confirm Power Off of System Display for Immediate Power On

When you press F16 (Confirm), the system stops running and then starts again automatically.

Note: Do not turn the modem on or off when the system is turned off and is made ready for remote IPL. Otherwise, the system may start unexpectedly, although it turns itself off in a few minutes.

Important Note: If you stop the system using the automatic power schedule or one of the options on the Power On and Off Tasks (POWER) menu, the IPL date and time system value (QIPLDATTIM) is checked and, if necessary, reset to the next scheduled power-on time. This checking does not occur if you power off in another way, so the system may not power on automatically. To force the power schedule to update the QIPLDATTIM system value, enter the following command on any command line.

```
CHGPWRSCDE DAY(*TODAY) PWRONTIME(*SAME) PWROFFTIME(*SAME)
```

Using the Power Pushbutton

If you cannot use option 3 (Power off the system immediately) or option 4 (Power off the system immediately and then power on) on the Power On and Off Tasks (POWER) menu to stop the system, you can turn the power off using the Power pushbutton to turn off the system when the mode is set to Manual.

Attention: Using the Power pushbutton to turn off the system may cause results that cannot be predicted in your data files, and the next IPL will take longer to complete.

Make sure that there are no tapes in the tape units or diskettes in the diskette units, and that the mode is set to Manual.

Do not turn the modem on or off when the system is turned off and is made ready for remote IPL. Otherwise, the system may start unexpectedly, although it turns itself off in a few minutes.

To turn the power off using the Power Pushbutton, do the following:

1. Press the Power pushbutton. The Function/Data display blinks with **O?** (the international power off symbol).

   Note: To cancel the power off operation, press any other push-button on the control panel.

2. Press the Power pushbutton again. The Power On light blinks as the system is being powered off. When power off is complete, the light goes off.

If the system does not turn the power off within 30 minutes, wait for the System Attention light to come on. When the System Attention light comes on, go to Chapter 3, Handling and Reporting System Problems and follow the steps necessary to solve the problem.

Using Removable Media

The AS/400 system uses the following media for saving or restoring data:

- Tape
- CD-ROM
- Optical library

To ensure a successful backup, it is important to handle and maintain the media properly.

Using Tapes and Tape Units

There are several types of tape cartridges and tape units that are commonly used on the AS/400 system:

- 1/4-inch tape cartridge and tape unit
- 1/4-inch mini tape cartridge and tape unit
- 8-mm tape cartridge and tape unit

- 1/2-inch tape cartridge and tape unit
- Magstar MP tape cartridge and tape unit

You can also use 1/2-inch tape reel and tape unit on the AS/400 system.

Tape Cartridge A tape cartridge is a case containing a reel of magnetic tape that can be put into a tape unit without stringing the tape between reels.

Tape Reel A tape reel is a round device on which magnetic tape is wound.

Tape Drive A tape drive is a device that isused to move the tape and read and write information on magnetic tapes.

Tape Unit A tape unit is a physical enclosure that contains the tape drive.

Tape Library The complete collection of tapes available for use on the system (including all new, scratch, used tape cartridges, or reels) is a tape library.

For all tapes, you need to establish a procedure for maintaining a tape library which includes:

- Assigning each tape a unique volume ID.

  Each tape must have a unique volume ID to maintain the accuracy of tape volume statistics as shown in "Monitoring Tape Volume Statistics" on page 2-63. On barcoded tapes, the volume ID must match the bar code.

- Establishing a temperature and humidity controlled tape media storage area.
- Maintaining records for each tape volume including:
  - Date the tape was purchased
  - Problems encountered
  - Corrective action taken

Regardless of the type of tape you are using, follow these guidelines to avoid damage and loss of the data on the tape.

Remember:

- Leave the reels or cartridges in their protective container until you use them.
- Place reels or cartridges in the computer room for 24 hours before using them.
- Remove the reel or cartridge from the tape unit when it is not in use.
- Store reels or cartridges in the protective container.
- Copy and then throw away reels and cartridges that are over four years old or that have a high number of temporary errors. See "Monitoring Tape Volume Statistics" on page 2-63 for information on how to obtain the number of errors.
- Operate tape units in a relatively clean, dust-free environment. Storing and operating tape media and tape devices in a dirty environment may cause errors and early life failures.

- Do not apply labels to the top of 8mm tapes.
- 8mm 160–meter tapes must have media recognition system (MRS), or the tapes will not load.

Apply an external label to the outside of each reel or cartridge and to the protective container when you store data on a tape. These labels can be ordered separately. Record information such as:

- Name or number of the reel or cartridge
- Type of data stored on the reel or cartridge
- Date the data was stored on the tape
- Tape volume ID

Do Not:

- Carry cartridges loosely in a box or basket because the leader blocks can catch on other tapes and become unlatched.
- Stack more than six cartridges on top of each other.
- Open a cartridge.
- Release the leader block and pull the tape from the cartridge.
- Touch any exposed tape.
- Expose the tape to direct sunlight, moisture, or high magnetic fields.
- Drop the tape reel or cartridge.
- Apply an external label to the outside top of the cartridge or reel. This could interfere with the drive or media operation.

Tapes, tape units, and diskettes are used primarily for saving and restoring system data. A tape unit is the physical enclosure that holds the tape drive.

Verifying That Your Tape Unit Works Correctly

To verify that your tape unit is working correctly, do the following:

1. Remove the reel or cartridge from the tape unit.
2. Type the WRKCFGSTS *DEV *TAP command on any command line and make the tape unit unavailable to the AS/400 (vary off).
3. Clean the tape unit. Refer to the cleaning instructions for the tape unit you are using.
4. Type the Verify Tape (VFYTAP) command on any command line and press the Enter key.

Errors That Can Occur with Tape Units

If an error message appears during tape usage, you can put the cursor under the message, and press F1 or HELP key. Then follow the instruction in the online help information to resolve the problem.

Using 1/4-Inch or 1/4-Inch Mini Tape Units

Cleaning the 1/4-Inch Tape Unit: The 1/4-inch or 1/4-inch mini tape unit requires periodic head cleaning. When using IBM tape cartridges, the head should be cleaned after every 8 hours of use. Other tape media may require more frequent cleaning. For example, if you are doing daily backups to a single cartridge, cleaning should be scheduled every week. When using tapes that were not written by a tape unit attached to your system, the drive should be cleaned more frequently. It is better to clean the tape unit too often than not often enough.

Use the IBM Cleaning Cartridge Kits as recommended below:

- For the QIC-5010, QIC-4GB-DC, QIC-2GB(DC), QIC-2GB, or QIC-1000 tape unit, it is recommended that you use part 46G2674.
- For all 1/4-inch tape units, except the QIC-3040 and QIC-5010, you can also use part number 16G8572.
- For the 1/4-inch mini tape unit (QIC-3040), use part 16G8583.

Note: Part 46G2674 does not work in the IBM QIC-525 and QIC-120 tape units. It is recommended that you use part 16G8572.

While cleaning the heads using part 16G8572, the status light on the 1/4-inch tape unit indicates that the device is in use. Clean the heads for approximately 20 seconds. Open the tape unit door even though the status light is still lit. Remove the cleaning cartridge.

For the QIC-5010, QIC-4GB-DC, QIC-2GB(DC), QIC-2GB, QIC-1000, and QIC-3040 tape units (except part 16G8572), the cleaning cycle takes place automatically after the cleaning cartridge is inserted. For the QIC-4GB-DC, QIC-2GB(DC), QIC-2GB, QIC-1000, and QIC-3040 tape units, the status light flashes at a rate of 1 cycle per second during the cleaning operation. For the QIC-5010 tape units, the Amber light is on and the Activity light is flashing at a rate of 2 cycles per second during the cleaning operation. After the flashing stops, remove the cleaning cartridge. The QIC5010 will unload the cleaning cartridge when cleaning is complete.

Tip: See the cleaning kit instructions when using non-IBM cleaning cartridges.

Using 1/4-Inch or 1/4-Inch Mini Tape Cartridges

Figure 2-24 on page 2-39 shows a 1/4-inch tape cartridge and the box used for storage.

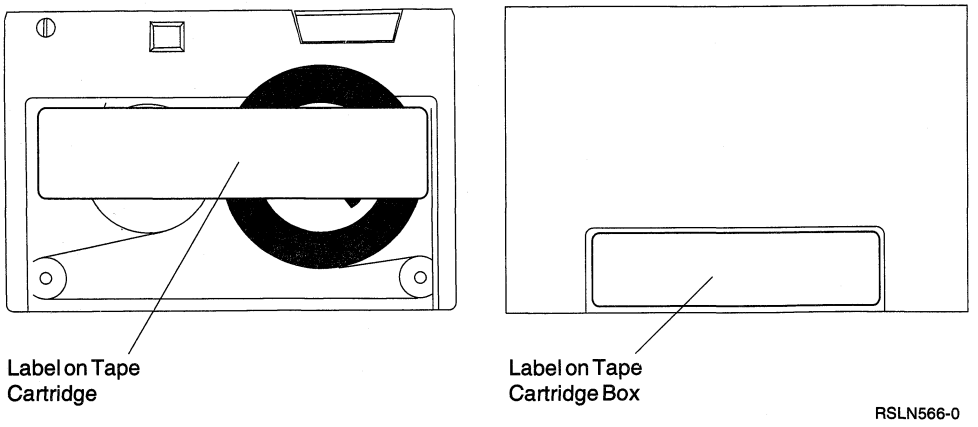


Figure 2-24. 1/4-Inch Tape Cartridge

Attention: Do not attach labels to the edges of the 1/4-inch tape cartridges; this may interfere with the cartridge sensors and cause the tape to run off the end of the spools.

Tape Cartridge and 1/4-Inch and 1/4-Inch Mini Tape Unit Compatibility: For full read/write capability, follow the guidelines in Table 2-2 to determine which tape cartridges can be used for each tape unit. This table shows the QIC format of tape cartridges and the tape unit that is required to process each QIC format. For example, for a QIC-1000 format, the tape cartridge must be 9120 or 9120SL and the tape unit type must be QIC-1000 or QIC-2GB or QIC2GB(DC) or QIC-4GB-DC or QIC5010.

Table 2-2. Compatibility Between Tape Cartridges and Tape Units

Tape Cartridge	Tape Unit to Use
QIC-5010 Compatible (DC5010 and 13GB SL)	QIC-5010
QIC-4GB Compatible (SLR5-4GB and SLR5-4GBSL)	QIC-4GB-DC
QIC-2GB Compatible (9250, 9250SL)[1]	QIC2GB, QIC-2GB(DC), QIC-4GB-DC or QIC-5010
QIC-1000 Compatible (9120 and 9120SL)	QIC-1000, QIC-2GB, QIC-2GB(DC), QIC-4GB-DC or QIC-5010
QIC-525 Compatible (6525, 6320, 6080)	QIC-525, QIC-1000, QIC-2GB, QIC-2GB(DC), QIC-4GB-DC or QIC-5010
QIC-120 Compatible (6150, 6037)[1]	QIC-120, QIC-525, QIC-1000, QIC-2GB, QIC-2GB(DC), QIC-4GB-DC or QIC-5010
QIC-3040 Compatible (MC3000, MC3000XL, MC3000SL)	QIC-3040 (MC)

1 The error correction code (ECC) is not available when tape cartridges are recorded in QIC-120 format

Error messages are displayed if the QIC format and the tape cartridge are not compatible. Errors that can occur are:

- Selecting a QIC format that cannot be written on the tape. For example, inserting a QIC-120 tape cartridge and specifying a QIC-1000 format.
- Attempting to process a high density tape cartridge in a low density tape unit. For example, you try to process a QIC-1000 tape cartridge in a QIC-525 or QIC-120 tape unit.
- Attempting to add a file and selecting a QIC format different from the format previously recorded on the tape. For example, inserting a tape cartridge recorded in QIC-525 format and specifying a QIC-120 format.

Remember: For full read/write compatibility, follow the guidelines in Table 2-2 on page 2-39.

When purchasing non-IBM tape cartridges, purchase a small quantity to verify the tape quality. Quality tape reduces the possibility of tape cartridge problems.

Loading 1/4-Inch or 1/4-Inch Mini Tape Cartridges: To load a 1/4-inch tape cartridge in a QIC-4GB-DC, QIC-2GB(DC), QIC-2GB, QIC-1000, QIC-525, or QIC-120 tape unit:

1. Push the pushbutton on the tape unit door to release the door.
2. Pull the tape unit door out, then push it down.
3. Insert the tape cartridge into the tape unit.

   The cartridge should be inserted firmly until it cannot go any further into the tape unit. About 10-mm (3/8 inch) of the cartridge remains outside the tape unit.
4. Lift up the tape unit door, then push it closed.

Attention: The cartridge does not go all the way into the tape unit until the tape unit door is closed. Use moderate force to close the door. Slamming the door shut may damage the tape unit.

Push the door until the latch holds the door closed.

To load a 1/4-inch tape cartridge in a QIC-5010 tape unit or a 1/4-inch mini tape cartridge in a QIC-3040 tape unit, insert a tape cartridge through the cover door until the loading mechanism pulls the cartridge into the drive allowing the door to close.

For most tape cartridge types, the 1/4–inch tape units run a retension operation whenever a tape cartridge is loaded, or if a tape cartridge is in the tape unit when the door is closed. retension means that the tape unit moves the tape to the end-of-tape position and rewinds it to the beginning-of-tape position. The retension operation is part of the load sequence. When using DC5010 and 13GBSL tape cartridges, the QIC-5010 1/4-inch tape unit runs the retension operation only when necessary (as determined by the tape unit) to maintain correct tape tension. The approximate retension times are as follows:

Table 2-3. Retension Times for 1/4-Inch Tape Cartridges

Tape Unit	Tape Cartridge	Approximate Retension Time
QIC-5010	DC-5010 (1200 feet) 13GB SL (155 feet)	Less than 6 minutes Less than 1 minute
QIC-4GB-DC	SLR5-4GB (1500 feet) SLR5-4GBSL (155 feet)	Less than 8 minutes Less than 1 minute
QIC-2GB QIC-2GB(DC)	9250 (1200 feet) 9250SL (155 feet)	Less than 6 minutes Less than 1 minute
QIC-1000	9120 (950 feet) 9120SL (155 feet)	Less than 4 minutes Less than 1 minute
QIC-525	6525 (1020 feet) 6320 (620 feet) 6080 (150 feet)	Less than 4 minutes Less than 3 minutes Less than 1 minute
QIC-120	6150 (620 feet) 6037 (150 feet)	Less than 3 minutes Less than 1 minute
QIC-3040	MC3000 (305 feet) MC3000XL (400 feet) MC3000SL (100 feet)	Less than 2 minutes Less than 3 minutes Less than 1 minute

Unloading 1/4-Inch or 1/4-Inch Mini Tape Cartridges

Attention: For the QIC-2GB(DC), QIC-2GB, QIC-1000, QIC-525, QIC-120 or QIC-3040 tape unit, do not remove a tape cartridge if the tape unit status light is green. For the QIC-5010 tape unit, do not remove a tape cartridge if the tape unit activity light is on. Only a cleaning cartridge can be removed when the light is green or the QIC-5010 activity light is on.

If you remove a tape cartridge while the status light is green, or the QIC-5010 activity light is on, you may have the following problems:

- A system message indicates that an error has occurred and the tape job must be repeated.
- You may not be able to retrieve data already on the cartridge because end-of-tape processing did not complete

To unload 1/4-inch mini tape cartridges, wait until the tape status light is off. Press the eject button. The tape drive rewinds the tape, unloads and ejects the tape cartridge. If the tape cartridge cannot unload and has to be removed manually from the tape drive, contact your service representative.

To unload the QIC-5010 1/4-inch tape unit, wait until the activity light is off. Press the unload button. The tape drive rewinds the tape, unloads and ejects the tape cartridge. If the tape cartridge cannot unload and has to be removed manually from the tape drive, contact your service representative.

To unload 1/4-inch tape cartridges from the QIC-4GB-DC, QIC-2GB(DC), QIC-2GB, QIC-1000, QIC-525, or QIC-120 tapes units:

1. Push the pushbutton on the tape unit door to release the door.
2. Pull the tape cartridge unit door out, then push it down.

Moderate force is necessary to fully open the door with the tape cartridge in the tape unit. Excessive force damages the tape unit.

3. Grasp the tape cartridge and pull the cartridge straight out of the slot.

Attention: Turning the cartridge or pulling too hard may damage the door mechanism.

4. Lift up the tape unit door, then push it closed.

   Little force is required to close and latch the door when the tape unit is empty. Moderate force is required when a tape cartridge is in the tape unit. Be sure to close the door on first attempt. If the door does not close completely and pops open, the tape drive may receive two retension commands. This condition may cause an error which requires an IPL to recover.

If you remove the tape cartridge while the green light is on, turn the light off by:

- Inserting the cartridge again.
- Run the Check Tape (CHKTAP) command and specify *REWIND for the End of tape option (ENDOPT) parameter.

Remember: Do not remove a tape cartridge from the tape unit unless the last command was run with *REWIND or *UNLOAD specified for the `End of tape` option (ENDOPT) parameter.

If the last command ends with *LEAVE, the tape unit heads might be over a data area. To avoid this, specify *REWIND or *UNLOAD for the End of tape option (ENDOPT) parameter of the last tape command. You may also use the Check Tape (CHKTAP) command with *REWIND specified for the End of tape option (ENDOPT) parameter.

Tape cartridges can be left in the drive for several hours or overnight if:

- The green light is off (*REWIND is specified for the End of tape option (ENDOPT) parameter).
- The room temperature does not vary by more than 9.5°C (15°F).
- Humidity levels are within the range that isshown in the table in "Shipping, Storage, and Operating Environments for the 1/4-Inch Tape Cartridges or 1/4-Inch Mini Tape Cartridges" on page 2-46.

Status Lights for QIC-5010 Tape Unit: The QIC-5010 tape unit has three indicator lights: two green and one amber. These status lights are turned on and off in various combinations to indicate the status of the tape unit.

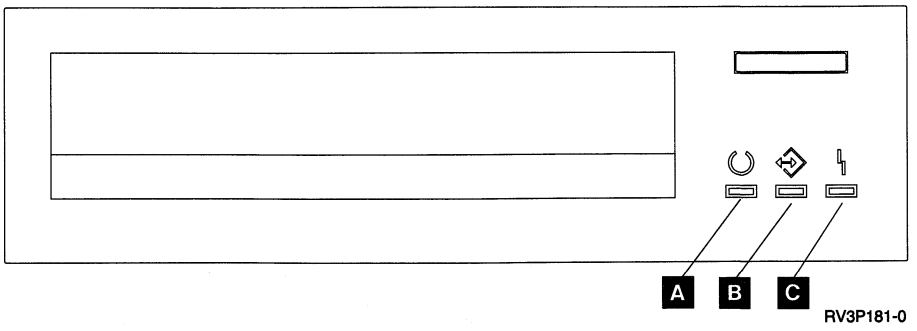


Figure 2-25. The QIC-5010 tape unit

The symbols that are located next to the status lights are the International Organization for Standardization (ISO) symbols that define the general function of the status lights as follows:

A Ready. This light indicates the following conditions:

- Off - No cartridge installed or no fault condition
- Green - Cartridge installed, loading or unloading
- Green flashing - Power on self-test in progress.

B Activity. This light indicates the following conditions:

- Off - No cartridge installed. No activity or fault condition
- Green flashing - Cartridge activity

C Fault. This light indicates the following conditions:

- Off - No fault condition
- Amber - Cleaning required or worn tape media
- Amber flashing - Fault condition

The various on/off combinations of the status lights are shown in the following chart.

Status Lights	State	Status
	On	Status light tests. (The status lights are on for 2 seconds when the power is turned on.)
	On	
	On	
	Flashing	Power up selftests. Diagnostic cartridge activity.
	Off	
	Off	
	Off	Cartridge not loaded.
	Off	
	Off	
	Off	Cartridge not loaded. Cleaning required.
	Off	
	On	
	On	Cartridge loaded. No activity.
	Off	
	Off	
	On	Cartridge loaded. Activity.
	Flashing	
	Off	
	On	Cartridge loaded. No activity. Cleaning required.
	Off	
	On	
	On	Cartridge loaded. Activity. Cleaning required.
	Flashing	
	On	
	Off	Cartridge loading or unloading
	Flashing	
	Off	
	Off	Cartridge loading or unloading. Cleaning required.
	Flashing	
	On	
	Off	Unrecoverable drive failure or microcode download failure.
	Off	
	Flashing	

RV3P182-0

Figure 2-26. Status lights on the QIC-5010 tape unit

Protecting Data Stored on 1/4-Inch Tape Cartridges or 1/4-Inch Mini Tape Cartridges: To protect data from being overwritten:

- Set the pointer toward **SAFE** for QIC-525 and QIC-120 tape cartridges, as shown in Figure 2-27 on page 2-45.
- Set the pointer toward the locked padlock icon for the QIC-1000, QIC-2GB, QIC-4GB-DC, QIC-2GB(DC) and QIC-5010 tape cartridges, as shown in Figure 2-28 on page 2-46.
- Slide the Record tab to the right for the QIC-3040 tape cartridges, as shown in Figure 2-29 on page 2-46.

To not protect the data:

- Set the pointer away from **SAFE** for the QIC-525 and QIC-120 tape cartridges, as shown in Figure 2-27.
- Set the pointer toward the unlocked padlock icon, for the QIC-1000, QIC-2GB, QIC-2GB(DC), QIC-4GB-DC, and QIC-5010 tape cartridges, as shown in Figure 2-28 on page 2-46.
- Slide the Record tab to the left for the QIC-3040 tape cartridges as shown in Figure 2-29 on page 2-46.

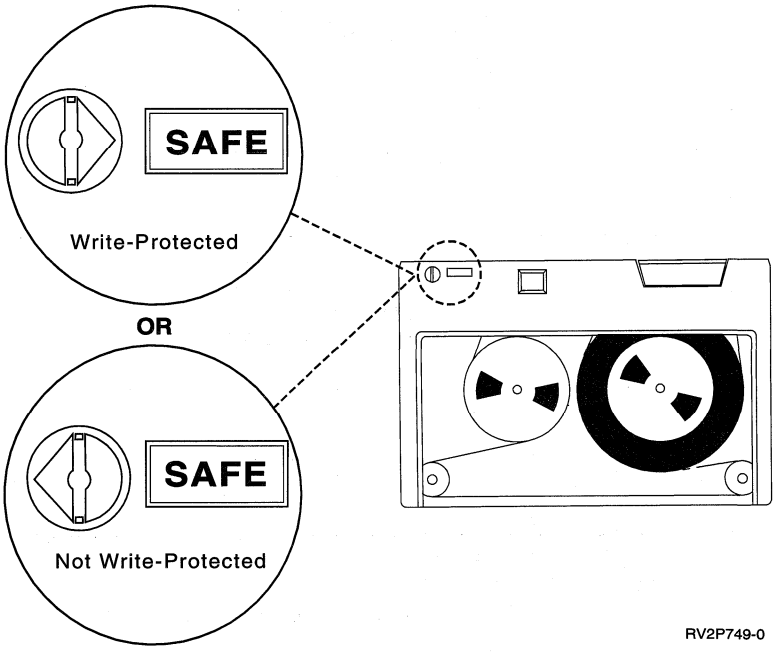


Figure 2-27. Write-Protect Positions for a 1/4-Inch Tape Cartridge (QIC-525 and QIC-120)

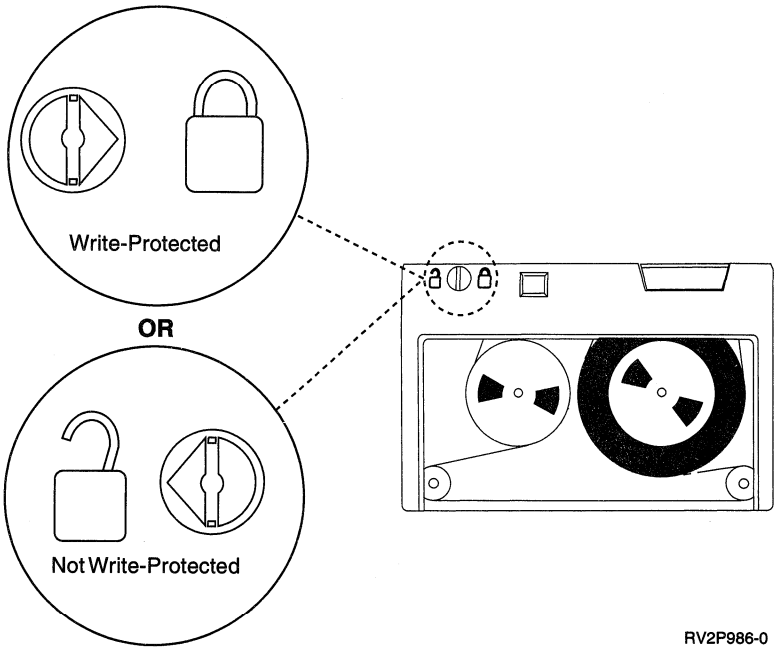


Figure 2-28. Write-Protect Positions for a 1/4-Inch Tape Cartridge (QIC-1000 and QIC-2GB, QIC-2GB(DC), QIC-4GB-DC, and QIC-5010)

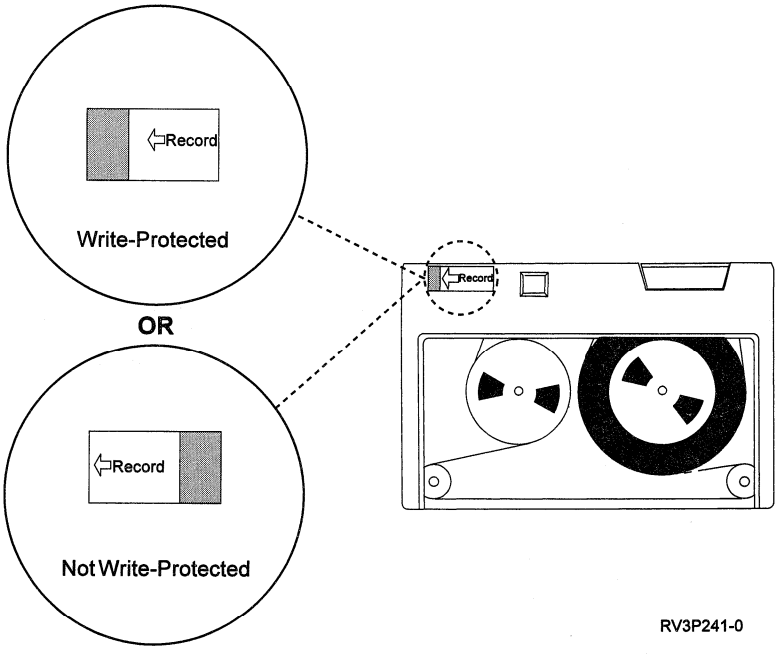


Figure 2-29. Write-Protect Positions for a 1/4-Inch Tape Cartridge (QIC-3040)

Shipping, Storage, and Operating Environments for the 1/4-Inch Tape Cartridges or 1/4-Inch Mini Tape Cartridges: The recommended environment for operation, storage, and shipment of 1/4-inch tape cartridges is a temperature of 15 to 25°C (59 to 77°F), and a relative humidity of 40 to 60%. Table 2-4 on page 2-47 provides maximum and minimum environmental conditions for safe shipment, storage, and use of the tape cartridges for an AS/400 tape unit. A hyphen (–) indicates that the dry bulb temperature is outside the recommended range for safe operation, storage, or shipment.

Table 2-4. Environment Ranges for 1/4-Inch and 1/4-Inch Mini Tape Cartridges

Dry Bulb Temperature Degrees		Relative Humidity (Percent)		
Celsius	**Fahrenheit**	**Operating**	**Storage**	**Shipping**
-40	-40.2	-	-	20 to 80
10	50	20 to 80	20 to 80	20 to 80
20	68	20 to 80	20 to 80	20 to 80
30	86	20 to 55	20 to 73	20 to 73
40	104	-	20 to 32	20 to 32

Using 8-Millimeter Tape Units

The AS/400 system supports the following tape units:

- 7208 Models 002, 012, 222, 232, 234, and 342
- 9427 Models 210, 211
- Feature Code 6390

The 7208 Models 002, 012, 222, 232, 234, and 342 are external tape units for the AS/400 System Units.

For the 7208 Model 002, refer to the following publication:

- *IBM 7208 Model 002 2.3GB External 8mm Tape Operator Guide* SA23-2675.

Attention: Mark a box on the 8-mm Cleaning Cartridge (part 16G8467) after each cleaning. The cleaned cartridge can be used approximately 12 times on a 7208–002.

The 160 tape may work in the 7208 Model 002. It will not be ejected when loaded in the 7208 Model 002. However, it is not recommended that you use 160-meter tape in the Model 002 as this may cause tape damage (due to the tape load mechanism).

For the 7208 Model 012, refer to the following publication:

- *IBM 7208 5.0GB External 8mm Tape Unit Model 012 Operator Guide*, SA26-7036.

  You can prepare 112–meter tapes on the Model 012 with the Initialize Tape (INZTAP) command.

  It is not necessary to mark the boxes on a cleaning cartridge that is used only with Model 012 tape drives. You can use the 8-mm Cleaning Cartridge (part 16G8467) approximately 40 times in a Model 012 (until the amber status light on the Model 012 does not turn off).

  Note: If you attempt to clean a tape drive that does not have the amber cleaning status indicator on, and you are using an expired cleaning cartridge, the drive will eject the expired cleaning cartridge and turn the amber cleaning status indicator to solid.

  The 7208 Models 012 does not support the 160-meter tape. The 160-meter tape is automatically ejected when loaded in the 7208 Models 012.

For the 7208 Model 222, refer to the following publication:

- *IBM 7208 7.0GB External 8mm Tape Unit Model 222 Operator Guide*, SA26-7117.

For the 7208 Model 232 and 234, refer to the following publication:

- *IBM 7208 External 8mm Tape Subsystem Models 232 and 234 operator's Guide*, SA26-7104.

  Models 232 and 234 can be attached with one or two cables to a single AS/400 system, or two separate AS/400 systems that have different AS/400 tape addresses. These models can be configured for mirroring or extended unattended save capability. Model 234 initializes either a 5.0 gigabyte (112 meter) or 7.0 gigabyte (160 meter) tape cartridge. However, both tape lengths are reported as FMT 5.0 gigabyte tape cartridges by the AS/400 system.

  The 7208 Model 232 does not support the 160-meter tape. The 160-meter tape is automatically ejected when loaded in the 7208 Models 232.

For the 7208 Model 342, refer to the following publication:

- *IBM 7208 20GB External 8mm Tape Unit Model 342 Setup and Operator Guide*, SA37-0380.

Note: The 7208–342 can read tapes written at the 2GB, 5GB, or 7GB formats. However, if a 20GB tape is inserted after the drive has been using a lower density tape, the 20GB tape is ejected and the drive will post a **must clean** message. The drive must be cleaned using the correct cleaning cartridge before it may be used again.

For the 9427 Models 210 and 211, refer to the following publication:

- *IBM 7208 External 8mm Tape Subsystem Models 210 and 211 operator's Guide*, SA26-7108.

The feature code 6390 is an 8mm tape unit that is internal to the AS/400. The 6390 supports the 7GB format when the 160-meter tape is used.

Status Lights for 8MM Tape Units: The 8mm tape units that support the 5.0GB, 7.0GB or 20GB format have three indicator lights: two green and one amber. These status lights are turned on and off in various combinations to indicate the status of the tape units.

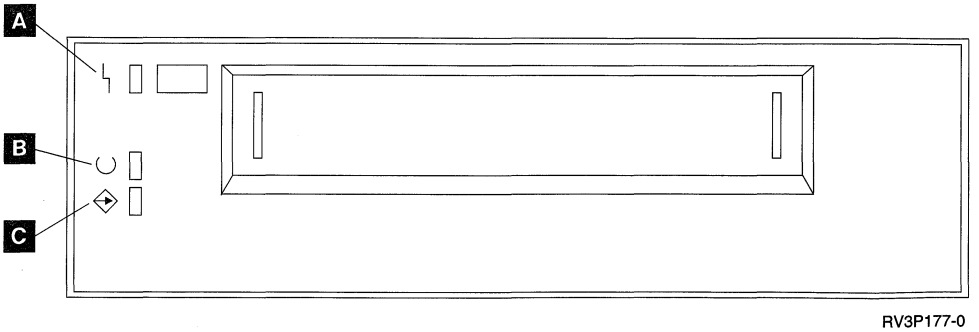


Figure 2-30. The 8MM 5.0GB or 7.0GB tape unit

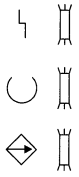
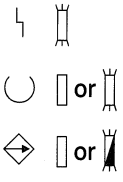
The symbols located next to the status lights are the International Organization for Standardization (ISO) symbols that define the general function of the status lights as follows:

A Disturbance. The amber status light flashes whenever the tape unit encounters an irrecoverable fault. It is on solid whenever the tape drive requires cleaning.

B Ready. The green status light is on solid whenever the tape unit is ready to receive the tape backup commands.

C Read-Write. The green status light flashes whenever the tape unit is moving the tape.

The various on/off combinations of the status lights are shown in the following chart.

Status Lights	State	Status
	On On On	The Power-on Self Test (POST) is running or the system has issued a reset to the drive. **Note:** The POST condition can occur either when the power is first applied or after use of the diagnostic cartridge.
	Off Off Off	One of the following has occurred: 1. The power is off. 2. The POST has completed successfully but no tape cartridge was inserted.
	Off Off Flashing	A tape cartridge has been inserted and the tape drive is performing a tape load/unload operation.
	Off On Off	The tape load operation has completed and the tape drive is ready to receive commands from the system.
	Off On Flashing	The tape is in motion and the tape drive is busy running a device operation.
	Flashing Off Off	The flash rate is fast (4 flashes per second) when using the test cartridge. The flash rate is slow (1 flash per second) when the tape drive has detected an internal fault that requires corrective action. Refer to your Service Guide or contact your service representative.
	On Off or On Off or Flashing	The tape path requires cleaning.

RV3P176-1

Figure 2-31. Status lights on the 8MM 5.0GB or 7.0GB tape units

Using 8-Millimeter Tape Cartridges

The following are the cartridges you can use in the 8-mm tape unit:

Test Cartridge #21F8577: Test Cartridge #21F8577 is used to write test data onto a tape cartridge. The tape unit reads the recorded data to check the write operation. Do not use this cartridge to save programs or data.

Note: This test cartridge may be used with the 2.3GB, 5.0GB, and 7.0GB 8-mm tape units.

Test Cartridge #59H2677: Test Cartridge #59H2677 is used to write test data onto a tape cartridge. The tape unit reads the recorded data to check the write operation. Do not use this cartridge to save programs or data.

Note: This test cartridge can only be used with the 20GB 8mm tape unit.

Diagnostic Cartridge #46G2660: Only use the Diagnostic Cartridge when the system is not available and you are not able to use Test Cartridge #21F8577. This diagnostic cartridge contains a program that tests only the read capability of the tape drive.

Note: Diagnostic Cartridge #46G2660 may not be used with the 7208 Model 002 or Model 342 tape units. Call your service representative for additional copies of the Diagnostic Cartridge.

8-mm (112-m) Tape Cartridge #21F8595: Use this cartridge to save your programs or data. Each tape cartridge provides up to 2.3GB of storage with the 7208 Model 002 or 5.0GB of storage on the 8-mm 5.0GB or 7.0GB tape units.

Note: Tape cartridges 21F8595 and 87G1601 can be read in the 7208 Model 342 but cannot be written.

8-mm (160-m) Tape Cartridge #87G1601: Use this cartridge to save your programs or data. Each tape cartridge provides up to 7.0GB of storage with the 7208 Models 222 and 234, 9427 Models 210 and 211, and Feature Code 6390.

8-mm Tape Cartridge #59H2678: Use this cartridge to save your programs and data with the 7208 Model 342.

Note: This cartridge cannot be used in the 7208 Models 002, 012, 222, 232, 234 or in the 9427 Models 210, 211, or in the feature code 6390.

Cleaning Cartridge #21F8593 and #16G8467: Use this cartridge for cleaning the 2.3GB, 5.0GB, and 7.0GB 8-mm tape unit heads. #16G8467 is a mildly abrasive cleaning tape and should be used whenever tape unit problems are encountered.

Cleaning Cartridge #59H2898: Use this cartridge for cleaning the 7208 Model 342.

Note: This cartridge cannot be used in the 7208 Models 002, 012, 222, 232, 234 or in the 9427 Models 210, 211, or in the feature code 6390.

Loading the 8-Millimeter Tape Cartridge: To load a tape cartridge, push the blue load/unload pushbutton on the tape drive.

- For the 7208 Model 002 tape unit, the tape drive opens, and a cartridge tray ejects. After a tape cartridge is inserted, push the tape drive door until the mechanical latch holds the door closed. The tape drive loads the tape from the tape cartridge.
- For all the other 8mm tape units, insert a tape cartridge through the cover door into the tape drive. The tape drive loads the tape from the tape cartridge.

  If you need more information, see the books listed in topic "Using 8-Millimeter Tape Units" on page 2-47.

The tape takes about 25 seconds to load. When the green ready light comes on, the drive is ready for data operations.

You can type commands on your display station while the tape is loading. Any commands to the tape unit start running once the tape has finished loading. Commands that do not require the tape cartridge are run immediately.

Unloading the 8-Millimeter Tape Cartridge: You can unload a tape cartridge by a system command or by pushing the load/unload pushbutton on the tape drive. Depending on the position of the tape, the time for rewind and unload is between 18 seconds and 3 minutes.

The drive rewinds the tape within the cartridge.

- The 7208 Model 002 tape unit ejects the tray containing the tape cartridge. After a cartridge is removed, another cartridge may be inserted. To keep dust and other contaminants out of the tape drive, push the drive door closed until the mechanical latch holds the door closed.
- The 7208 Models 012, 222, 232, 234, 342 or the 6390 tape unit ejects the tape cartridge, which can then be removed.

If the tape cartridge cannot unload and has to be removed manually from the drive, contact your service representative.

Protecting Data Stored on 8-Millimeter Tape Cartridges: The window on the tape cartridge that is shown in Figure 2-32 on page 2-53 controls write protection. To prevent data from being written on the tape cartridge, slide the tab so that the window is closed. To allow data to be written on the tape cartridge, slide the tab so that the window is open.

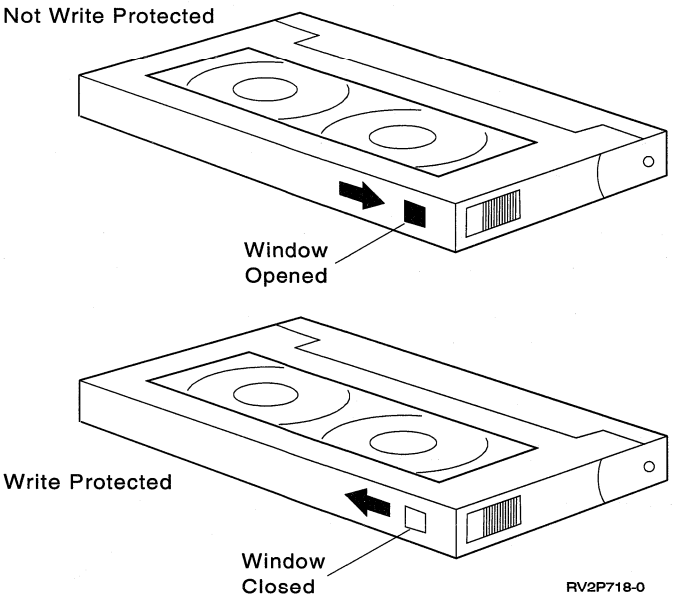


Figure 2-32. Write Protection of 8-mm Tape Cartridges

Erasing Data on the 8-Millimeter Tape Cartridge: To erase data on an 8-mm tape cartridge, use a tape erasing device that has a magnetic coercivity strength of 1500 oersteds or more.

Note: You may also erase the tape by specifying *YES for the *Clear* parameter on the Initialize Tape (INZTAP) command. However, this method takes up to 3.5 hours. For the 160-m tape unit, it may take up to 5 hours.

Using 1/2-Inch and Magstar MP Tape Units

AS/400 supports the following 1/2-inch tape units:

- 3480
- 3490
- 3490E
- 3494
- 3590

AS/400 supports the following Magstar MP tape units:

- 3570

Tape Unit with Automatic Cartridge Loader: There are two ways that tape cartridges can be loaded with the automatic cartridge loader:

Manual Mode You insert tape cartridges one at a time by pressing the Start key.

Auto Mode You can preload multiple tape cartridges. The tape cartridges will automatically load when the previous cartridge is unloaded.

Note: For the 3570, 3490Fxx, 3590, and 3494, the tape device supports a random mode of operation. In random mode, the tape device operates as a tape library. Tape libraries require special considerations. For more information, see the following book:

- *Automated Tape Library Planning and Management*, SC41-5309.

Sharing Systems with a 3480, 3490, 3490E, or 3590 Tape Unit: The 3480, 3490, 3490E, or 3590 tape units can be attached to:

- One or two input/output processors on the same AS/400 system.
- Two AS/400 systems.
- An AS/400 system and a System/390*.

You can choose whether or not you want your 3480, 3490, 3490E, or 3590 tape unit assigned to an AS/400 system when the tape unit is varied on (made available for intended use). Assigning a tape unit reserves the tape unit specifically for one system.

To assign a 3480, 3490, 3490E, 3570, or 3590 Tape Unit:

1. Use the Work with Device Description (WRKDEVD *TAP) command to work with a tape device description. in the *Assign device at vary on* field and press the Enter key to assign the tape unit to the system.

   Note: **YES* is the default for Version 2 Release 3. For Version 2 Releases 1 and 2, the assign device at vary on parameter was not optional. For releases prior to Version 2 Release 1, the assign function did not exist.

2. Use the Vary Configuration (VRYCFG) command to vary off the tape unit.

   Note: The Vary Configuration (VRYCFG) command can be run by using the VRYCFG command or by using the Work with Configuration Status (WRKCFGSTS) command. To use the Work with Configuration Status command, type `WRKCFGSTS *DEV *TAP` and press the Enter key.

3. Use the VRYCFG command to vary on the tape unit and assign it to the system.

If the tape unit is being used by the other system, a message is displayed that indicates the tape unit is assigned elsewhere. The tape unit must be varied off (made unavailable) at the other system before it can be varied on (made available) at a new system.

To leave a tape unit unassigned:

1. Use the Work with Device Description (WRKDEVD *TAP) command to work with a tape device description. In the *Assign device at vary on* field and press the Enter key to leave the tape unit unassigned.

   Attention: A tape unit that is unassigned may be varied on to both systems. The operator must control the tape application programs so that the two systems do not interfere with each other. The results of failing to control the tape application programs may be unpredictable.

2. Use the Vary Configuration (VRYCFG) command to vary off the tape unit.

3. Use the VRYCFG command to vary on the tape unit.

Remember:

- When a tape unit is being shared by two AS/400 systems, the tape unit can only be in VARY ON status on one system at a time. To use a drive, vary it on by typing the following on any command line and pressing the Enter key:

  ```
  VRYCFG CFGOBJ(TAPxx) CFGTYPE(*DEV) STATUS(*ON)
  ```

- If you do not want to vary on tape units during future IPLs, type the following on any command line and press the Enter key:

  ```
  CHGCTLTAP CTLD(TAPCTLxx) ONLINE(*NO)
  ```

  After doing an IPL, to vary on only the controller, type the following on any command line and press the Enter key:

  ```
  VRYCFG CFGOBJ(TAPCTLxx) CFGTYPE(*CTL) STATUS(*ON) RANGE(*OBJ)
  ```

1/2-Inch and Magstar MP Tape Unit Addressing: For a 34xx or 35xx tape device attached to a type 6501 or 6534 IOP or a type 2729 IOA, the SCSI address must be set to 0 when the device is used for IPL. The SCSI address can be set to any address except 7 when the device is not being used for initial program load.

For a 34xx tape device attached to a type 2644 IOP, the controller address must be set to address 7. The device address must be set to address 0 when the device is used for IPL. Address 8 can be used when there is no device at address 0. The controller and device can be set to any value when the device is not being used for IPL.

Backing Up and Restoring Data with the 1/2-Inch and Magstar MP Tape Unit: The 3480, 3490, 3490E, 3570, or 3590 attached tape unit is most often used to back up and restore data. You can use multiple tape units to back up and restore data plus the automatic cartridge load function to do an unattended backup. When using multiple tape units, the sequence of tape media used is across the tape units: the first tape is on tape unit 1, and the second on tape unit 2.

For example, if you use the 3490 tape unit (model D32) with the automatic cartridge load function to back up the data, 12 cartridges can be loaded using the automatic cartridge load function. When the job is complete, tapes 1, 3, 5, 7, 9, and 11 are in tape unit 1. Tapes 2, 4, 6, 8, 10, and 12 will be in tape unit 2. To restore the data, the odd-numbered tapes must be loaded into tape unit 1 and the even-numbered tapes in tape unit 2.

Before backing up data, all tapes should be initialized on the model and type of tape unit that will be used to do the backup. Tapes that are initialized on other tape units may not be recognized by the AS/400 system. Tapes that are initialized on a 3490 D3x tape unit cannot be used on 3490E D4x or Cxx tape units.

Cleaning the 3480, 3490, 3490E, and 3590 Tape Unit: On the average, clean the tape path on each drive every seven days. If you use an unusually large amount of tape, clean the tape path more often. If the drive displays a *CLEAN message, clean the tape unit path as soon as possible. You should also clean the tape path after each initial program load (IPL), after a drive is reset, or whenever the power on the tape drive has been interrupted.

To clean the tape path, insert the special cleaning cartridge as you would a normal tape cartridge. The part number for the 3490 cleaning cartridge is 4780527. The part number for the 3590 cleaning cartridge is 05H4435. Keep track of the number of uses on the label provided with each cleaning cartridge and then throw the cartridge away after 500 uses.

Tip:

1. Do not use a grease pencil on the label.
2. The cleaning cartridge should be undamaged and clean when it is inserted into a tape unit.

If your tape unit has the automatic cartridge loader feature, put the cartridge into the feed position and press the start pushbutton. The cleaning cartridge can also be put into the input stack, and the cleaning procedure takes place whenever the cleaning cartridge is loaded into the drive. If you start cleaning during a job, an inquiry message is displayed. After responding to the message, the drive threads the cleaning tape, cleans the read/write head, and then rewinds and unloads the cleaning cartridge. When the cartridge has been unloaded, remove it and mark the usage label.

Cleaning the 3490 Fxx, 3494, and 3570 Tape Units: These tape units provide random access to the tape cartridges. When the device detects that cleaning is needed, the tape unit will perform the cleaning operation automatically, if the cleaning cartridge is in the internal cell (known only to the Random Access Cartridge Loader). The tape unit keeps track of the number of cleaning operations performed by the cleaning cartridge and ejects the cleaning cartridge through the priority cell when the cleaning cycles allowed for the cleaning cartridge have been used up. The part number for the 3590 Tape Cleaning Cartridge is 05H4435. The part number for the 3570 Tape Cleaning Cartridge is 05H2463.

Using 1/2-Inch and Magstar MP Tape Cartridges

Before You Start:

Inspect the cartridge and do not use it if:

- The cartridge case is cracked or broken.
- The leader block or the latch is broken.
- The file-protect selector is damaged.
- The cartridge case contains any liquid.
- The cartridge case has any other obvious damage.
- The tape is wound completely out of the cartridge onto the machine reel and then reattached to the cartridge reel by the service representative. This repair is temporary and permits the cartridge to be loaded one time so that the data can be copied on a replacement cartridge.

  Note: If you have a damaged cartridge, substitute a backup version of the data from another cartridge. If the cartridge has a detached leader block but no other damage, you can repair the cartridge with the *IBM Leader Block Repair Kit.*

If dirt appears on the external surface of a cartridge, lightly moisten a lint-free cloth (IBM part 2108930) with IBM cleaning fluid (IBM part 8493001), or its equivalent, and wipe the outside surfaces.

Attention: Do not allow anything wet, including the cleaning fluid, to contact the tape.

Make sure all cartridge surfaces are dry and the leader block is snapped into place before you load the tape cartridge.

Protecting Data Stored on 1/2-Inch Tape Cartridge: To protect the data, roll the thumbwheel selector on the side of the cartridge left or right until it is in the correct position.

The 3570 and 3590 data cartridges are preformatted with data servo tracks. These cartridges should not be bulk erased. The 3570 and 3590 tape devices have control data at the beginning of each cartridge. The device updates (writes) this region every time a cartridge is loaded. As a result, the device display will state **writing** even if you have file protected the cartridge. This data is separate from the user data.

Note: For more detailed information about using 1/2-inch tape cartridges, see *Care and Handling of the IBM Magnetic Tape Cartridge* GA32-0047.

Protecting Data Stored on Magstar MP Tape Cartridge: To protect the data, slide the file protect selector on the end of the cartridge until it is in the correct position.

Note: For more detailed information about using Magstar MP tape cartridges, see the *IBM 3570 Magnetic Tape Subsystem Operator's Guide* GA32–0345.

Using 1/2-Inch Tape Reels

Use the following tape and reel recommendations for maximum performance and reliability:

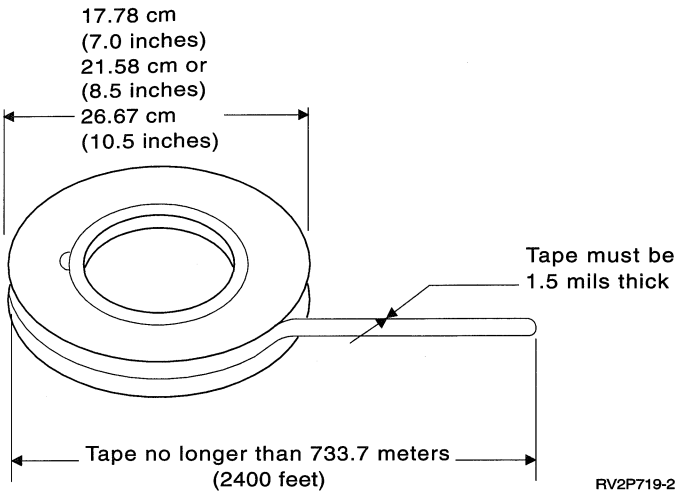
Tapes:

1.5 mil thick
A maximum of 733.7 meters (2400 feet)

Reels:

15.24 cm (6.0 inches)
17.78 cm (7.0 inches)
21.58 cm (8.5 inches)
26.67 cm (10.5 inches)

Using tapes that are longer than 2400 feet is not recommended. Using these tapes will cause the tape unit head to wear incorrectly. You could have an increase in read and write errors.



Follow these tips to ensure that your tape reels are used correctly:

Remember:

- Secure the end of the tape with a tape end fastener when not in use.
- Keep the reel protected with a locking collar when not in use.
- Store tapes in a vertical position.

Do Not:

- Squeeze the outer flanges of the reels when handling and loading tape. Hold the tape evenly around the outer edge by the palm of your hand.
- Allow tape ends to drag on the floor and get dirty.
- Touch the tape surface.

Preparing a Tape Leader: A tape leader that is square or damaged can cause the tape to load incorrectly in units that automatically load tapes. When using this type of tape unit, ensure that the tape loads correctly by:

- Preparing the tape leader with the tape leader tool (IBM part 2512063).
- Pressing hard when cutting the tape. This prevents static problems on the tape leader.

Figure 2-33 on page 2-59 shows how to correctly prepare a tape leader.

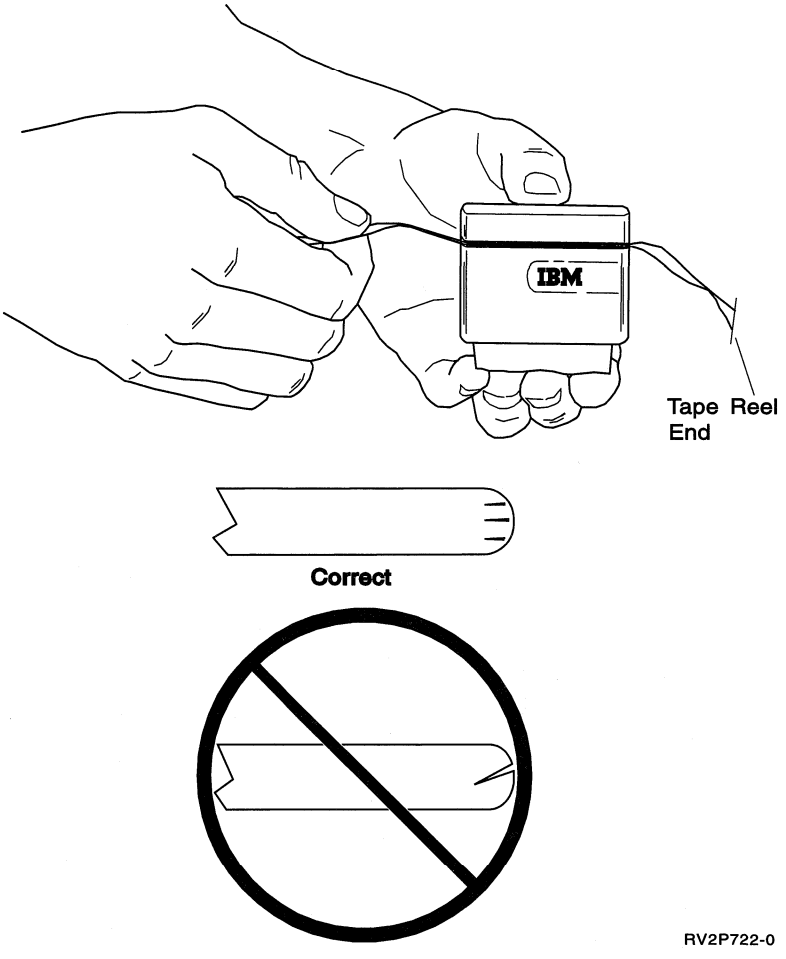


Figure 2-33. Preparing a Tape Leader

Loading the 1/2-Inch Tape Reel: When loading 6-inch and 10-inch reels of tape on the 9348, carefully place the tape reel on the center of the hub.

When loading a tape reel, ensure that the loose end of the tape is on the tape reel and not under the reel.

Protecting Data Stored on the 1/2-Inch Tape Reel: To prevent the drive from writing data, remove the write enable ring as shown in Figure 2-34 on page 2-60. To allow the drive to write on the tape, install the write enable ring.

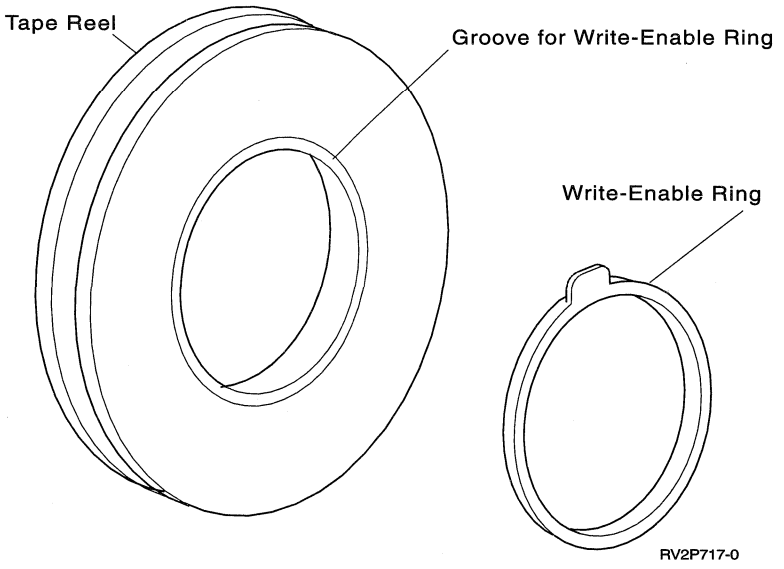


Figure 2-34. 1/2-Inch Tape Reel Write Protection

Cleaning the 1/2-Inch Tape Reel Unit: Use Table 2-5 as a guide to establish how often to clean your tape reel unit.

Table 2-5. Cleaning the 1/2-Inch Tape Reel Unit

When:	Clean the tape path:
Less than ten reels are used in eight hours.	Every eight hours.
More than 10 reels are used in eight hours.	Every one to two hours of running.
Particles appear on the tape path or you are using new or seldom used tapes.	After each reel.

Use the following cleaning supplies:

- Tape cleaning kit, IBM part 352465 or equivalent
- Cleaning fluid, IBM part 8493001, 13F5647, or equivalent
- Lint-free cloth, IBM part 2108930
- Rigid cleaning tool, IBM part 2200574 or equivalent

To clean the tape reel unit:

1. Set the power switch to the Off position.
2. Clean the following areas using a lint-free cloth or swab and cleaning fluid:

   Read/write head
   Tape cleaner block
   Tape guides
   General tape path

Pay particular attention to the read/write head and tape cleaner block. Push hard against the read/write head. Dry the areas with a lint-free cloth until the cloth comes away clean.

If the tape unit is cleaned thoroughly and a particular tape is causing errors, discard the tape.

General Tape Usage Information

Tape Volume, Initialization, and Volume ID

A **volume** is a tape reel, a tape cartridge, or a diskette. Each volume must be initialized before data files can be recorded on the tape (or diskette) magnetic medium. A tape **volume ID** is a name or number identification that is recorded in a standard volume label at the beginning of the tape when a tape is initialized.

Initializing Tape: Use the Initialize Tape (INZTAP) command to initialize a tape. When you run this command, a standard volume label is recorded at the beginning of the magnetic tape medium.

- When a tape is initialized, any information previously recorded on the tape medium is erased and written over with new information. Information is also written over when new data files are appended to the newly recorded volume label.

Note: Do not reuse an old tape volume if permanent read or write errors have been detected more than two times. Also do not reuse an old tape volume if temporary read or write errors for that volume are excessive. To determine if temporary errors are excessive, see "Monitoring Tape Volume Statistics" on page 2-63.

Commonly Used Parameters of the INZTAP Command: The most commonly used INZTAP parameters are:

- New volume identifier (Volume ID)
- Check for active files
- Tape density

***New Volume Identifier* (Volume ID)**

Use the new volume identifier parameter to provide a unique volume identification (ID) for a tape being initialized for use as a standard labeled tape. This parameter is required for tape cartridges. This option is not required by 1/2-inch tape reels.

- On the Initialize Tape display, type the volume identifier of your choice in the new volume identifier parameter. The identifier can be no longer than six characters in length and should not start with a *.

Check for Active Files

An active file has an expiration date that is equal to or later than the current date.

Select one of three options to complete the parameter:

- Type *YES in the check for active files parameter if you want all data files on the tape to be checked before the tape is initialized. If an active file is found, the tape volume is not initialized and you receive an error message.

Attention: ***Check for active files=*YES*** is the default option. The processing of tapes that have a large file, or tapes that have many files, may take a long time. The processing of 8-millimeter tapes may take up to 3.5 hours.

- Type *NO in the check for active files parameter if you want the tape to be initialized immediately without checking for active files. Use *NO when:
  - The tape or data cartridge is new.
  - You are sure you want the volume initialized and you want the INZTAP processing to complete in the minimum amount of time.
  - You are sure you want the volume initialized and the INZTAP command failed when you entered *YES or *FIRST in the parameter field.

Attention: If you type *NO in the Check for active files parameter, the system writes over all data that is on your tape. Make sure the tape cartridge you are using is new. If the tape you are using is not new, be certain that you want the tape volume initialized regardless of the data that is on the tape.

- Type *FIRST in the check for active files parameter if you want to check only the first file on the tape. If this file is active, the tape volume is not initialized. The processing time for this parameter option depends on the size of the first file on the tape.

Tape Density

The tape density parameter determines the amount of data recorded per inch of tape. The choice of density also changes the format of 1/4-inch and 8-mm tape cartridges.

If you are initializing two or more reels or cartridges for a multi-volume SAVE operation, the density and format of all volumes must be the same.

Clear

The clear parameter is used to erase all of the data on the tape medium that follows the standard volume label record at the beginning of the tape. The Magstar MP, 1/2-inch, and all 1/4-inch tape drives except the QIC-5010 tape drive have an erase head that erases all data tracks in one pass. The QIC–5010 1/4–inch tape drive and the 8-mm tape drive erases at the normal write speed. This can take a very long time.

Note: Using the clear parameter to erase QIC–5010 1/4–inch tapes and 8-mm tapes is not recommended because the process time for erasing 8-mm tapes can be up to 3.5 hours.

Copying Tapes

To copy a tape:

1. You must have two tape drives.
2. Make sure the tape units are turned on.
3. Load the tape to be copied into one tape unit.
4. Load the tape receiving the information in the other tape unit.

Note: If the tape that receives the information is new, you must initialize it before continuing. See "Tape Volume, Initialization, and Volume ID" on page 2-61 for information on how to initialize a tape.

5. Enter the Duplicate Tape (DUPTAP) command and press F4 (Prompt).
6. Specify the name of the tape unit from which the information is to be copied in the From device (FROMDEV) parameter.
7. Specify the name of the tape unit to which the information is to be copied in the To device (TODEV) parameter.
8. Press the Enter key. A message is displayed when it is time to insert a new tape.

Monitoring Tape Volume Statistics

To ensure that your tapes are in good condition, you should monitor the tape volume statistics on your AS/400 system.

1. Use the Start System Service Tools (STRSST) command.
2. Select option 1 (Start a service tool) on the System Service Tools menu.
3. Select option 1 (Product Activity Log) on the Start a Service Tool menu.
4. Select option 4 (Work with removable media lifetime statistics) on the Product Activity Log menu.
5. Select the type of removable media for which you want data on the Select Media Option display. The Work with Lifetime Statistics display appears.

```
                        Work with Lifetime Statistics

Removable media . . . . . :   1/4 inch cartridge tape

Type options, press Enter.
4=Delete entry   6=Print entry

         Volume      --Temporary Errors---     --------K Bytes-------
Option   ID               Read       Write          Read     Written
       >>PHB021        23452450       23450      23457123    97689690
         THB021              2           0         14307           0
         AIPLT               0           3        214494      137546
         AD0000              0           0             3           0
         AIPL                0           0             2       27620
         IVIHE               0           0             1           0
         MM                  0           0           361           0
         PHB031              0           0             2           0
         PTFFIX              0           0             3         432


F3=Exit             F5=Refresh          F10=Delete all
F11=Print all       F12=Cancel

(C)  COPYRIGHT IBM CORP.
```

Figure 2-35. Work with Lifetime Statistics Display

6. If you see the following symbols preceding the volume ID on the Work with Lifetime Statistics display, take the appropriate action:

Symbol	Explanation	Action to take
>>	Media replacement recommended	Copy the contents of the media to a new tape and discard the old tape.
>	Media approaching replacement criteria	• Replace the tape if the tape format is: – QIC-120 – 7208 2.3GB – 6250 bpi density • If the tape format does not fulfill the above conditions, continue to monitor this tape to ensure that media replacement is not necessary.

Note: To ensure accurate statistics, each tape cartridge or reel must have a unique volume ID.

When to Clean

After 400 MB of data transfers have occurred for the volume ID, the Error Log Utility uses the following guidelines to determine whether a particular tape should no longer be used.

- Discard tape reels and tape cartridges that have a read or write error.
- If all tapes used in a single drive exceed the criteria that follows this list, the read/write head are probably dirty and should be cleaned.
- If a tape reel or cartridge exceeds the criteria that follows this list, copy the contents to a new tape and discard the old tape.

1/4-Inch Tape Cartridge:

- Tape cartridges recorded in QIC-120 format
  - One temporary write error per 1250KB written.
- Tape cartridges recorded in QIC-525, QIC-1000, QIC-2GB, or QIC–4GB format
  - One temporary write error per 890KB written.
- Tape cartridges recorded in QIC-3040 format
  - One temporary write error per 890KB written.
- Tape cartridges recorded in QIC-5010 format
  - One temporary write error per 125KB written.

See Table 2-2 on page 2-39 for a list of tape cartridges.

8-Millimeter Tape Cartridge:

- 7208 2.3GB Format
  - One temporary write error per 50KB written.
- 7208 5.0GB or 6390 7.0GB Format
  - One temporary write error per 10KB written.

1/2-Inch and Magstar MP Tape Cartridge:

- 3480 and 3490
  - One temporary write error per 160,000KB written.
- 3570 and 3590
  - No criteria for pass or fail is defined for this media. This device tracks the media statistics and will notify the operator and host system when the media needs to be replaced.

1/2-Inch Tape Reel:

- 9347
  - One temporary write error per 4,500KB written.
- 9348 and 2440
  - One temporary write error per 5,000KB written for 1600 bpi.
  - One temporary write error per 8,500KB written for 6250 bpi.
- 3422

- One temporary write error per 8,500KB written.

Storage Device Ready Conditions

Use Table 2-6 if you are having trouble making a device ready. All the conditions listed for each device must be correct for the device to be ready.

If you are not able to make a device ready, contact your service representative.

Table 2-6 (Page 1 of 2). Storage Device Ready Conditions

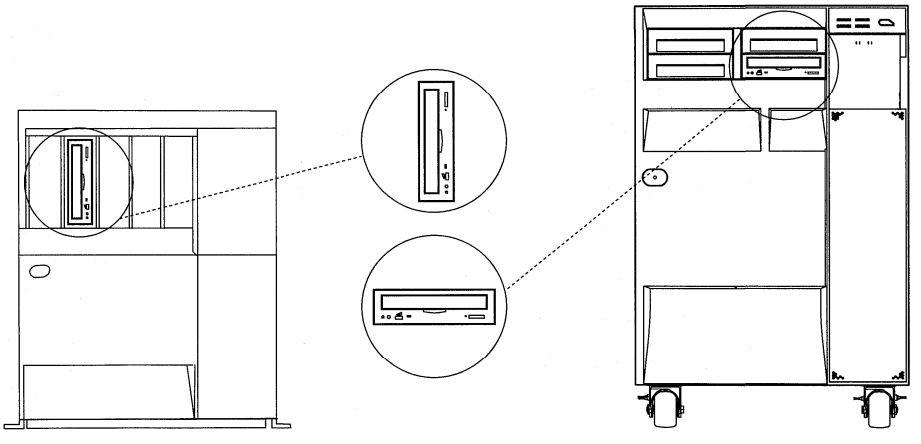
Storage Device	Ready Description	Reference Information
Tape Unit		
2440	• Power light is on • Tape is loaded • Status display shows A 0 • Online light is on	*IBM 2440 Magnetic Tape Subsystem Operator's Manual* G571-0149.
1/4-inch	• Tape cartridge is inserted. – The tape cartridge must be changed or, to reuse the same cartridge, the tape drive must be opened and closed again under the following conditions: - The tape unit was made unavailable (varied off). - The tape application program ended with the *UNLOAD option. – If the tape unit is inserted into the 5032 Removable Storage Unit, the 5032 power switch must also be on.	
7208/6390 8mm	• Power light is on • Tape cartridge is inserted • Ready light is on The 7208 Model 002 and 012 are table top tape units. If a tape unit has been moved, ensure that the external signal cable is properly connected.	• *7208 2.3GB External 8mm Tape Drive Model 002 Operator's Guide*, SA23-2675. • *7208 5.0GB External 8mm Tape Drive Model 012 Operator's Guide*, SA26-7036.
9347	• Power light is on • Load/Rewind light is on • Online light is on	*7208 20 GB External 8mm Tape Unit Model 342 Setup and Operator's Guide*, SA37-0319.
9348	• Power light is on • Tape is loaded • Status display shows 00 A002 • Online light is on	*9348 Customer Information*, SA21-9567.
3422/3430	• Power light is on • Enable/Disable switch is set to the Enable position • Tape is loaded • Ready light is on	*IBM 3422 Magnetic Tape Subsystem Operator's Guide*, GA32-0090.

Table 2-6 (Page 2 of 2). Storage Device Ready Conditions

Storage Device	Ready Description	Reference Information
3480/3490/ 3490E	• Power light is on • DC Power light is on • Control unit Online switch is set to the Online position • Control unit Normal/Test switch is set to the Normal position • Control unit channel Enable/Disable switch is set to the Enable position • Tape unit Online/Offline switch is set to the Online position • Tape is loaded • Tape unit displays Ready U or Ready F	See the appropriate operator's guide for your specific model.
3570/3590	• Tape is loaded • Tape unit displays Ready	
Diskette Unit		
9331	• Power light is on • Unit Ready light is on	

Using CD-ROM

The CD-ROM drive is a read-only drive. The feature code for the AS/400 system CD-ROM drive is 6320 or 6321. Figure 2-36 shows the CD-ROM drives on the System Model 4xx and System Model 5xx.



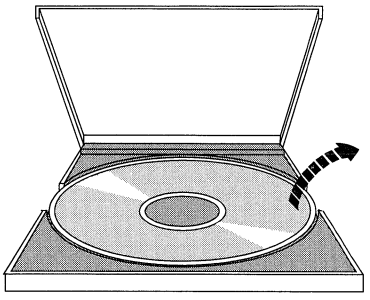
RV3P171-2

Figure 2-36. CD-ROM drives on the System Model 4xx (left) and System Model 5xx (right)

Note: The CD-ROM drive on the AS/400 system is not enabled for the digital audio disc.

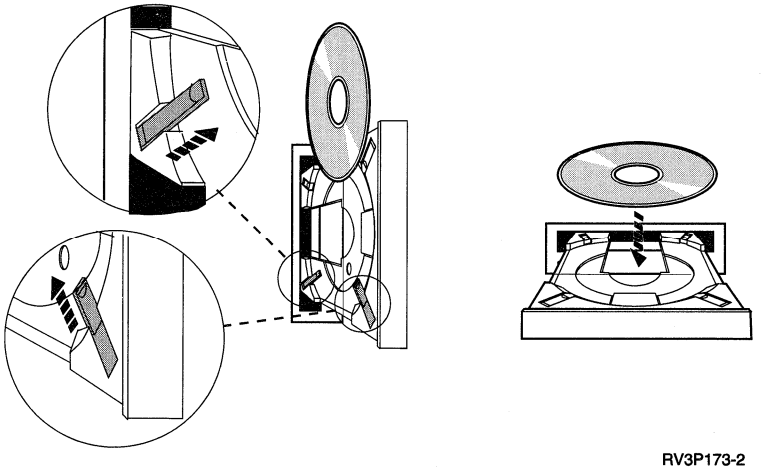
Loading and unloading a CD

1. Remove the CD from the protective case.



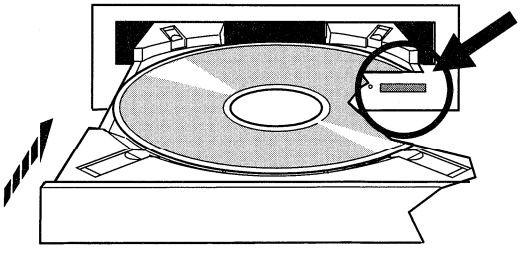
RV3P172-0

2. Slide the CD into the CD tray with the label side showing. If your CD-ROM is vertically positioned, make sure that the CD is secured by the two tabs at the bottom of the CD tray as shown on the left in the following illustration.



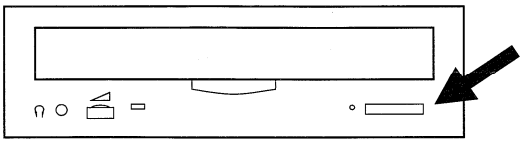
RV3P173-2

3. When you have properly positioned the CD in the CD tray, press the Eject button or push the tray into the CD-ROM drive.



RV3P174-0

4. To remove the CD from the CD-ROM drive, press the Eject button.



RV3P175-0

Cleaning

No preventive maintenance is necessary for the CD-ROM drive. Always handle discs by the edges to avoid finger prints. Discs can be wiped with a soft lint-free cloth or lens tissue. Always wipe in a straight line from the inner hub to the outer rim.

Verify Optical Device

The Verify Optical(VFYOPT) command can be used to detect hardware errors, or verify whether a problem has been resolved. This function can be used to verify a CD-ROM drive or a directly attached optical media library device.

To use this function, do the following:

1. On any command line, type

   `VFYOPT DEV(xxxxxxxxxx)`

   where xxxxxxxxxx is the device name.

   A display is shown with instructions on how to perform verification test.

2. Follow the instructions, and press the Enter key. The verification test is run.

   If the test completes successfully , you will receive a message about the successful completion. If hardware errors occur during the test, you will receive an error message.

Using Optical Media Libraries

The IBM 3995 Optical Library Dataserver is a storage device for the AS/400 system that provides removable and permanent storage of information on optical media. The 3995 Optical Library lets you access data right at your work station. It is an alternative to retrieving data that is traditionally kept on paper, stored on diskette, stored on microfilm, or stored on magnetic tape.

If you are using the 3995 Optical Media Library and would like more information, see the following manuals:

- *IBM 3995 AS/400 Optical Library Dataserver: Operator's Guide Models 142 and 042*, GA32-0140
- *Optical Support*, SC41-5310

Chapter 3. Handling and Reporting System Problems

When you are analyzing your problem, in many cases, you will be able to solve the problem yourself. Other times, you may need the help of a technical support person or a service representative. When you do need outside help, it is important for you to collect as much information about the problem as you can by following the steps in this chapter. For more information on how to report a detected problem, see "Reporting hardware and software problems" on page 3-9.

Before You Begin

Ask yourself the following questions:

Note: If you suspect a problem with System Support Program (SSP), see *System Problem Determination-SSP*, SC21-8296.

- Has there been an external power outage or momentary power loss?
- Has the hardware configuration changed?
- Has system software been added?
- Have any new programs or program changes been recently installed?

  To make sure that your licensed programs and products have been properly installed, use the Check Product Option (CHKPRDOPT) command.
- Have any program temporary fixes (PTFs) been applied recently?

  Some problems can be corrected by installing cumulative PTF packages. Even if there is no change activity to the equipment or programs on your system, you should install cumulative PTF packages every three or four months. If you are experiencing changes to your system, you should order and install the current cumulative PTF package to keep your system at the most current PTF level. See "What are PTFs and Why Do I Need Them?" on page 5-13 for information on PTFs.
- Have any system values changed?
- Has any system tuning been done?

Keep these questions in mind while you are diagnosing the problem.

1. Can you power on your system?

   Yes **No**

   ↓ Go to "Analyzing Problems With a Symptom" on page 3-15.

   Continue with next step.

2. Does the Function/Data display on the system control panel start with Function 11-3, or is the System Attention light on? Cycle through the functions using the ↓ or ↑ buttons to determine if a 11–3 exists.

   No **Yes**

   ↓ Go to step 17 on page 3-5.

   Continue with next step.

Additional Information:

Press the Enter pushbutton to alternate between function and data.

3. Does the system console show a Main Storage Dump Manager display?

   No **Yes**

   ↓ See "Performing a Main Storage Dump" on page 3-22.

   Continue with next step.

4. Does the display station that was in use when the problem ocurred (or any display station) still appear to be operational?

   Yes **No**

   ↓ If your system console can not vary on, go to "Procedure 11–Recovering When System Console did not Vary On" on page 3-21. For all other workstations, go to "Procedure 5–Recovering From Workstation Failure" on page 3-19.

   Continue with next step.

   Additional Information:

   The display station is operational if there is a sign-on display or a menu with a command line. If another display station is operational, use that display station to solve the problem.

5. Is there a message related to this problem shown on the display station?

   Yes **No**

   ↓ Go to step 10 on page 3-3.

   Continue with next step.

6. Is this a system operator message?

   Yes **No**

   ↓ Go to step 8.

   Continue with next step.

   Additional Information:

   A message is a system operator message if the display indicates that the message is in the QSYSOPR message queue. Critical message can be found in the QSYSMSG message queue. For information about QSYSMSG message queue, see chapter 4 of the *System Operation*, SC41-4203 book.

7. Is the system operator message either highlighted or does it have an asterisk (*) by it?

   No Go to step 12 on page 3-3.

   Yes Go to step 16 on page 3-5.

8. Move the cursor to the message line and press the Help key, or use Option 5 (Display details and reply). Does the Additional Message Information display appear?

   Yes **No**

   ↓ Go to step 10 on page 3-3.

   Continue with next step.

Additional Information:

See the *System Operation*, SC41-4203 book, for information about messages.

9. Record the message information that is shown on the problem summary form in Problem Summary Forms. If possible, follow the recovery instructions on the Additional Message Information display. Did this solve the problem?

   No **Yes**

   ↓ **End of procedure.**

   Continue with next step.

10. Type `dspmsg qsysopr` on any command line and press the Enter key to display system operator messages.

    Did you find a message that is highlighted or has an asterisk (*) by it?

    No **Yes**

    ↓ Go to step 16 on page 3-5.

    Continue with next step.

11. Did you find a message at or near the time the problem occurred?

    Yes **No**

    ↓ Go to step 14 on page 3-4.

    Continue with next step.

    System Operator Messages

    To determine the time a message occurred, display additional information about the message using option 5 (Display details and reply) on the Work with Messages display. The time that the message was sent is shown on the Additional Message Information display.

    If the problem seems to affect only one display station, you might be able to use information from the Job (JOB) menu to diagnose and solve the problem. Type `go job` on any command line and press the Enter key to find this menu. For information on the Job menu, see chapter 2 of the *System Operation*, SC41-4203 book.

    End of procedure.

12. Use option 5 (Display details and reply) for the message to display additional information about the message; otherwise, move the cursor to the message line and press the Help key. Record the message information shown on the problem summary form in Problem Summary Forms. If possible, follow any recovery instructions shown. Did this solve the problem?

    No **Yes**

    ↓ **End of procedure.**

    Continue with next step.

    Additional Information:

    If the additional message information tells you to run problem analysis, go to step 16 on page 3-5.

13.

Were you instructed by the message information to look for additional messages in the system operator's message queue (QSYSOPR)?

No **Yes**

↓ Press F12 (Cancel) to return to the list of messages, then look for other related messages. Go to step 10 on page 3-3.

Continue with next step.

14. Do you know which input/output device you are having a problem with?

    No **Yes**

    ↓ Type **ANZPRB** on the command line and press the Enter key.

    Note: See "Analyzing a New Problem" on page 3-8 for information on how to use the Analyze Problem (ANZPRB) command.

    Report the problem. See "Reporting problems detected by the system" on page 3-10 for information about using the problem log to report a problem electronically.

    End of procedure.

15. If you don't know the input/output device, describe the problems that you have observed by doing the following:

    a. Type **go userhelp** on any command line and press the Enter key.

    b. Select option 10 (Save information to help resolve a problem) on the Information and Problem Handling (USERHELP) menu.

    c. Type a brief description of the problem and press the Enter key on the Save Information to Help Resolve a Problem display. (If you specify the default Y for the Enter notes about problem field and press the Enter key, the Select Text Type display appears that allows you to enter more text to describe your problem.)

    d. Report the problem. See "Reporting problems detected by the system" on page 3-10 for information about using the problem log to report a problem electronically.

    Creating Your Own Problem Record

    This step helps you isolate and describe the problems that you observed.

    You can store system and job-related information in spool files and create an entry (identified by the problem ID) in the system problem log. This information can be used to assist your technical support representative in solving the problem.

    Note: Using `go userhelp`, you can create a brief note describing the problem you observed. To describe your problem in greater detail, use the Analyze Problem (ANZPRB) command. Using the Analyze Problem (ANZPRB) command may also run a test to further isolate the problem.

    See "Adding notes to your problem record" on page 3-12 for additional information about analyzing and reporting problems.

End of procedure.

16. Move the cursor to the message line and press the Help key.

    Press the F14 key, or use the Work with Problem (WRKPRB) command as instructed.

    If this does not solve the problem, go to "Analyzing Problems With a Symptom" on page 3-15.

    Running Problem Analysis

    With problem analysis you can gather more information about the problem to either solve it or report it without the help of a service representative. You can run problem analysis on messages that are highlighted (basic assistance level) or have an asterisk (*) next to them (intermediate assistance level). If you do not see any of these messages, you may not be authorized to the Work with Problem (WRKPRB) command, or the message does not support additional problem analysis.

    Besides running problem analysis on messages, you can also use F14 (Work with problem) if it is available on your display. If F14 is not available, use the Work with Problem (WRKPRB) command to run problem analysis. From the Work with Problems display, select Option 8 (Work with Problem), and then select Option 1 (Analyze problem) from the Work with Problem menu. If you do not see Option 1 on the Work with Problem menu, go to "Analyzing Problems With a Symptom" on page 3-15 before reporting the problem to IBM.

    See "Adding notes to your problem record" on page 3-12 for additional information about analyzing and reporting problems.

    End of procedure.

17. Record the system reference codes on the problem summary form in Problem Summary Forms. Make sure that you have collected all of the codes.

    Go to "Procedure 2–Recovering When Attention Light is on or SRC is Displayed" on page 3-16.

    Collecting System Reference Codes

    If you have system expansion or extension tower attached to your system, select Function 05, and record the system reference code.

    If 11-3 is shown in the Function/Data display on the control panel, then the numbers that follow are the system reference code.

    If a number other than 11-3, is shown in the Function/Data display, the number may not indicate a problem with the system. These codes may indicate functions you select from the control panel. For example, function 01 displays the type of IPL you did as follows:

    Function Description

    01 ..A. .... The last IPL of the system did not include the installation of temporary program temporary fixes (PTFs).

    01 ..B. .... The last IPL of the system included the installation of temporary program temporary fixes (PTFs).

    See "System Unit Control Panels" on page 2-2 for more information about the system unit control panel. See page 2-6 for information about the Function/Data display.

Note: If you have a display station with *Type* and *Reference Code* columns on it, record the data under the *Type* column as the first 4 characters of function 11 on the problem summary form in Problem Summary Forms. If an A, B, C, or D is displayed as the first digit in the *Type* column, use the data in the *Reference Code* column as the last four characters of function 11. Go to"Getting Help with Problems" for information on who to contact if you need more help.

Getting Help with Problems

The following table shows an overview of the AS/400 system support structure and gives you guidelines on who to call for your specific problem. Before calling for help, it is recommended that you fill out the appropriate form in "Problem Summary Forms" on page 3-27. Your service representative may need the information you have filled in to further analyze the problem.

Type of Problem	Call	Telephone Numbers
Question • Advice • Migrating • "How to" • Operating • Configuring • Ordering • Performance • General information	• IBM AS/400 Support Line or IBM Business Partner • • • • • AS/400 Marketing Specialist or IBM Direct Support Line or IBM Business Partner	• 1-800-237-5511 • • • • • • 1-800-IBM-CALL • 1-800-IBM-4YOU
Software • PTF fix information • OS/400 problem • IBM application program • Loop, hang, or message	IBM Software Service	• 1-800-237-5511
Hardware • IBM system hardware broken • Hardware system reference code (SRC) • IBM input/output (I/O) problem • Upgrade	IBM Hardware Service	• 1-800-IBM-SERV

Calling IBM Marketing or Business Partner

Call your IBM Marketing Team or IBM Business Partner:

Questions:

Name: _____

Phone: _____

Call IBM AS/400 Support Line:

Questions:

Name: _____

Phone: _____

Calling Your Software Service Representative

Call your software service representative if you have not reported the problem.

Your software service representative is:

Name: _____

System Software:

Name: _____

Phone: _____

Customer #: _____

Application Programs:

Name: _____

Phone: _____

Record the service request number (sometimes called program management record or PMR) on the problem summary form in Problem Summary Forms.

Calling Your Hardware Service Representative

Call your hardware service representative if you have not reported the problem.

Your hardware service representative is:

Name: _____

System Hardware:

Name: _____

Phone: _____

Customer #: _____

Device or Other Equipment Manufacturer (OEM):

Name: _____

Phone: _____

Communications Network:

Telephone Company Name: _____

Phone: _____

Record the service request number (sometimes called program management record or PMR) on the problem summary form in Problem Summary Forms.

Analyzing a New Problem

A new problem is one that you detect while using the system and has not been recorded in the problem log or one that is in the problem log with a status of `opened`.

To analyze a new problem that has not been recorded in the problem log:

1. Use the Analyze Problem (ANZPRB) command.
2. Select the option that most closely corresponds to the problem you have encountered on the Analyze a New Problem display. A series of steps then guides you through problem analysis. As you progress through problem analysis, a symptom string is built from your responses.

   Important: If you encounter the Problem Analysis display while you are building your symptom string, it is recommended that you contact IBM service before continuing. See "Getting Help with Problems" on page 3-6 for more information on who to call.
3. When you complete problem analysis, the collected information is placed in the problem log.

To analyze a problem that has been recorded in the problem log with `opened` status:

1. Type `dspmsg qsysopr` on any command line and press the Enter key to see the system operator messages.
   - If the message is highlighted, use option 5 (Display details and reply) for the message. On the Additional Message Information display, press F14 (Work with problem).
   - If the message has an asterisk (*) next to it, press F14 (Work with problem) on the Display Messages display.

2. Select Option 8 (Work with problem), and then Option 1 (Analyze problem). As you progress through problem analysis, a symptom string is built from your responses.
3. When you complete problem analysis, the collected information is placed in the problem log.

You can also use the following method to analyze a problem with open status in the problem log:

1. Enter the Work with Problem (WRKPRB) command on any command line.
2. Select Option 8 (Work with problem) for the problem, and then Option 1 (Analyze Problem).

Reporting hardware and software problems

For hardware failures that do not disable system operation, AS/400 electronic customer support provides a fast, electronic method for requesting the service of an IBM service representative with replacement parts. Using this method, you may report failures occurring on your AS/400 system and selected input or output devices.

For problems with software or Licensed Internal Code, you should notify the IBM service system of the failure and related symptoms. The problems that are detected by the system can be reported either manually or automatically. For information on how to report problems manually, see "Reporting problems detected by the system" on page 3-10. For information on how to report problems automatically, see "Automatic problem reporting" on page 3-13. The system searches a file of known problems and, if available, sends a program temporary fix (PTF) to your system for installation.

If a problem is new, a problem management record (PMR) is created by the IBM service system. The PMR number is returned to your AS/400 system. Depending on your contract with IBM, you may or may not be entitled to voice support (telephone). If you have voice support, IBM service center personnel will contact you and work with you to resolve the problem. If you do not have voice support, you may view the service centers response by using the Query Problem Status (QRYPRBSTS) command. For more information on the QRYPRBSTS command, see "Querying problem status" on page 3-13.

Related topics

"Reporting problems detected by the system" on page 3-10
"Sending a service request immediately" on page 3-10
"Sending a service request later" on page 3-11
"Reporting problems by voice" on page 3-12
"Adding notes to your problem record" on page 3-12
"Automatic problem reporting" on page 3-13
"Querying problem status" on page 3-13
"Finding a previously reported problem" on page 3-14

Reporting problems detected by the system

The system problem log allows you to display a list of all the problems that have been recorded on the system. You can also display detailed information about a specific problem, such as the product type and serial number of the device that had the problem, the date and time of the problem, the part that failed, where the part is found, and the problem status. You can also analyze and report a problem, or determine any service activity.

To report a problem that has an entry in the problem log, do the following:

1. Type `WRKPRB` on any command line and press the Enter key. The Work with Problems (WRKPRB) display appears.
2. If you have a problem ID, look for an entry with the same ID on the Work with Problems display. Select option 8 (Work with problem) for the problem you want to work with. Press the Enter key, and the Work with Problem display appears.
3. Select option 2 (Report problem) on the Work with Problem display. Press the Enter key, and the Verify Contact Information display appears.
4. To change any fields that appear on the Verify Contact Information display, type over the current information and press the Enter key. The new information is included in the service request.
5. Select the severity level that closely relates to the severity of your problem on the Select Problem Severity display.
6. Select who should receive and process your request on the Select Service Provider display.
7. Select when and how you want to send the service request on the Select Reporting Option display. See "Related Topics" for instructions on different options for sending service requests or reporting problems.

Sending a service request immediately

If you decide to send a service request now, select option 1 (Send service request now) on the Select Reporting Option display. The problem log entry is packaged as a service request, your AS/400 system automatically dials the IBM service provider system, and the problem is transmitted to the service provider.

Note: Service requests can also be sent to other AS/400 systems that have the SystemView System Manager/400* licensed program installed.

The service provider determines whether the request is for hardware or software service, and takes the appropriate action that is described below.

Hardware Service:

If the service provider is IBM, and if no PTFs are found that match your problem symptoms, one of the following happens:

- Your request is sent to an IBM service representative.
- An IBM Customer Assistance Group representative calls you to assist in further problem definition. The connection to the service provider system ends, and the status of the problem in the problem log is changed to SENT.

Software Service:

- A search is performed against the database of program temporary fixes (PTFs) using the symptom string you created during problem analysis.
- If the service provider is IBM, a match is found, and a PTF is available, the PTF is transmitted to you electronically. Or, a PTF tape is ordered and sent to you through normal mail channels. The size of the PTF and its requisites determine whether the PTF is sent electronically or mailed. PTFs that you receive electronically are placed in the QGPL library with a file name of the PTF number that is preceded by a Q and a file type of SAVF.
- If a match is not found or the PTF is not available, you see the Save APAR Data display, which saves the following information about your problem:
  - History log
  - Job information
  - Hardware and software resources
  - Error log entries
  - Vertical Licensed Internal Code log entries
  - Problem log entries
  - Pictures of displays

  You can then forward this information to the IBM Software Support Center to help you solve your problem.

The connection to the service provider ends when you receive a PTF or when your problem is opened for further investigation. The status of the problem is changed to SENT or ANSWERED in the problem log.

Note: Whenever electronic customer support is used, the AS/400 needs to dial out to the IBM system. Remember to have the electronic customer support modem available and powered on.

Sending a service request later

If you decide to send a service request later, select option 2 (Do not send service request) on the Select Reporting Option display. The status of the problem in the problem log changes to PREPARED.

To submit a problem with PREPARED status, follow the directions in "Reporting problems detected by the system" on page 3-10. When the problem is reported, the problem log entry is packaged as a service request, your AS/400 system automatically dials the service provider system, and the problem is transmitted to the service provider.

To report all problems in the problem log that have a status of PREPARED, do one of the following:

1. On the Work with Problems display, press F16 (Report prepared problems).
2. On any command line, type `SNDSRVRQS *PREPARED` and press the Enter key.

The connection to the service provider system ends when you receive a program temporary fix (PTF) or when your problem is opened for further investigation. The status of the problem is changed to SENT or ANSWERED in the problem log.

Note: Whenever electronic customer support is used, the AS/400 needs to dial out to the IBM system. Remember to have the electronic customer support modem available and powered on.

Reporting problems by voice

If you find that you are not connected to a telephone line, or your communications lines are down, you can report a problem with your system by voice (telephone). To report the problem by telephone, follow the directions in "Reporting problems detected by the system" on page 3-10. When you get to the Select Reporting Option display, select option 3 (Report service request by voice). The Report Service Request by Voice display gives you the telephone number of the service provider for your specific problem.

Note: If the service provider is IBM, IBM assigns a service number to the problem. To put this number in the problem log, press F14 (Specify service-assigned number) on the Report Service Request by Voice display.

Adding notes to your problem record

To attach a note or add to an existing note in the problem record, do the following:

1. Use the Work with Problem (WRKPRB) command.
2. Select option 12 (Enter text) on the Work with Problems display. The Select Text Type display appears.
3. Select Option 1 (Problem description) to enter problem description. Only the text that is entered with this option is sent to the service provider along with the problem.

Notes should be typed in the following format to keep a chronological record of events.

- On the first line, type a brief description of the problem.
- On the second line, type the current date.
- On the third line, type in the note that you want to send. Use as many additional lines (up to 20) as you need.

Include the following information in your notes:

- Any recent release update that you have applied to the system
- Any changes you made in the system configuration
- Any new program or feature that you are using
- Anything that may be different since the last time the program was run

Related topics

"Automatic problem reporting" on page 3-13
"Querying problem status" on page 3-13
"Finding a previously reported problem" on page 3-14

Automatic problem reporting

The automated problem analysis function runs problem analysis routines automatically when the system detects a problem. The problem reporting function notifies the service provider of the software problem. To run these functions, the appropriate service attributes must be set to *YES. If these attributes are set to *NO, you will need to run the problem analysis manually. The default value for service attributes is *NO.

Use the Display Service Attribute (DSPSRVA) command to display the service attributes, or use the Change Service Attributes (CHGSRVA) command to change the service attributes.

To change service attributes, fill in the appropriate information in the fields. Specify *Yes in the Analyze problem field to automatically run problem analysis at the time of the failure. Problem analysis includes programs that attempt to isolate or correct the problems. Automated problem analysis applies mostly to hardware problems, and some software problems in Licensed Internal Code. To determine which problems are analyzed automatically and which ones are not, use the Work with Problem (WRKPRB) command. If the status is Opened, it indicates that the problem has not been analyzed. For problems that are not analyzed automatically, you can use the Work with Problems (WRKPRB) command to run the problem analysis manually.

When *Yes is specified in the Report problem automatically field, software problems are reported automatically to the service provider. Your service provider is specified in the Control point name field. For hardware problem reporting, contact your service provider.

Related topics

"Reporting hardware and software problems" on page 3-9
"Reporting problems detected by the system" on page 3-10

Querying problem status

To retrieve the latest status of a previously reported problem, use one of the following methods:

Method 1:

1. Type `QRYPRBSTS` on any command line, and press the F4 key. The Query Problem Status (QRYPRBSTS) display appears.

   Note: Currently, the QRYPRBSTS command is not enabled to query hardware problems.

2. If you know the problem management record (PMR) number, type `*PMR` in the Problem identifier field and press the Enter key. Additional fields appear on the display. Type the PMR number in the Service number field and press the Enter key. If you know the WRKPRB problem ID number, type the 10-digit ID number for the problem in the Problem identifier field and press the Enter key. If you don't know the problem ID number, see "Finding a previously reported problem" in the "Related topics" section for instructions on how to find this 10-digit number.

3. After the query is complete, enter: `WRKPRB xxxxxxxxxx` where xxxxxxxxxx is the 10-digit problem ID number. The Work with Problem display appears.
4. Type Option 12 (Enter text) next to the problem entry and press the Enter key. The Select Text Type display appears.
5. Select Option 10 (Query Status text). The Query results are shown.

Method 2:

1. Type `WRKPRB` on any command line and press the Enter key. The Work with Problems display appears.
2. Find the problem entry for which you want to query the status. To start a query, the problem entry must have a status of Answered or Sent.
3. Type Option 8 (Work with problem) next to the problem entry. The Work with Problem menu appears.
4. Select Option 41 (Query problem status text). The Results of the query are shown.

Note: The QRYPRBSTS command does not apply to problem entries that have a Fix request specified in the problem description column of the Work with Problem display.

Related topics

"Reporting hardware and software problems" on page 3-9
"Finding a previously reported problem"

Finding a previously reported problem

To find a previously reported problem, you need to know the IBM Service-assigned number, also known as the problem management record (PMR).

Once you have this number, type the following on any command line:

```
WRKPRB SRVID(XXXXX)
```

where XXXXX is the PMR number, then press the Enter key.

If you do not have the PMR number, use the Work with Problem (WRKPRB) command and search the list for the problems with a status of SENT, VERIFIED, ANSWERED, and CLOSED.

Related topics

"Querying problem status" on page 3-13

Enabling Automated Remote System Reporting Options

With automated problem analysis and reporting functions, you can also set up automated remote service so that the problems can be reported to the remote service provider when your system is down. For example, your system stops working and a System reference code (SRC) such as B6000615 is shown on the control panel. This condition can automatically be reported to your service provider, who can then call you or send a service representative to help you with the problem. For more details, contact your service provider.

Remote Access to Dedicated Service Tools (DST) and Remote Control Panel

Remote access to DST and Remote Control Panel is available if you are using *PRPQ AS/400 Remote Access for OS/2 Support* 5799-FPH.

Problem Handling Tables and Procedures

Analyzing Problems With a Symptom

Please read the symptom index from top to bottom. Find the symptom that describes the problem and go to the procedure and page indicated.

Symptoms	Recovery Procedure and Page
You cannot power on the system.	Procedure 1 on page 3-15
The system attention light is on, or a system reference code is displayed on the control panel	Procedure 2 on page 3-16
A pushbutton or light on the control panel is not working properly	Procedure 3 on page 3-17
You cannot perform an initial program load (IPL) or you suspect an operating system failure	Procedure 4 on page 3-18
Your workstation or device (such as display or printer) is not working	Procedure 5 on page 3-19
You are having a problem with a tape or optical device	Procedure 6 on page 3-19
You are having a problem with a disk or diskette device	Procedure 7 on page 3-20
You cannot communicate with another device or computer	Procedure 8 on page 3-20
Your system seems to be in a loop or hang condition	Procedure 9 on page 3-20
You are having an intermittent problem	Procedure 10 on page 3-21
No symptom to match in the table	Go to "Getting Help with Problems" on page 3-6.

Procedure 1–Recovering From System Power Problem

1. Make sure that the power that is supplied to the system is adequate. If your system units are protected by an emergency power off (EPO) circuit, check that the EPO switch is not activated.
2. Verify that your system power cables are properly connected to the electrical outlet.

Note: When the power is available, the Function/Data display on the control panel is lit.

3. If you have an uninterruptible power supply (UPS), verify that the cables are properly connected to the system, and the UPS is functioning.
4. Make sure all system units are powered on.
5. Turn on the system again.
6. Is a system reference code displayed on the control panel?

   Yes Go to "Procedure 2–Recovering When Attention Light is on or SRC is Displayed" on page 3-16.

   No Go to "Calling Your Hardware Service Representative" on page 3-7.

Procedure 2–Recovering When Attention Light is on or SRC is Displayed

In the table, xxxx can be any number 0 through 9 or letter A through F. If you cannot find the system reference code in this table, go to "Getting Help with Problems" on page 3-6.

Table 3-1 (Page 1 of 2). List of System Reference Codes

System Reference Code Starting with 11-3	What You Should Do
0000 AABB 0000 AACC	You attempted a timed, remote, or automatic IPL with the system in the Secure or Manual mode. 1. Set the system to the Normal or Auto mode and do the IPL again. 2. If you are still not able to do an IPL, go to "Calling Your Hardware Service Representative" on page 3-7.
0000 AADD	You attempted a manual IPL with the system in the Secure or Auto mode. 1. Set the system to the Normal or the Manual mode and try the operation again. 2. If you are still not able to do an IPL, go to "Calling Your Hardware Service Representative" on page 3-7.
1xxx D101 1xxx D102	Battery Power Unit x failed. Battery Power Unit x test failed. Replace the battery power unit. See "Replacing Battery Power Unit on Models 5xx and Tower FC507x and FC508X" on page 3-47 for information on how to replace the battery. If the battery still does not work after the replacement, Go to "Calling Your Hardware Service Representative" on page 3-7.
63xx xxxx	The tape unit failed. See "Procedure 6–Recovering From Tape or Optical Device Problem" on page 3-19.
93xx xxxx	A disk or diskette Unit failed. See "Procedure 7–Recovering From Disk or Diskette Drive Problem" on page 3-20.
A6xx 500x	Work station controller failure. See "Procedure 5–Recovering From Workstation Failure" on page 3-19.
A1xx xxxx B1xx xxxx	IPL load device failure. See "Procedure 4–Recovering From IPL or System Failure" on page 3-18.

Table 3-1 (Page 2 of 2). List of System Reference Codes

System Reference Code Starting with 11-3	What You Should Do
A900 2000	The IPL completed normally, does the system console have a sign on screen? If the system did not vary on, see "Procedure 11–Recovering When System Console did not Vary On" on page 3-21. If the system varied on, check the QSYSARB job log for the message and follow the corrective actions indicated in the message. To view the QSYSARB job log, use the Work with Active Job (WRKACTJOB) command, and then select Option 10 (Display jobs) to view the job log. You need to have *QSECOFR authority to view the job log. If the same problem still exists, go to "Calling Your Hardware Service Representative" on page 3-7.
B0xx xxxx	Failure detected by communication Licensed Internal Code. 1. Make sure the latest PTF package is installed. 2. If this does not solve the problem, see "Calling Your Software Service Representative" on page 3-7.
B6xx xxxx	Not enough auxiliary storage. 1. If your system unit has some disk storage space available, add more to auxiliary storage pool 1. 2. If this does not solve the problem, go to "Calling Your Software Service Representative" on page 3-7.
B9xx xxxx	OS/400 installation failure Go to "Procedure 4–Recovering From IPL or System Failure" on page 3-18.
C1xx xxxx C3xx xxxx C5xx xxxx	IPL status. This is a normal indication during the IPL. You may suspect a hang or loop condition if the SRC does not change during the two-minute period. See "Procedure 9–Recovering From System Hang or Loop Condition" on page 3-20.
D1xx xxxx	Diagnostic status. This is a normal indication while the system main storage is being saved to disk. If the system is still not running correctly after 30 minutes, go to "Calling Your Hardware Service Representative" on page 3-7.
D6xx xxxx	Diagnostic status. This is a normal indication while the system is being powered down. If the system does not start normally after 30 minutes, go to "Calling Your Software Service Representative" on page 3-7. When xxxx is changing, the system is doing a main storage dump. Go to 11 on page 3-25

Procedure 3–Recovering When Pushbutton or Light Is Not Working Properly

1. Are your control panel pushbuttons working properly?

   Yes Continue with step 2 on page 3-18.

   No. Try turning on the system again. If the same failure occurs, go to "Calling Your Hardware Service Representative" on page 3-7.

2. Are the control panel lights working properly?

   Yes End of the procedure

   No Go to "Calling Your Hardware Service Representative" on page 3-7.

Procedure 4–Recovering From IPL or System Failure

Verify the following:

- The device from which you did the IPL is powered on.
- The tape and CD are loaded properly.
- The sign-on User ID and password are correct.
- The system is set to the correct mode (Manual, Normal, Auto or Secure).
- The system value for date/time and control panel mode is set correctly if this is a timed IPL.
- The Phone, modem, control panel mode, and QRMTIPL value are set up correctly if this is a remote IPL.

Do the following:

1. Do an IPL from the system control panel as follows:
   a. Set the system to the Manual mode.
   b. If the system is powered on:
      1) Select Function 03.
      2) Press the Enter pushbutton to start an IPL.
   c. If the system is powered off:
      1) Press the power on pushbutton.

   Note: The control panel must be in Normal or Manual mode.
2. Sign on the system when the Sign On display appears. If you do not see the Sign On display, do you have a new SRC?

   No Go to "Getting Help with Problems" on page 3-6.

   Yes Go to "Procedure 2–Recovering When Attention Light is on or SRC is Displayed" on page 3-16.
3. On the IPL Options display, specify YES for the following parameters:
   - Define or change the system at IPL
   - Clear output queues
   - Clear job queues
   - Clear incomplete job logs
4. Change the system value for QMCHPOOL to a smaller value.
5. Make sure the system value for QCTLSBSD has the correct spelling, or assign an alternative controlling subsystem.
6. Change the system value for QPWRDWNLMT to a larger value.

7. Continue IPL process. If the same failure occurs, set the system to the Normal mode, then go to "Calling Your Hardware Service Representative" on page 3-7.

Procedure 5–Recovering From Workstation Failure

1. Make sure all workstations and devices (such as displays or printers) are turned on.
2. Make sure all workstation cables are attached properly and set to the proper address. For information about workstation address, see "Determining the Primary or Alternative Consoles" on page 3-25 if you are using system console, and see *Local Device Configuration*, SC41-5121 if you are using other workstations.
3. Make sure recently attached workstations have been properly configured to the system.
   - Workstation addresses are unique (if applicable)
   - Workstations are terminated (if applicable)
4. Check all workstation printers for mechanical problems such as paper jams, ribbon failure and so on.
5. Vary off the failing workstation controller if any other workstation is operational, and then Vary it on again. To vary on or off the workstation controller, do the following:

   Note: You need to end all active jobs before varying off the workstation controller. To end active jobs, use the Work with Active Jobs (WRKACTJOB) command.

   a. Enter `WRKCFGSTS *CTL` on any command line. The Work with Configuration Status display appears.

   b. Specify **1** (Vary on) or **2** (Vary off) in the opt column next to your workstation controller, and press the Enter key.
6. Try the operation again. If you still have the same problem, go to "Calling Your Hardware Service Representative" on page 3-7.

Procedure 6–Recovering From Tape or Optical Device Problem

Verify the following:

- All tapes or optical devices are powered on and in a Ready (enabled) condition.
- Cables between the system and the tape or optical device are properly connected (if applicable).
- Tape density and tape bits per inch (BPI) matches.
- Tape path is cleaned.
- CD-ROM disc is clean, the format is supported, and the disc is loaded properly with the label side showing.

Do the following:

- Do all the tapes or CD-ROM device fail to read or write?

No. Replace the tape and CD, and try the operation again. For more information about tape and optical device, see "Using Removable Media" on page 2-35. If the same failure occurs, Go to "Calling Your Hardware Service Representative" on page 3-7.

Yes Go to "Calling Your Hardware Service Representative" on page 3-7.

Procedure 7–Recovering From Disk or Diskette Drive Problem

1. Make sure that all disk and diskette devices are powered on and enabled.

Note: Some disk units may have enable switches.

2. Make sure cables are properly connected between the system and disk or diskette device (if applicable).
3. Do all diskettes fail to read or write?

No Replace the diskette and try the operation again. For more information about diskette, see "Using Removable Media" on page 2-35. If the same failure occurs, go to "Calling Your Hardware Service Representative" on page 3-7.

Yes Go to "Calling Your Hardware Service Representative" on page 3-7.

Procedure 8–Recovering From Communication Problem

1. Make sure all communication equipment such as, modems or transceiver are powered on. Make sure all communication cables are properly connected.
2. Make sure the remote system is ready to receive your communication.
3. Verify the network equipment (or provider) is functional. This includes phone service (for example, verify the status of communication lines).
4. Verify that the configuration is correctly specified for the failing communication or LAN facility.

It you still have the same problem, go to "Calling Your Hardware Service Representative" on page 3-7.

Procedure 9–Recovering From System Hang or Loop Condition

The system appears unable to accept commands. This problem can be caused by system hardware or the system may be in a loop or hang condition.

Perform the following:

1. Take a system main storage dump. See "Performing a Main Storage Dump" on page 3-22 for more information.

Note: System main storage dump gathers data of the current state of the system during the loop or hang condition. This information is critical for problem solving. Valuable diagnostic information will be lost if you do not collect the storage dump information before you try to do an IPL.

2. Call IBM Software Service after taking the system main storage dump.

Procedure 10–Recovering From Intermittent Problem

1. Enter the Analyze Problem (ANZPRB) command on any command line. The Select Type of System display appears.
2. Select Option 1 (This AS/400 or attached device). The Analyze problem display appears.
3. Select Option 3 (Hardware problem). The Problem Frequency display appears.
4. Select Option 1 (Yes) to get an intermittent checklist, and follow instructions.

If the problem still exists, go to "Getting Help with Problems" on page 3-6.

Procedure 11–Recovering When System Console did not Vary On

1. Locate the workstation that is used as primary system console. see "Determining the Primary or Alternative Consoles" on page 3-25 for information about determining system consoles.
2. Make sure the workstation cables are attached properly, and set to the correct address.
3. Can you sign on to an alternative console?

   No Go to Step 5.

   Yes Go to Step 4.
4. If you can sign on to an alternative console, do the following:
   a. Make sure the primary console controller (e.g. CTL01) and device description (e.g. DSP01) have been created or restored. To check device description, use the command `WRKCFGSTS *CTL`.
   b. If descriptions exist, check the system operator message to determine why the primary console failed. Take corrective actions indicated in the message.

      If you still can not solve the problem, set the system to the Normal mode, and go to "Calling Your Software Service Representative" on page 3-7.
5. If you can not sign on to an alternative console, do the following:
   a. Set the system to the manual mode, select function 3, and press the Enter pushbutton to start an IPL until you see the IPL Option display.
   b. Were you able to get to the IPL Option display?

      No Contact your IBM service representative.

      Yes Continue with Step 5c.
   c. On the IPL Options display, specify **Y** (Yes) in the Define or change system at IPL field, **N** (No) in the Set major system option field, and press the Enter key.
   d. On the Define or Change the System at IPL display, select Option 1 (Configuration commands), and press the Enter key. The Configuration Commands menu appears.
   e. Select Option 2 (Controller description commands) to see the controller description for the system console. Verify that the controller (e.g. CTL01) was created correctly. If the name has been changed, see "Finding the Primary Console When System Is Operational" on page 3-26.

f. Select Option 3 (Device description commands) to see device description for the system console. Verify that the device (e.g. DSP01) was created correctly. If the name has been changed, see "Finding the Primary Console When System Is Operational" on page 3-26.

If you still can not solve the problem, set the system to the Normal mode, and go to "Calling Your Software Service Representative" on page 3-7.

Performing a Main Storage Dump

A main storage dump (MSD) is a process of collecting data from the system's main storage. A main storage dump can be performed in the following ways:

- Automatically - by the service processor as the result of a system failure.
- Manually - by performing a Function 22 on the control panel when the system waits, loops, or appears to have an operating system failure.

Automatic Main Storage Dump

After a failure that causes the system to perform a main storage dump, the following display may appear:

```
                                Main Storage Dump Manager

The system has failed.    Report the following information to your
IBM Service representative.

Function 11 ...........: 65321306
Function 12 ...........: 6D600413
Function 13 ...........: 00000210
Function 14 ...........: FFFFFFFF
Function 15 ...........: 65320001
Function 16 ...........: 00000000
Function 17 ...........: 00000000
Function 18 ...........: 00000000
Function 19 ...........: 00000000
Type/Model/Feature.....: 9406 0620 2181



IPL in progress.  Please wait.
```

Figure 3-1. Main Storage Dump Manager

The Main Storage Dump Manager display (with no function keys at the bottom of the display) shows the failing SRC earlier than previous releases. At this time, the main storage dump is waiting for DASD to report in. If not all DASD has reported in after waiting approximately 40 minutes, a Missing Disk Units display will appear. Otherwise, as soon as the last DASD reports in, the Main Storage Dump Manager display will be redisplayed showing the PF3 and PF12 function keys and a message that the Main Storage Dump (MSD) must be copied for service. At this time, the dump can be copied or displayed as shown in the following display:

```
                                Main Storage Dump Manager

The system has failed.    Report the following information to your
IBM Service representative.

Function 11 ...........: 65321306
Function 12 ...........: 6D600413
Function 13 ...........: 00000210
Function 14 ...........: FFFFFFFF
Function 15 ...........: 65320001
Function 16 ...........: 00000000
Function 17 ...........: 00000000
Function 18 ...........: 00000000
Function 19 ...........: 00000000
Type/Model/Feature.....: 9406 0620 2181



Warning:  The Main Storage Dump (MSD) must be copied for service.
          Failure to copy the Main Storage Dump will limit
          the ability to diagnose the failure.

Press Enter to copy the MSD for service or view the MSD.

F3=Exit      F12=Cancel
```

Figure 3-2. Main Storage Dump Manager

Note: If there are no missing disk units, then the Main Storage Dump display may appear for a very short time or not at all.

Performing a Main Storage Dump Manually

To place the data from system's main storage to the load-source disk, perform the following procedure:

1. Verify that there are no interactive jobs running.
   a. Select Manual mode.
   b. Use the Increment/Decrement buttons to display Function 22 (main storage dump).
   c. Press Enter pushbutton on the control panel.
2. Is 0000 0000 displayed on the control panel for more than 30 seconds?

   No **Yes**

   ↓ The multiple function IOP or service processor is not responding to a request from the control panel.

   Go to "Getting Help with Problems" on page 3-6.

   This ends the procedure.
3. An attention SRC is displayed, A1xx 3022, indicating that Function 22 has been selected. Reselect Function 22, press Enter on the control panel, and wait for the dump to complete.
4. Did the main storage dump complete successfully?

Note: The appearance of a A1xx 300x SRC on the control panel or on the Main Storage Dump display indicates a successful MSD.

No	Yes
↓	Return to the procedure that sent you here.
	This ends the procedure.

5. Go to "Getting Help with Problems" on page 3-6.

   This ends the procedure.

Displaying and Copying a Main Storage Dump

This procedure helps you in managing the existing Main Storage Dump (MSD) information on your system.

To display or record MSD summary and report the information to your service representative, do the following:

1. On any command line, enter STRSST.
2. Select Option 1 (Start a service tool). The Start Service tool display appears.
3. Select option 6 (Main storage dump manager). The Main Storage Dump Manager display appears.
4. Select Option 1 (Work with current Main Storage Dump). The Work with Current Main Storage Dump display appears.
5. Select Option 1 (Display/Print). The Display Main Storage Dump data display appears.
6. Select Option 1 (MSD summary). The Main Storage Dump Summary display appears. This display shows the system reference code, date and time of the MSD.
7. Record and report the summary information to your service provider.
8. Press F3 (Exit) to return to the Main Storage Dump Manager Display.
9. Copy existing MSD to a predefined MSD storage area on the system. This may prevent the MSD from being overwritten by possibly another dump.
   a. On the Main Storage Dump Manager display, select Option 1 (Work with current Main Storage Dump). The Work with Current Main Storage Dump display appears.
   b. Select Option 3 (Copy to disk). The Copy Disk display appears. Type a dump description, then press the Enter key to start copying the dump. After the dump is copied, a message will be displayed indicating whether the MSD copy has been completed.

      If the message indicates "Copy completed normally", you are done with this procedure, and you can continue with the procedure in topic "Purging Dumps From a Main Storage Dump" on page 3-25.

      If you do not see the Message "Copy completed normally", continue with step 10.
10. Has your service provider requested a tape for copying the MSD?

No Work with your service provider on the problem.

Yes Go to Step 11.

11. To copy MSD to a tape device, do the following:
    a. Select Option 1 (Work with current Main Storage Dump). The Work with Current Main Storage Dump display appears.
    b. Select Option 2 (Copy Main Storage Dump to Media). The Copy Main Storage Dump to Media display appears.
    c. Load the media and follow the instruction on the display.
    d. When the copy procedure is successfully completed, process the tape according to your service provider's instruction. If you encounter a problem with the copy procedure, contact your service provider.

Purging Dumps From a Main Storage Dump

This procedure is used when dump copies are no longer needed by your service provider.

1. On any command line, enter STRSST.
2. Select Option 1 (Start a service tool). The Start Service tool display appears.
3. Select option 6 (Main storage dump manager). The Main Storage Dump Manager display appears.
4. Select Option 2 (Work with copies of Main Storage Dumps). The Work with Copies of Main Storage Dumps display appears. From this display, you can see the dump copy information. If you want to delete any dump copies, type 4 next to the dump copies, and press the Enter key twice. If you do not want to delete any dump copies, press F3 (Exit) three times to exit SST.

Determining the Primary or Alternative Consoles

The primary console is a workstation that is attached to the first Input/Output Processor that is capable of supporting workstations.

In addition to the primary console, the system can assign up to two alternative consoles. The 1st alternative console can only be a TWINAX workstation that is attached to the same IOP as the primary console. The 2nd alternative console is a workstation that is attached to the next IOP or IOA that is capable of supporting workstations.

The IOP that supports the console must be on the first system bus (bus 1).

If a workstation is not correctly attached to the first IOP that is capable of attaching workstations, then the system will not assign a primary console. The system will display a reference code on the operators panel. In addition, if the IPL mode is set to Manual, the system will stop.

Primary Console Workstation Requirements

In order to be the primary console, the workstation must be operational and have the correct port and address. If the workstation is a PC, it must also have an active emulation program on the workstation.

The workstation requirements are:

- TWINAX workstation
  - Port 0 Address 0
- ASCII workstation
  - Port 0
- PC attached to ASCII IOP or IOA
  - Port 0
  - PC software to emulate a 316x or 3151 terminal
- PC attached to TWINAX IOP
  - Port 0 Address 0
  - 5250 emulator software active on PC
- PC attached to a LocalTalk IOA (6054)
  - SNA*ps 5250 Version 1.2 (or above) application
  - Console capable selected on MacIntosh (IOA converts to Port 0 Address 0)
- PC attached to a 2609, 2612, 2699, or 2721 communications input/output adapter (IOA)
  - Client Access Console cable attached to the 2609 or 2612 P2 port (part number 46G0450 or 46G0479), 2699 (part number 21H3779), or 2721 (part number 44H7504)
  - 5250 emulation or Rumba active on PC

Finding the Primary Console When System Is Operational

The following methods can be used to find the primary console:

Method 1: Look for a sign-on display with a DSP01 in the upper right corner.

Method 2: If the device name (DSP01) for the console has been changed, you can verify the device name for the primary console by doing the following:

1. Enter `DSPCTLD QCTL` on any command line. The Display Controller Description display appears. Find the Resource name parameter (such as CTL01) and record it.
2. Enter `PRTDEVADR rrrrr` on any command line,

   where rrrrr is the resource name you recorded.

If the printer is active, the data will be printed.

Method 3

1. Enter `STRSST` on any command line. The System Service Tools (SST) appears.
2. Select Option 1 (Start a service tool). The Start a Service Tool display appears.
3. Select Option 7 (Hardware Service Manager). The Hardware Service Manager display appears.
4. Select Option 2 (Logical Hardware resources). The Logical Hardware Resources display appears.
5. Select Option 1 (System bus resources). The Logical Hardware Resources on System Bus appears. The < symbol indicates the IOP that the system console

is attached to. You can use Option 9 (Resource associate with IOP and display detail) to find location of system bus, board and card.

Finding the Primary Console When System Power is Off

Use one of the following:

- Power on the system in the Manual mode and look for the IPL and Install System display.
- Power on the system in the Normal mode and look for DSP01 on the sign on display

Note: The name may have been changed. Reference "Finding the Primary Console When System Is Operational" on page 3-26 to determine the display name.

Problem Summary Forms

The Problem Summary Form is used to record information displayed on the system unit control panel. When you perform problem analysis in Chapter 3, Handling and Reporting System Problems you may be instructed to fill out this form so your service representative can further analyze the problem. The form should be removed from the binder when used.

There are four forms, one for each of the following:

1. System Model 150, 600, 620, S10, and S20 (single processor capability)
2. System Model 170
3. System Model 4xx
4. System Model 5xx
5. System Model 620 and S20 (multiple processor capability)

There is one form for each type of control panel. Use the form that matches the control panel for your system.

Make copies of a blank form to use if you need more forms.

Problem Summary Form—System Model 150, 600, 620, S10, and S20 (Single Processor Capability)

Date and time that the problem occurred: ___/___/___ ___:___:___

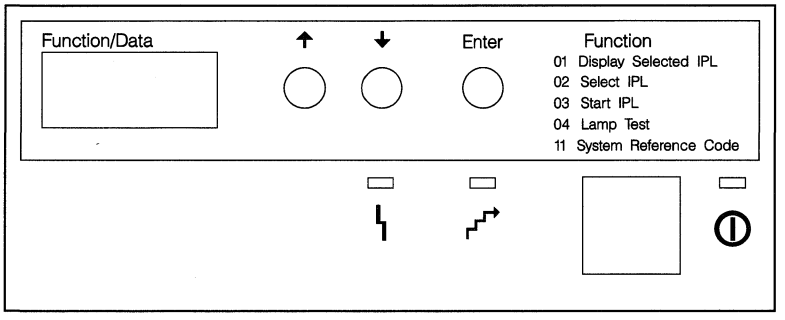
PMR or service request number: _____

Describe the problem: _____

Message ID	Message Text	From/Send Program	Instruction Number	To/Receive Program	Instruction Number

1 Record the mode.
2 Set the mode to Manual.
3 Place a check on the line below to indicate which lights on the control panel are on.

- Power On
- Processor/Active/Activity
- System Attention



RV4P015-0

4 Press the Increment/Decrement buttons until 11-3 is shown in the Function/Data display. Press the Enter pushbutton.
5 Record the 8 characters shown in the Data display for Function 11-3.

11XX	
12XX	
13XX	
14XX	
15XX	
16XX	
17XX	
18XX	
19XX	
20XX	

6	Press the Increment button. This action steps the function/Data display to the next higher number (12, 13, and so on) and blanks the Data display.
7	Press the Enter pushbutton. This action shows a new set of 8 characters in the Data display. Record this data on the form.
8	Repeat steps 6 and 7 until data has been recorded through Function 20. All functions may not be displayed, depending on the failure.
9	Set the same mode as recorded in Step 1 of this form. Press the Increment/Decrement buttons until the number 11-3 is shown in the Function/Data display. Press the Enter pushbutton. The original system reference code (SRC) appears.
10	Return to the step that sent you here.

Comments: _____

Problem Summary Form—System 170

Date and time that the problem occurred: ___/___/___ ___:___:___

PMR or service request number: _____

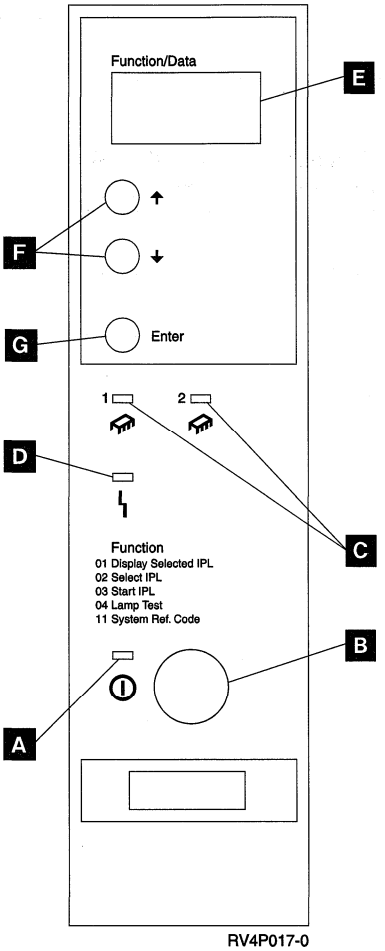
Describe the problem: _____

Message ID	Message Text	From/Send Program	Instruction Number	To/Receive Program	Instruction Number

1 Record the mode.
2 Set the mode to Manual.

3 Place a check on the line below to indicate which lights on the control panel are on.

- Power On
- Processor/Active/Activity
- System Attention



4 Press the Increment/Decrement buttons until 11-3 is shown in the Function/Data display. Press the Enter pushbutton.

5 Record the 8 characters shown in the Data display for Function 11-3.

11XX	
12XX	
13XX	
14XX	
15XX	
16XX	
17XX	
18XX	
19XX	
20XX	

6 Press the Increment button. This action steps the function/Data display to the next higher number (12, 13, and so on) and blanks the Data display.

7 Press the Enter pushbutton. This action shows a new set of 8 characters in the Data display. Record this data on the form.

8 Repeat steps 6 and 7 until data has been recorded through Function 20. All functions may not be displayed, depending on the failure.

9 Set the same mode as recorded in Step 1 of this form. Press the Increment/Decrement buttons until the number 11-3 is shown in the Function/Data display. Press the Enter pushbutton. The original system reference code (SRC) appears.

10 Return to the step that sent you here.

Comments: _____

Problem Summary Form—System Model 4xx

Date and time that the problem occurred ___/___/___ ___:___:___

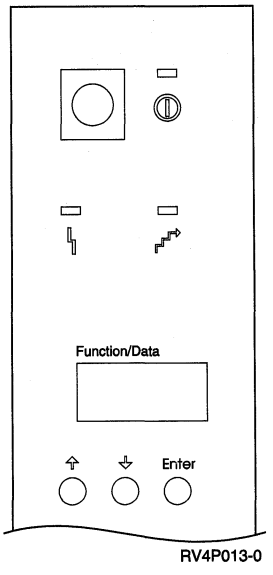
PMR or service request number: _____

Describe the problem: _____

Message ID	Message Text	From/Send Program	Instruction Number	To/Receive Program	Instruction Number
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

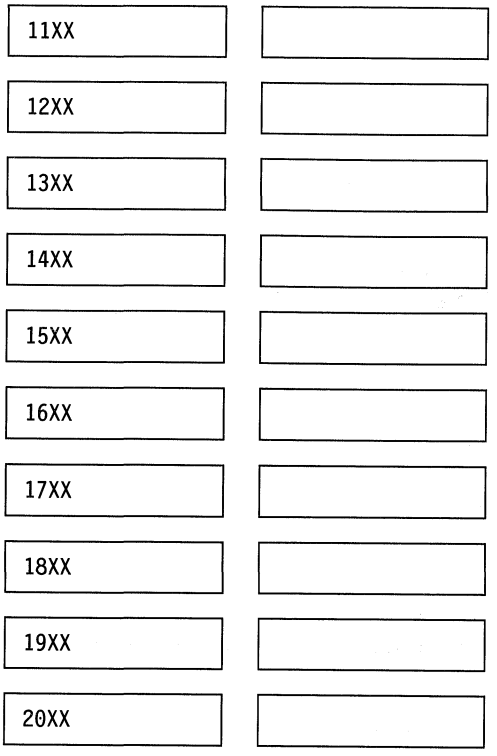
1 Record the mode.
2 Set the mode to Manual.
3 Place a check on the line below to indicate which lights on the control panel are on.

- Power On
- Processor/Active/Activity
- System Attention



RV4P013-0

4 Press the Increment/Decrement buttons until 11-3 is shown in the Function/Data display. Press the Enter pushbutton.
5 Record the 8 characters shown in the Data display for Function 11-3.



6 Press the Increment button. This action steps the function/Data display to the next higher number (12, 13, and so on) and blanks the Data display.

7 Press the Enter pushbutton. This action shows a new set of 8 characters in the Data display. Record this data on the form.

8 Repeat steps 6 and 7 until data has been recorded through Function 20. All functions may not be displayed, depending on the failure.

9 Set the same mode as recorded in Step 1 of this form. Press the Increment/Decrement buttons until the number 11-3 is shown in the Function/Data display. Press the Enter push-button. The original system reference code (SRC) appears.

10 Return to the step that sent you here.

Comments: _____

Problem Summary Form—System Model 5xx

Date and time that the problem occurred ___/___/___ ___:___:___

PMR or service request number: _____

Describe the problem: _____

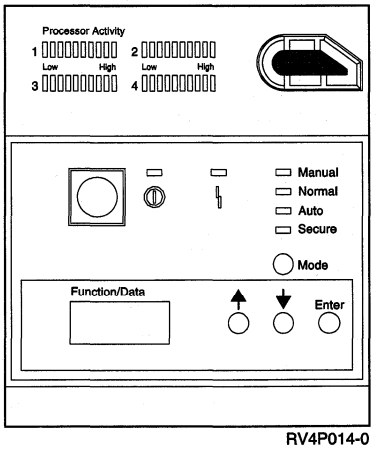
Message ID	Message Text	From/Send Program	Instruction Number	To/Receive Program	Instruction Number
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

1 Record the mode.

2 Set the mode to Manual.

3 Place a check on the line below to indicate which lights on the control panel are on.

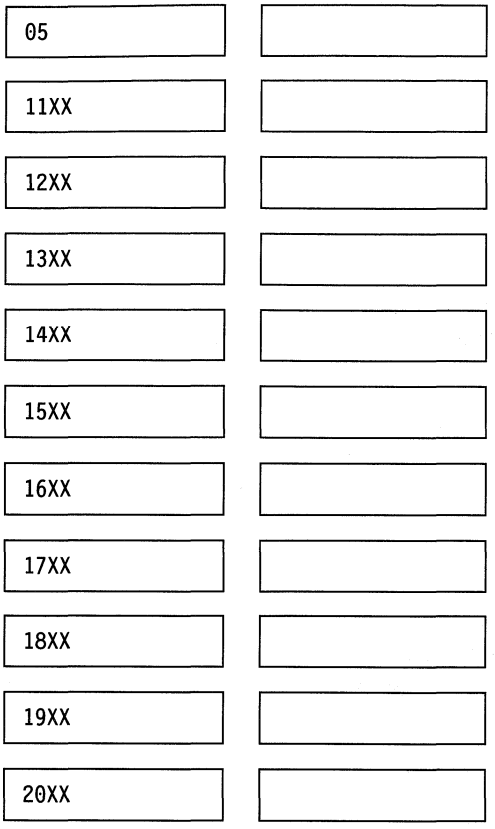
- Power On
- Processor/Active/Activity
- System Attention



RV4P014-0

4 Press the Increment/Decrement buttons until 05 is shown in the Function/Data display. Press the Enter pushbutton.

5 Record the 8 characters shown in the Data display for Function 05.



6 Press the Increment button. This action steps the function/Data display to the next higher number (11-3, 12, 13, and so on) and blanks the Data display.

7 Press the Enter pushbutton. This action shows a new set of 8 characters in the Data display. Record this data on the form.

8 Repeat steps 6 and 7 until data has been recorded through Function 20. All functions may not be displayed, depending on the failure.

9 Set the same mode as recorded in Step 1 of this form. Press the Increment/Decrement buttons until the number 11-3 is shown in the Function/Data display. Press the Enter push-button. The original system reference code (SRC) appears.

10 Return to the step that sent you here.

Comments: _____

Problem Summary Form—System Model 620 and S20 (Multiple Processor Capability)

Date and time that the problem occurred ___/___/___ ___:___:___

PMR or service request number: _____

Describe the problem: _____

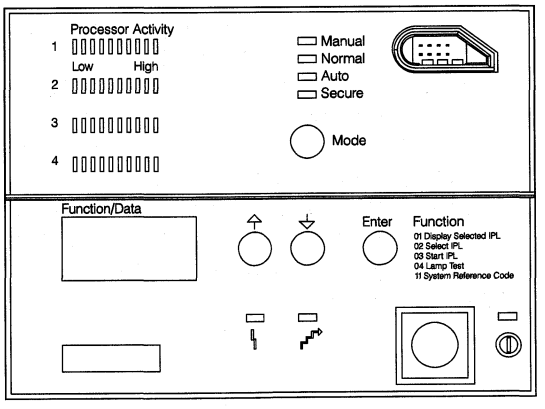
Message ID	Message Text	From/Send Program	Instruction Number	To/Receive Program	Instruction Number
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

1 Record the mode.

2 Set the mode to Manual.

3 Place a check on the line below to indicate which lights on the control panel are on.

- Power On
- Processor/Active/Activity
- System Attention



RV4P011-1

4 Press the Increment/Decrement buttons until 05 is shown in the Function/Data display. Press the Enter pushbutton.

5 Record the 8 characters shown in the Data display for Function 05.

05	
11XX	
12XX	
13XX	
14XX	
15XX	
16XX	
17XX	
18XX	
19XX	
20XX	

6 Press the Increment button. This action steps the function/Data display to the next higher number (11-3, 12, 13, and so on) and blanks the Data display.

7 Press the Enter pushbutton. This action shows a new set of 8 characters in the Data display. Record this data on the form.

8 Repeat steps 6 and 7 until data has been recorded through Function 20. All functions may not be displayed, depending on the failure.

9 Set the same mode as recorded in Step 1 of this form. Press the Increment/Decrement buttons until the number 11-3 is shown in the Function/Data display. Press the Enter push-button. The original system reference code (SRC) appears.

10 Return to the step that sent you here.

Comments: _____

Problem Summary Form—System Models 64x, S30, S40, and 65x

Date and time that the problem occurred ___/___/___ ___:___:___

PMR or service request number: _____

Describe the problem: _____

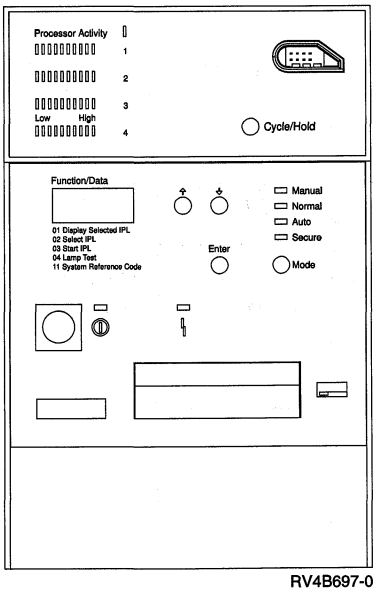
Message ID	Message Text	From/Send Program	Instruction Number	To/Receive Program	Instruction Number
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

1 Record the mode.

2 Set the mode to Manual.

3 Place a check on the line below to indicate which lights on the control panel are on.

- Power On
- Processor/Active/Activity
- System Attention



RV4B697-0

4 Press the Increment/Decrement buttons until 05 is shown in the Function/Data display. Press the Enter pushbutton.

5 Record the 8 characters shown in the Data display for Function 05.

05	
11XX	
12XX	
13XX	
14XX	
15XX	
16XX	
17XX	
18XX	
19XX	
20XX	

6 Press the Increment button. This action steps the function/Data display to the next higher number (11-3, 12, 13, and so on) and blanks the Data display.

7 Press the Enter pushbutton. This action shows a new set of 8 characters in the Data display. Record this data on the form.

8 Repeat steps 6 and 7 until data has been recorded through Function 20. All functions may not be displayed, depending on the failure.

9 Set the same mode as recorded in Step 1 of this form. Press the Increment/Decrement buttons until the number 11-3 is shown in the Function/Data display. Press the Enter pushbutton. The original system reference code (SRC) appears.

10 Return to the step that sent you here.

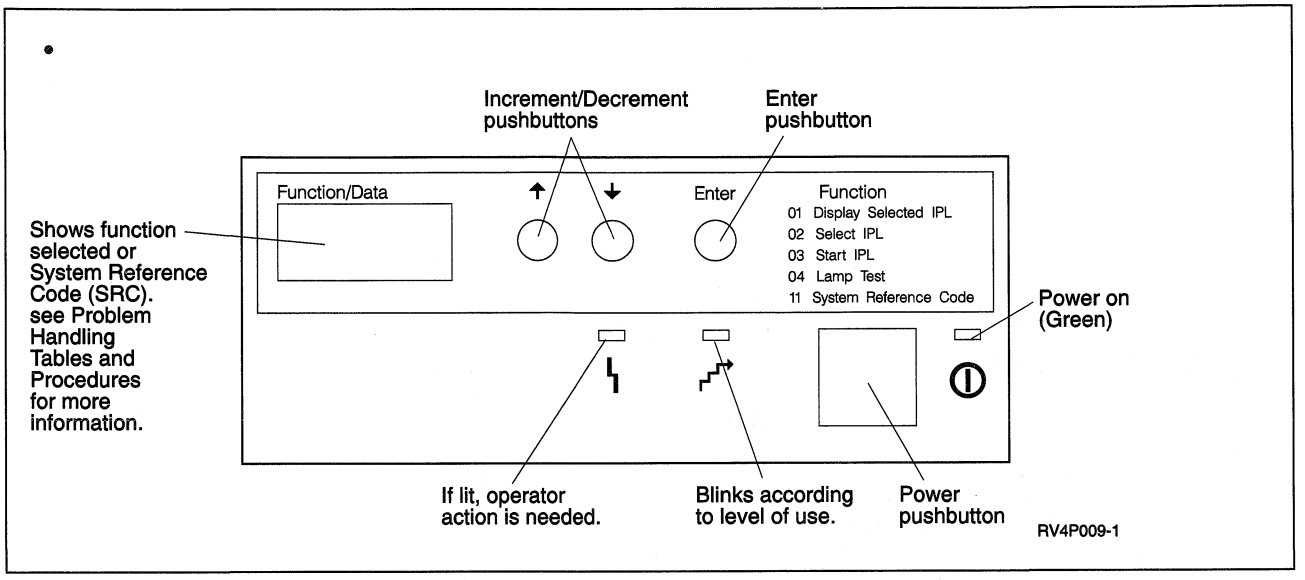
Comments: _____

Control Panel Status Forms

The System Control Panel Status form is used for you to keep all of your important control panel information in one place, should you need to call for assistance. There is a separate form for the System Model 4xx, System Model 5xx, 62x, 64x, and 65x system units.

Fill out one of the forms and post it near your system unit or keep it in an accessible place. If you have problems with your system, refer to this sheet for information on what the different problem signals are and the phone number to call if you are having problems. For information on the different types of problems and who to call for them, see "Getting Help with Problems" on page 3-6.

System Models 150, 600 and Some 620, and S20 Control Panel Status Form



IBM Customer Number: _____

Computer Serial Number _____

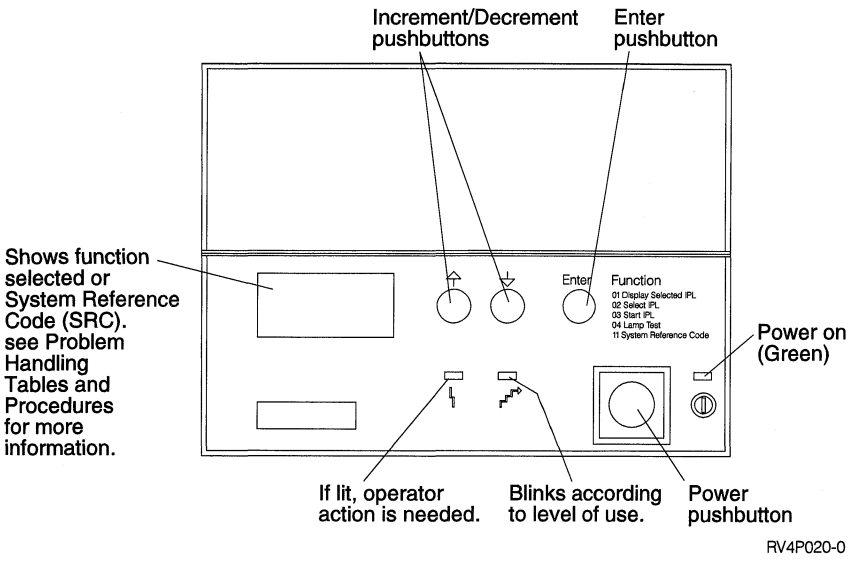
AS/400 Model: _____

IBM Business Partner Marketing Team Number: _____

IBM Software Service Number: _____

IBM Hardware Service Number: _____

System Models 620 and S20 Control Panel Status Form



IBM Customer Number: _____

Computer Serial Number _____

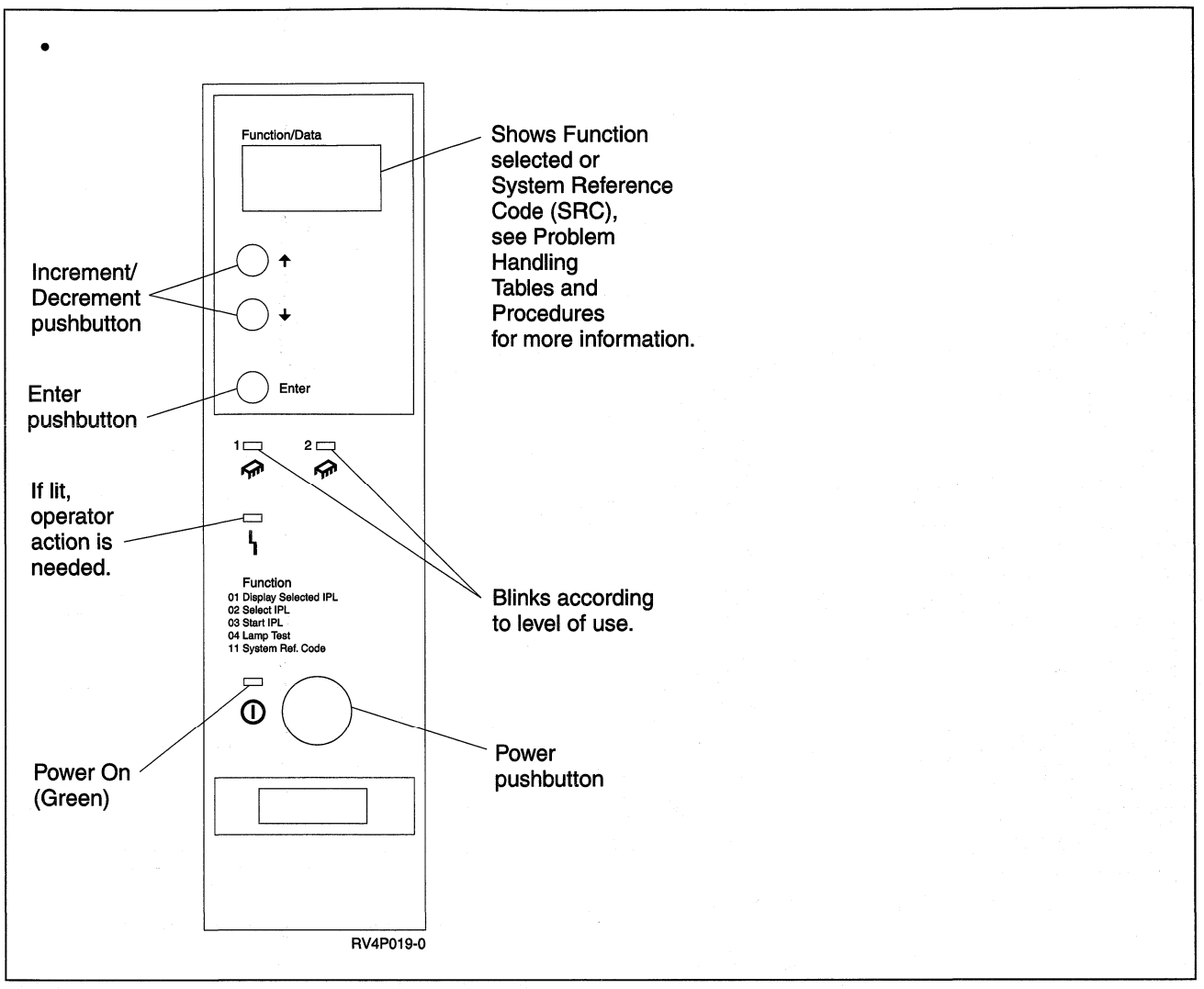
AS/400 Model: _____

IBM Business Partner Marketing Team Number: _____

IBM Software Service Number: _____

IBM Hardware Service Number: _____

System Model 170 Control Panel Status Form



IBM Customer Number: _____

Computer Serial Number: _____

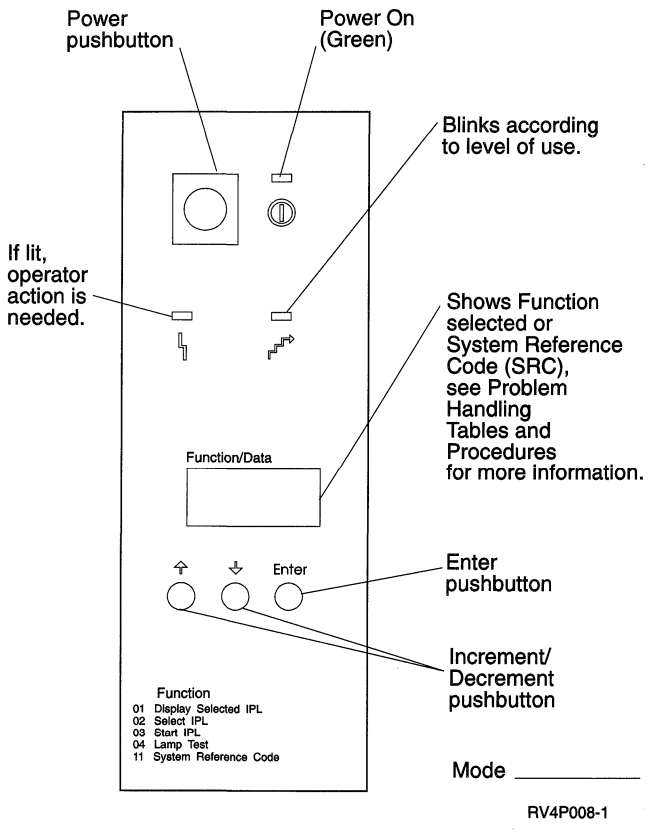
AS/400 Model: _____

IBM Business Partner/Marketing Team Number: _____

IBM Software Service Number: _____

IBM Hardware Service Number: _____

System Model 4xx Control Panel Status Form



IBM Customer Number: _____

Computer Serial Number: _____

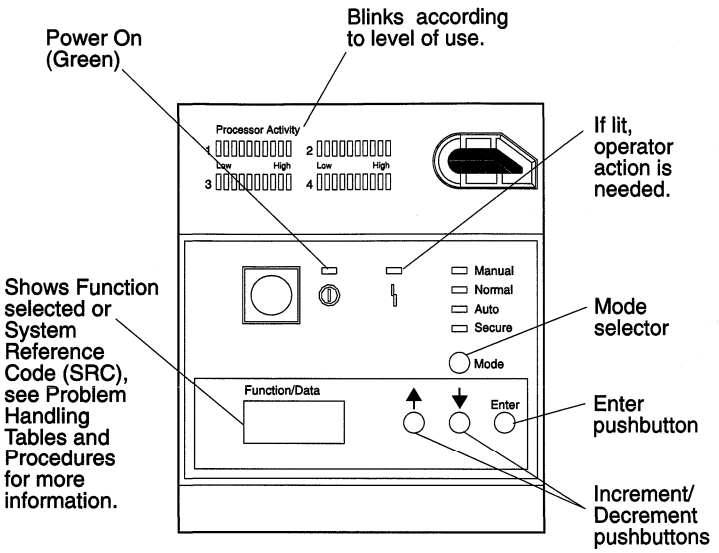
AS/400 Model 9402/9404– _____

IBM Business Partner/Marketing Team Number: _____

IBM Software Service Number: _____

IBM Hardware Service Number: _____

System Model 5xx Control Panel Status Form



IBM Customer Number: _____

Computer Serial Number: _____

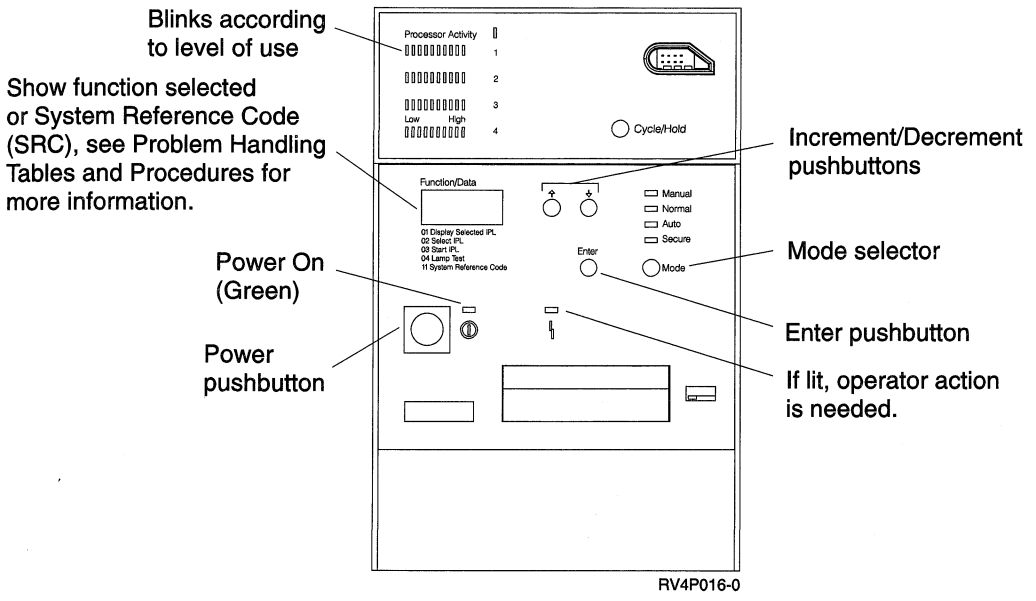
AS/400 Model 9404/9406– _____

IBM Business Partner/Marketing Team Number: _____

IBM Software Service Number: _____

IBM Hardware Service Number: _____

System Models 64x, S30, S40, and 65x Control Panel Status Form



IBM Customer Number: _____

Computer Serial Number: _____

AS/400 Model 9404/9406– _____

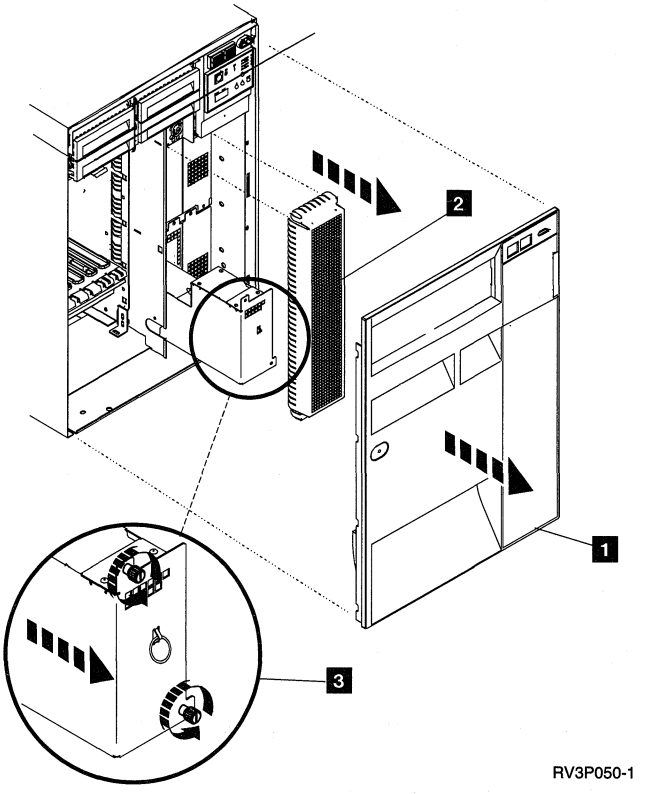
IBM Business Partner/Marketing Team Number: _____

IBM Software Service Number: _____

IBM Hardware Service Number: _____

Replacing Battery Power Unit on Models 5xx and Tower FC507x and FC508X

Replace the battery power unit when the system reference code (SRC), 1xxx D101 or 1xxx D102 is shown on the system control panel. The part number for the battery power unit is 86G8040.



1. Do not power off the system.
2. Remove the front cover **1**.
3. Pull out and lift to remove the screen **2**.

   Attention: Removing the battery power unit while the system is running on battery power will cause the system to fail and may damage the battery power unit and the card enclosure.

   Ensure that the system is not running on battery power. As a test, be sure that the console accepts system commands before removing the battery power unit.

4. **CAUTION:**
   Be careful when removing or installing this part or unit. This part or unit is heavy, but has a weight smaller than 18 kilograms (39.7 pounds). (RSFTC201)

   Loosen the screws and use two hands to pull the battery power unit out **3**.
5. Install the battery power unit by reversing the removal procedure.

CAUTION:
The battery is a lead-acid battery. To avoid possible explosion, do not burn. Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations.

In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (RSFTC225)

Chapter 4. Tips for Customizing Your System

This chapter contains tips when you are ready to fine tune your system to meet your specific needs.

Using Automatic Configuration to Configure Local Devices

Your AS/400 is shipped with automatic configuration set to Yes (Y) (the default value). IBM recommends that you use automatic configuration to do your device configuration. Using automatic configuration, you can have your local controllers, tape controllers, and local twinaxial devices configured for you by the system. The system **automatically assigns** default values to create a configuration description for each local controller and each local twinaxial device. AS/400 also automatically assigns names to all of your local devices.

An option on the Set Major System Options display allows you to select or deselect automatic configuration.

```
                              Set Major System Options

Type choices, press the Enter key.

  Enable automatic configuration . . . . . . Y          Y=Yes, N=No
  Device configuration
    naming . . . . . . . . . . . . . . . . . *NORMAL    *NORMAL, *S36, *DEVADR
  Default special environment. . . . . . . . *NONE      *NONE, *S36
```

Note: The Set Major System Options display is only available during an attended IPL.

If you use automatic configuration and want to tailor a description, allow automatic configuration to run first and then tailor your description.

Use F1 (Help) to read additional information about displays and fields.

Adding Additional Local Controllers and Devices at a Later Time

If you leave automatic configuration set to Yes (Y), the system continues to automatically configure any local controllers and devices you attach. This includes any new local workstation controllers and tape controllers, and any new twinaxial display stations, twinaxial printers, tape units, diskette units, optical units, and media library devices.

When adding a new local workstation controller, tape unit controller, optical unit, or media library device, the system must be powered off to physically attach the controllers. Automatic configuration creates a configuration description for the new controllers the next time you perform an IPL on the system.

When adding new external devices, the system does not have to be powered off, and you do not have to perform an IPL for automatic configuration to take place. As

long as the system power is on and the system is up and running, automatic configuration takes place as soon as the devices are plugged in and powered on.

Printing a Copy of Your System Configuration

After automatic configuration has configured all of your devices, you must print a copy of your system's configuration. This print out is required for you or your service representative when you have to handle problems. Ensure that you have a printer that is configured and ready to print. The system configuration is a list of devices that are attached to the system.

Tip: To print a copy of your system configuration:

__ 1. On the command line, type DSPHDWRSC.

__ 2. Specify *AHW for the Type field on the Display Hardware Resource display.

__ 3. Use *PRINT for the Output field.

__ 4. Press the Enter key.

The system configuration is sent to the output queue identified in your user profile. Keep a printed copy in a safe place.

"Work with..." Configuration Displays

Several CL commands are available for you to use to see different configuration description displays. Note which options are available on each of the displays:

- The Work with Hardware Resources (WRKHDWRSC) command
- The Work with Device Descriptions (WRKDEVD) command
- The Work with Controller Descriptions (WRKCTLD) command
- The Work with Line Descriptions (WRKLIND) command

Note: You may need additional authority to use some of the options, such as change or print, that are available on these commands.

If, for example, you want to change a device description for a local display station, use the WRKDEVD command to work with the specific local display station. You are shown the Work with Device Descriptions display that contains a list of all the local display stations configured on your system to which you are authorized. The Work with Device Descriptions display might look like this:

```
                    Work with Device Descriptions
                                                          System:  SYSNAMxxx
Position to . . . . .  _________   Starting characters

Type options, press Enter.
  2=Change   3=Copy   4=Delete   5=Display   6=Print   7=Rename
  8=Work with status  9=Retrieve source

Opt   Device       Type    Text
 _    DSP01        3196    Console (system operator office)
 _    DSP02        3197    Advertising office 2-4325
 _    DSP03        3180    Secretaries office 2-8745
 _    DSP04        3196    Accounting office (Peter) 2-8801
 _    DSP05        3180    Accounting office (Jackie) 2-4596
 _    DSP06        3180    Jan Jones office 2-5629
 _    DSP07        5251    Storage room 2-6372
 _    DSP08        5292    Vice President office 2-0906

                                                                    More...
Parameters or command
===>_____________________________________________________________________
F3=Exit   F4=Prompt   F5=Refresh   F6=Create   F9=Retrieve   F12=Cancel
F14=Work with status
```

Figure 4-1. Work with Device Descriptions Display

Using F6 (Create) on this display allows you to create new local display station descriptions.

How to Change the Text Description of Your Devices

When automatic configuration is set to Yes (Y), devices are created with a text description that reads: Created by Auto-Configuration. Because this is very generic, you may want to change the text descriptions to something that is more meaning or better describes the devices. You might want to include the location or user of the device, for example. (See Figure 4-1 for an idea of how to name your devices.)

Tip: To change the text descriptions:

__ 1. Type WRKCFGSTS CFGTYPE(*DEV) (the Work with Configuration Status command with configuration type of device specified as parameters) on a command line. Press the Enter key.

__ 2. Type 8 (Work with description) in the Opt field next to the description that you want to change. Press the Enter key.

__ 3. Type 2 (Change) in the Opt field to change the text description.

How to Change the Name of Your Devices

When automatic configuration is set to Yes (Y), devices are created using the AS/400 device naming convention. If you do not like what the AS/400 names your devices, you can change them. You must first vary off the device before you rename it.

Tip: Use either of the following methods to change the names of your devices:

__ 1. Type WRKDEVD (the Work with Device Descriptions command) on a command line and press the Enter key.

__ 2. Type 7 (Rename) in the Opt field to change the device name.

OR:

__ 1. Type RNMOBJ (the Rename Object command) on a command line and press the Enter key.

You must have object management authority to the object to be able to use the RNMOBJ command.

__ 2. Use F1 (Help) to read more information about the display or use F4 (Prompt) to be prompted for valid values to enter in the field.

How to Change Your Configuration Naming Convention

The names that were assigned by the system can be changed by using the Rename Object (RNMOBJ) command. If you decide to change your naming convention or decide to change the names that were assigned originally by the system through automatic configuration, you have two options:

- Use the RNMOBJ command for each configuration description
- Delete the original description, then create a new description with a new name (do not start the name with the letter Q)

How Do I Configure Devices at Remote Locations?

This chapter does not address what steps you need to do to accomplish this task. See the *Communications Configuration,* SC41-5401, SC41–5401, for more information.

Using Configuration Menus for Manual Configuration

Configuration menus are designed to lead you step by step through the manual configuration process for the type of configuration you are performing. (A **menu** is a displayable list of items from which a user can make a selection.)

Remember: Based on the options you select, you are shown a "Work with..." configuration display. One "Work with..." configuration display exists for each type of configuration description. For example, for controller descriptions, use the Work with Controller Descriptions display; for device descriptions, use the Work with Device Descriptions display, and so on.

The "Work with..." configuration displays show a list of the existing configuration descriptions to which you have operational authority. For example, the Work with Controller Descriptions display lists all the controller descriptions that have already been created on your system, including descriptions for all local workstation controllers, tape unit controllers, remote work station controllers, and communications con-

trollers. Depending on the menu options you select, the list of controllers on the Work with Controller Descriptions display may only be part of the list, showing the descriptions for a particular type of controller. For example, if you get to the Work with Controller Descriptions display using the menu option for local workstation controllers, only the existing local workstation controller descriptions to which you have operational authority are listed on the display. From the "Work with..." configuration displays, you can work with (create, change, copy, delete, display, print) configuration descriptions that already exist on the system.

For a more detailed discussion of manual configuration concepts, see *Local Device Configuration*, SC41-5121.

Configuration Tasks You Can Perform

Once you have created an initial configuration for your system, other configuration tasks can be performed at any time. These configuration tasks allow you to continually assess your existing configuration and adapt it for a changing system. Becoming familiar with these tasks allows you to make better decisions about which configuration is best for your system.

The configuration tasks include:

- Creating configuration descriptions
- Changing configuration descriptions
- Copying configuration descriptions
- Deleting configuration descriptions
- Displaying configuration descriptions
- Printing configuration descriptions
- Renaming configuration descriptions
- Working with configuration status
- Retrieving **CL** (control language) source for configuration descriptions
- Printing device addresses

You can perform any of these configuration tasks using the configuration menus and "Work with..." configuration displays.

"Work with..." Configuration Displays

Each of the configuration menus lead to a "Work with..." configuration display. From the "Work with..." configuration displays, you can perform any of the configuration tasks listed above. This is the most convenient method of performing configuration tasks.

Each "Work with..." configuration display contains a list of all the configuration descriptions of a particular type to which you have operational authority. You can use the list to choose the description with which you would like to work. For example, if you want to change a device description for a local display station, you would go through the configuration menus selecting the options for local display stations. You are shown the Work with Device Descriptions display that contains a list of all the local display stations configured on your system to which you are authorized. The Work with Device Descriptions display might look like this:

```
                    Work with Device Descriptions
                                                          System:  SYSNAMxxx
Position to . . . . .  _________   Starting characters

Type options, press Enter.
  2=Change   3=Copy   4=Delete   5=Display   6=Print   7=Rename
  8=Work with status  9=Retrieve source

Opt   Device       Type    Text
 _    DSP01        3196    Console (system operator office)
 _    DSP02        3197    Advertising office 2-4325
 _    DSP03        3180    Secretaries office 2-8745
 _    DSP04        3196    Accounting office (Peter) 2-8801
 _    DSP05        3180    Accounting office (Jackie) 2-4596
 _    DSP06        3180    Jan Jones office 2-5629
 _    DSP07        5251    Storage room 2-6372
 _    DSP08        5292    Vice President office 2-0906

                                                                    More...
Parameters or command
===>_____________________________________________________________________
F3=Exit   F4=Prompt   F5=Refresh   F6=Create   F9=Retrieve   F12=Cancel
F14=Work with status
```

From this display, you have the option to change, copy, delete, display, rename, or print any of the configuration descriptions listed. Using F6 on this display allows you to create new local display station descriptions.

Work with Hardware Resources Command

An alternative method of accessing "Work with..." configuration displays is through the use of the Work with Hardware Resources (WRKHDWRSC) command. All locally attached hardware can be displayed, along with the operational status (power on, power off, or detected by the system during the latest IPL), location, resource name, and configuration status. By using this command, and specifying the configuration type, you may create, update, change the status, delete, and display any local configuration object.

For example, if you want to change the configuration description for a work station controller, type:

WRKHDWRSC

and press F4 (Prompt). **Prompt** is a remainder or a displayed request for information or user action. The user must respond to allow the program to proceed. The **command line** is on a display where command option numbers, or selections can be entered. By entering *LWS for the type, you will be shown a display listing all of the local work station resources. By selecting option 5 (Work with controller description) next to the controller you want to work with, the Work with Controller Descriptions display is shown.

```
                    Work with Controller Descriptions
                                                          System:  SYSNAMxxx
Position to . . . . .  _________   Starting characters

Type options, press Enter.
  2=Change   3=Copy   4=Delete   5=Display   6=Print   7=Rename
  8=Work with status  9=Retrieve source      12=Print device addresses

Opt   Controller   Type    Text
 _    QCTL         6040    Controller description created during IPL.









                                                                      Bottom
Parameters or command
===>
F3=Exit   F4=Prompt   F5=Refresh   F6=Create   F9=Retrieve   F12=Cancel
F14=Work with status
```

From this display, you may change, copy, delete, display, print, work with status, retrieve source, and print device addresses with the controller you have chosen.

Using Keyboard and Display Station-Tips

The following is a list of things you need to know when creating configuration descriptions. For more information on keyboard and display station functions, see the *System Operation for New Users*, SC41-3200 book.

- Use the Enter key and the Roll keys to create configuration descriptions. Press the Enter key when the word **Bottom** is visible at the lower-right corner of the display; press the Roll key when the word **More...** is visible.
- A bold caret symbol is placed to the left of a field after you press the Enter key or the Roll key to indicate that you have entered or changed a value in this field.
- Three types of fields are used with the prompts when entering configuration information:
  - Blank fields that have a bold underline are fields that must be assigned a value.
  - Blank fields that do not have a bold underline are optional.
  - Fields that are already filled have default values that you may change.
- Online help information is available for the command keys shown at the bottom of all displays by pressing the Help key or F1.
- If you make a mistake while typing information to create a description, you can change it before you exit that display, in most cases. In some cases, to change a field requires that you delete the description and create a new one. (You may want to print the description before deleting it, or use the Retrieve source option to keep a copy of the CL source for the description.) A **default value** is automatically supplied or assumed by the system or program when no value is specified by you.

Making an Object Available or Unavailable for Use (Varying Objects On and Off)

Varying off an **object** (device, controller, line, network interface, or network server) makes it unavailable for use. For example, if you vary off a particular display station, you cannot use that display station again until it is varied on at the system. Varying on an object establishes the logical link between the system and the object so that the object is available to the system for normal use.

Before you can perform some of the configuration tasks on certain objects, you may have to vary off the object. Then, once an object is varied off, you must vary on the object to make it usable again.

The Work with Configuration Status (WRKCFGSTS) display has options for varying on and varying off the network interfaces, network servers, lines, controllers, and devices attached to your system.

For more information on how to vary on and vary off objects on your system, see the *System Operation*, SC41-4203 book.

Creating Configuration Descriptions

You can create new configuration descriptions from the "Work with..." configuration displays. When you use the function key to create, you are asked for the specific information, or attributes, of the item for which you are creating a description. For example, when creating a new local work station controller description, you are asked for the name of the local controller, the local controller type and model, the resource name assigned to the local controller, and so on. Once you fill in the information and press the Enter key, your description is created.

Note: If you create a configuration description using the "Work with..." configuration panels, the Create Device Description display is shown with most of the required information already present. This is a simple way to create configuration descriptions.

Changing Configuration Descriptions

Once you have created a configuration description, it remains on the system as you created it until you choose to change it. You may want to do this later as your system needs change, as your system grows, or as your use for a particular item changes. For example, as you add more devices, you may decide to change your addressing scheme for your devices.

The easiest way to change configuration descriptions is to use option 2 (Change) on the "Work with..." configuration display. When you type 2 next to an entry on the "Work with..." configuration display and press the Enter key, the existing values for the description are shown. You can then change the values you intended to change. The changed description takes effect as soon as you complete entering the information and press the Enter key.

However, some information in a configuration description cannot be changed once the original description is created. For example, you cannot change the type and model number listed for a device. The type and model number you assign initially in the configuration description remains in effect until you delete the entire description. If you decide to change the type and model number listed in a configuration

description, you must delete the configuration description, and create it again specifying the new values.

Note: If you have specified port sharing, you may not change certain fields in the port device description. Those fields are the line speed, parity, and word length (if you indicated port sharing was to automatically detect the line speed, parity, and word length).

Also, when you change a configuration description using option 2 (Change) on the "Work with..." configuration display, any prompts shown with the value *SAME are prompts that do not apply to the object the description is for and cannot be changed.

In addition, some objects must be varied off before changes to the configuration descriptions for those objects can be made.

Also, other values cannot be changed after the original description has been created. These values are not shown with the existing values when you select the change option on the "Work with..." configuration display. To change these values, you must delete the original description, and create a new one. (You may want to print the description before deleting it, or use the Retrieve source option to keep a copy of the CL source for the description.)

Copying Configuration Descriptions

An option on the "Work with..." configuration displays allows you to copy a particular configuration description and use it as a base for another similar description.

Copying configuration descriptions is very similar to creating new configuration descriptions. Both result in the creation of a new description. When you type option 3 (Copy) next to an entry on the "Work with..." configuration display and press the Enter key, you see the first prompt display for the appropriate Create command. However, instead of defaults being shown, the values are filled in with the actual values from the description being copied.

For example, if you add a new display station to your system and you want it configured like another one that already exists on your system, you could copy the existing one to create the new one.

For each type of configuration description, however, some information must be unique. When you choose the copy option on the "Work with..." configuration displays, you can change the information that must be unique for the item you are creating.

Deleting Configuration Descriptions

Another option on the "Work with..." configuration displays allows you to delete configuration descriptions. If a description for a physical attachment that no longer exists on your system is shown, you should delete the description. Or, if you want to create a new description for an existing physical attachment, you should delete the old configuration description first.

A configuration description cannot be deleted unless the object in the description is varied off. Also, all other objects attached to the object in the description being deleted must be varied off. For example, if you want to delete a line description, the

line itself must be varied off, and all the controllers and devices attached to that line must be varied off.

Note: You may want to print a copy of a configuration description before deleting it, or use the Retrieve source option to keep a copy of the CL source for the description. See "Printing Configuration Descriptions" and "Retrieving Configuration Source" for more information on printing descriptions and retrieving copies of CL source.

You can delete a configuration description using option 4 (Delete) on the "Work with..." configuration display. When you type a 4 next to an entry on the display and press the Enter key, the Confirm Delete display is shown. If you press the Enter key again, the description is deleted.

Displaying Your Configuration

Another configuration task is displaying your configuration descriptions. You may want to view them to make sure they were correctly created or to see what the current values are.

You can display a configuration description using option 5 (Display) on the "Work with..." configuration display. When you type a 5 next to an entry on the display and press the Enter key, the description is shown with its current values.

Printing Configuration Descriptions

An option on the "Work with..." configuration displays allows you to print a particular configuration description. This enables you to keep a printed copy of any or all of the configuration descriptions on your system.

You can print a configuration description using option 6 (Print) on the "Work with..." configuration display. When you type a 6 next to an entry on the display and press the Enter key, the description is sent to an output queue so that it can be printed.

Renaming Configuration Descriptions

An option on the "Work with..." configuration displays allows you to change the name of a configuration description without deleting the description and manually creating a new one.

You can rename a configuration description using option 7 (Rename) on the Work with Objects display. When you type a 7 next to an entry on the display and press the Enter key, the Rename Object (RNMOBJ) display is shown. You can then change the name of your configuration description.

Notes:

1. You can also change the name of a configuration description by using the Rename Object (RNMOBJ) command.
2. The new name specified for the configuration description must be unique, and the configuration object must be varied off before you begin.
3. If you are using automatic configuration and decide to change the naming convention for your local configuration, you must change the

QDEVNAMING system value. Use the Change System Values (CHGSYSVAL) command) and delete the old configuration descriptions. Then, automatic configuration creates new descriptions using the new naming convention. The new descriptions take effect the next time you perform an IPL or the next time the devices are powered on.

Working with Configuration Status

After you have completed your initial configuration and are using your system, you can use the Work with Configuration Status display to do various tasks related to your configuration. To show the Work with Configuration Status display, select option 4 (Work with configuration status) on the Configure Devices and Communications menu.

Following is an example of the Work with Configuration Status display:

```
                  Work with Configuration Status          SYSNAMxxx
                                                       05/27/95 10:47:31
Position to . . . . .  __________  Starting characters

Type options, press Enter.
  1=Vary on   2=Vary off   5=Work with job    8=Work with description
  9=Display mode status ...

Opt  Description       Status              -------------Job--------------
 _   LIN01            ACTIVE
 _     CTL01          ACTIVE
 _       DSP01        ACTIVE                PUTGET      QSECOFR    000966
 _       DSP02        VARIED OFF
 _   LIN02            ACTIVE
 _     CTL02          ACTIVE
 _       DSP03        SIGNON DISPLAY
 _     CTL03          VARY ON PENDING
 _       DSP04        VARY ON PENDING
                                                                    More...
Parameters or command
===>_____________________________________________________________________
F3=Exit   F4=Prompt     F12=Cancel      F23=More options      F24=More keys
```

The Work with Configuration Status display shows status information for network servers, network interfaces, lines, controllers, devices, and for jobs associated with devices. This information may be sent to a file for printing. The display can be for a location or for one or more network interfaces, lines, controllers, or devices. All attached configuration descriptions are shown for each line, controller, or device description selected. Attached descriptions are indented under the object to which they are attached, as shown in the example.

For network server descriptions, the status displayed is the configuration status of the object. Options are available from the Work with Configuration Status display to show the status of the network server functions and client sessions. Use this option to check for active clients before varying off a network server.

The status display for a requested location shows lines with attached controllers, devices, and modes for the specified location.

For more information on configuration status, see the *Communications Management*, SC41-5406 book.

Retrieving Configuration Source

An option on the "Work with..." configuration displays allows you to retrieve the CL source statements for a configuration description. This source can be used later to create the configuration description again.

You can retrieve the source for a configuration description using option 9 (Retrieve source) on the "Work with..." configuration display. When you type 9 next to an entry on the display and press the Enter key, the CL source for the description is placed in a database source file member. The file name used is QCLSRC, and the member name used is the name of the configuration description. You can press F4 (Prompt) to specify a different file and member name. A **source file** is a file of programming code that is not compiled into machine language. A source file can contain source members for such items as high-level language programs and data description specifications.

Note: This option is not available on the Work with Configuration Status display.

For more information about retrieving configuration source, see the *Communications Configuration*, SC41-5401 book.

Printing Device Addresses

An option on the Work with Controller Descriptions display allows you to print the addresses of all the devices attached to your local or remote work station controllers. You can use this option on both twinaxial and ASCII work station controllers.

You can print the device addresses for the devices attached to a work station controller using option 12 (Print device addresses) on the Work with Controller Descriptions display. When you type 12 next to an entry on the display and press the Enter key, the output is sent to an output queue so it can be printed.

Authority Needed for Configuration

To perform the configuration tasks on a particular configuration description, you must have special authority to the description. With **special authority** you can perform system functions, including all object authority (such as, system authority, job control authority, and service authority). Some tasks are more restricted than others and require a greater amount of authority.

The authority required for each of the configuration tasks is shown:

- To create a configuration description, you only need to have authority to the particular configuration command.
- To display or print a configuration description, you must have *USE authority to the description.
- To copy a configuration description, you must have *USE authority to the description being copied.
- To change a configuration description, you must have *CHANGE and *OBJMGT authority to the description.

- To delete a configuration description, you must have existence authority for the object.
- To see a configuration description on one of the "Work with..." configuration displays, you must have operational authority to the description.
- To rename a configuration description from the Work with Objects display, you must have object management authority for the description that is being renamed, and you must have update authority for the library in which the object is located. **Object management authority** allows the user to specify the authority for the object, move or rename the object, and add members to database files.

For more information on authority, see the *Security - Basic*, SC41-5301 book and *Security - Reference*, SC41-5302 book.

Configuring Disk Units

Disk units are storage devices that attach locally to your system and can contain one or more disk drives. A **disk drive** controls and moves the disk. You do not have to create configuration descriptions for them. However, when you add more disk units to your system, you do have to tell the system to use the new units, and tell the system which auxiliary storage pool the units should be applied to. **Auxiliary storage pools** are one or more storage units defined for one or more disk units. Subsystems that make up auxiliary storage pools provide a means of isolating certain objects on specific disk units to prevent the loss of data due to disk media failure on other disk units. In other words, you configure the disk units into the system.

When your system was initially set up, all the disk units you ordered for your system were configured for you. However, if you decide to add more disk units to your system, you must configure them yourself.

To use the Work with Disk Units display, complete the following steps:

1. Perform a manual mode IPL from the control panel.
2. The IPL/Install the System menu is shown. From this menu, select option 3 (Dedicated Service Tools). **Dedicated Service Tools** are the part of the Service Function used to service the system when the operating system is not working.
3. Type the default password (22222222) on the Dedicated Service Tools password menu and press the Enter key. If you specified another password, then type that password.
4. The Dedicated Service Tools menu is shown. From this menu, select option 4 (Work with disk devices).
5. The Work with Disk Units display is shown. From this display, you can change your storage device configuration to add the storage of the new disk unit.

For more information on how to configure storage devices, refer to the online help information for the Dedicated Service Tools menus, or see the *Backup and Recovery*, SC41-5304 book.

For information on how to configure auxiliary storage pools (ASPS) or checksum protection, see the *Backup and Recovery*, SC41-5304 book.

Controlling Initial Program Load (IPL)

You can control the IPL by changing the IPL start-up program, calling a special IPL recovery program, setting up an unattended environment, or setting up an unattended nighttime environment.

Changing the IPL Start-Up Program

The autostart job in the controlling subsystem transfers control to the program that is specified in the system value QSTRUPPGM. You can tailor this program.

You can create your own program and change the QSTRUPPGM system value to that program name. Or, you can use the shipped program QSTRUP in QSYS as a base to create your own program. To do this, you would:

1. Retrieve the source of the shipped program byusing the RTVCLSRC command (for example, `RTVCLSRC PGM(QSYS/QSTRUP) SRCFILE(YOURLIB/YOURFILE)`).
2. Change the program.
3. Create the program by using the CRTCLPGM command, putting it into your own library.
4. Test the program to ensure that it works.
5. Change the system value QSTRUPPGM to the program name and library you specified on the CRTCLPGM command.

Source for CL Start-up Program

Table 4-1. Source for CL Start-up Program

Object	Command	CL Program Source

QSTRUP	CRTCLPGM	PGM
		DCL VAR(&STRWTRS); TYPE(*CHAR) LEN(1)
		DCL VAR(&CTLSBSD); TYPE(*CHAR) LEN(20)
		DCL VAR(&CPYR); TYPE(*CHAR) LEN(90) VALUE('+
		5769-SS1 (C) COPYRIGHT IBM CORP 1980, 1997. +
		LICENSED MATERIAL - PROGRAM PROPERTY OF IBM')
		
		QSYS/STRSBS SBSD(QSPL)
		MONMSG MSGID(CPF0000)
		
		QSYS/STRSBS SBSD(QSERVER)
		MONMSG MSGID(CPF0000)
		
		QSYS/RLSJOBQ JOBQ(QGPL/QS36MRT)
		MONMSG MSGID(CPF0000)
		
		QSYS/RLSJOBQ JOBQ(QGPL/QS36EVOKE)
		MONMSG MSGID(CPF0000)
		
		QSYS/STRCLNUP
		MONMSG MSGID(CPF0000)
		
		QSYS/RTVSYSVAL SYSVAL(QCTLSBSD) RTNVAR(&CTLSBSD);
		IF ((&CTLSBSD *NE 'QCTL QSYS ') +
		*AND (&CTLSBSD *NE 'QCTL QGPL ')) GOTO DONE
		
		QSYS/STRSBS SBSD(QINTER)
		MONMSG MSGID(CPF0000)
		
		QSYS/STRSBS SBSD(QBATCH)
		MONMSG MSGID(CPF0000)
		
		QSYS/STRSBS SBSD(QCMN)
		MONMSG MSGID(CPF0000)
		DONE:
		
		QSYS/RTVSYSVAL SYSVAL(QSTRPRTWTR) RTNVAR(&STRWTRS);
		IF (&STRWTRS = '0') GOTO NOWTRS
		
		CALL PGM(QSYS/QWCSWTRS)
		MONMSG MSGID(CPF0000)
		
		NOWTRS:
		
		RETURN
		CHGVAR VAR(&CPYR); VALUE(&CPYR);
		/* Needed to include CPYR variable in program. */
		ENDPGM

QSTRUPPGM System Value

QSTRUPPGM is the start-up program. This value specifies the name of the program that iscalled from an autostart job when the controlling subsystem is started. This program performs setup functions, such as starting subsystems and printers. This system value can only be changed by the security officer or by someone with security officer authority. A change to this system value takes effect the next time an IPL is performed. QSTRUPPGM can have the values:

- 'QSTRUP QSYS': The program that is specified is run as a result of a transfer of control to it from the autostart job in the controlling subsystem.
- '*NONE': The autostart job ends normally without calling a program.

The default startup program QSYS/QSTRUP does the following:

- Starts the QSPL subsystem for spooled work.
- Releases the QS36MRT and QS36EVOKE job queues if they were held (these are used by the System/36 environment).
- Starts Operational Assistant cleanup, if allowed.
- Starts all printer writers unless user specified not to on the IPL Options display.
- If the controlling subsystem is QCTL, it starts the QINTER, QBATCH, and QCMN subsystems.

Type	Length	Shipped Value
Character	20	'QSTRUP QSYS'

Miscellaneous Tips

Getting Job Logs in One Output Queue

To get the job logs in one output queue, change the job log print file. The default output queue for job logs is the output queue the job is using. Therefore, job logs for different jobs go to different output queues. Since the system looks at the print file first to determine which output queue to use, you can specify that all job logs go to one output queue by changing the job log print file output queue parameter to a specific output queue.

To change the job log print file so that all job logs go to a specified output queue:

```
CHGPRTF FILE(QSYS/QPJOBLOG)
OUTQ(library/outq)
```

Stopping a Job Log From Being Created

To prevent a job log from being produced at the completion of a batch job, you can specify LOG(*NOLIST) on the following commands:

- Batch Job (BCHJOB)
- Submit Job (SBMJOB)
- Change Job (CHGJOB)
- Create Job Description (CRTJOBD)

- Change Job Description (CHGJOBD)

If you specify LOG(*NOLIST), the job log is not produced at the end of a job unless the job end code is 20 or greater. If the job end is 20 or greater, the job log is produced.

For an interactive job, the value that is specified for the LOG parameter on the SIGNOFF command takes precedence over the LOG parameter value that is specified for the job.

Chapter 5. Tips for Managing Your System

Printing System Information

Periodically, you should print a record of the contents of your system, such as how your system is customized and what libraries your system contains. We suggest printing this information quarterly or whenever you make a major change, such as installing a new application. This printed record of your system contents can be useful if you ever need to recover from a disaster or if you need to evaluate the results of a major system change.

To print system information, do the following:

1. To ensure that your printouts are complete, sign on with a user profile (such as the security officer) that has sufficient authority to list different types of system resources. The user profile should also be enrolled in the system distribution directory.
2. If you want, use the Change Job (CHGJOB) command to assign your job to an output queue that is not assigned to an active printer. The Print System Information (PRTSYSINF) command creates many reports that can be very long. You probably want to print these reports at a time when your system is not busy.
3. Type `PRTSYSINF` and press the Enter key.

   You see the Print System Information display, which tells you what information the sytsem will print.
4. Review the information on the display. Then press the Enter key. The system runs a series of commands and programs to print system information. Table 5-1 on page 5-2 describes the spooled files that the system creates. The PRTSYSINF command does not create empty spooled files. Therefore, you might not have all the files in Table 5-1 on page 5-2 because some objects or types of information might not exist on your system.
5. Print the spooled files that the PRTSYSINF command creates and keep them as a record of your system's contents. If you choose to save these files to tape rather than printing them, be sure to use proper procedures for saving the content of spooled files. (When you save an output queue the sytsem does *not* save the contents of spooled files. The *Backup and Recovery*, SC41-5304 describes how to save spooled files.
6. Use appropriate commands to print an IBM-supplied objects that you have modified, such as the QSYSPRT print file.
7. If you maintain a CL program that has your configuration information, use the Retrieve Configuration Source (RTVCFGSRC) command to ensure that the CL program is current.

Table 5-1. System-created spooled files

Spooled File Name	User Data	Description of Contents
QPEZBCKUP	DSPBCKUPL	List of all user libraries
QPEZBCKUP	DSPBCKUPL	List of all folders
QSYSPRT	DSPSYSVAL	Current settings for all system values
QDSPNET	DSPNETA	Current settings for all network attributes
QSYSPRT	DSPCFGL	Configuration lists
QSYSPRT	DSPEDTD	User-defined edit descriptions (a separate spooled file for each)
QSYSPRT	DSPPTF	Details of all PTFs that are installed on the system
QPRTRPYL	WRKRPYLE	All reply list entries
QSYSPRT	DSPRCYAP	Settings for access path recovery times.
QSYSPRT	DSPSRVA	Settings for service attributes.
QSYSPRT	DSPNWSSTG	Network server storage spaces information.
QSYSPRT	DSPPWRSCD	Power on/off schedule
QSYSPRT	DSPHDWRSC	Hardware configuration reports (a separate spooled file for each resource type, such as *CMN or *LWS)
QSYSPRT	WRKOPTCFG	Optical device descriptions
QSYSPRT	DSPRJECFG	Remote job entry configurations
QPDSTSRV	DSPDSTSRV	SNADS configuration
QPRTSBSD	DSPSBSD	Subsystem descriptions (a separate spooled file for each subsystem description on your system)
QSYSPRT	DSPSFWRSC	Installed licensed programs (Software Resources List)
QPRTOBJD	DSPOJBD	A list of all the journals on your system
QPDSPJRNA	WRKJRNA	The journal attributes for each journal that is not in the QUSRSYS library (a separate file for each journal). Typically, journals in the QUSRSYS library are IBM-supplied journals. If you have your own journals in the QUSRSYS library, you need to manually print information about those journals.
QSYSPRT	CHGCLNUP	Settings for automatic cleanup
QPUSRPRF	DSPUSRPRF	Current values for the QSECOFR user profile
QPRTJOBD	DSPJOBD	Current values for the QDFTJOBD job description
QPJOBLOG	PRTSYSINF	The job log for this job[1]

Notes:

1. On your system, this spooled file might be in the QEZJOBLOG output queue.

Printing a List of Hardware Devices

A current listing of the locations for the hardware controllers on your system can be useful when you need hardware service or when you upgrade your system. To print the label locations of hardware controllers on your system, do the following:

Note: Do this whenever you make changes to hardware on your system, such as adding a new controller.

1. Type the following:

   ```
   WRKHDWPRD
   ```

   You see the Work with Hardware Products display.

2. Select option 4 (Display description label locations). You see the Display Description Label Locations display:

```
                  Display Description Label Locations
                                                              System:
System type-model/serial . . . . . . . :   9406-F90 / 10-00904

---------------Location-----------------
Frame    EIA      Device     Card
 ID    Location  Position  Position  Port  Label
  A       13                  3           CTL02
  A       13                  3B          *NONE
  A       13                  4       1   TRNLINE
  A       22                              TAP02
  A       26        1                     TAP25
  A       31                              DKT01
  B       11                  2A      1   MTAPCL1, MTASCL1,
                                            MTBSCL1
  B       11                  2A      2   MTAPCL2, MTASCL2,
                                            MTBSCL2
```

Figure 5-1. Display Description Label Locations

3. Press F17 (Print). You receive the following message: `Label location list printout was created.`
4. Press F3 (Exit) until you return to a menu with a command line. If you see the Upgrade IPL Option Settings display, press F3 to exit that display.
5. Retrieve the printout from the printer and keep it with your other system documentation.

Cleaning Up Your System

Think of your system like a house or office. It can fill up with clutter and unnecessary objects. This clutter can fill up the disk storage on your system and affect your system performance. The topics that follow provide suggestions for cleaning up your system on a regular basis.

Setting Up Automatic Cleanup

You can set up our system to run some cleanup functions regularly. Do the following to set up automatic cleanup:

1. Type `GO CLEANUP` to display the CLEANUP menu.
2. Select option 1 (Change cleanup options). You see the Change Cleanup Options display:

```
                    Change Cleanup Options                    XXXXXX

Type choices below, then press Enter.

Allow automatic cleanup . . . . . . . . . . . . .   Y          Y=Yes, N=No

Time cleanup starts each day  . . . . . . . . . .   22:00:00   00:00:00-23:59:59,
                                                                *SCDPWROFF,
                                                                *NONE

Number of days to keep:
  User messages . . . . . . . . . . . . . . . . .   7          1-366, *KEEP
  System and workstation messages . . . . . . . .   4          1-366, *KEEP
  Job logs and other system output  . . . . . . .   7          1-366, *KEEP
  System journals and system logs . . . . . . . .   30         1-366, *KEEP
  OfficeVision/400 calendar items . . . . . . . .   30         1-366, *KEEP
```

Figure 5-2. Change Cleanup Options

3. Type Y for the *Allow automatic cleanup* field.
4. Type values in the fields on the bottom half of the display (*Number of days to keep*). The online help information and the *Basic System Operation, Administration, and Problem Handling*, SC41-5206 book provide more information about what these options do.
5. Set up your system to run automatic cleanup regularly by typing a value in the *Time cleanup starts each day* field. Then press the Enter key.

   Notes:

   a. If you want to run the automatic cleanup function immediately, you can select option 3 (Start cleanup immediately) from the CLEANUP menu. If you receive the message `Cleanup has already been started`, select option 4 (End cleanup). This ends either the scheduled cleanup job or the cleanup job that is already started. Then select option 3 again to run cleanup immediately.

   b. You can use the Work with Active Jobs (WRKACTJOB) command to determine when the cleanup jobs have finished. Their names begin with `QCLN`. Or you can check the QSYSOPR message queue for the message CPC1E1D (`Cleanup has completed`).

Cleaning Up Obsolete User Profiles

Obsolete user profiles take space on your system. In addition, obsolete user profiles probably own objects that you no longer need. To identify obsolete user profiles, do the following:

1. Type `GO SECTOOLS` and press the Enter key. You see the Security Tools menu.
2. Select option 4 (Analyze profile activity). You see the Analyze Profile Activity (ANZPRFACT) display.
3. For the *Number of inactive days*, type the number of days that a user can go without signing on before you consider the user profile to be inactive.
4. Press the Enter key. The system schedules a job to run once a month (at 1 a.m. on the day after you selected this menu option). The job sets the status to *DISABLED for any user profile that has been inactive longer than the number of days that you specified. You receive a listing of the user profiles that the system set to *DISABLED.

Notes:

a. You can use option 3 (Change active profile list) from the Security Tools menu to make a user profile exempt from ANZPRFACT processing.

b. The *Tips and Tools for Securing Your AS/400,* SC41-5300 book provides more information about using security tools.

When you receive the report of user profiles that the system disabled, do the following:

1. Type `WRKUSRPRF *ALL` and press the Enter key. You see the Work with User Enrollment display.

   Note: If you see the Work with User Profile display, user F21 to change to basic assistance level.

2. On the display, type 4 (Remove) in the option column for the user profile that you want to remove. You see the Remove User display.
3. Select 2 (Delete or change owner of specific objects owned by this user) and press the Enter key. You see a list of objects owned by the user.
4. For every object that you no longer need on the system, type 4 (Delete) in the option column in front of the object.

   Notes:

   a. You can select more than one object for deletion at a time.

   b. To see the type of object, press F11.

5. Press the Enter key. You see the Confirm Delete of Objects display.
6. If your selections are correct, press the Enter key. Otherwise, press F12 (Cancel) to return to the selection display.
7. For objects that you want to keep, you need to assign them to a new owner. Type the name of the user profile for the new owner at the top of the display.
8. Type 2 (Change to new owner) in the option column next to the objects and press the Enter key. You see the Confirm Change of Owner display.
9. If your selections are correct, press the Enter key. Otherwise, press F12 (Cancel) to return to the selection display.
10. When you have handled all the objects that the user profile owned, you see the message (`User does not own any objects, press Enter to remove`)
11. Press the Enter key to remove the user profile from the system. You see several messages while the system removes the user's records. Then you see the Work with User Enrollment display again with a confirmation message at the bottom of the display.
12. To remove any spooled files that the user created, do the following:

    a. Press F9 to display a command line.

    b. Type `WRKSPLF SELECT(`*`user-profile-name`*`)` and press the Enter key.

    c. On the Work with Spooled Files display, use option 4 (Delete) to delete any spooled files that you no longer need.

    d. When you have deleted all the spooled files that are no longer necessary, press F12 (Cancel).

Note: Spooled files can remain on the system even when the user profile that created them is no longer on the system.

13. If you have additional user profiles to remove, return to step 2 on page 5-5.

Cleaning Up Obsolete Objects

As part of your cleanup effort, you need to encourage users to clean up objects that they no longer need. Figure 5-3 shows a sample set of instructions that you can distribute to users. Notice that the example refers to an archives library. You might want to create a library for users to store things that they seldom use. Your operators can periodically save the library to tape and delete it from your system.

To delete objects that you no longer need, do the following:

__ **Step 1.** At a command line, type the following and press the Enter key:

```
WRKOBJOWN
```

You see the Work with Objects by Owner display. It lists all of the objects that you own.

__ **Step 2.** If you are not sure about whether to delete an object, you can use the MOVOBJ (Move Object) command to move the object to the following archives library: _____. System operators will save this library to an archives tape before deleting the library from the system.

__ **Step 3.** If you are sure that you no longer need an object, use option 4 (Delete) on the Work with Objects by Owner display to remove the object from the system. (You can delete more than one object at a time.) You will see a confirmation display with the objects that you selected to be deleted.

__ **Step 4.** Verify that the correct objects are listed. Then press the Enter key.

__ **Step 5.** To see a list of spooled files that you created, type the following and press the Enter key:

```
WRKSPLF
```

You see the Work Spooled Files display or the Work with Printer Output display, depending on your assistance level.

__ **Step 6.** From the display, use option 4 to delete spooled files that you no longer need.

Figure 5-3. Cleanup Instructions – Sample

Cleaning Up Licensed Programs

Your system might have licensed programs that you no longer need. (Perhaps you installed them as a test and decided not to use them.) To remove licensed programs that you do not plan to use, do the following:

1. To create a list of all the software resources on your system, type the following and press the Enter key:

   ```
   DSPSFWRSC OUTPUT(*PRINT)
   ```

2. Retrieve the printout from the printing and mark any licensed programs that you want to delete. *Be sure* that you do not need a licensed program before you delete it.

3. Type `GO LICPGM` and press the Enter key. You see the Work with Licensed Programs menu.

4. To save a licensed program before you delete it, type 1 (Save) in the option column in front of the licensed program. Follow the instructions on the prompt displays.

   Note: If a licensed program does not appear in the list, use the Save Licensed Program (SAVLICPGM) command to save it.

5. Press F12 (Cancel) to return to the Work with Licensed Program menu.
6. After you have saved the licensed programs, select option 12 (Delete licensed programs) from the menu. You see the Delete Licensed Programs display.
7. Type 4 (Delete) in the option column in front of each licensed program that you want to delete.

   Note: If a licensed program does not appear in the list, use the Delete Licensed Program (DLTLICPGM) command to delete it.

8. Follow the instructions on any prompt displays that you see.

Cleaning Up Your Hardware Configuration

Your system might have configuration descriptions for devices that no longer exist on your system. You should remove these unnecessary descriptions to save space and improve your IPL performance. Do the following:

1. Type `WRKHDWRSC TYPE(*CMN)` and press the Enter key. You see the Work with Communications Resources display.
2. Press F11 (Display resource addresses/statuses).
3. For any resource that has a status of `Not detected`, type a 4 (Remove) in the option column. Do this only if the hardware is not physically on the system. You might need to check with your hardware service representative to determine this.
4. Press F12 (Cancel).
5. Repeat steps 1 through 4 for resource type *LWS. You see the Work with Local Work Station Resources display.
6. Repeat steps 1 through 4 for resource type *CSA. You see the Work with Coupled Resources display.
7. Type `WRKHDWRSC TYPE(*STG)` and press the Enter key. You see the Work with Storage Resources display.
8. For any resource that has a status of `Not detected`, type a 4 (Remove) in the option column. Do this only if the hardware is not physically on the system. You might need to check with your hardware service representative to determine this.
9. Press F12 (Cancel).
10. Repeat steps 7 through 9 for resource type *PRC.

    Note: For resource type *PRC, *do not* delete the resource CEC01, even if its status is `Not detected`.

Additional Cleanup Tasks

Following are suggested tasks that you can perform regularly (such as monthly) to clean up the disk usage on your system. You may perform these tasks in any sequence. Some of them might require information from your system users.

1. To identify and delete obsolete libraries, do the following:
   a. Type `DSPBCKUPL OUTPUT(*PRINT)` and press the Enter key.
   b. Retrieve the printout from the printer. The printout shows all the libraries on your system. Mark any libraries that you no longer need.
   c. Before you delete a library, use the Save Library (SAVLIB) command to save it to tape.
   d. To delete the library, use the Delete Library (DLTLIB) command.

      Note: If a library contains objects that have dependent objects in another library (such as physical and logical files), you will need to resolve the dependency problems before you can delete the library. On option might be to change the sequence in which you delete unneeded libraries. (Delete the library with the logical files first.)
2. To free up unused space in document library objects (DLOs), use the Reorganize Document Library Objects (RGZDLO) command. This command compresses documents and removes unused space caused by editing changes. If your users frequently edit documents on the system, this command might free up a significant amount of space.
3. If you have save files that contain information that you no longer need (for example, because you have saved it to tape), you can clear the save files and free up most of the space that they use. Use the Clear Save File (CLRSAVF) command.
4. If you have database files with large numbers of deleted records, you can use the Reorganize Physical File Member (RGZPFM) command to free up space that is used for deleted records.

   Notes:

   a. You can use the Display File Description (DSPFD) command to determine how many deleted records are in a file.
   b. If you reorganize a file that is journaled, you *must* save the file immediately after you reorganize it.
5. To free up space that is used by deleted spooled files, use the Reclaim Spool Storage (RCLSPLSTG) command. (Your system might do this automatically if you have set the QRCLSPLSTG system value.)
6. If you have message queues that sometimes have many messages, you can reset the message queues to their original sizes. Use the Clear Message Queue (CLRMSGQ) command to remove all the messages from the message queue. This resets the size.
7. Save and delete any journal receivers that you no longer need for recovery. Use the Save Object (SAVOBJ) command and the Delete Journal Receiver (DLTJRNRCV) command. The *Backup and Recovery*, SC41-5304 book has more information about managing journal receivers.

8. If you use OfficeVision, periodically remove old mail, calendars, documents, and folders. The *Managing OfficeVision/400*, SH21-0699 book provides more information about OfficeVision cleanup.
9. If disk usage on your system is high, consider permanently applying PTFs to clean up temporary objects and the PTF index. Use the Apply PTF (APYPTF) command.

   Note: You should permanently apply PTFs only after you have validated the affect of the fixes on your system.

Tips for Improving IPL Performance

The topics that follow describe actions that you can take to reduce the amount of time that it takes your system to perform an IPL (initial program load).

Note: A **normal IPL** means that your previous system shutdown was under normal conditions rather than being an abrupt shutdown caused, for example, by a power failure.

Cleanup Activities That Affect IPL Performance

"Cleaning Up Your System" on page 5-3 suggests many tasks that you can perform to reduce the clutter on your system and improve overall system performance. Following are specific cleanup activities that can have the most impact on the time that it takes your system to perform an IPL.

Reducing the Number of Jobs on the System

In simple terms, a new AS/400 job starts whenever a user signs on the system or submits a batch job. When a job starts, the system creates an internal entry in a job table. It uses this table to keep track of all the jobs on the system and to organize information about those jobs.

From a user perspective, an interactive job ends when the user signs off. A batch job ends when all the programs have run to completion. However, from a system perspective, a job ends when all the objects that are associated with that job have been removed from the system. Often, jobs create spooled files that remain on the system for days or weeks. As long as those spooled files remain, the entry for the job remains in the job table.

When you perform an IPL, the system processes all the entries in the job table. A very large job entry table can significantly increase your IPL time. The best way to clean up jobs is to remove unnecessary spooled files. "Setting Up Automatic Cleanup" on page 5-3 describes how you can set up your system to automatically remove old spooled files. "Cleaning Up Obsolete Objects" on page 5-6 describes steps you can take to encourage users to remove spooled files that they no longer need.

You can use the Display Job Tables (DSPJOBTBL) command, seeFigure 5-4 on page 5-10 , to monitor the size of the job table on your system. Use this as a signal for when you need to encourage your users to perform housekeeping.

```
                          Display Job Tables                    SYSTEMX
                                                          02/20/97  14:05:32
Permanent job structures:                 Temporary job structures:
  Initial  . . . . :   30                   Initial  . . . . :   20
  Additional . . . :   10                   Additional . . . :   10
                                            Available  . . . :   3


                        ---------------------Entries----------------------
    Table         Size        Total    Available       In-use        Other
        1       164608          160            8          152            0
```

Figure 5-4. Display Job Tables Display

Reducing the Number of Device Descriptions

Whenever you perform an IPL, the system processes every device description on the system several times (to make performance calculations and to prepare for varying on the device). You can reduce this processing time by removing obsolete device descriptions from your system. "Cleaning Up Your Hardware Configuration" on page 5-7 describes a method for finding and removing unnecessary device descriptions.

System Settings That Affect IPL Performance

You can use the Change IPL Attributes (CHGIPLA) command to control some of the processing that the system does during an IPL. Figure 5-5 shows the prompt display for the command. The topics that follow describe several of the parameters and how they affect IPL performance. (For a complete description of all the parameters, refer to online information or the *CL Programming*, SC41-5721 book.

```
                      Change IPL Attributes (CHGIPLA)

Type choices, press Enter.

Restart type . . . . . .   *SYS          *SAME, *SYS, *FULL
Keylock position . . . . . .   *SAME      *SAME, *NORMAL, *AUTO...
Hardware diagnostics . . . . . .   *MIN    *SAME, *MIN, *ALL
Compress job tables  . . . . . .   *NONE   *SAME, *NONE, *NORMAL...
Check job tables . . . . . .   *ABNORMAL  *SAME, *ABNORMAL, *ALL
Rebuild product directory  . . .   *NONE   *SAME, *NONE, *NORMAL...
Mail server framework recovery .   *NONE   *SAME, *NONE, *ABNORMAL
Clear job queues . . . . . .   *NO         *SAME, *YES, *NO
Clear output queues  . . . . . .   *NO      *SAME, *YES, *NO
Clear incomplete joblogs . . . .   *NO      *SAME, *YES, *NO
Start print writers  . . . . . .   *YES     *SAME, *YES, *NO
Start to restricted state  . . .   *NO      *SAME, *YES, *NO
```

Figure 5-5. Change IPL Attributes Display

Specifying IPL Restart Type

When you specify RESTART(*SYS), the system restarts the System Licensed Internal Code and the operating system. However, the system does not completely stop and then restart all the hardware functions. Usually, the IPL time for RESTART(*SYS) is less than the IPL time for RESTART(*FULL).

Note: You can also specify the restart type on the Power Down System (PWRDWNSYS) command.

Controlling the Level of Hardware Diagnostics

When you specify HDWDIAG(*MIN), the system performs only a minimum, critical set of hardware diagnostics. The system runs a quick processor diagnostic check that covers approximately 90% of the hardware in approximately 10% of the time that is required for full diagnostics. The system does not perform extended main storage diagnostic or chip-to-chip circuitry tests.

When you specify HDWDIAG(*ALL), the system performs complete hardware diagnostics. If you are not experiencing any hardware problems, you can reduce your IPL time by specifying HDWDIAG(*MIN). However, you should periodically perform an IPL with HDWDIAG(*ALL) to ensure that the system checks the status of all components. You should always specify HDWDIAG(*ALL) for the first IPL after any of the following:

- Installation of new processor cards or modules, because of either hardware service or a system upgrade.
- Replacement of the main processor card.
- Replacement or addition of main storage.

You can override the HDWDIAG parameter from the control panel on the system unit by doing the following:

1. Select function 02 (Select IPL type/mode).
2. Press Enter. The system panel displays the current setting for the IPL type and mode.
3. Press Enter again to display the IPL speed. (The Enter button toggles between IPL type and IPL speed.) Following are the values for the IPL speed:

   F Fast (*MIN) IPL (overrides IPL attribute setting)

   S Slow (*ALL) IPL (overrides IPL attribute setting)

   V Cancel override of current IPL attribute setting
4. Use the increment and decrement function to scroll through and select your desired IPL speed.
5. Press Enter to store the selected value.
6. Continue the IPL.

Compressing the Job Tables

When a job ends on your system, the system deletes its entry from the job table and makes that entry space available for another job. If the number of jobs on your system continues to grow, the system must expand the size of the job tables to accommodate new jobs. After you perform cleanup activities on your system, you might find that you have a large number of available job entries. (See the *Available* column in Figure 5-4 on page 5-10.)

If you have a large number of available job table entries, you should set the *Compress job tables* parameter to *YES for your next IPL. Although the next IPL will be longer because of the compression, subsequent IPLs will be shorter because the system will have a smaller job table to process.

Note: Remember to set the *Compress job tables* parameter to *NO after the next IPL.

Checking the Job Tables

When you specify *ABNORMAL for the *Check job tables* parameter, the system checks for damage to internal job tables and their associated objects only when your last system shutdown was abnormal. For most installations, this level of checking is sufficient and will reduce your overall IPL time.

Rebuilding the Product Directory

The system maintains an internal product directory of all installed licensed programs. The system rebuilds this product directory automatically when you install the operating system. For most systems, this directory should be stable when you upgrade to a new release or install new licensed programs. You can reduce your IPL time by instructing the system never to rebuild the product directory (RBDPRDDIR(*NONE)).

Automatic Performance Tuning

The performance adjustment (QPFRADJ) system value controls when the system does automatic performance tuning. You can set up your system to dynamically tune performance, to calculate performance values during an IPL, or both. When you set up your system to tune performance during an IPL, it calculates performance settings based on information that includes the number of devices and network interfaces and the total amount of main storage. If your system configuration is stable, you can reduce your IPL time by eliminating these calculations (because they will have the same result each time). For a stable configuration, set the QPFRADJ system value to 3 (automatic adjustment) or 0 (no adjustment).

How Access Paths and Journaling Affect IPL Performance

Access paths and journaling can affect your IPL performance in the following ways:

- When you restart your system after it ends abnormally, the system must rebuild any access paths that were open when the system stopped. This rebuild time can be lengthy. You can reduce this time by journaling access paths, either explicitly by using the Start Journal Access Path (STRJRNAP) command or implicitly by using the System-Managed Access-Path Protection support. The *Backup and Recovery*, SC41-5304 book describes both methods for protecting access paths from long recovery times.
- When you perform a manual IPL, you see the Edit Rebuild of Access Paths display. You can use this display to specify which access paths the system rebuilds during the IPL versus after the IPL. Except for critical files, you probably want to delay rebuilding access paths until after your system has completed the IPL.

Note: The system rebuilds an access path if the access path was open for update when the system stopped or if the file description specifies `MAINT(*DLY)`.

- Management of journal receivers can also affect IPL performance. You can set up a journal so that the system manages when to detach the current receiver and attach a new one. This simplifies your job of monitoring the size of your journal receivers. However, for each journal that specifies `MNGRCV(*SYSTEM)`, the system performs processing during the IPL. If IPL performance is critical to you, you should consider switching to MNGRCV(*USER) for most of your journals.
- Similarly, you can set up the system to automatically delete journal receivers that it no longer needs for recovery by specifying `DLTRCV(*YES)` for the journal. This avoids excessive disk usage for journal receivers but it also increases your IPL time. Again, if IPL performance is critical, consider switching to DLTRCV(*NO). However, you will need to monitor your system and remove the journal receivers manually to avoid disk usage problems.

What are PTFs and Why Do I Need Them?

IBM periodically creates program temporary fixes (PTFs) to correct problems or potential problems found within a particular IBM licensed program. PTFs may fix problems that appear to be hardware failures, or they may provide new functions.

PTFs are designed to replace one or more objects in the licensed program. Generally, PTFs are incorporated in a future release of the system.

PTFs packaged using the SystemView* System Manager/400 licensed program may also be available for non-IBM programs. See the *System Manager Use*, SC41-5321 for information on this licensed program.

The program maintenance strategy discussed in this chapter applies specifically to IBM AS/400 system service and delivery.

AS/400 Program Maintenance Strategy

The AS/400 program maintenance strategy consists of preventive service and corrective service.

Preventive Service (Cumulative PTF Packages)

Preventive service helps you avoid problems that have been resolved since the start of the current release.

Cumulative PTF packages contain PTFs which affect the general system population. If a PTF provides a change for a limited set of users or requires special handling, it may not be included in the package. Cumulative PTF package application is useful for ensuring that you have key changes and improvements for your system. The entire cumulative PTF package should be installed after you first install or reinstall any new version, release, and modification level on your system. Cumulative PTF packages can be ordered electronically or by telephone and are always sent by mail on a CD-ROM or tape.

Cumulative PTF packages should be installed every three to four months if there is no change to the equipment or programs on your system. Between releases of cumulative PTF packages, IBM service support provides PTFs that may be important to your system. For information about these PTFs, see "Ordering Preventive Service Planning (PSP) Information" on page 5-22. You should periodically order preventive service planning information and review the PTFs listed. If any of these PTFs are needed for your system, you should order and install them.

Corrective Service

Corrective service corrects problems reported to IBM service support. If you have a problem with an IBM licensed program, you can describe the problem using the Analyze Problem (ANZPRB) command or the Work with Problem (WRKPRB) command. You can report the problem electronically or by calling your service support representative. You can also have the system analyze or report any problems automatically. For more information on reporting problems, see Chapter 3, Handling and Reporting System Problems.

Ordering PTFs and PTF Information

Table 5-2 shows how to use the Send PTF Order (SNDPTFORD) command to order PTFs and PTF information. Details on how to order a PTF follow this table.

To process your PTF order in batch, use the Submit Job (SBMJOB) command.

Table 5-2. Getting PTFs and PTF Information

PTF Information	Command
Specific PTFs and cover letters	SNDPTFORD *nnnnnnn*[1]
PTF cover letter only	SNDPTFORD *nnnnnnn*[1] PTFPART(*CVRLTR)
PTF cross-reference summary list V3R2M0 to V4R2M0 V3R7M0 to V4R2M0 V4R1M0 to V4R2M0	 SNDPTFORD SF97022 SNDPTFORD SF97051 SNDPTFORD SF97056
Cumulative PTF packages	SNDPTFORD SF99*vrm*[2]
PSP information for licensed programs	SF98*vrm*[2]
PSP information for Licensed Internal Code	MF98*vrm*[2]
PTF summary list	SF97*vrm*[2]

Notes:

1. *nnnnnnn* is the PTF identifier. You can order up to 20 PTFs at a time.
2. *v* is the version, *r* is the release, and *m* is the modification level of the system. For Version 4 Release 2, type 420.

Ordering Individual PTFs and Cover Letters

To order individual PTFs and cover letters electronically, type the following command on any command line and press the Enter key:

```
SNDPTFORD nnnnnnn
```

where nnnnnnn is the number of the individual PTF you want to order. You can order up to 20 PTFs at a time.

When you receive PTFs electronically on your service support communications line, they are placed in a save file in library QGPL. In most cases, the save file name is the PTF identifier prefixed with a **Q**. For example, the save file for PTF identifier SFnnnnn is QSFnnnnn.

Notes:

1. If the PTF files are too large to be delivered electronically, they are delivered on CD-ROM or tape.
2. When you order a PTF that has been replaced (superseded) with another PTF, you receive the ordered PTF, not the replacement PTF. To identify PTFs that have been replaced (superseded), consult the PTF summary list.
3. When you order a PTF for a product that is installed on your system, you will receive a PTF package that contains the ordered PTF and its requisites.
4. If you order a PTF for a product that is not installed on your system, you will receive only the PTF that you ordered. If you use the Display PTF (DSPPTF) command on the PTF you just ordered, you will receive the following message:

   `"PTF 5769xxx-SFxxxxx is not found."`

   This message means that the PTF is for a release of the product that is not installed on your system. Contact your service provider for the correct PTF number.

Ordering a PTF Cover Letter Only: To order a PTF cover letter without ordering the PTF, type the following command on any command line and press the Enter key:

```
SNDPTFORD nnnnnnn PTFPART(*CVRLTR)
```

Specifying Media for Shipping a PTF: You can specify the media for shipping PTFs by doing the following:

1. Type the Work with Contact Information (WRKCNTINF) command on any command line. The Work with Support Contact Information display appears.
2. Select Option 2 (Work with local service information). The Work with Local Service Information display appears.
3. Select Option 2 (Change service contact information). Page down to the next display.
4. Specify the PTF medium type by entering the corresponding number.

Copying PTF Cover Letters From CD-ROM or Tape

PTFs on CD-ROM or tape are sent by mail. A shipping information letter is included with the CD-ROM or tape. Each PTF on the CD-ROM or tape may also have a cover letter.

Copy the cover letter into file QAPZCOVER in library QGPL. Make sure that the product that you are copying the cover letter for is installed.

Copying Cover Letters From CD-ROM: To copy a cover letter from CD-ROM, do the following:

1. Type the following on any command line:

   ```
   LODPTF LICPGM(XXXXXXX) SELECT(zzzzzzz)
   DEV(YYYYY) COVER(*ONLY) PATHID(*FIRST)
   ```

   where XXXXXXX is the licensed program number found in the shipping information letter, YYYYY is the CD-ROM unit ID (typically named OPT01 or OPT02), and zzzzzzz is the PTF ID for the cover letter you want.

2. Repeat step 1 for each licensed program PTF cover letter on the CD-ROM.

Note: If you are using this function to simultaneously load PTFs and copy PTF cover letters, change COVER(*ONLY) to COVER(*YES). This loads the PTF and copies the cover letter onto the system.

Copying Cover Letters From Tape

- If the tape contains multiple PTFs:

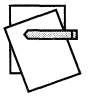
  1. Type the following on any command line:

     ```
     LODPTF LICPGM(XXXXXXX) DEV(YYYYY) COVER(*ONLY) ENDOPT(*LEAVE)
     ```

     Where XXXXXXX is the licensed program number found in the shipping information letter, and YYYYY is the tape unit ID (typically named TAP01 or TAP02).

  2. Repeat step 1 for each licensed program PTF cover letter on the tape except the last licensed program PTF cover letter.

  3. For the last PTF cover letter on the tape, change ENDOPT(*LEAVE) to ENDOPT(*REWIND).



Note: If you are using this function to simultaneously load PTFs and copy PTF cover letters, change COVER(*ONLY) to COVER(*YES). This loads the PTF and copies the cover letter onto the system. If there are multiple PTF files on the tape and the *LEAVE option is not specified, you must then specify the PTF sequence number for the Sequence number (SEQNBR) parameter. Your PTF sequence number is in the cover letter that comes with your tape. For each PTF package, you need to specify the correct sequence number.

- If the tape contains only one PTF, type the following on any command line:

  ```
  LODPTF LICPGM(XXXXXXX) DEV(TAPYY) COVER(*ONLY)
  ```

  Where XXXXXXX is the licensed program number, and YY is the tape device ID.

Displaying and Printing PTF Cover Letters

There are two ways to display or print PTF cover letters. You should use the first method in most cases. If you are unable to display or print a cover letter using the first method, use the second method. This may be necessary, for example, when you want to print or display a cover letter for a product that has not been installed or supported on your system.

Method 1

1. Enter the Display Program Temporary Fix (DSPPTF) command and press F4 (Prompt).

Note: The DSPPTF command only works for products that are installed or supported.

2. Specify the product, PTF identifier, and release for the appropriate parameters on the Display Program Temporary Fix (DSPPTF) display.
3. Specify *YES for the Cover letter only (COVERONLY) parameter and press the Enter key to display the cover letter.

You can also print a PTF cover letter using the following command:

```
DSPPTF LICPGM(xxxxxxx) SELECT(yyyyyyy) COVERONLY(*YES) OUTPUT(*PRINT)
```

where xxxxxxx is the licensed program number, and yyyyyyy is the PTF identification number.

For example, if you wanted to print the PTF Summary List, type the following command on any command line:

```
DSPPTF LICPGM(5769SS1) SELECT(SF97072) COVERONLY(*YES) OUTPUT(*PRINT)
```

Note: Your output will be placed in the output queue that is associated with your job. The output is stored under the file name QSYSPRT. For more information on how to print your output, see chapter 3 of the *System Operation*, SC41-4203 book.

Method 2

Printing the Cover Letter

1. Type the following on any command line:

   ```
   cpyf fromfile(QGPL/QAPZCOVER) tofile(QGPL/QPRINT) frommbr(nnnnnnn)
   ```

   where nnnnnnn is the name of the file member in which the PTF cover letter is stored.

Note: The member containing the cover letter is usually named Qnnnnnnnxx, where nnnnnnn is either the associated PTF number or a time stamp, and xx is the last two digits of the language code for the cover letter. For cover letters in English, the last two digits of the language code do not appear and the member name is the same as the corresponding PTF number. This is also the case when you are displaying a cover letter.

2. Press the Enter key. The file member is copied to the QPRINT print file.
3. On the Operational Assistant menu, select option 1 (Work with printer output). The Work with Printer Output display is shown.
4. Look in the *Printer/Output* column for the file name QPRINT. This is the file that contains the cover letter.

5. If the file is held, you can print the cover letter by selecting option 6 (Release).

Displaying the Cover Letter: To read the PTF cover letters:

1. Type `dsppfm` (the Display Physical File Member command) on any command line.
2. Press F4 (Prompt). The Display Physical File Member display is shown.
3. Specify the member name in file QAPZCOVER in library QGPL.
4. Press the Enter key. The cover letter is shown.

Figure 5-6 on page 5-19 shows the contents of a typical PTF cover letter from IBM. PTF cover letters from systems using the SystemView System Manager/400* licensed program appear different.

```
5769SS1 5050 0000 SF04400 2924 R02M00
XPF-DSPOBJD-CPF9999-DSPOBJD FUNCTION CHECKS WITH LIN(*) PARM

PTF/FIX # SFxxxxx - OS/400 - BASE SYSTEM
LICENSED PROGRAM: 5769SS1

-------------------------------------------------------------------------------
|  SYSTEM  |  LEVEL   |  RELEASE  |  RECOMPILE  |  LIBRARY  |  MRI    |  APAR
|          | MIN/MAX  |           |             |           | FEATURE |  FIXED
|          |          |           |             |           |         |
|  AS/400  |  NONE    |  V4R2M0   |    N        |  QSYS     |  2937   |  SAxxxxx
-------------------------------------------------------------------------------
PRE/COREQUISITE PTF/FIX LIST
----------------------------
REQ   LICENSED          PTF/FIX   LEVEL
TYPE  PROGRAM   REL     NUMBER    MIN/MAX   OPTION

____  ________  ___     _______   _______   ______
PRE   5769SS1   420     SFxxxxx   NONE      0000
PRE   5769999   420     MFxxxxx   NONE      0000
CO    5769SS1   420     SFxxxxx   NONE      0000
DIST  5769SS1   420     SFxxxxx   NONE      0000
DIST  5769SS1   420     SAxxxxx   NONE      0000 (SEE MRI PTF/FIX LIST BELOW)

MRI PTF/FIX LIST
----------------
APAR SAxxxxx AFFECTS THESE LANGUAGES.  IF YOU HAVE ANY OF THESE LANGUAGES
INSTALLED, INSTALL THE CO-REQUISITE MRI PTF THAT CORRESPONDS TO THE LANGUAGE(S)
INSTALLED ON YOUR SYSTEM.
      ------------------------------------------------------
   :  FEATURE                              LICENSED  PTF/FIX  :
   :  CODE     LANGUAGE                    PROGRAM   NUMBER   :
   :  -------  ------------------------    --------  -------  :
   :  2924     ENGLISH UPPER/LOWER CASE    5769SS1   SFxxxxx  :
   :  2938     ENGLISH UPPERCASE (DBCS)    5769SS1   SFxxxxx  :
   :  2950     ENGLISH UPPERCASE           5769SS1   SFxxxxx  :
   :  2984     ENGLISH U/L (DBCS)          5769SS1   SFxxxxx  :

DESCRIPTION OF PROBLEM FIXED FOR APAR SAxxxxx:
----------------------------------------------
USERS CANNOT RECEIVE PTFS FOR PRODUCTS NOT INSTALLED
ON THEIR SYSTEMS.

 CORRECTION FOR APAR SAxxxxx:
-----------------------------
ELECTRONIC CUSTOMER SUPPORT PROGRAM CODE WILL BE CHANGED SO THAT PTFS WILL
BE REQUESTED EVEN IF THE CORRESPONDING PRODUCTS ARE NOT INSTALLED ON THE
REQUESTING SYSTEM.
```

Figure 5-6 (Part 1 of 2). Sample PTF Cover Letter

```
 CIRCUMVENTION FOR APAR SAxxxxx:
------------------------------
 NONE.

 ACTIVATION INSTRUCTIONS:
-----------------------------------
NONE.

 SPECIAL INSTRUCTIONS:
-----------------------------------
NONE.

DEFAULT INSTRUCTIONS :
---------------------
THIS PTF MUST BE APPLIED AT IPL TIME.

SUPERSEDES
PTF/FIX NO(S).   APAR TITLE LINE
-------------   ------------------------------------------------------------
SFxxxxx          OSP-RSTS36F-MSGCPA2C6C RESTORING ALL FILES FROM SYSTEM/34
```

Figure 5-6 (Part 2 of 2). Sample PTF Cover Letter

Description: The following is a description of the information contained in a PTF cover letter:

PTF/Fix # The alphanumeric identifier for the program temporary fix (PTF) or Licensed Internal Code fix.

Licensed Program The alphanumeric identifier for the licensed program.

System The IBM system for which this PTF is valid.

Level Min/Max The lowest and highest level of the product that this PTF can be installed on.

Release The version, release, and modification number of the system for which this PTF is valid. For example, with V4R2M0, the following is true:

V4 is Version 4
R2 is Release 2
M0 is Modification 0

Recompile *Y* (Yes) means a recompile of affected objects is necessary after this PTF is applied.

N (No) means a recompile is not necessary after this PTF is applied.

Library The library the PTF is intended for.

MRI Feature The numeric identifier for the language feature of the language sensitive object affected by the PTF. *None* means language sensitive object is not affected.

APAR Fixed The number of the authorized program analysis report (APAR) for which this PTF was created.

Prerequisite PTF/Fix List The information about the PTFs that must be applied on the system *before* this PTF can be applied.

Corequisite PTF/Fix List The information about other PTFs that must be installed along with this PTF. The system will check to ensure all corequisite PTFs are applied together.

Distribution Requisite PTF/Fix List The information about other PTFs that must be installed at the same time as this PTF. The system will not verify distribution requisites are applied together.

MRI Requisite PTF/Fix List The information about other PTFs that must be installed at the same time as this PTF. Select the PTFs that correspond to the languages that you have installed on your system.

Description of Problem Fixed A brief description of the problem this PTF fixes.

Correction A brief description of what has been done to correct the problem.

Circumvention A description, if applicable, of how to work around the problem and continue your operation without applying the PTF.

Activation Instructions Actions you must perform in order to activate PTFs without an IPL of the system. Activation instructions are limited to actions that would normally be accomplished by an IPL of the system, such as stopping and restarting a subsystem, varying devices offline and back online, etc.

Special Instructions Any special information pertaining to this PTF.

Default Instructions Tells when the PTF can be applied; either at the next IPL (delayed) or immediately.

Supersedes PTF/Fix No(s) The numbers of the PTFs that this PTF replaces or supersedes.

APAR Title Line The title of the authorized program analysis report (APAR) for the superseded PTF.

Printing Information APARs

Information APARs are created when there is a need to provide worldwide access to information. Typically, information APARs are created to describe pervasive user errors, provide recovery actions for non-defect situations, or explain system operation.

To print an Information APAR, do the following:

1. Type the following on any command line:

   ```
   DSPPTF LICPGM(INFOAS4) SELECT(xxxxxxx) OUTPUT(*PRINT)
   ```

   where xxxxxxx is the name of the information APAR you are printing.
2. Press the Enter key. Your printer output will be placed in the output queue that is associated with your job.
3. On the Operational Assistant menu, select option 1 (Work with Printer Output). The Work with Printer Output display is shown.
4. Look in the Printer/Output column for the name of your spooled file or printer output. This file contains the information APAR.
5. If the file is held, you can print the information APAR by selecting option 6 (Release).

Ordering a Cumulative PTF Package

To order a cumulative PTF package electronically:

1. Identify your licensed program release level:
   a. Type `GO LICPGM` on any command line and press the Enter key.
   b. Select option 10 (Display installed licensed programs) on the Work with Licensed Programs display.
   c. Press the F11 key. The current version, release, and modification level is shown in the *Installed Release* column where **V** is the version, **R** is the release, and **M** is the modification level.
2. Type `SNDPTFORD SF99VRM`, where `VRM` is the version, release, and modification level you found in step 1.

   For example, for Version 4 Release 2 Modification 0, type `SNDPTFORD SF99420`.
3. Verify the shipping information on the Verify Contact Information display. If any of the information is incorrect, change it and press the Enter key.
4. Select option 1 (Send service request now) on the Select Reporting Option display. This places the PTF order.

Ordering the PTF Cross-Reference Summary List

The **PTF cross-reference summary list** itemizes PTFs from an earlier release that are included in the current release. Use this list to make sure you order any PTFs for the new release that you had at the previous release, but are not included in the list. These PTFs will not have the same number, but they correct the same problem.

To order this list electronically, select the version and release you are moving from and use the corresponding command.

Moving From Command

Version 3 Release 2 SNDPTFORD SF97022

Version 3 Release 7 SNDPTFORD SF97051

Version 4 Release 1 SNDPTFORD SF97056

Ordering Preventive Service Planning (PSP) Information

Preventive service planning (PSP) information is a collection of information that is used when installing a licensed program, cumulative PTF package, or hardware. PSP information should be reviewed before installing a licensed program, a cumulative PTF package, or hardware. You should order preventive service planning information and review the recommended High Impact Pervasive (HIPER) PTFs periodically. HIPER PTFs fix severe problems such as: your system may crash or hang and requires an IPL to recover, your system may be stuck in a looping condition, your system's data integrity may be threatened, your system may experience a severe performance degradation, or the problem involves usability of a product's major function. If any of the PTFs are needed for your system, you should order and install them.

To order PSP information, use the following commands:

Licensed programs SNDPTFORD SF98*vrm*

Licensed Internal Code SNDPTFORD MF98*vrm*

Where *vrm* is version, release, and modification level. For Version 4 Release 2 Modification 0, use `420`.

To print preventive service planning (PSP) information, use the instructions for printing and displaying PTF cover letters found in "Displaying and Printing PTF Cover Letters" on page 5-16. The PSP information is placed in QAPZCOVER when it is sent to you.

Preventive service planning information is available for:

- Licensed programs installation
- Licensed Internal Code
- System equipment
- Cumulative PTF packages
- PTFs in error (PE)
- High impact or pervasive (HIPER) problems

These PSPs can be ordered through your software service provider or by using the electronic customer support function.

Preventive service planning information includes the following:

Installation Information Information concerning upgrade and new installation, including information about cumulative PTF package installation.

General Information Hints or tips for working with PTF packages or products.

PTFs in error Information about all PTFs found to have a problem, the users that will be affected by the problem, and recommendations on how to avoid the problem.

Service recommendations Detailed information about critical PTFs you need to install.

You should get this information before you install or upgrade system equipment and licensed programs. This ensures that you have all the latest information that is applicable for the new program or cumulative package.

Carefully review the following sections of the PSP before installing the cumulative package:

Service Recommendations: This section lists those High Impact PERvasive (HIPER) problems that have been discovered in the base code since shipment and not included in this cumulative package. As before, these recommendations should be reviewed based on your system's setup and configuration.

PTFs in Error (PE): This section contains a list of PTFs that are included on this cumulative package that, since shipment, have been found to be defective. You have two options: install the cumulative package without applying the PTFs in error, or you can install the corrective PTFs for the PTFs in error, if available. This section lists the defective PTF, the users affected, the reason the PTF is defective, and the recommended action to take.

The PSP information also contains a list of PTF identifiers to order PSP information for Licensed Internal Code and system equipment, licensed programs installation, and PSPs for older cumulative packages.

Ordering the PTF Summary List

A **PTF summary list** is a cover letter that contains a list of PTFs that affect most system users. Use the PTF summary list to identify PTFs you may want to order. The PTF summary list also identifies the current PTF package and what package each PTF was included in.

To order the PTF summary list, use the following command:

```
SNDPTFORD SF97vrm
```

Where `vrm` is version, release, and modification level. For Version 4 Release 2 Modification 0, use `420`.

Finding the Status of PTF Orders

To find the status of PTF orders:

1. Use the Work with Problem (WRKPRB) command.
2. All PTFs that you requested and have been sent (either electronically or through the mail) are identified in the *Problem Description* column as `Fix Request` on the Work with Problems display.
3. Use option 5 (Display details) for the problem with the problem description `Fix Request`.
4. Press F9 (Display PTFs) on the Display Problem Details display.

   All PTFs related to the problem you selected are shown on the Display PTF information display. This includes the PTFs you ordered, in addition to any others requested that are not already on your system.

Installing PTFs

This topic provides instructions on how to install cumulative PTF packages, or individual PTFs for Licensed Internal Code or Licensed Programs. PTF installation includes two steps: load and apply. With the following instructions, PTFs are loaded and applied for you automatically.

Before You Start:

- Have a current backup of your operating system and licensed programs. If you have backed up the operating system and licensed programs since the last time you applied PTFs, that backup is acceptable.
- Have all users sign off the system. If you fail to have all users sign off the system and someone else is doing a PTF operation, the cumulative PTF package will not load.
- Be sure you have security officer (*SECOFR) user class. You need it to do the following steps.

Installing a Cumulative PTF Package

If your system changes to a new release, order and install the current cumulative PTF package to keep your system at the most current PTF level.

To install cumulative PTF packages:

- Read the PTF shipping information letter thoroughly and follow the instructions contained in it. You should be running on the **B** storage area (B side) when installing the cumulative PTF packages. For more information on how to select the storage area, see "System Storage Areas A and B" on page 5-27.

Displaying or Printing the Cumulative PTF Package Summary: To print or display the summary of PTFs contained in a cumulative PTF package on CD-ROM

1. Load the cumulative PTF package CD-ROM in the CD-ROM drive, and on any command line type:

   ```
   LODPTF LICPGM(5769999) DEV(OPTYY) SELECT(*ALL) PATHID(*FIRST)
   COVER(*ONLY)
   ```

   where YY is the unit ID for the CD-ROM drive in which you loaded the PTF CD-ROM.

   For information about printing the cumulative PTF package summary, see "Displaying and Printing PTF Cover Letters" on page 5-16.

2. A copy of the PTF summary is put into file QAPZCOVER in Library QGPL.

To print or display the summary of PTFs contained in a cumulative PTF package on tape:

1. Load the cumulative PTF package tape in the tape unit, and on any command line type:

   ```
   CPYFRMTAP FROMFILE(QTAPE) TOFILE(QPRINT) FROMSEQNBR(3) FROMDEV(TAPYY)
   FROMREELS(*SL)
   ```

   where YY is the tape unit ID (for example, TAP01) in which you loaded the PTF tape.

2. A copy of the PTF summary is put into a system output queue from which you can print or display the PTF summary information.

Installing High-Impact Pervasive (HIPER) PTFs From a Cumulative PTF Package: To install both high-impact pervasive (HIPER) PTFs and HIPER Licensed Internal Code fixes, follow the PTF installation instructions in the shipping information letter. When you are on the Install Options for Program Temporary Fix display, specify 2 for the *PTF type* field. To install only HIPER Licensed Internal Code fixes, specify 3 for the *PTF type* field.

Verifying Installation of the Cumulative PTF Package: After completing the last IPL in the installation instructions, to verify that the PTF package was properly installed:

1. Type `go licpgm` on any command line and press the Enter key.
2. Select option 50 (Display log for messages) on the Work with Licensed Programs display.
3. Fill in the start date and start time on the Display Install History display and press the Enter key.

4. On the Display History Log Contents display, if the cumulative PTF package was installed successfully, you see messages like the following:

```
Licensed program or PTF installation process started.
Loading of PTFs completed successfully.
Marking of PTFs for delayed application started.
Marking of PTFs for delayed application completed successfully.
Apply PTF started.
Applying of PTFs for product 5769xxx completed successfully.
Applying of PTFs for product 5769xxx completed successfully.
Applying of PTFs for product 5769xxx completed successfully.
  ⋮
Applying of PTFs completed.
```

   If the cumulative PTF package was not installed successfully, you see error messages like the following.

```
Licensed program or PTF installation process started.
Loading of PTFs failed.
Marking of PTFs for delayed application started.
Marking of PTFs for delayed application failed.
Apply PTF started.
  ⋮
Applying of PTFs failed for product 5769xxx.
  ⋮
Applying PTFs failed.
```

Displaying the Cumulative PTF Package Level of Your System: The cumulative PTF package level of your system refers to the latest cumulative PTF package installed on your system. To determine the cumulative PTF package level of your system:

1. Enter the following command:

   ```
   DSPPTF LICPGM(5769SS1)
   ```

2. The *PTF ID* column on the Display PTF Status display lists the identifiers for all of the cumulative PTF packages installed on your system. Cumulative PTF package identifiers start with the letter T.

   If you are using Version 4 Release 2 Modification 0, and you have PTF TC94178 installed on your system, your cumulative PTF package level is C4178420 (420 is added to the end of the package ID to indicate Version 4 Release 2 Modification Level 0). The last four digits of the cumulative package ID indicate the release date of the package, using the Julian calendar. The latest cumulative PTF package is the one where the last four digits are the highest.

Note: PTF IDs that start with the letters TC indicate that the entire CD-ROM or tape has been applied. PTF IDs that start with the letters TA indicate that the HIPER PTFs and HIPER Licensed Internal Code fixes have been applied. PTF IDs that start with the letters TL indicate that the HIPER Licensed Internal Code fixes have been applied. To find the level of Licensed Internal Code fixes on your system, enter `DSPPTF 5769999`.

Omitting Individual PTFs From a Cumulative Package: The omit function allows you to specify individual PTFs that you do not want to install from the cumulative package. To use the omit function, do the following:

1. On the Install Options for Program Temporary Fixes display, specify `Y` for the Other options field, and press the Enter key. The Other Install Options display is shown.
2. Specify `Y` for the Omit PTFs field, and a value for the Apply Type field, and then press the Enter key. The Omit Program Temporary Fixes display is shown.
3. In the Opt Column, type a `1` next to each product and release for which you want to omit specific PTFs from being installed, and press the Enter key. The PTFs to Omit display is shown for each product that was selected on the previous display. This display shows the list of PTFs that are to be omitted from being loaded for the specified product and release.
4. To add PTFs to the list on the PTFs to Omit display, type a `1` on the first line of the Opt column and specify the PTF ID in the PTF ID column. Press the Enter key.
5. Repeat step 4 until you have specified all the PTFs you want to omit from being installed for the product and release. Press the Enter key again and repeat the procedure for the next product and release you selected on the Omit Program Temporary Fixes display. When you are done with the last product and release you have selected, the Omit Program Temporary Fixes display is shown again. The > symbol next to the product and release indicates that you have specified PTFs to be omitted. Press the Enter key. The Confirm to Omit PTFs panel is shown.
6. It lists each of the PTFs that have been specified to be omitted from being installed. If the list is correct, press the Enter key. Normal PTF installation process continues from this point.

Note: You can install PTFs using the power on and power off schedules.

System Storage Areas A and B

The system maintains two copies of all Licensed Internal Code on the system. One copy is considered the permanent copy and is stored on system **storage area A**. The other copy is considered the temporary copy and is stored on system **storage area B**. When the system is running, it uses the copy that was selected before the last IPL.

A **B** in the Data display on the front panel of the system unit indicates that the next system IPL will be made from the **B** or temporary storage area. The **B** storage area contains any Licensed Internal Code fixes that have been temporarily or permanently applied. Temporarily applied Licensed Internal Code fixes can be applied permanently (copied to the **A** storage area) or be permanently removed.

For the system to use the latest Licensed Internal Code fixes that are temporarily applied, you must be using the **B** storage area. The **B** storage area is what you normally use. Select the **A** storage area if the IPL to the **B** storage area fails because of a temporarily applied Licensed Internal Code fix.

Selecting the A or B Storage Area: The PTF process described in "Installing PTFs" on page 5-24 controls the storage areas for you. However, you can change the storage area on the command line or the control panel:

- Command line:

  ```
  PWRDWNSYS *IMMED RESTART(*YES) IPLSRC(X)
  ```

  Where X is the storage area you want to select.

- Control panel:

  1. For systems with a mode button, set the system to the Manual mode. For systems without a mode button, start at step 2.
  2. Press the Increment/Decrement buttons until 02 is displayed in the Function/Data display on the control panel.
  3. Press the Enter pushbutton on the control panel.
  4. For systems with a mode button, press the Increment/Decrement buttons until the character that represents the storage area you want to use for your IPL source (A or B) appears in the Function/Data display. For systems without a mode button, press the Increment/Decrement buttons until you see Normal (N) and the character (A or B) for the IPL storage area you want to appear in the Function/Data display.
  5. Press the Enter pushbutton on the control panel to save the IPL settings.
  6. For systems with a mode button, set the mode to Normal.
  7. Power off the system using option 4 (Power off the system and immediately power on) on the Power On and Off Tasks (POWER) menu.

     Wait for the system to power down and automatically start an IPL. You see the Sign On display when the IPL is complete. The storage area is now changed.

Installing Licensed Internal Code Fixes

Licensed Internal Codes fixes are PTFs for the Licensed Internal Code. There are two types of Licensed Internal Code fixes: Delayed and immediate.

Delayed Licensed Internal Code fixes can only be applied immediately while running on the A side, or can be applied delayed while running on the B side.

Immediate Licensed Internal Code fixes can be applied immediately while running on the A or B storage area. No IPL is required for applying immediate PTFs.

You must be running on the B storage area to use any temporarily applied Licensed Internal Code fixes. Temporarily applied Licensed Internal Code fixes can be applied permanently (copied to the A storage area). To permanently apply delayed or immediate Licensed Internal Code fixes, you must be running from the B storage area. These PTFs can be permanently applied without an IPL.

Note: Licensed Internal Code PTFs to be applied on the next IPL while running on the A side must be applied immediately.

More information describing delayed and immediate PTFs can be found in"Applying PTFs" on page 5-36 .

Instructions for Installing Licensed Internal Code Fixes: For immediate Licensed Internal Code fixes that will be applied immediately without an IPL, see the instructions in "Applying Licensed Internal Code Fixes Without an IPL" on page 5-40.

For delayed Licensed Internal Code fixes and immediate Licensed Internal Code fixes that will be applied during an IPL, use the following instructions:

1. Print and read each cover letter. For information on how to do this, see "Displaying and Printing PTF Cover Letters" on page 5-16.
2. If there are any pre-installation special instructions in any of the cover letters, follow those instructions first.

   Note: Do not cancel any of the following steps once they are started. Allow each step to complete normally.

   If shipping information letters are included with the PTF CD-ROM or tape you received, follow the instructions in the letters to install the PTFs. If the shipping information letters are not included with the CD-ROM or tape, continue with the following instructions.
3. Determine the storage area you are currently using:
   a. Type `dspptf 5769999` on any command line and press the Enter key.
   b. On the Display PTF Status display, the storage area is identified in the *IPL source* field. ##MACH#A is the **A** storage area and ##MACH#B is the **B** storage area.
   c. If you are not running on the **B** storage area, type the following command on any command line and press the Enter key:

      ```
      PWRDWNSYS *IMMED RESTART(*YES) IPLSRC(B)
      ```
4. Type **`go ptf`** on any command line and press the Enter key.
5. Select option 8 (Install program temporary fix package) on the Program Temporary Fix (PTF) display. The Install Options for Program Temporary Fixes display is shown.
6. If the PTF was delivered electronically, type `*service` in the *Device* field. If the PTF was delivered on a tape, type `tapyy`, where `yy` is the name of the tape unit (for example, `tap01`) where you loaded the PTF tape. If the PTF was delivered on CD-ROM, type `optyy`, where `yy` is the name of the CD-ROM drive unit (for example, `opt01`) where you loaded the PTF CD-ROM.
   - If you do not want to install certain PTFs, you can omit those PTFs by using the procedure in topic "Omitting Individual PTFs From a Cumulative Package" on page 5-27.
   - If you have additional PTFs to install at this time, type an `N` (No) in the *Automatic IPL* field and install the additional PTFs. If you do not have additional PTFs to install at this time, type a `Y` (Yes) in the *Automatic IPL* field.

     Note: Although it will take longer than previous releases to set Licensed Internal Code fixes for apply on the next IPL, the next IPL will take much less time.

7. Press the Enter key.

   After the IPL has finished, see "Verifying PTF Installation" to verify that the PTFs are installed. If there are any post-installation special instructions in the cover letter, follow those instructions at this time.

Installing Licensed Program PTFs or OS/400 PTFs

For immediate OS/400 PTFs that will be applied immediately without an IPL, see the instructions in "Applying Immediate Licensed Program or OS/400 PTFs Temporarily or Permanently Without an IPL" on page 5-39.

For licensed program PTFs, delayed OS/400 PTFs, or Immediate OS/400 PTFs that will be applied during an IPL, use the following instructions:

1. Print and read each cover letter. For information on how to do this, see "Displaying and Printing PTF Cover Letters" on page 5-16.
2. If there are any pre-installation special instructions in any of the cover letters, follow those instructions first.

   Note: Do not cancel any of the following steps once they are started. Allow each step to complete normally.

3. Type **go ptf** on any command line and press the Enter key.
   - If you do not want to install certain PTFs, you can omit those PTFs by using the procedure in topic "Omitting Individual PTFs From a Cumulative Package" on page 5-27.
   - If you have additional PTFs to install at this time, type an `N` (No) in the *Automatic IPL* field and install the additional PTFs. If you do not have additional PTFs to install at this time, type a `Y` (Yes) in the *Automatic IPL* field.
4. Select option 8 (Install program temporary fix package) on the Program Temporary Fix (PTF) display.
5. If the PTF was delivered electronically, type `*service` in the *Device* field. If the PTF was delivered on a tape, type `tapyy`, where `yy` is the name of the tape unit (for example, `tap01`) where you loaded the PTF tape. If the PTF was delivered on CD-ROM, type `optyy`, where `yy` is the name of the CD-ROM drive unit (for example, `opt01`) where you loaded the PTF CD-ROM.

   Note: PTFs may not be applied successfully during an IPL if the IPL is abnormal.

6. Press the Enter key.

   After the IPL has finished, see "Verifying PTF Installation" to verify that the PTFs are installed. If there are any post-installation special instructions in the cover letter, follow those instructions at this time.

Verifying PTF Installation

To verify that your Licensed Internal Code and licensed program PTFs have been installed correctly, do the following:

1. Type `GO LICPGM` command on any command line and press the Enter key. The Work with Licensed Programs display appears.

2. Select Option 50 (Display log for messages). The Display Install History display appears.
3. Fill in the start date and start time on the Display Install History display and press the Enter key. The messages about PTF installation are shown.

When Your PTFs Do Not Install

To determine the cause of the failure, do the following:

1. Place the cursor on the previous message and press F10 (Display all).

Tip: If F10 (Display all) is not available, switch to intermediate assistance level using F21 (Select assistance level) and try again.

2. A new message is shown that helps you find out what errors occurred. Use the Help key to display additional message information.

You can also look at the SCPF job log for errors. To check this job log, do the following:

1. Enter the following command:

```
WRKSPLF SELECT(QSYS *ALL *ALL SCPF) ASTLVL(*INTERMED)
```

2. The Work with All Spooled file display appears. Find the last spooled file named QPJOBLOG. Use Option 5 (Display) to see if any errors are listed.

OS/400 PTF and licensed program activity does not occur during an unattended IPL that immediately follows an abnormal system end. For information on what causes an abnormal IPL, see "What Causes an Abnormal IPL?" on page 2-31. If an abnormal IPL occurs, and Licensed Internal Code fixes were ready to be applied, the Licensed Internal Code fixes will now be applied. Do the following:

- To apply the PTFs after an abnormal IPL to storage area **B**:
  1. Enter the following command:

```
PWRDWNSYS *IMMED RESTART(*YES) IPLSRC(B)
```

Displaying PTF Status

To determine the status of the PTFs for products that are installed and supported on your system:

1. Enter the Display PTF (DSPPTF) command and press F4 (Prompt).
2. Specify the licensed program number and PTF identifier for the product (LICPGM) parameter and for the PTF numbers to select (SELECT) parameter. If you want to see the status for all the products on the system, specify *ALL for both parameters and press the Enter key until all the licensed programs are displayed.
3. The Display Program Temporary Fix display shows the action that will be taken for a PTF at the next unattended IPL.

The status of a PTF can be:

`On order` Ordered but not received by the system. They may reside on a tape, CD-ROM, be sent electronically, or copied from a tape.

`Cover letter only` A cover letter exists for the PTF.

`Save file only` PTF exists in a save file in library QGPL.

`Not applied` Loaded but not applied.

`Temporarily applied` Applied temporarily

`Temporarily applied - PND` Applied temporarily - Pending

`Temporarily applied - ACN` Applied temporarily - Action

`Permanently applied` Applied permanently

`Permanently applied - PND` Applied permanently - Pending

`Permanently applied - ACN` Applied permanently - Action

`Temporarily removed` Removed temporarily

`Temporarily removed - PND` Removed temporarily - Pending

`Temporarily removed - ACN` Removed temporarily - Action

`Permanently removed - PND` Removed permanently - Pending

`Permanently removed - ACN` Removed permanently - Action

`Superseded` PTF is replaced by another.

`Damaged` A PTF object cannot be found (perhaps accidentally removed). The PTF must be loaded again before you can apply it or remove it.

The pending and action status indicate that additional actions need to be taken to make the PTF active or inactive. `PND` means the PTF status will be updated after the actions are taken. `ACN` means the PTF status will not be updated until the next IPL as no exit program was provided to verify that the actions were actually performed. `Temporarily applied - ACN` does not mean that the fix is not in effect. It means that the system cannot verify that it is in effect.

Displaying PTF Information

You can find out general information about a PTF by doing the following:

1. Enter DSPPTF on any command line. The display PTF Status display appears.

```
                          Display PTF Status
                                                          System:   SYSNAMXX
Product ID  . . . . . . . . . :   5769SS1
IPL source  . . . . . . . . . :   ##MACH#B
Release of base option. . . . :   V4R2M0 L00


Type options, press Enter.
5=Display PTF details   6=Print cover letter   8=Display cover letter

    PTF                                          IPL
Opt ID      Status                               Action
_   SF00007  Temporarily applied                 None
_   SF00006  Not applied                         None
_   SF00005  Not applied                         Yes
_   SF00004  Not applied                         Yes
_   SF00004  Permanently applied                 None
_   SF00003  Permanently applied                 None
_   SF00002  Permanently applied                 None
_   SF00001  Permanently applied                 None
_   SF00000  Temporarily applied - PND           None
                                                                      More...
F3=Exit   F11=Display alternate view   F12=Cancel
```

Figure 5-7. Display PTF Status

2. Select the specific PTF that you want to display, and then Option 5 (Display PTF details). The Display PTF menu appears.
3. Select Option 1 (General information). The General information display appears.

```
                            General Information

Product ID/PTF ID . . . . . . . . . . :   5769SS1  SF00000
Release . . . . . . . . . . . . . . . :   V4R2M0

On order . . . . . . . . . . . . . . . :   No
PTF save file . . . . . . . . . . . . :   Yes
PTF status . . . . . . . . . . . . . . :   Temporarily applied
Type . . . . . . . . . . . . . . . . . :   Immediate
Unattended IPL action . . . . . . . . :   None
Optional part . . . . . . . . . . . . :   *BASE
PTF library . . . . . . . . . . . . . :   QSYS
Cover letter . . . . . . . . . . . . . :   No
Mandatory instructions . . . . . . . . :   No
Test Fix . . . . . . . . . . . . . . . :   No
Action pending . . . . . . . . . . . . :   Yes
Action required . . . . . . . . . . . :   Yes
Target OS/400 Release . . . . . . . . :   V4R2M0
Minimum-maximum level . . . . . . . . :   L00-L00
                                                                      Bottom

Press Enter to continue

F3=Exit   F12=Cancel
```

Figure 5-8. General Information display

The following describes each parameter on the General information display

On order Specifies whether the PTF is on order. Yes indicates that the PTF is on order, but may or may not be on the system. No indicates that the PTF is not ordered.

PTF save file Specifies whether a save file exists for the PTF.

PTF status Specifies the current status of the PTF.

The PTF status field on the Display information display may differ from the Status field on the Display PTF status panel for several reasons:

- If there has been a change in status since the Display PTF Status display is shown, the General information display shows the updated status.
- The Status field on the Display PTF Status display is a combination of the PTF status field, and the Action pending and Action required fields on the General information display. As shown in Figure 5-7 on page 5-33, the PTF status field on the Display PTF status display has Temporarily applied - PND.
- If the system encountered an error while building the PTF information file, the PTF status is updated when the General information display is shown.

Type Specifies whether the PTF is immediate or delayed

Unattended IPL action Specifies the action that will occur on the next unattended IPL.

Option part Specifies the option that this PTF is for

PTF library Specifies the library this PTF is installed into.

Cover letter Specifies whether there is a cover letter for this PTF.

Mandatory instructions Specifies whether there are instructions that need to be performed before this PTF is applied.

Action pending Specifies whether there is an action that needs to be performed. If YES is specified for this field, an action needs to be taken to make the PTF active or inactive. If NO is specified, it means the PTF is active.

Action required Specifies whether an action is required to make this PTF active after it has been applied.

Target OS/400 Release Specifies the release of the operating system this PTF can be copied to or loaded on.

Minimum-maximum level Specifies the lowest and highest level of the product that this PTF can be installed on. PTFs are able to span multiple levels of a system.

Advanced PTF Topics

This section includes information on how to load and apply PTFs, remove PTFs, and distribute PTFs to remote systems.

PTF installation includes two steps: **load** and **apply**. The easiest way to install PTFs is to follow the instructions found in "Installing PTFs" on page 5-24. If you follow these instructions, the PTFs are loaded and applied for you automatically.

Occasionally, you may need to install PTFs by loading them first and applying them later. The following sections give you information on how to load and apply PTFs under special circumstances. If you do not need to use the load and apply steps separately, use "Installing PTFs" on page 5-24 to install your PTFs.

Attention: The methods introduced in this section are not the recommended ways to install PTFs. Using these methods may cause the following error conditions:

- PTF is not applied during an IPL due to missing prerequisites.
- Required distribution requisites are missing after the PTF apply.

Therefore, it is recommended that you use "Installing PTFs" on page 5-24 to install all your PTFs.

Loading PTFs

The PTF packages on CD-ROM, tape, or in a save file can contain many PTFs. You can load one, some, or all of them using the Load Program Temporary Fix (LODPTF) command. As PTFs are loaded, the system verifies that the release of the product is correct. PTF status is `Not applied` after the PTF has been loaded on the system. Use the Apply Program Temporary Fix (APYPTF) command to apply the PTF. For some of the applied PTFs, the status is `Temporarily applied - ACN`. There are also some temporarily applied PTFs that show a status of `Temporarily applied - PND`. For these PTFs, you need additional actions to make them active.

Loading Individual PTFs From a Cumulative PTF Package: To load one PTF from a cumulative package:

1. Enter the Load PTF (LODPTF) command and press F4 (Prompt).
2. Specify the parameter values according to the PTF you are loading.
3. Specify the PTF identifier you want to load in the PTF numbers to select (SELECT) parameter and press the Enter key.
4. Repeat the Load PTF (LODPTF) command for each PTF you want loaded from the cumulative CD-ROM or tape.

For PTFs on a CD-ROM, the system will automatically find the PTF file in the cumulative package that contains the selected individual PTFs when you specify PATHID(*FIRST). All PTFs to be loaded must exist in the same path identifier. Otherwise, you need to load the PTFs separately.

For PTFs on a tape, you can also use the Load PTF (LODPTF) command to specify the PTFs by the sequence number found in the cover letter that comes with the tape. In the PTF numbers to select (SELECT) parameter, specify the PTF you want. Specify the sequence number for the sequence number (SEQNBR) parameter. You need to specify the correct sequence number for each PTF in the cumulative package. When loading individual PTFs from the package on tape, you can also specify ENDOPT(*LEAVE) on the Load Program Temporary Fix (LODPTF) command and repeat the command until the desired PTF is found.

Loading PTFs That Supersede Other PTFs: If the PTF being loaded replaces (supersedes) existing PTFs (identified in the PTF cover letter) the following considerations apply:

- If the PTF to be replaced is *not applied* to the system, the new PTF can be loaded successfully. A record is kept indicating that the replaced PTF has been superseded.
- If the PTF to be replaced is *permanently applied*, it is considered to be a part of the operating system or licensed program to which it was applied. The new PTF can be loaded successfully.
- If the PTF to be replaced is *temporarily applied*, the load operation will automatically permanently apply any replaced (superseded) PTFs. If you do not want the PTF function to permanently apply any replaced (superseded) temporarily applied PTFs automatically, specify *NOAPY for the Superseded PTFs (SPRPTF) parameter on the Load Program Temporary Fix (LODPTF) command. The PTFs to be replaced must either be permanently applied or permanently removed before PTFs that are replacing them can be loaded.

Note: When you order a PTF, IBM service does not search through the PTFs to determine which one is the latest level. For example, if you order a PTF that is superseded by another PTF, IBM service will only send you the PTF ordered by you instead of the superseding PTF. You need to use the summary list to identify a PTF you need to order. Scan the summary list for PTFs that replace the PTF in question and then order the PTF. For more information on how to order a PTF, see "Ordering PTFs and PTF Information" on page 5-14.

Applying PTFs

Some PTFs cannot be applied immediately because the operating system or licensed programs they affect are active. These PTFs are called **delayed** PTFs and can be applied at the next system initial program load (IPL). **Immediate** PTFs can be applied without doing an IPL if the licensed program they affect is not in use, or may be applied like delayed PTFs when you do the next IPL.

PTFs can be **applied** (made active) on either a **temporary** or **permanent** basis. If the PTF is applied temporarily, a copy of the object being changed is saved. If the PTF is applied permanently, the old object is removed. Permanently applied PTFs cannot be removed.

PTFs generally should be applied temporarily when received. Applying PTFs temporarily allows you to test them in your operational environment. You should ensure that the new PTFs operate properly on your system before applying them permanently. As long as the PTFs are applied temporarily, they can be removed. Once they have been applied permanently, they cannot be removed.

When you are sure that the Licensed Internal Code fixes work properly, it is recommended that you apply them permanently to reduce the time required to install the next cumulative PTF package, and to make available the storage for future PTF applies. If this storage is not made available, you will need to permanently apply some of your Licensed Internal Code fixes before you can temporarily apply any additional PTFs. Temporarily applied Licensed Internal Code fixes are only in effect when you use the **B** storage area to perform an IPL.

Notes:

1. You cannot apply or remove PTFs with mandatory special instructions when *ALL is specified on the PTF numbers to select (SELECT) parameter of Apply Program Temporary Fix (APYPTF) or Remove Program Temporary Fix (RMVPTF) commands. These PTFs are only applied or removed when they are specified by a number on the SELECT parameter. This protects against applying or removing PTFs without reading the mandatory special instructions.
2. The term PTF, in this context, refers to Licensed Internal Code fixes and licensed program fixes, including OS/400 program fixes.

Applying Licensed Program or OS/400 PTFs Temporarily or Permanently During an Unattended IPL: You can apply both delayed and immediate PTFs temporarily or permanently.

To apply delayed PTFs temporarily, type the following command on any command line and press the Enter key:

```
APYPTF LICPGM(*ALL) SELECT(*ALL) APY(*TEMP) DELAYED(*YES) IPLAPY(*YES)
```

To permanently apply all PTFs that are temporarily applied (status of `Temporarily applied`) during the next unattended IPL, or to permanently apply all immediate PTFs that have a status of `Not applied` during the next IPL, type the following command on any command line and press the Enter key:

```
APYPTF LICPGM(*ALL) SELECT(*ALL) APY(*PERM) DELAYED(*YES) IPLAPY(*YES)
```

Type the following command and press the Enter key to perform an IPL on the system.

```
PWRDWNSYS *IMMED RESTART(*YES) IPLSRC(B)
```

Note: You must specify LICPGM(*ALL) and SELECT(*ALL) to ensure that PTF dependency checking takes place for prerequisite Licensed Internal Code fixes.

Checking Requisite PTFs: When applying PTFs, other PTFs can be specified as requisites for the PTF. These different types include prerequisites and corequisites. Each type has a different relationship with the PTF you are trying to apply. Some of the relationships have additional considerations.

Prerequisite PTFs: You must specify LICPGM(*ALL) and SELECT(*ALL) on the Apply Program Temporary Fix (APYPTF) command to ensure that PTF dependency checking takes place for prerequisite Licensed Internal Code fixes. The PTF with prerequisites knows about its prerequisites, but a prerequisite PTF does not have any information about the PTF that is dependent on it. Therefore, prerequisite checking must be done when the PTF with the prerequisites is set for apply. When you use the GO PTF command and Option 8 to apply a PTF with prerequisites, any Licensed Internal Code fixes that are called out as prerequisites are set for permanent apply. This is very important to remember. It is the action of setting the dependent for apply that sets the Licensed Internal Code fixes prerequisite for permanent apply.

Corequisite PTFs: The system will not apply corequisite PTFs unless it is also applying the other. The corequisite relationship is two-way, meaning each PTF must specify the other as a corequisite. Corequisites must be within the same product, option, version and release. The system will check that the corequisite PTFs are applied at the same time, but it cannot ensure that one will not end up active without the other.

The system now recognizes under certain conditions, whether a PTF specified as a prerequisite or corequisite is really needed. This decision is based on whether the function it will fix is actually installed on your system. These prerequisites and corequisites are displayed as conditional requisities.

Applying Licensed Program or OS/400 PTFs Temporarily or Permanently During an Attended IPL: You can apply both delayed and immediate PTFs temporarily or permanently that have a status of `Not applied` during an attended IPL.

To apply a delayed PTF temporarily, you only need to do one IPL. To apply a delayed PTF permanently after it has been applied temporarily and tested, you need to do another IPL.

Before You Start:

- Send a message to users notifying them to sign off the system.
  1. Type `go managesys` on any command line and press the Enter key.
  2. Select option 12 (Work with Signed-On Users) on the Manage Your System, Users, and Devices (MANAGESYS) menu.
  3. Press F10 (Send message to all) on the Work with Signed-On Users display.

     Note: If the Work with User Jobs display is shown, you are in the intermediate assistance level. To get to the Work with Signed-On Users display, press F21 (Select assistance level) and select the basic assistance level.
  4. Type the message in the *Message text* field and press F10 (Send).
- Use the Work with User Jobs display to determine if there are other jobs or programs running on the system.
  1. Enter the Work with User Jobs (WRKUSRJOB) command.
  2. Use option 4 (End) for the jobs you want to end on the Work with User Jobs display.

To apply a PTF temporarily or permanently during an attended IPL:

1. Switch the system unit to the Manual mode.

   If you are temporarily applying delayed Licensed Internal Code fixes, select storage area **A**. Immediate Licensed Internal Code fixes can be applied when IPL'd to storage area B. If you are permanently applying Licensed Internal Code fixes, select storage area **B**.
2. Type `PWRDWNSYS *IMMED RESTART(*YES) IPLSRC(x)`, where `x` is your storage area, on any command line and press the Enter key.

3. Select option 1 (Perform an IPL) on the IPL or Install the System display.
4. Type your user ID and password on the Sign On display.
5. Select the licensed program for which you want to apply the PTF on the Select Products to Work with PTFs display.
   - If PTFs are not applied or are temporarily applied, the Work with PTFs display is shown. This display is used to apply and remove PTFs and shows the current status of each PTF that you can work with.
   - If you want to keep the same status for any of the PTFs displayed, leave the *Opt* column empty.
   - PTFs that are not applied can be either temporarily applied using option 1 or permanently removed using option 4.
   - PTFs that are temporarily applied can be either permanently applied using option 2 or temporarily removed using option 3.

     Note: For an explanation of "permanently removed" and "temporarily removed" PTFs, see "Removing PTFs" on page 5-41.
6. After typing the option number you want for each of the PTFs displayed, press the Enter key.
7. Repeat step 5 and step 6 for each licensed program for which you want to apply PTFs.
8. Press F3 (Exit) to continue with system operations.

Applying Immediate Licensed Program or OS/400 PTFs Temporarily or Permanently Without an IPL: To apply immediate PTFs temporarily or permanently without doing an IPL:

1. Make sure the licensed programs to which the PTFs are being applied are not in use.

   Note: If you are applying PTFs to the Licensed Internal Code or to the Operating System/400, be sure to follow any special instructions, including activation instructions, in the cover letter to ensure that the system is in the correct state.
2. Enter the Apply Program Temporary Fix (APYPTF) command and press F4 (Prompt). Press F9 (All parameters) to display all of the fields on the Apply Program Temporary Fix (APYPTF) display.
3. Specify the number that corresponds to the licensed program you are applying PTFs for the Product (LICPGM) parameter.
4. Specify the release level for the Release (RLS) parameter.

   Note: The release parameter is only required if more than one release of the product is installed.
5. Select the PTFs you want applied by doing one of the following:
   - Specify the identifiers of the PTF you want to apply in the PTF numbers to select (SELECT) parameter. To apply all PTFs, specify *ALL in the PTF numbers to select (SELECT) parameter.
   - Specify *ALL for the PTF numbers to select (SELECT) parameter, and the numbers of specific PTFs you do not want to apply for the PTF numbers to omit (OMIT) parameter.

Note: Specify APYREQ(*YES) to ensure all requisites within the same product are also applied if individual PTF identifiers are specified in the SELECT parameter.

6. To temporarily apply the PTFs, specify *TEMP for the Extent of change (APY) parameter. To permanently apply the PTFs, specify *PERM.

   Note: PTFs applied temporarily can be removed; PTFs applied permanently cannot be removed (see "Removing PTFs" on page 5-41).

7. Specify *NO for the Delayed PTFs (DELAYED) parameter.

   Note: To apply all immediate PTFs right now and all delayed PTFs on the next IPL, specify *ALL for the Product (LICPGM) parameter, *ALL for the Select (SELECT) parameter, and *IMMDLY for the Apply Type (APPLY) parameter..

8. Press the Enter key. The system applies the PTFs to the specific licensed program.

9. Repeat steps 2 on page 5-39 through 8 until the PTFs are applied for all the selected licensed programs.

Applying Licensed Internal Code Fixes at the Next Unattended IPL: To apply Licensed Internal Code fixes that have already been loaded at the next unattended IPL, you must be currently operating from the **B** storage area. If you are currently operating on the A storage area, the Licensed Internal Code fixes can be applied immediately.

1. Make sure the system is in the Normal mode.
2. If you are not running on the correct storage area, type the following command on any command line and press the Enter key:

   ```
   PWRDWNSYS *IMMED RESTART(*YES) IPLSRC(B)
   ```

3. Type the following commands on any command line and press the Enter key after each one:

   ```
   APYPTF LICPGM(5769999) APY(*TEMP) DELAYED(*YES)

   PWRDWNSYS *IMMED RESTART(*YES) IPLSRC(B)
   ```

Note: While applying Licensed Internal Code fixes, it may be necessary for the system to reorganize a portion of the Licensed Internal Code storage. This reorganization can take up to 1 hour. While this reorganization is taking place, system reference codes (SRCs) C600 434B and C600 435B are displayed.

Applying Licensed Internal Code Fixes Without an IPL: You may be operating from either storage area to temporarily apply an immediate Licensed Internal Code fix without doing an IPL. You must be operating from the **B** storage area to permanently apply a temporarily applied Licensed Internal Code fix without doing an IPL.

To determine the storage area you are currently operating from, type `DSPPTF 5769999` on any command line and press the Enter key. On the Display PTF Status display, the storage area is identified in the *IPL source* field. ##MACH#A is the **A** storage area and ##MACH#B is the **B** storage area.

If you are not running on the correct storage area, type the following command on any command line and press the Enter key:

```
PWRDWNSYS *IMMED RESTART(*YES) IPLSRC(X)
```

where IPLSRC(X) is A if you want to apply them temporarily or B if you want to apply them permanently.

To apply Licensed Internal Code fixes immediately, type the following on any command line:

```
APYPTF 5769999 APY(xxxxx) DELAY(*NO)
```

where xxxxx is *TEMP or *PERM, and press the Enter key.

Resetting IPL Action: If you decide not to apply PTF on the next IPL, you can reset IPL action by using the following command:

```
APYPTF LICPGM(5769999) APY(*TEMP) DELAYED(*YES) IPLAPY(*NO)
```

Removing PTFs

You can remove PTFs that are applied temporarily. Delayed PTFs applied temporarily can be removed temporarily when you do an IPL and then removed permanently without doing an IPL. Immediate PTFs applied temporarily can be removed either temporarily or permanently without doing an IPL. You can also remove immediate PTFs that have been loaded but not applied. PTFs applied permanently cannot be removed.

When PTFs are removed temporarily, the original objects that were replaced by the PTF are restored to the program library. The system again verifies that the PTF being removed is not required for any other currently applied PTF. If the PTF being removed is found to be required, the other PTF (that it is required for) must be removed first or at the same time.

Notes:

- Before you remove a PTF, be sure that the object affected by the immediate PTF is not in use.
- Licensed Internal Code PTFs can only be removed permanently.

Removing Licensed Program PTFs: To remove one or more licensed program PTFs:

1. Enter the Remove Program Temporary Fix (RMVPTF) command and press F4 (Prompt).
2. On the Remove Program Temporary Fix (RMVPTF) display, type the character value of the licensed program (shown on the cover letter) for the Product (LICPGM) parameter.
3. Select the PTFs you want removed by doing one of the following:
   - Specify the numbers of the PTFs you want to remove for the PTF numbers to select (SELECT) parameter or *ALL to remove all of them.

     Note: Specify RMVDEP(*YES) when specific PTF numbers are entered on the SELECT parameter to ensure that dependents in the same product are also removed.

- Specify *ALL for the PTF numbers to select (SELECT) field and the numbers of specific PTFs you do not want to remove for the PTF numbers to omit (OMIT) parameter.

4. Specify *TEMP for the Extent of change (APY) parameter to remove the PTFs temporarily or *PERM to remove the PTFs permanently.
5. If you are removing immediate PTFs, specify *NO for the Delayed PTFs (DELAYED) parameter.
6. If you are identifying delayed or immediate PTFs that are to be automatically removed during the next unattended IPL, specify *YES for the Delayed PTFs (DELAYED) parameter and *YES for the Remove on unattended IPL (IPLRMV) parameter.
7. Press the Enter key.

Removing OS/400 PTFs: To remove an immediate OS/400 PTF temporarily, use the following command:

```
RMVPTF LICPGM(5769SS1) SELECT(SFxxxxx) RMV(*TEMP) RMVDEP(*YES)
```

where xxxxx is the PTF identifier.

Note: If the PTF is only temporarily removed, it will be applied again with the next cumulative PTF package.

To remove an immediate OS/400 PTF permanently, use the following command:

```
RMVPTF LICPGM(5769SS1) SELECT(SFxxxxx) RMV(*PERM) RMVDEP(*YES)
```

where xxxxx is the PTF identifier.

To remove a delayed OS/400 PTF temporarily, do the following:

1. Use the following command:

   ```
   RMVPTF LICPGM(5769SS1) SELECT(SFxxxxx) RMV(*TEMP) DELAYED(*YES) RMVDEP(*YES)
   ```

   where xxxxx is the PTF identifier.
2. Type the following command and press the Enter key to do an IPL to the B side:

   ```
   PWRDWNSYS OPTION(*IMMED) RESTART(*YES) IPLSRC(B)
   ```

To remove a delayed OS/400 PTF permanently, do the following:

1. Temporarily remove the delayed PTF first.
2. Use the following command:

   ```
   RMVPTF LICPGM(5769SS1) SELECT(SFxxxxx) RMV(*PERM) RMVDEP(*YES)
   ```

   where xxxxx is the PTF identifier.

Removing Licensed Internal Code Fixes: To remove an immediate PTF for the Licensed Internal Code temporarily, use the following command:

```
RMVPTF LICPGM(5769SS1) SELECT(SFxxxxx) RMV(*PERM) RMVDEP(*YES)
```

where xxxxx is the PTF identifier.

To remove a delayed Licensed Internal Code PTF temporarily, do the following:

1. Type the following command and press the Enter key:

   ```
   RMVPTF LICPGM(5769999) SELECT(MFxxxxx) RMV(*PERM) DELAYED(*YES) RMVDEP(*YES)
   ```

   where xxxxx is the Licensed Internal Code identifier.

2. Type the following command and press the Enter key to do an IPL to the B side:

   ```
   PWRDWNSYS OPTION(*IMMED) RESTART(*YES) IPLSRC(B)
   ```

Removing Individual PTFs in a Cumulative Package Before the Next IPL: To remove a PTF from a PTF cumulative package after you have already selected option 8 (Install program temporary fix package) on the Program Temporary Fix (PTF) menu, but before the IPL has been done, enter the following command:

```
APYPTF LICPGM(XXXXXXX) SELECT(YYYYYYY) DELAYED(*YES) APY(*TEMP) IPLAPY(*NO)
```

where XXXXXXX is the licensed program and YYYYYYY is the number of the PTF you want to omit.

This resets the IPL apply indicator to `IPL Action NONE`. If you receive an error message, check the job log. If you receive message CPF3608, this PTF has PTFs that depend on it. You must omit these dependent PTFs before omitting the original PTF. The status of the omitted PTFs will remain `Not applied` during subsequent IPLs. When you are finished omitting PTFs, enter the following command to complete the cumulative package installation:

```
PWRDWNSYS OPTION(*IMMED) RESTART(*YES) IPLSRC(B)
```

Deleting PTF Save Files and Cover Letters: After you have permanently applied a program temporary fix (PTF), you may want to delete the PTF save file and cover letter if you do not need to distribute it to another system. Once a PTF has been permanently applied and the save file is deleted, all information about the PTF except the status information is also deleted. By deleting the save file, you can make more room on your system for other files.

To delete a PTF save file, use the Delete Program Temporary Fix (DLTPTF) command. Do not use the Delete File (DLTF) command to delete PTF save files.

Note: PTF save files and cover letters for a previous release are removed during automatic cleanup if system logs are specified. See chapter 8 of the *System Operation*, SC41-4203 book, for more information on how to set up your system so they are removed automatically.

Distributing PTFs to Remote Systems

You can distribute some or all the PTFs you receive to a remote system. PTFs that are in a save file can be sent to remote systems electronically. If you have the SystemView System Manager/400 licensed program installed, see the *System Manager Use*, SC41-5321 book for information on how to use the Create PTF Package (CRTPTFPKG) command and the Send PTF (SNDPTF) command.

Note: When preparing a PTF package to send to a remote system, make sure that the model of the remote system unit is compatible with the model of system unit required for the PTFs (shown on the cover letter as *Models*).

PTFs that are on CD-ROM, tape, or received electronically can be packaged as follows:

- Combine some or all the PTFs you received electronically into a single PTF save file so you can send it electronically to a remote system.

  Note: You cannot combine PTFs from different languages, releases, or superseded PTFs into one save file.

- Copy one or more PTF files from CD-ROM or tape to a PTF save file so you can send it electronically to a remote system.

If the PTFs are already in a save file, use object distribution to send the save files electronically to the remote system. See the *SNA Distribution Services*, SC41-5410 book for more information about using object distribution.

If you ordered and received a PTF electronically for another system that has a newer release than the one on your system, you cannot load, copy, or display that PTF on your system, but you can send that PTF to the remote system using object distribution.

Loading, Applying, and Removing PTFs Automatically at Remote Systems: To load PTFs on remote systems follow the instructions in "Installing Licensed Program PTFs or OS/400 PTFs" on page 5-30.

To load PTFs received through the distribution services network, type the following on any command line:

```
LODPTF LICPGM(xxxxxxx) DEV(*SAVF) SELECT(nnnnnnn)
```

where xxxxxxx is the licensed program number and nnnnnnn is the PTF identifier. Next, use the Apply PTF (APYPTF) command to apply the PTFs.

To load PTFs from device *SERVICE, do the following:

Note: Loading PTFs from device *SERVICE is only valid if one PTF exists in the savefile.

1. Use the QPZGENNM application program interface (API) to generate a name for the PTF save file.
2. Store the PTF save file in the library returned from the API.
3. Once the PTF exists in the save file, use the QPZLOGFX API to store the information about the PTF in the PTF database.
4. Type the following command on any command line to load the PTF:

   ```
   LODPTF LICPGM(xxxxxxx) SELECT(nnnnnnn) FROMDEV(*SERVICE)
   ```

   where xxxxxxx is the licensed program number and nnnnnnn is the PTF identifier.

Note: See the *System API Reference*, SC41-5801 for more detailed information about the QPZGENNM and QPZLOGFX APIs.

To have PTFs applied automatically at the next unattended IPL on a remote system, specify the delayed parameter value as *YES. If the next IPL at the remote system is attended, the Select Products to Work with PTFs display is shown and the operator can choose to apply or not to apply the PTFs. If the operator chooses

not to apply the PTFs, they are applied automatically during the next unattended IPL.

To remove delayed PTFs from remote systems (see "Removing PTFs" on page 5-41). Specify *YES for the *Delayed PTFs* field to remove PTFs during the next unattended IPL. If the next IPL on the remote system is attended, the Work with PTFs display is shown and the operator can choose to remove or not to remove the PTFs. If the operator chooses not to remove the PTFs, they are removed automatically during the next unattended IPL.

Building a Tailored PTF Package: The following example shows you how to build your own PTF package that can be used the same way as a PTF package supplied by IBM service support. This example combines a PTF package with individual PTFs into a tailored PTF package for distribution to other AS/400 systems in your network.

If you have the SystemView System Manager/400 licensed program installed on your system, use the Create Program Temporary Fix Package (CRTPTFPKG) command instead of this procedure. See the *System Manager Use*, SC41-5321 book for more information on how to build your own PTF package using the SystemView System Manager/400 licensed program.

The order of a cumulative PTF package is:

1. High-impact pervasive (HIPER) Licensed Internal Code Fixes (5769999)
2. HIPER OS/400 PTFs (5769SS1)
3. HIPER licensed program PTFs (for example, OfficeVision licensed program)
4. A delimiter which divides the HIPER PTFs from the non-HIPER PTFs (5769111)
5. Non-HIPER Licensed Internal Code fixes
6. Non-HIPER OS/400 PTFs
7. OS/400 online information PTFs (if any)
8. Non-HIPER licensed program PTFs

For this example, assume that you want a tape that contains all but one (SF00600) of the PTFs from the most recent PTF package on CD-ROM or tape received from IBM service support, including the high-impact pervasive (HIPER) PTFs. In addition, you want to include four individual PTFs received electronically from service support. These four PTFs are MF00050, SF00480, SF00500, and SF00800.

Because the four individual PTFs were received from IBM service support, they already exist in save files in library QGPL. They exist in the library as object type `*file`, as shown below:

```
File Name  Object Type
QMF00050   *FILE
QSF00480   *FILE
QSF00500   *FILE
QSF00800   *FILE
```

The following shows the procedures for building a tailored PTF package from CD-ROM or tape.

Tailoring a PTF Package From Tape

1. Find out the sequence number of the PTF file you want to copy from the PTF cumulative package by using the Display tape (DSPTAP) command:

   ```
   DSPTAP DEV(TAP01) DATA(*LABELS) OUTPUT(*PRINT)
   ```

   The Display Spooled File display is shown. The product identifier is listed in the Data File Label column, and the PTF file sequence number is listed in the File Seq column. For example, to copy PTF for product RPG/400, first find the data file label that identifies the product with an extension of A00, then find the corresponding sequence number. According to Figure 5-2, the product identifier is P5769RG1.A00 and the file sequence number is 7.

```
                    Display Spooled File
File  . . . . . :   QPTAPDSP                        Page/Line   1/1
Control . . . . .   _                             Columns     1 - 78
Find  . . . . . .   _
5769SS1 V4R1M0                        TAPE VOLUME INFORMATION         C4123410
Device . . . . . :   TAP01                Volume . . . . . :   C4123410
Owner ID . . . . :                        Density  . . . . :   *QIC120
Type . . . . . :   *SL                    Code . . . . . :   *EBCDIC
                        Record
                    File  Block   Recg  Record  Block   File    Mvol  Mvol
Data File Label     Seq   Format  Tech  Length  Length  Length  Ind   Seq
P5769999.A00        0001  *U            00000   32760   000002        0001
P5769999.A01        0002  *U            00000   32760   000016        0001
P5769999.A02        0003  *U            00080   32760   000066        0001
P5769SS1.A00        0004  *U            00000   32760   000002        0001
P5769SS1.A01        0005  *U            00000   32760   000013        0001
P5769SS1.A02        0006  *U            00080   32760   000066        0001
P5769RG1.A00        0007  *U            00000   32760   000002        0001
P5769RG1.A01        0008  *U            00000   32760   000013        0001
P5769RG1.A02        0009  *U            00080   32760   000066        0001
     More...
F3=Exit   F12=Cancel   F19=Left   F20=Right   F24=More keys
```

Figure 5-9. Display Spooled File display

```
                    Display Spooled File
File . . . . . :   QPTAPDSP                        Page/Line   1/23
Control . . . . .  _                             Columns     1 - 78
Find . . . . . .   _
P5769111.A00       0010  *U            00000   32760   000002        0001
P5769111.A01       0011  *U            00000   32760   000016        0001
P5769111.A02       0012  *U            00080   32760   000066        0001
P5769999.A00       0013  *U            00000   32760   000002        0001
P5769999.A01       0014  *U            00000   32760   000013        0001
P5769999.A02       0015  *U            00080   32760   000066        0001
P5769SS1.A00       0016  *U            00000   32760   000002        0001
P5769SS1.A01       0017  *U            00000   32760   000016        0001
P5769SS1.A02       0018  *U            00080   32760   000066        0001




     Bottom
F3=Exit   F12=Cancel   F19=Left   F20=Right   F24=More keys
```

Figure 5-10. Display Spooled File display - screen 2

2. Use the Copy Program Temporary Fix (CPYPTF) command to bring the HIPER PTFs from the cumulative PTF package into library QGPL. Two licensed programs are being used in this example (MF and SF PTFs).

```
CPYPTF   LICPGM(5769999)
FROMDEV(TAP01)
TODEV(*SAVF)
FROMSEQNBR(1)
FROMENDOPT(*LEAVE)
TOSAVF(QGPL/PCUMH999)

CPYPTF   LICPGM(5769SS1)
FROMDEV(TAP01)
TODEV(*SAVF)
FROMSEQNBR(4)
FROMENDOPT(*LEAVE)
TOSAVF(QGPL/PCUMHSS1)
```

3. Copy the product delimiter into a save file.

```
CPYPTF   LICPGM(5769111)
FROMDEV(TAP01)
TODEV(*SAVF)
SELECT(*ALL)
FROMSEQNBR(10)
FROMENDOPT(*LEAVE)
TOSAVF(QGPL/PCUMH111)
```

4. Copy the non-HIPER PTFs from the cumulative package into a save file omitting the unwanted PTFs.

```
CPYPTF   LICPGM(5769999)
FROMDEV(TAP01)
TODEV(*SAVF)
FROMSEQNBR(13)
FROMENDOPT(*LEAVE)
TOSAVF(QGPL/PCUMP999)

CPYPTF   LICPGM(5769SS1)
FROMDEV(TAP01)
TODEV(*SAVF)
OMIT(SF00600)
FROMSEQNBR(16)
FROMENDOPT(*LEAVE)
TOSAVF(QGPL/PCUMPSS1)
```

Tailoring a PTF Package From CD-ROM

1. Find out the path identifier for the PTF file you want to copy from the PTF cumulative package:

   Note: A path identifier is a 1 to 6-digit number that identifies each PTF file on the CD-ROM. Each release of a licensed product on the CD-ROM has its own unique set of identifiers. Each set of path identifiers for the product begins with the number 1 indicating the first PTF file for the product and release. This first PTF file may or may not contain HIPER PTFs for the product.

   To get the path identifier for each PTF file you want to copy from the cumulative PTF package for your product, use the Copy Program Temporary Fix (CPYPTF) command, and specify PATHID(*SELECT). The Select PTF CD-ROM File display is shown.

```
                              Select PTF CD-ROM File
                                                                System:   SYSNAMXX
Product . . . . . . . . :   5769SS1

Type option, press Enter.
1=Select

                                 National
                    Feature      Language        Path        Hiper
Opt    Release      Type         Version     Identifier      PTFs
_      V4R2M0       *CODE                        1          Yes
_      V4R2M0       *CODE                        2          No
_      V4R2M0       *LNG          2924           2          No
```

Figure 5-11. Select PTF CD-ROM File display

2. Use the Copy Program Temporary Fix (CPYPTF) command to bring the HIPER PTFs from the cumulative PTF package into library QGPL. Two licensed programs are being used in this example (MF and SF PTFs). You can identify the HIPER PTF files on the Select PTF CD-ROM File panel by a Yes in the Hiper PTFs column.

```
CPYPTF   LICPGM(5769999)
FROMDEV(OPT01)
TODEV(*SAVF)
FROMPATHID(1)
TOSAVF(QGPL/PCUMH999)

CPYPTF   LICPGM(5769SS1)
FROMDEV(OPT01)
TODEV(*SAVF)
FROMPATHID(1)
TOSAVF(QGPL/PCUMHSS1)
```

3. Copy the product delimiter into a save file.

```
CPYPTF   LICPGM(5769111)
FROMDEV(OPT01)
TODEV(*SAVF)
SELECT(*ALL)
FROMPATHID(1)
TOSAVF(QGPL/PCUMH111)
```

4. Copy the non-HIPER PTFs from the cumulative package into a save file omitting the unwanted PTFs.

```
CPYPTF   LICPGM(5769999)
FROMDEV(OPT01)
TODEV(*SAVF)
FROMPATHID(2)
TOSAVF(QGPL/PCUMP999)

CPYPTF   LICPGM(5769SS1)
FROMDEV(OPT01)
TODEV(*SAVF)
OMIT(SF00600)
FROMPATHID(2)
TOSAVF(QGPL/PCUMPSS1)
```

Creating the Tailored PTF Cumulative Tape: Repeat the command for each licensed program with non-HIPER PTFs. The OMIT parameter was used to identify the PTF not included in the tailored package. The TOSAVF name must be 8 characters in length and must start with the letter P. You can choose the remaining seven characters. The library on the TOSAVF parameter must be QGPL.

Library QGPL now contains:

```
File Name  Object Type
QMF00050   *FILE
QSF00480   *FILE
QSF00500   *FILE
QSF00800   *FILE
PCUMH999   *FILE
PCUMHSS1   *FILE  (plus more for HIPERs of licensed programs)
PCUMH111   *FILE
PCUMH999   *FILE
PCUMPSS1   *FILE  (plus more for non-HIPERs of licensed programs)
```

1. Initialize the tape for the tailored cumulative package.

```
INZTAP   DEV(TAP01)
NEWVOL(CUMPKG)
```

2. Copy the Licensed Internal Code HIPER PTFs into one file and place it first on the tape.

```
CPYPTF   LICPGM(5769999)
FROMDEV(*SERVICE)
TODEV(TAP01)
SELECT(CUMH999)
TOENDOPT(*LEAVE)
```

   The TOENDOPT(*LEAVE) parameter is used to maintain tape position.

3. Copy the OS/400 HIPER PTFs onto the tape.

```
CPYPTF   LICPGM(5769SS1)
FROMDEV(*SERVICE)
TODEV(TAP01)
SELECT(CUMHSS1)
TOENDOPT(*LEAVE)
```

   Repeat for each licensed program with HIPER PTFs.

4. Copy the delimiter to the tape.

```
CPYPTF   LICPGM(5769111)
FROMDEV(*SERVICE)
TODEV(TAP01)
SELECT(CUMH111)
TOENDOPT(*LEAVE)
```

5. Copy the non-HIPER Licensed Internal Code fixes into one file and place on the tape.

```
CPYPTF   LICPGM(5769999)
FROMDEV(*SERVICE)
TODEV(TAP01)
SELECT(CUMP999 MF00050)
TOENDOPT(*LEAVE)
```

6. Copy the non-HIPER OS/400 PTFs into one file and place on the tape.

```
CPYPTF   LICPGM(5769SS1)
FROMDEV(*SERVICE)
TODEV(TAP01)
SELECT(CUMPSS1 SF00480 SF00500 SF00800)
TOENDOPT(*LEAVE)
```

   Repeat for each licensed program with non-HIPER PTFs.

The tape now contains the tailored PTF package. It can be used in the same way that your service support PTF packages are used.

PTFs can now be loaded on, applied to, or removed from a system.

Backing Up Your System

What you need to save is easy: everything. To be prepared for a site loss or certain types of disk failures, you need to be able to recover everything on your system.

What Do You Need to Save and How Often?

In an ideal world, how often you need to save is also an easy question. Every week, save the parts of your system that do not change very much. Every day, save the parts of your system that change often.

Table 5-3 describes the parts of the system, whether they are supplied by IBM or created by users, and how often they change:

Table 5-3. Overview of Parts of the System

Item Description	IBM- Supplied?	When Changes Occur
Parts of the System That Do Not Change Often:		
Licensed Internal Code	Yes	PTFs or new release of the operating system
Operating system objects in QSYS library	Yes	PTFs or new release of the operating system
OS/400 optional libraries (QHLPSYS, QUSRTOOL)	Yes	PTFs or new release of the operating system
Licensed program libraries (QRPG, QCBL, Qxxxx)	Yes	Updates to licensed programs
Licensed program folders (Qxxxxxxx)	Yes	Updates to licensed programs
Licensed program directories (/QIBM, /QOpenSys/QIBM)	Yes	Updates to licensed programs
Parts of the System That Change Often:		
Security information (user profiles, private authorities, authorization lists)	Some	Regularly as new users and objects are added or authorities are changed[1]
Configuration objects in QSYS	No	Regularly, when device descriptions are added or changed or when you use the Hardware Service Manager function to update configuration information[1]
IBM-supplied libraries that contain user data (QGPL, QUSRSYS)	Yes	Regularly
User libraries that contain user data and programs	No	Regularly
Folders and documents	Some	Regularly, if you use these objects
Distributions	No	Regularly, if you use the distribution function
Directories	Some	Regularly, if you use these objects

1 These objects may also change when you update licensed programs.

Realistically, when you run save procedures, how you run save procedures, and what you save depend on the size of your **save window**. Your save window is the amount of time that your system can be unavailable to users while you perform your save operations. To simplify your recovery, you need to save when your system is at a known point and your data is not changing.

When you select a save strategy, you should balance what your users think is an acceptable save window with the value of the data you might lose and the amount of time it may take to recover.

Choose one of the save strategies described in the topics that follow, based on the size of your save window. Then reevaluate your decision based on how your save strategy positions you for a recovery.

Save Window	Description	Save Strategy
Long	An 8- to 12-hour block of time available daily with no system activity (including batch work).	Simple
Medium	A shorter block of time (4 to 6 hours) available daily with no system activity.	Medium
Short	Little or no time available when the system is not being used for interactive or batch work.	Complex

Simple Save Strategy

The simplest save strategy is to save everything every night (or off-shift hours). You can use option 21 (Entire system) from the Save menu to do this. You can schedule option 21 to run without an operator (unattended) beginning at a certain time.

You can also use this method to save your entire system after you upgrade to a new release or apply program temporary fixes (PTFs).

You may find that you do not have enough time or enough tape unit capability to run option 21 without an operator. You can still employ a simple strategy:

Daily Save everything that changes often.

Weekly Save the things that do not change often.

Table 5-3 on page 5-51 shows how the system can be viewed by what changes often and what does not. Option 23 (All user data) on the Save menu saves the things that change regularly. Option 23 can be scheduled to run unattended. To run unattended, you must have enough online backup media capacity.

If your system has a long period of inactivity on the weekend, your save strategy might look like this:

Friday night	Save menu option 21
Monday night	Save menu option 23
Tuesday night	Save menu option 23
Wednesday night	Save menu option 23
Thursday night	Save menu option 23
Friday night	Save menu option 21

Medium Save Strategy

You may find you do not have a long enough save window to use a simple save strategy. Perhaps you run large batch jobs on your system at night. Or, you have very large files that take a long time to save. If this is the case, you may need to develop a medium save strategy, which means the complexity for saving and for recovery is medium.

When developing a medium save strategy, apply this principle: the more often it changes, the more often you should save it. You just need to be more detailed in evaluating how often things change than when you use a simple strategy.

Several techniques are available to use in a medium save strategy. You may use one of them or a combination.

- Saving changed objects
- Journaling database files and saving the journal receivers
- Saving groups of libraries, folders, or directories

Saving Changed Objects: You can use several commands to save only information that has changed since the last save operation or since a particular date and time.

You can use the Save Changed Objects (SAVCHGOBJ) command to save only those objects that have changed since a library or group of libraries was last saved. This can be particularly useful in a situation where programs and data files are in the same library. Typically, data files change frequently and programs change infrequently. You can use the SAVCHGOBJ command to save only the files that change.

You can use the Save Document Library Object (SAVDLO) command to save only documents and folders that have changed. You can use the SAVDLO command for all user ASPs or for a specific user ASP.

You can use the Save (SAV) command to save objects in directories that have changed since a particular point.

You might also choose to save changed objects if your batch workload is heavier some nights. For example:

Day	Batch Workload	Save Operation
Friday night	Light	Save menu option 21
Monday night	Heavy	Save changes only[1]
Tuesday night	Light	Save menu option 23
Wednesday night	Heavy	Save changes only[1]
Thursday night	Heavy	Save changes only[1]
Friday night	Light	Save menu option 21

[1] Use a combination of the SAVCHGOBJ, SAVDLO, and SAV commands.

Journaling Database Files: If your save operations take too long because your files are large, saving changed objects may not help you. If you have a file member with 100 000 records and 1 record changes, the SAVCHGOBJ command saves the entire file member. In this situation, journaling your database files and saving journal receivers regularly may be a better solution, even though recovery is more complex.

When you journal a database file, the system writes a copy of every changed record to a journal receiver. When you save a journal receiver, you are saving only the changed records in the file, not the entire file.

If you journal your database files and have a batch workload that varies, your save strategy might look like this:

Day	Batch Work-load	Save Operation
Friday night	Light	Save menu option 21
Monday night	Heavy	Save journal receivers
Tuesday night	Light	Save menu option 23
Wednesday night	Heavy	Save journal receivers
Thursday night	Heavy	Save journal receivers
Friday night	Light	Save menu option 21

Notes:

1. To take advantage of the protection that journaling provides, you should detach and save journal receivers regularly. How often you save them depends on the number of journaled changes that occur. Saving journal receivers several times during the day may be appropriate for you. How you save journal receivers depends on whether they are in a separate library. You might use the Save Library (SAVLIB) command or the Save Object (SAVOBJ) command.
2. You must save a new member of a database file before you can apply journal entries to the file. If your applications regularly add new file members, you should consider using the SAVCHGOBJ strategy either by itself or in combination with journaling.

The chapter in the *Backup and Recovery*, SC41-5304 book called "Planning and Setting Up Journaling" provides more information about setting up and managing journaling.

Saving Groups of Libraries, Folders, or Directories: Many applications are set up with data files in different libraries from application programs. Data files change frequently. On most systems, application programs change infrequently. If your system is set up like this, you may want to save only the libraries with data files on a daily basis.

You can use option 1 (Change daily backup options) on the Set Up Backup (SETUPBCKUP) menu to create a list of libraries or folders to be backed up daily.

You can use option 1 (Run daily backup) from the Run Backup (RUNBCKUP) menu to save this list of libraries or folders. Or you can schedule a job to run daily backup using option 20 (Change backup schedule) on the SETUPBCKUP menu.

Your save strategy might look like this:

Friday night	RUNBCKUP menu option 11
Monday night	RUNBCKUP menu option 1
Tuesday night	RUNBCKUP menu option 1
Wednesday night	RUNBCKUP menu option 1
Thursday night	RUNBCKUP menu option 1
Friday night	RUNBCKUP menu option 11

Should You Use the Backup Menu or the Save Menu?: You can use options 21, 22, and 23 on the Save menu to ensure that you have saved everything on your system. Recovery using these save tapes is straight-forward. However, you must have a long enough save window to be able to save all user libraries (option 23) on a regular basis.

You can use the Backup menu if you want to save a list of libraries or changed objects only. It provides a simple method for doing a partial backup on a regular basis. If you use the Backup menu, you may be able to complete your daily save operations in less time with less media. However, recovery from the media created by using the Backup menu can be more complex.

Select either the Save menu or the Backup menu for your save strategy. Do not mix backup options from the two menus. If you use backup options from both menus, you may have incomplete save media and your recovery may be more difficult.

Check Your Strategy Often!:

If your situation requires a strategy of medium complexity, it also requires regular review:

- Are you saving everything occasionally?
- What do you need to do to recover?
- Are you using options like journaling or saving changed objects to help you recover? Do you know how to recover using those options?
- Have you added new applications? Are the new libraries, folders, and directories being saved?
- Are you saving the IBM-supplied libraries that contain user data (QGPL and QUSRSYS)?
- Have you tested your recovery?

Complex Save Strategy

A very short save window requires a complex strategy for saving and for recovery. You use the same tools and techniques described for a medium save strategy, but at a greater level of detail. For example, you may need to save specific critical files at specific times of the day or week.

Saving your system while it is active is often necessary in a complex save strategy. The save active (SAVACT) parameter is supported on these commands:

- Save Library (SAVLIB)
- Save Object (SAVOBJ)
- Save Changed Objects (SAVCHGOBJ)
- Save Document Library Object (SAVDLO)
- Save (SAV)

If you use save-while-active support, you can significantly reduce the amount of time that files are made unavailable. When the system has established a checkpoint for all objects being saved, the objects can be made available for use. Save-while-active support should be used in combination with journaling and commitment control to simplify the recovery procedure. Commitment control also improves save-while-active performance.

If you choose to use save-while-active support, make sure you understand the process and monitor how well checkpoints are being established on your system. The part of the *Backup and Recovery*, SC41-5304 book called "Save-While-Active Function" describes using save-while-active support. The *AS/400 System Availability and Recovery for V2R2* book, GG24-3912, describes recovering when save-while-active support is used for the save procedures.

Check Your Strategy Often!:

If your situation requires a complex strategy, it also requires regular review:

- Are you saving everything occasionally?
- What do you need to do to recover?
- Are you using options like journaling or saving changed objects to help you recover?
- Have you added new applications? Are the new libraries, folders, and directories being saved?
- Are you saving the IBM-supplied libraries that contain user data (QGPL and QUSRSYS)?
- Are you getting good checkpoints if you use the save-while-active function?
- Have you tested your recovery?

If your system is so critical to your business that you do not have a manageable save window, you probably cannot afford an unscheduled outage either. You should seriously evaluate all the availability options of the AS/400 system, including dual systems.

Obtaining Further Information

For additional information on backing up and recovering your AS/400, refer to the *Backup and Recovery*, SC41-5304 book.

Automatic System Management Functions

This topic discusses some of the automatic system management functions you can use to improve your system performance.

Performance Tuning

Performance tuning is a way to either manually or automatically adjust the performance of the system. There are many options for tuning your system. The concepts presented here give you some general guidelines, not all the answers. Each system environment is unique, requiring you to observe performance and make adjustments that are best for your environment.

You can make performance adjustments to your system in two ways:

- Set up the system to make performance adjustments automatically. This is the approach that most users should take.
- Make the performance adjustments manually.

Automatic System Tuning

The system can set performance values automatically to provide efficient use of system resources. You can set up the system to tune system performance automatically by:

- Adjusting storage pool sizes and activity levels
- Adjusting storage pool paging

Setting Up the System to Adjust Storage Pools and Activity Levels:

Use the QPFRADJ system value to control automatic tuning by adjusting storage pools and activity levels. Two forms of automatic performance adjustments use storage pools and activity levels:

- Initial program load (IPL) adjustments
- Dynamic adjustments

You can set up the system to adjust performance at IPL, dynamically, or both.

- To set up the system to only tune at the initial program load (IPL), set system value QPFRADJ to 1.

  Each time you do an IPL, the system examines the machine configuration information and makes performance adjustments to achieve efficient use of system resources. No further performance adjustments occur until you do an IPL to the system again, select dynamic performance adjustments, or issue CL commands that change the performance values.

- To set up the system to make performance adjustments at IPL and to make performance adjustments dynamically, set system value QPFRADJ to 2.

When the system is started and periodically thereafter, the system examines the machine configuration, the jobs running on the system, storage requirements, and so on, and makes performance adjustments. Performance values settings change periodically to improve resource use on the system.

- To set up the system to make performance adjustments dynamically and **not** tune during an IPL, set the system value QPFRADJ to 3.

  The performance values are not reset at IPL to the initial values.

If performance tuning is new to you, you should set up the system to adjust at IPL and dynamically.

Performance Tuning Tips: If you make any adjustments to the pool size or activity level values, you should consider setting QPFRADJ to 0. Otherwise, the values may be reset.

Performance Adjustment at Initial Program Load: When you perform an IPL, the system examines the machine configuration and the controlling subsystem value (QCTLSBSD). If QPFRADJ is set to 1 or 2, the system uses the configuration information to set the initial pool sizes and activity levels. If the controlling subsystem is QBASE or QCTL, the system sets up separate pools for spool and interactive jobs.

The IPL performance adjustments result in changes to the following values:

- Machine pool size (QMCHPOOL system value)
- Base pool activity level (QBASACTLVL system value) if the controlling subsystem is QSYS/QBASE, QSYS/QCTL, QGPL/QBASE, or QGPL/QCTL
- Pool number 2 in subsystem QGPL/QSPL to use shared pool *SPOOL
- Pool size and activity level for shared pool *SPOOL
- Pool number 2 in subsystems QSYS/QBASE and QGPL/QBASE to using shared pool *INTERACT if controlling subsystem is QSYS/QBASE, QSYS/QCTL, QGPL/QBASE, or QGPL/QCTL
- Pool number 2 in subsystems QSYS/QINTER and QGPL/QINTER to using shared pool *INTERACT if controlling subsystem is QSYS/QBASE, QSYS/QCTL, QGPL/QBASE, or QGPL/QCTL
- Pool size and activity level for shared pool *INTERACT

Note: At the first IPL after the 2617 Ethernet or 2619 token-ring card is added, dynamic tuning does not adjust machine pool storage for the Ethernet or token-ring networks. Machine pool storage is adjusted at the second IPL to consider these cards.

Dynamic Performance Adjustment: The dynamic tuning support provided by the system automatically adjusts pool sizes and activity levels for shared pools to improve the performance of the system. This tuning works by moving storage from underused storage pools to pools that would benefit from more storage. This tuning also sets activity levels to balance the number of jobs in the pool with the storage allocated for the pool. To adjust the system, the tuner uses a guideline that is calculated based on the number of jobs.

Dynamic tuning changes the following performance values:

- *MACHINE pool size (QMCHPOOL system value)

- *BASE pool activity level (QBASACTLVL system value)
- Pool size and activity level for shared pool *INTERACT
- Pool size and activity level for shared pool *SPOOL
- Pool sizes and activity levels for shared pools *SHRPOOL1-10

Setting Up the System to Adjust Storage Pool Paging (Expert Cache): To control automatic performance tuning by adjusting storage pool paging, you can:

- Use the Change Shared Pool (CHGSHRPOOL) command (see "Using the CHGSHRPOOL Command to Adjust Storage Pool Paging.")
- Use the Change Pool Attributes (QUSCHGPA) API (see the *System API Reference*, SC41-5801.)
- Use the Change Pool Tuning Information (QWCCHGTN) API (see the *System API Reference*, SC41-5801.)

Using the CHGSHRPOOL Command to Adjust Storage Pool Paging: The paging parameter has two settings for shared storage pools: fixed paging (*FIXED) and dynamic paging (*CALC). If performance tuning is new to you, you should set this attribute to *CALC.

FIXED:* The system limits the amount of memory used by jobs that are running in the storage pool. The system transfers data from auxiliary storage and frequently writes changed data back to auxiliary storage. **Auxiliary storage is all addressable disk storage. **Main storage** is all addressable storage where programs are run.

**CALC:* The system automatically determines the best approach for handling data in the storage pool.

- If many jobs are running in a small storage pool, the system limits the amount of memory used by each job.
- If the storage pool for those jobs has enough memory, the system determines (object by object) how much data to bring into the storage pool.
- If objects are referred to sequentially, the system brings larger blocks of data into memory and delays writing changes of the data. This reduces the number of I/O operations issued by the job and reduces the contention for disk drives, which, in turn, reduces the time that jobs wait on I/O requests.
- If objects are referred to randomly, the system does not bring in large blocks of data because that does not reduce the number of I/O operations.

If you tune using *CALC and the system ends abnormally, the recovery time could be longer than the recovery time would be with fixed paging.

See also:

- *DB2 for AS/400 Database Programming*, SC41-5701
- QWCCHGTN API in the *System API Reference*, SC41-5801
- QUSCHGPA API in the *System API Reference*, SC41-5801

Notices

This information was developed for products and services offered in the U.S.A. IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
500 Columbus Avenue
Thornwood, NY 10594
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

IBM World Trade Asia Corporation
Licensing
2-31 Roppongi 3-chome, Minato-ku
Tokyo 106, Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
Software Interoperability Coordinator
3605 Highway 52 N
Rochester, MN 55901-7829
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this information and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement or any equivalent agreement between us.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrates programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. You may copy, modify, and distribute these sample programs in any form without payment to IBM for the purposes of developing, using, marketing, or distributing application programs conforming to IBM's application programming interfaces.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

Programming Interface Information

This publication documents General-Use Programming Interface and Associated Guidance Information provided by the OS/400 program.

General-Use programming interfaces allow the customer to write programs that obtain the services of the OS/400 program.

Trademarks

The following terms are trademarks of International Business Machines Corporation in the United States, or other countries, or both:

Advanced 36
AS/400
Client Access
DB2
IBM
Information Assistant
Magstar
OfficeVision/400
Operating System/400
Operational Assistant
OS/400
PowerPC
PSF
RPG/400
System/36
System/390
SystemView
400
800-IBM-CALL

C-bus is a trademark of Corollary, Inc.

Microsoft, Windows, Windows NT, and the Windows 95 logo are registered trademarks of Microsoft Corporation.

Java and HotJava are trademarks of Sun Microsystems, Inc.

UNIX is a registered trademark in the United States and other countries licensed exclusively through X/Open Company Limited.

PC Direct is a registered trademark of Ziff Communications Company and is used by IBM Corporation under license.

Other company, product, and service names may be trademarks or service marks of others.

Bibliography

You may need to refer to other IBM manuals for more specific information about a particular topic. The following IBM AS/400 manuals contain information that you may need.

For information about planning, installation, and migration:

- *Local Device Configuration*, SC41-5121, provides information about how to do an initial configuration and how to change that configuration. It also contains conceptual information about device configuration.
- *Software Installation*, SC41-5120, provides step-by-step procedures for initial install, installing licensed programs, program temporary fixes (PTFs), and secondary languages from IBM.
- *ASCII Work Station Reference*, SA41-3130, provides information on how to use ASCII work stations attached to the AS/400 system. It describes how to adjust the settings of ASCII work stations and provides information on keyboard mappings and character code mappings.

  This manual also describes the process of ASCII device setup and provides examples about ASCII device setting adjustments. It also contains information on special considerations for personal computer setting adjustments, and auxiliary printer setting adjustments.

For information about system use:

- *System Operation for New Users*, SC41-3200, provides beginner information about how to sign on and off; send and receive messages; and respond to keyboard error messages. It also contains information on how to use function keys; use display, command, and help information; and control and manage jobs.
- *System Operation*, SC41-4203, provides information about handling messages, working with jobs and printer output, devices communications, working with support functions, cleaning up your system, and so on.
- *Managing OfficeVision/400*, SH21-0699, provides information on how to manage the day-to-day activities of OfficeVision. It also includes information on maintaining office enrollment and creating and managing office objects.
- *Q & A Database Coordinator's Guide*, SC41-8088, describes how to use Question-and-Answer (Q & A) to search through questions and answers stored in a Q & A database on the system. This manual also includes information about creating a Q & A database.

For information about system management:

- *Security - Basic*, SC41-5301, explains why security is necessary, defines major concepts, and provides information on planning, implementing, and monitoring basic security on the AS/400 system.
- *Backup and Recovery*, SC41-5304, contains information about planning a backup and recovery strategy. Other topics include different types of media available to save and restore system data, save and restore procedures, and disk recovery procedures. It also describes how to install the system again from backup, how to plan for and set up user auxiliary storage pools (ASPs), mirrored protection, and checksums, along with other availability recovery topics. It also provides information about journaling and save-while-active.
- *Work Management*, SC41-5306, provides information about how to create and change a work management environment. Other topics include a description of tuning the system, collecting performance data, working with system values, and gathering data to determine who is using the system and what resources are being used.
- *System Manager Use*, SC41-5321, provides information about the commands and functions available when the SystemView System Manager/400 licensed program is installed on one or more AS/400 systems in a network. This manual also provides setup procedures and information for maintaining a network of AS/400 systems.

For more information about communications and connectivity:

- *SNA Distribution Services*, SC41-5410, provides information about administering data communications applications on the AS/400 system.
- *Communications Management*, SC41-5406, provides information on how to start, stop, verify, and test communications, handle communications errors, and work with communications status.
- *Communications Configuration*, SC41-5401, provides information on how to configure the communications functions available with the OS/400 licensed program, including detailed descriptions of network interface, line, controller, device, mode, and class-of-service descriptions; configuration lists; and connection lists.

For information about program enablers:

- *Printer Device Programming*, SC41-5713, provides information on printing elements and concepts of the AS/400 system, printer file and print spooling support for printing operation, and printer connectivity.
- *System/36 Environment Programming*, SC41-4730, provides information identifying the differences in the applications process in the System/36 environment on the AS/400 system. It helps the user understand the functional and operational differences (from a System/36 perspective) when processing in the System/36 environment on the AS/400 system. This includes an environment functional overview, considerations for migration, programming, communications, security, and coexistence.
- *System/36 Environment Reference*, SC41-4731, provides information about using System/36 procedure control expressions, procedures, operation control language (OCL) statements, control commands, and utilities on the AS/400 system.

For information about program interfaces:

- *System API Reference*, SC41-5801, provides information on how to create, use, and delete objects that help manage system performance, use spooling efficiently, and maintain database files efficiently. This manual also includes information on creating and maintaining the programs for system objects and retrieving OS/400 information by working with objects, database files, jobs, and spooling.

Index

Special Characters

(WRKPRB) Work with Problem command 3-5

Numerics

1/2-inch tape cartridge
  cleaning 2-56
  storing data 2-57
  using 2-56
  volume statistics 2-65
1/2-inch tape reel
  loading 2-59
  storing data 2-59
  using 2-57
  volume statistics 2-65
1/2-inch tape reel unit
  cleaning 2-60
  when to clean 2-60
1/2-inch tape unit
  addressing 2-55
  automatic cartridge loader operation 2-53
  backing up data 2-55
  cleaning 2-55
  models 2-53
  restoring data 2-55
  using 2-53
1/4-inch mini tape cartridge
  environment ranges 2-46
  guidelines for using 2-39
  loading 2-40
  operating 2-46
  shipping 2-46
  storing 2-46
  storing data 2-45
  unloading 2-41
  using 2-38
1/4-inch mini tape unit
  cleaning 2-38
  using 2-38
1/4-inch tape cartridge
  environment ranges 2-46
  error 2-39
  guidelines for using 2-39
  illustration 2-39
  loading 2-40
  operating 2-46
  shipping 2-46
  storing 2-46
  storing data 2-45
  unloading 2-41
  using 2-38
1/4-inch tape cartridge *(continued)*
  volume statistics 2-65
1/4-inch tape unit
  cleaning 2-38
  using 2-38
3270 device emulation
  starting 1-11
3480, 3490, 3490E, 3590 tape unit
  sharing systems with 2-54
3570 tape unit
  cleaning 2-56
3590 tape unit
  cleaning 2-56
8-mm tape cartridge
  erasing 2-53
  loading 2-52
  storing tape 2-52
  unloading 2-52
  volume statistics 2-65
8-mm tape unit
  cleaning 2-47
    attention notice 2-47
  tape cartridge to use 2-50
  using 2-47, 2-50

A

A storage area
  changing 5-28
  description 5-27
  displaying 5-28
access path
  definition 2-25
  editing during attended IPL 2-24
activity level
  using to tune system automatically 5-57
adding
  local controllers and devices
    dynamically 4-1
adding user 1-14
address
  printing local device 1-2
address display
  SPCN 2-9
addressing
  1/2-inch tape unit 2-55
adjusting performance
  initial program load (IPL) 5-58
adjustment
  CHGSHRPOOL command 5-59
  expert cache 5-59
  storage pool paging 5-59

advanced assistance level 1-2
advanced PTF topics 5-34
alternative console, determining 3-25
Analyze Problem (ANZPRB) command 3-5, 3-8, 5-14
analyzing
  new problem 3-8
analyzing problems 1-8
ANZPRB (Analyze Problem) 3-8
ANZPRB (Analyze Problem) command 3-5
application program
  PTF 5-36
Apply Program Temporary Fix (APYPTF)
 command 5-36
applying
  delayed program temporary fix (PTF) 5-36
  immediate program temporary fixes (PTFs)
    method 5-36
    permanently without an IPL 5-39
    temporarily without an IPL 5-39
  Licensed Internal Code fixes
    at the next unattended IPL 5-40
    immediately 5-40
  program temporary fix (PTF)
    permanently during an attended IPL 5-38
    permanently during an unattended IPL 5-37
    remote system 5-44
    temporarily during an attended IPL 5-38
    temporarily versus permanently 5-36
APYPTF (Apply Program Temporary Fix)
 command 5-36
AS/400 system 2-11
  See also system
assistance level
  advanced 1-2
  basic 1-2
  changing 1-2
  intermediate 1-2
attachable device
  list 2-1
attended initial program load (IPL)
  applying PTFs permanently during 5-38
  applying PTFs temporarily during 5-38
  definition 2-12
  doing when power is off 2-18
  doing when the power is on 2-18
  editing access paths during 2-24
  editing check pending constraints during 2-26
attention light 3-16
attention notice
  cleaning
    8-mm tape unit 2-47
  Initialize Tape (INZTAP) command 2-61
  power pushbutton 2-35
  powering down the system 2-32
  removing tape cartridge from tape unit 2-41
  tape cartridge cleaning 2-56
attention notice *(continued)*
  Work with Device Description (WRKDEVD)
   command 2-54
  WRKDEVD (Work with Device Description)
   command 2-54
authority 4-12
auto mode (system unit) 2-6, 2-8
automated remote service 3-14
automatic cartridge loader operation
  1/2-inch tape unit 2-53
automatic configuration 4-1
  local controllers 4-1
  local devices 4-1
  Set Major System Options display 4-1
  tape controllers 4-1
  using 4-1
automatic IPL after power is restored (QPWRRSTIPL)
 system value 2-23
automatic power 1-11
automatic power schedule
  solving problems 2-16
automatic system tuning 5-57
  adjustments to storage pools and activity
   levels 5-57
  dynamic performance adjustments 5-58
  performance adjustment at IPL 5-58
  storage pool paging 5-59
auxiliary storage
  definition 5-59

B

B storage area
  changing 5-28
  description 5-27
  displaying 5-28
backing up
  data
    Magstar MP tape unit 2-55
    using 1/2-inch tape unit 2-55
basic assistance level 1-2
basic tasks
  fast path 1-1
batch job
  changing priority 1-3
  scheduling 1-3
  submitting 1-4
Battery
  replacing 3-47
battery power unit 2-10
break message
  sending 1-6
bypassing
  system password 2-29

C

calling
  hardware service representative 3-7
  IBM business partner 3-7
  marketing representative 3-7
  software service representative 3-7
cartridge
  loader operation
    1/2-inch tape unit 2-53
cartridge, tape 2-56
  See also tape cartridge
CD-ROM
  installing cumulative PTF packages from 5-25
  loading and unloading 2-67
  using 2-67
Change power on/off defaults option
  Power On and Off Tasks menu 2-14
changing
  active batch job 1-3
  assistance level 1-2
  batch job 1-3
  batch job priority 1-3
  clean up 1-7
  configuration description 4-4, 4-8
  configuration during IPL 2-21
  device
    name 1-2
    printer 1-5
  IBM-supplied passwords 1-14
  job
    description 1-3
    logging level 1-3
  message
    notification 1-5
    queue 1-5
  network attribute
    during IPL 2-21
  password 1-14
  power on and off schedule 1-10
    defaults 2-14
    entries 2-15
    individual days 2-15
  printer 1-12
    characteristics 1-12
    file 1-12
    message queue 1-5
  printer output characteristics 1-12
  priority 1-3
    spooled file 1-13
  spooled file priority 1-13
  storage area for IPL source 5-28
  support contact information 1-6
  system
    date 1-6
    time 1-6
    values 1-6
changing *(continued)*
  system attribute
    during IPL 2-21
  system IPL
    from control panel 2-17
  system password 2-28
  system value
    during IPL 2-21
    method 2-21
  user profile 1-14
    during IPL 2-21
check pending constraint
  editing during attended IPL 2-26
Check Product Option (CHKPRDOPT) command 3-1
Check Tape (CHKTAP) command 2-42
checking
  licensed program installation 3-1
  product installation 3-1
  tape cartridge 2-42
checking status
  device 1-2
  printer output 1-13
CHKPRDOPT (Check Product Option) command 3-1
CHKTAP (Check Tape) command 2-42
cleaning
  1/2-inch tape cartridge 2-56
  8-mm tape unit
    attention notice 2-47
  tape cartridge
    attention notice 2-56
  tape unit
    1/2-inch 2-55, 2-60
    1/4-inch mini 2-38
    3570 2-56
    3590 2-56
    8-mm 2-47
cleanup
  system 1-7
client-server series 2-2
code
  list of system reference (SRC) 3-16
collecting
  disk space information 1-7
  system reference codes (SRCs) 3-5
command, CL
  Analyze Problem (ANZPRB) 3-5
  ANZPRB (Analyze Problem) 3-5, 3-8, 5-14
  Apply Program Temporary Fix (APYPTF) 5-36
  APYPTF (Apply Program Temporary Fix) 5-36
  Check Product Option (CHKPRDOPT) 3-1
  Check Tape (CHKTAP) 2-42
  CHKPRDOPT (Check Product Option) 3-1
  CHKTAP (Check Tape) 2-42
  Copy File (CPYF) Command 5-21
  Copy Program Temporary Fix (CPYPTF) 5-45
  CPYF (Copy File) command 5-21

command, CL *(continued)*
CPYPTF (Copy Program Temporary Fix) 5-45
Delete PTF (DLTPTF) 5-43
Display Program Temporary Fix (DSPPTF) 5-16, 5-31
DLTPTF (Delete PTF) 5-43
DSPPTF (Display Program Temporary Fix) 5-16, 5-31
Duplicate Tape (DUPTAP) 2-63
DUPTAP (Duplicate Tape) 2-63
GO LICPGM 5-30
GO PTF 5-29
Load Program Temporary Fix (LODPTF) 5-35
LODPTF (Load Program Temporary Fix) 5-35
Power Down System (PWRDWNSYS) 2-8
PWRDWNSYS (Power Down System) 2-8
Remove Program Temporary Fix (RMVPTF) 5-36, 5-41
RMVPTF (Remove Program Temporary Fix) 5-36, 5-41
Send Program Temporary Fix Order (SNDPTFORD) 5-14, 5-22
SNDPTFORD (Send Program Temporary Fix Order) 5-14, 5-22
Start System Service Tools (STRSST) 2-63
STRSST (Start System Service Tools) 2-63
Work with Device Description (WRKDEVD) 2-54
Work with Subsystem Descriptions (WRKSBSD) 2-31
WRKDEVD (Work with Device Description) 2-54
WRKPRB (Work with Problem) 3-5, 3-8, 5-14
WRKSBSD (Work with Subsystem Descriptions) 2-31
communication problem 3-20
communications
configuring 1-11
using 1-11
complex save strategy 5-56
configuration 4-1, 4-4
See also automatic configuration
automatic
using 4-1
changing during IPL 2-21
communications 1-11
disk unit 4-13
enabling during IPL 2-20
manual 4-4
menus 4-4
retrieving configuration source 4-12
status 1-2
configuration commands 4-13
See also Communications Configuration
configuration description
authority 4-12
changing 4-8
copying 4-9
configuration description *(continued)*
creating 4-8
displaying 4-10
printing 4-10
renaming 4-10
retrieving source 4-12
configuration menu 4-4
configuration source
retrieving 4-12
configuration status
working with
example 4-11
configuration task
changing 4-4, 4-8
configuration descriptions 4-4, 4-8
authorizing 4-12
copying 4-9
creating 4-8
deleting 4-9
displaying 4-10
printing 4-10
renaming 4-10
printing device addresses 4-12
retrieving configuration source 4-12
using "Work with..." configuration displays 4-2, 4-5
working with configuration status 4-11
configuring
disk units
using Dedicated Service Tools (DST) 4-13
menu 4-4
options
configuration menus 4-4
console, primary and alternative 3-25
constraint
definition 2-26
contact information 1-6
contextual help 1-4
control panel
changing
system IPL 2-17
illustration
System Model 4xx 2-2
System Model 5xx 2-2
status forms 3-40
system expansion tower 2-8
system unit 2-2
controlling
initial program load (IPL) 4-14
Copy File (CPYF) command
printing Information APAR 5-21
Copy Program Temporary Fix (CPYPTF) command 5-45
copying
configuration descriptions 4-9
programming temporary fix (PTF) cover letters
from magnetic tape 5-15

copying *(continued)*
tape 2-63
corequisite
PTF 5-37
correcting common tape unit errors
procedure 2-37
corrective service
definition 5-13
cover letter, PTF
copying
from CD-ROM 5-15
from magnetic tape 5-15
CPYF (Copy File) command
printing Information APAR 5-21
CPYPTF (Copy Program Temporary Fix)
command 5-45
creating
configuration descriptions 4-8
problem record 3-4
creating a user profile 1-14
cross-reference summary list (PTF)
receiving
ordering 5-22
cumulative PTF package
content 5-13
definition 5-13
displaying level 5-26
installing 5-25
installing high-impact pervasive (HIPER) PTFs 5-25
loading PTFs from 5-35
omitting PTFs in
before the next IPL 5-43
ordering 5-13, 5-14, 5-22
preventive service planning (PSP) information 5-23
receiving 5-13
current storage area
A (permanent) 5-28
B (temporary) 5-28
permanent 5-28

D

data
backing up
1/2-inch tape unit 2-55
Magstar MP tape unit 2-55
restoring
1/2-inch tape unit 2-55
Magstar MP tape unit 2-55
storing
1/2-inch tape cartridge 2-57
1/4-inch mini tape cartridge 2-45
1/4-inch tape cartridge 2-45
Magstar MP tape cartridge 2-57
date
changing system 1-6
dedicated service tools (DST)
configuring disk units 4-13
to enter password 2-29
default IPL options 2-20
defining
system during IPL 2-21
definition
access path 2-25
attended IPL 2-12
constraint 2-26
corrective service 5-13
cumulative PTF package 5-13
IPL threshold 2-25
journal 2-25
preventive service 5-13
program temporary fix (PTF)
delayed 5-36
immediate 5-36
permanently applied 5-36
temporarily applied 5-36
subsystem 2-31
system value 2-21
unattended IPL 2-12
delayed program temporary fix (PTF)
definition 5-36
Delete PTF (DLTPTF) command 5-43
deleting
See also removing
configuration descriptions 4-9
Delete Program Temporary Fix (DLTPTF) 5-43
deleting 4-9
DLTPTF (Delete Program Temporary Fix) 5-43
program temporary fix (PTF)
immediate 5-41
save file 1-7
user profile 1-14
device
attachable 2-1
checking status 1-2
emulation, starting 3270 1-11
making available 1-2
name, changing 1-2
naming at IPL time 2-20
printer, changing 1-5
printing local addresses 1-2
varying on 1-2
device address 4-12
directory entries
working with 1-11
disk
IPL from 2-19
disk drive
definition 4-13
disk problem 3-20
disk space
collecting information 1-7

disk space *(continued)*
printing report 1-7
disk unit
configuring 4-13
definition 4-13
diskette
displaying contents 1-12
ready condition 2-66
diskette problem 3-20
display
"Work with..." 4-2, 4-4, 4-5
address (SPCN) fault 2-9
display device
handling problem 3-1
Display power on and off schedule option
Power On and Off Tasks menu 2-14
Display Program Temporary Fix (DSPPTF) command
displaying PTF cover letters 5-16
finding PTF status 5-31
display station function 4-7
displaying
configuration descriptions 4-10
cumulative PTF package level 5-26
diskette contents 1-12
power on and off schedule 2-14
program temporary fix (PTF)
cover letter 5-16
status 5-31
status
PTF 5-31
subsystem description 2-32
system status 1-7
tape contents 1-12
your configuration 4-10
distributing
program temporary fix (PTF)
remote system 5-43
tailored package 5-45
DLTPTF (Delete PTF) command 5-43
document
restoring 1-9
saving 1-9
document library object
restoring 1-9
DSPPTF (Display Program Temporary Fix)
command 5-16, 5-31
DST (dedicated service tools)
configuring disk units 4-13
to enter password 2-29
dump
main storage 3-23
automatic 3-22
introduction 3-22
manual 3-22
Duplicate Tape (DUPTAP) command 2-63
duplicating 2-63
See also copying
DUPTAP (Duplicate Tape) command 2-63
dynamic performance adjustments 5-57, 5-58
IPL (initial program load) 5-58
storage pool paging 5-59
dynamic storage pool paging 5-59

E

editing
access paths
during attended IPL 2-24
check pending constraint
during attended IPL 2-26
emulation
starting 3270 device 1-11
starting printer 1-11
Enter pushbutton (system unit) 2-6
erasing
8-mm tape cartridge 2-53
error
tape cartridge
1/4-inch 2-39
tape unit 2-37
expansion control panel
illustration 2-8
expert cache 5-59

F

failure, power
setting automatic power on 1-11
fast path
basic tasks 1-1
fault display
SPCN 2-9
file
save
deleting 1-7
working with 1-7
spooled
changing priority 1-13
sending 1-13
working with network 1-12
finding
information about the AS/400 system 1-4
status of PTF orders 5-24
folder
restoring 1-9
saving 1-9
form
control panel status
Model 150 3-40
System Model 150 3-41
System Model 170 3-43
System Model 4xx 3-44

form *(continued)*
control panel status *(continued)*
System Model 5xx 3-45
System Model 600 3-41
System Model 620 3-41, 3-42
System Model 64x 3-46
System Model 65x 3-46
System Model S20 3-41, 3-42
problem summary 3-27
function/data display 2-6

G

getting 5-14
See also receiving
help with problems 3-6
preventive service planning (PSP) information 5-22
grace period
70 day 2-11
guidelines
performance tuning 5-57
using 1/4-inch mini tape cartridges 2-39
using 1/4-inch tape cartridges 2-39

H

handling
messages 1-5
problem
procedures 3-15
summary form 3-27
table 3-15
system problem 3-1
hang, system 3-20
hardware service representative
calling 3-7
help
getting 3-6
using 1-4
helping
users
sign on 1-14
users sign on 1-14
high-impact pervasive (HIPER) PTFs
installing 5-25
HIPER (high-impact pervasive) PTFs
installing 5-25
humidity
mini tape cartridge effect 2-46
tape cartridge effect 2-46

I

IBM business partner
calling 3-7
IBM-supplied password
changing 1-14
identifying
PTF ordered through service support 5-24
immediate (program temporary fix) PTF
applying permanently
without an IPL 5-39
applying temporarily
without an IPL 5-39
definition 5-36
Increment/Decrement buttons 2-6
information
finding about the system 1-4
saving 1-9, 1-10
Information APAR
printing 5-21
Information Assistant options using 1-4
InfoSeeker option using 1-4
initial program load (IPL)
applying immediate PTFs permanently without 5-39
applying immediate PTFs temporarily without 5-39
applying Licensed Internal Code fixes at the next unattended 5-40
attended
applying PTFs temporarily 5-38
definition 2-12
editing access paths during 2-24
editing check pending constraints during 2-26
mode 2-18
changing
configuration 2-21
from system control panel 2-17
mode 2-17
network attribute 2-21
options during 2-19
system attribute 2-21
system during 2-21
system value 2-21
user profile 2-21
controlling 4-14
defining system during 2-21
license key 2-11
omitting PTFs in a cumulative package before the next 5-43
option
default special environment 2-20
device configuration naming 2-20
display 2-18
enable automatic configuration 2-20
viewing 2-19
overview 2-29
performance adjustment 5-58
remote 2-17
setting
date and time 2-19
major system options 2-20
option 2-19

initial program load (IPL) *(continued)*
source
A storage area 5-28
B storage area 5-28
changing 5-28
displaying 5-28
storage area
A (permanent) 5-27
B (temporary) 5-27
system reference codes (SRCs) displayed during 2-29
system value
automatic IPL after power is restored (QPWRRSTIPL) 2-23
controlling 2-22
IPL date and time (QIPLDATTIM) 2-22
IPL status (QIPLSTS) 2-23
IPL type (QIPLTYPE) 2-23
QIPLDATTIM (IPL date and time) 2-22
QIPLSTS (IPL status) 2-23
QIPLTYPE (IPL type) 2-23
QPWRRSTIPL (automatic IPL after power is restored) 2-23
QRMTIPL (remote IPL) 2-23
QUPSDLYTIM (uninterruptible power supply delay time) 2-24
QUPSMSGQ (uninterruptible power supply) 2-24
remote IPL (QRMTIPL) 2-23
uninterruptible power supply (QUPSMSGQ) 2-24
uninterruptible power supply delay time (QUPSDLYTIM) 2-24
threshold 2-25
unattended
applying PTFs permanently 5-37
definition 2-12
Initialize Tape (INZTAP) command 2-61
attention notice 2-61
parameters 2-61
initializing
See also ?
system 2-11
tape 2-61
initializing tapes 1-12
input description 2-1
installation
checking
licensed program 3-1
product 3-1
verifying
PTF package 5-25
installing
high-impact pervasive (HIPER) PTF
from a cumulative PTF package 5-25
program temporary fix (PTF)
cumulative package 5-25
Licensed Internal Code 5-28
licensed program 5-30
installing *(continued)*
program temporary fix (PTF) *(continued)*
OS/400 5-30
solving problems 5-31
verifying 5-30
PTFs 5-24
interactive job 1-4
intermediate assistance level 1-2
intermittent problem 3-21
interrupting
user with a message 1-6
INZTAP (Initialize Tape) command 2-61
attention notice 2-61
parameters 2-61
IPL (initial program load) 2-14
applying immediate PTFs permanently without 5-39
applying immediate PTFs temporarily without 5-39
applying Licensed Internal Code fixes at the next unattended 5-40
attended
applying PTFs permanently 5-38
applying PTFs temporarily 5-38
definition 2-12
editing access paths during 2-24
editing check pending constraints during 2-26
mode 2-18
changing
configuration 2-21
from system control panel 2-17
mode 2-17
network attribute 2-21
options during 2-19
system attribute 2-21
system during 2-21
system value 2-21
user profile 2-21
controlling 4-14
defining system during 2-21
displaying
system value during 2-21
omitting PTFs in a cumulative package before the next 5-43
option
default special environment 2-20
device configuration naming 2-20
display 2-18
enable automatic configuration 2-20
viewing 2-19
overview 2-29
performance adjustment 5-58
remote 2-17
setting
date and time 2-19
major system options 2-20
option 2-19
source
A storage area 5-28

IPL (initial program load) *(continued)*
source *(continued)*
B storage area 5-28
changing 5-28
displaying 5-28
storage area
A (permanent) 5-27
B (temporary) 5-27
system reference codes (SRCs) displayed during 2-29
system value
automatic IPL after power is restored (QPWRRSTIPL) 2-23
controlling 2-22
IPL date and time (QIPLDATTIM) 2-22
IPL status (QIPLSTS) 2-23
IPL type (QIPLTYPE) 2-23
QIPLDATTIM (IPL date and time) 2-22
QIPLSTS (IPL status) 2-23
QIPLTYPE (IPL type) 2-23
QPWRRSTIPL (automatic IPL after power is restored) 2-23
QRMTIPL (remote IPL) 2-23
QUPSDLYTIM (uninterruptible power supply delay time) 2-24
QUPSMSGQ (uninterruptible power supply) 2-24
remote IPL (QRMTIPL) 2-23
uninterruptible power supply (QUPSMSGQ) 2-24
uninterruptible power supply delay time (QUPSDLYTIM) 2-24
threshold 2-25
unattended
applying PTFs permanently 5-37
definition 2-12
IPL date and time (QIPLDATTIM) system value 2-22
IPL or Install the System display
perform an IPL option 2-19
IPL start-up program
changing 4-14
IPL status (QIPLSTS) system value 2-23
IPL type (QIPLTYPE) system value 2-23

J

job
batch 1-3
changing log level 1-3
interactive 1-4
priority 1-3
scheduling batch 1-3
job description
changing 1-3
job log
getting into one output queue 4-16
stopping creation of 4-16
job queue
changing priority of batch jobs on 1-3
releasing
after stopping the system 2-33
working with 1-3, 1-4
journal
definition 2-25

K

key
license 2-11
keyboard function 4-7

L

level
displaying cumulative PTF package 5-26
library
restoring 1-9
saving 1-9
license key
initial program load (IPL) 2-11
Licensed Internal Code fix
applying
immediately 5-40
next unattended IPL 5-40
installing 5-28
removing 5-42
licensed program
checking installation 3-1
PTFs
installing 5-30
removing 5-41
list
cross-reference summary for PTFs
ordering 5-22
receiving 5-22
system reference code (SRC) 3-16
Load Program Temporary Fix (LODPTF) command 5-35
loading
1/2-inch tape reel 2-59
1/4-inch mini tape cartridge 2-40
1/4-inch tape cartridge 2-40
8-mm tape cartridge 2-52
program temporary fix (PTF)
from a cumulative PTF package 5-35
method 5-35
over another PTF 5-35
remote system 5-44
local devices
printing addresses 1-2
LODPTF (Load Program Temporary Fix) command 5-35

logging level 1-3
loop, system 3-20

M

magnetic tape
  copying PTF cover letters from 5-15
Magstar MP tape cartridge
  storing data 2-57
  tape
    volume statistics 2-65
Magstar MP tape unit
  backing up data 2-55
  restoring data 2-55
main storage
  definition 5-59
main storage dump 3-22
  purge 3-25
  system storage 3-22
  to diskette 3-23
  to tape 3-25
main storage dump (MSD)
  copy 3-24
  display 3-24
maintaining
  licensed program
    corrective service 5-13
    preventive service 5-13
making device available 1-2
managing the system 1-6
manual configuration 4-4
Manual mode (system unit) 2-6, 2-7
marketing representative
  calling 3-7
media
  shipping PTF 5-15
  using
    optical media library 2-35
    tape 2-35
medium save strategy 5-53
menu
  configuring 4-4
  definition 4-4
message
  changing 1-5
  changing notification 1-5
  description
    printing 1-5
  interrupting user 1-6
  notification
    changing 1-5
  printing 1-5
  printing description 1-5
  removing
    from other message queues 1-5
    manually 1-7
    personal queue 1-6
message *(continued)*
  removing *(continued)*
    printer 1-7
    system operator message queue 1-6
    workstation message queues 1-6
  responding to printer 1-13
  sending to signed-on users 1-6
  working with 1-5, 1-6
message queue
  changing 1-5
  changing a printer 1-5
  personal 1-6
  removing messages 1-6
mini tape cartridge
  humidity and temperature 2-46
mode
  Auto 2-6, 2-8
  Manual 2-6, 2-7
  Normal 2-6, 2-7
  powering the system on 2-15
  Secure 2-6, 2-8
  Secure position 2-8
model
  1/2-inch tape unit 2-53
Model 150
  control panel status form 3-40
Model 170 2-1
Models 4xx 2-1
Models 5xx 2-1
Models 6xx 2-1
Models Sxx 2-1
monitoring
  tape volume statistics 2-63
MSD (main storage dump) 3-22, 3-23
  purge 3-25

N

network attribute
  changing
    during IPL 2-21
network file
  working with 1-12
new problem
  analyzing 3-8
no power
  doing an attended IPL 2-18
Normal mode (system unit) 2-6, 2-7
Notices X-1

O

object
  definition 4-8
  making available (vary on) 4-8
  making unavailable (vary off) 4-8

object *(continued)*
renaming 1-2
saving 1-9
object in directory
restoring 1-9
saving 1-10
omit PTF
using Go PTF command 5-27
omitting
PTFs in a cumulative package 5-43
operating methods
commands 1-1
description 1-1
menus 1-1
optical device problem 3-19
optical library
attached to AS/400 system 2-1
optical media library
using 2-69
option
IPL 2-19, 2-20
setting major system 2-20
using the InfoSeeker 1-4
options
using the Information Assistant 1-4
ordering
cumulative PTF package 5-22
order
superseding 5-14
preventive service planning (PSP) information
cumulative PTF packages 5-23
types 5-22
program temporary fix (PTF)
cover letter 5-14
cross-reference summary list 5-22
cumulative package 5-14
electronically 5-14
individual 5-14
summary list 5-24
superseding 5-14
PSP (preventive service planning) information
cumulative PTF packages 5-23
types 5-22
PTFs 1-8
OS/400
license key 2-11
OS/400 licensed program
removing 5-42
OS/400 PTFs
installing 5-30
output description 2-1
output queue
getting job logs into one 4-16
output, printer
checking status 1-13
overriding
printer file 1-12

P

package
cumulative PTF
loading PTFs from 5-35
ordering 5-22
paging, storage pool 5-59
panel, control 2-2
See also control panel
parameter
Initialize Tape (INZTAP) command
Check for active files 2-61
password
changing 1-14
system 2-28
bypassing 2-29
changing 2-28
perform an IPL option
IPL or Install the System display 2-19
performance
adjustment
initial program load (IPL) 5-58
automatic system tuning 5-57
dynamic performance adjustments 5-57, 5-58
guidelines 5-57
IPL performance adjustments 5-58
performance adjustment at IPL 5-57
tuning 5-57
tuning tips 5-58
performance tuning
definition 5-57
permanent PTF
advantages 5-36
applying 5-36
during an attended IPL 5-38
during an unattended IPL 5-37
applying immediate
without an IPL 5-39
definition 5-36
save file 5-43
permanent storage area 5-27
personal computer (PC)
attached to AS/400 system 2-1
personal message queue 1-6
power
changing 1-10
Power Down System (PWRDWNSYS) command 2-8
power failure
setting automatic power on 1-11
power on
doing an attended IPL 2-18
mode 2-15

power on and off schedule
changing
defaults 2-14
entries 2-15
individual days 2-15
displaying 2-14
setting 2-14
Power On and Off Tasks menu
Change power on/off defaults option 2-14
Display power on and off schedule option 2-14
Power On light 2-5
power problem 3-15
power pushbutton
attention notice 2-35
stopping the system 2-35
power schedule
solving problems 2-16
powering off
See also stopping
attention notice 2-32
doing an attended IPL 2-18
immediate 2-33
method 2-11
using menu options 2-11
powering off the system 1-10
powering on system 2-11
See also starting system
powering on the system 1-10
powering up system 2-11
See also ?
preparing
tape leader 2-58
prerequisite
PTF 5-37
preventive service
definition 5-13
description 5-23
maintenance strategy 5-13
ordering 5-14
ordering a cumulative PTF package 5-14
planning information 5-14, 5-23
cumulative PTF package 5-22
equipment 5-22
Licensed Internal Code fix 5-22
licensed program PTF 5-22
PTF 5-13
primary console, determining 3-25
printer
changing 1-12
changing for a device 1-5
emulation, starting 1-11
message
removing 1-7
responding to 1-13
not starting 1-13
problems and solutions 1-13
printer *(continued)*
restarting 1-13
working with 1-12
writer 1-13
printer device
attached to AS/400 system 2-1
printer output
changing characteristics before the job runs 1-12
checking status 1-13
held 1-13
not assigned to a printer 1-13
removing 1-7
working with 1-12
printing
configuration descriptions 4-10
device addresses 4-12
disk space information 1-7
displayed messages 1-5
Information APAR 5-21
local device addresses 1-2
message description 1-5
problems 1-13
program temporary fix (PTF)
cover letter 5-16
cumulative tape summary 5-25
priority
changing batch job on the job queue 1-3
changing run 1-3
problem
analyzing 1-8, 3-1
automatic power schedule 2-16
CD-ROM 3-19
communication 3-20
disk 3-20
diskette 3-20
display device 3-1
getting help with 3-6
handling 3-1
intermittent 3-21
IPL 3-18
light 3-17
optical device 3-19
printer 1-13
pushbutton 3-17
reporting 3-1
symptom index
analyzing 3-15
system failure 3-18
system reference code (SRC) 3-16
tape 3-19
working with 1-9, 5-14
problem analysis
running 1-8, 3-5
problem handling
considerations before you begin 3-1
diagnosing 3-1

problem handling *(continued)*
getting help with 3-6
problem summary form 3-27
procedures 3-15
Processor Active light 2-5
System Attention light 2-6
table 3-15
problem record
creating your own 3-4
problems
signing on 1-14
procedure
correcting common tape unit errors 2-37
fixing problems 3-15
processing
data 2-1
Processor Active light 2-5
Processor Activity light 2-5
product
checking installation 3-1
profile, user
changing 1-14
creating 1-14
deleting 1-14
helping
sign on 1-14
program maintenance strategy 5-13
program temporary fix (PTF) 5-16, 5-24
See also cumulative PTF package
See also delayed PTF
See also immediate PTF
A storage area 5-27
advanced topics 5-34
application program 5-36
applying
Licensed Internal Code fixes 5-40
permanently 5-36
remote systems automatically 5-44
applying Licensed Internal Code fixes
immediately 5-40
B storage area 5-27
building a tailored package 5-45
central site processing 5-43, 5-45
changing
storage areas (A or B) 5-28
cover letter
deleting 5-43
description 5-20
displaying 5-16
printing 5-16
receiving electronically 5-14
removing 5-43
cumulative package 5-13, 5-23
cumulative package level, displaying 5-26
cumulative PTF summary
printing 5-25
program temporary fix (PTF) *(continued)*
deleting save file 5-43
displaying 5-16, 5-31
displaying status 5-31
distributing to remote system 5-43, 5-45
finding status of order 5-24
information
receiving 5-14
install problems, solving 5-31
installation
verifying 5-30
installing
cumulative package from CD-ROM 5-25
cumulative package from tape 5-25
high-impact pervasive (HIPER) 5-25
instructions 5-25
Licensed Internal Code 5-28
licensed program 5-30
OS/400 5-30
Licensed Internal Code fix
removing 5-42
loading 5-35
maintenance strategy 5-13
omit function 5-27
omitting
from cumulative package before the next IPL 5-43
order
finding the status of 5-24
sending 5-14
ordering
cumulative PTF package 5-14
electronically 5-14
individually 5-14
preventive service planning (PSP) information 5-14
service support 5-24
package
building tailored 5-45
ordering a cumulative 5-22
verifying installation 5-25
permanent
applying during an unattended IPL 5-37
preventive service planning (PSP) 5-22
printing 5-16
receiving
electronically 5-14
removing
cover letter 5-43
from a cumulative package 5-43
from remote system 5-44
immediate 5-41
Licensed Internal Code fix 5-42
licensed program 5-41
local system 5-41
OS/400 licensed program 5-42
save file 5-43

program temporary fix (PTF) *(continued)*
selecting A or B storage area 5-28
shipping information letter 5-25
status
displaying 5-31
summary list 5-24
temporary
applying during an attended IPL 5-38
using 5-13
verifying PTF package installation 5-25
PSP (preventive service planning) information
description 5-23
getting 5-22
ordering 5-22
PTF
corequisite 5-37
ordering 1-8
prerequisite 5-37
shipping
media 5-15
PTF (program temporary fix) 5-24, 5-36
See also cumulative PTF package
See also delayed PTF
See also immediate PTF
A storage area 5-27
advanced topics 5-34
application program 5-36
applying
Licensed Internal Code fixes 5-40
permanently 5-36
remote systems automatically 5-44
applying Licensed Internal Code fixes
immediately 5-40
B storage area 5-27
building a tailored package 5-45
central site processing 5-43, 5-45
changing
storage areas (A or B) 5-28
cover letter
deleting 5-43
description 5-20
displaying 5-16
printing 5-16
receiving electronically 5-14
removing 5-43
cross-reference summary list
ordering 5-22
receiving 5-22
cumulative package 5-13, 5-23, 5-35
cumulative package level, displaying 5-26
cumulative PTF summary
printing 5-25
deleting save file 5-43
displaying 5-16
displaying status 5-31
distributing to remote system 5-43, 5-45
PTF (program temporary fix) *(continued)*
finding status of order 5-24
information
receiving 5-14
install problems, solving 5-31
installation
verifying 5-30
installing 5-24
cumulative package from CD-ROM 5-25
cumulative package from tape 5-25
high-impact pervasive (HIPER) 5-25
instructions 5-25
Licensed Internal Code 5-28
licensed program 5-30
OS/400 5-30
Licensed Internal Code fix
removing 5-42
loading 5-35
maintenance strategy 5-13
omit function 5-27
omitting
from cumulative package before the next IPL 5-43
order
finding the status of 5-24
sending 5-14
ordering
cumulative PTF package 5-14
electronically 5-14
individually 5-14
preventive service planning (PSP) information 5-14
service support 5-24
package
building tailored 5-45
ordering a cumulative 5-22
verifying installation 5-25
permanent
applying during an attended IPL 5-38
applying during an unattended IPL 5-37
applying immediate without an IPL 5-39
preventive service planning (PSP) 5-22
printing 5-16
receiving
electronically 5-14
removing
cover letter 5-43
from a cumulative package 5-43
from remote system 5-44
immediate 5-41
Licensed Internal Code fix 5-42
licensed program 5-41
local system 5-41
OS/400 licensed program 5-42
save file 5-43
selecting A or B storage area 5-28

PTF (program temporary fix) *(continued)*
shipping information letter 5-25
status
displaying 5-31
summary list 5-24
temporary
applying during an attended IPL 5-38
applying immediate without an IPL 5-39
using 5-13
verifying PTF package installation 5-25
PTF cumulative package
content 5-13
ordering 5-13
receiving 5-13
purge
main storage dump 3-25
pushbutton :ih1.power
pushbutton 2-5
PWRDWNSYS (Power Down System) command 2-8

Q

QIPLDATTIM (IPL date and time) system value 2-22
QIPLSTS (IPL status) system value 2-23
QIPLTYPE (IPL type) system value
changing IPL options 2-18
description 2-23
unattended IPL 2-12
QPWRRSTIPL (automatic IPL after power is restored) system value 2-23
QRMTIPL (remote IPL) system value 2-23
QSTRUP start-up program 4-14
QSTRUPPGM (start-up program name) system value 4-16
QSYSOPR
removing messages from 1-6
queue
removing messages from your personal 1-6
QUPSDLYTIM (uninterruptible power supply delay time) system value 2-24

R

ready condition
diskette 2-66
storage device 2-66
storage device ready condition 2-66
tape unit 2-66
receiving
program temporary fix (PTF)
cover letter 5-14
cross-reference summary list 5-22
cumulative package 5-25
electronically 5-14
information 5-14
recover
workstation failure 3-19
reference code
list of system (SRC) 3-16
remote controller
attached to AS/400 system 2-1
remote IPL (QRMTIPL) system value 2-23
remote job entry session
working with 1-12
remote service
automated 3-14
remote system
applying PTF 5-44
initial program load (IPL) 2-17
program temporary fix (PTF)
distributing 5-43, 5-45
loading 5-44
removing PTF 5-44
starting 2-17
Remove Program Temporary Fix (RMVPTF) command 5-36, 5-41
removing
8-mm tape cartridge 2-52
messages
other message queues 1-5
personal queue 1-6
system operator message queue 1-6
workstation message queues 1-6
printer output 1-7
program temporary fix (PTF)
from a cumulative package 5-43
immediate 5-41
Licensed Internal Code 5-42
licensed program 5-41
local system 5-41
OS/400 licensed program 5-42
remote system 5-44
save file 5-43
tape cartridge
attention notice 2-41
users 1-14
renaming
configuration description 4-10
objects 1-2
reporting
system problem 3-1
requisite
checking 5-37
restarting
printer 1-13
restoring
data
Magstar MP tape unit 2-55
using 1/2-inch tape unit 2-55
document 1-9
document library object 1-9

restoring *(continued)*
folder 1-9
individual object 1-9
object in directory 1-9
user library 1-9
retension operation 2-40
retrieving
configuration source 4-12
reviewing
program temporary fix (PTF)
status 5-31
RMVPTF (Remove Program Temporary Fix)
command 5-36
local system 5-41
run priority
changing 1-3
running
problem analysis 3-5
running problem analysis 1-8

S

save file
deleting 1-7
program temporary fix (PTF)
deleting 5-43
removing 5-43
save strategy
complex 5-56
how often to save 5-51
journaling 5-54
medium 5-53
save-while-active function 5-56
saving changed objects 5-53
saving groups of libraries 5-54
simple 5-52
what to save 5-51
save window
definition 5-51
save-while-active function
overview 5-56
saving
document 1-9
folder 1-9
information 1-9, 1-10
library 1-9
object 1-9
object in directory 1-10
schedule
power on and off
changing days 2-15
changing defaults 2-14
changing entries 2-15
displaying 2-14
scheduling
batch job 1-3
scheduling *(continued)*
power on and off 1-10, 2-14
Secure mode (system unit) 2-6, 2-8
security
controlling IPL 4-14
changing IPL start-up program 4-14
SELECT parameter 5-36
selecting
A storage area 5-28
assistance level 1-2
B storage area 5-28
Send Program Temporary Fix Order (SNDPTFORD)
command 5-14, 5-22
sending
break message 1-6
messages to signed-on users 1-6
program temporary fix (PTF)
order 5-14
remote system 5-43
spooled file 1-13
Server Series 2-2
service
calling hardware 3-7
calling software 3-7
corrective 5-14
preventive 5-13
service support
identifying PTF ordered through 5-24
preventive service planning (PSP) information for licensed program 5-22
PTF summary list 5-24
session
working with a remote job entry 1-12
set initial program load (IPL) date and time 2-19
Set Major System Options display 4-1
setting up
automatic power on after power failure 1-11
power on and off schedule 2-14
sharing
systems with a 3480, 3490, 3490E, or 3590 tape unit 2-54
sign on
problems 1-14
signed-on users
sending messages to all 1-6
signing off users 1-7
signing on
system 2-13
simple save strategy 5-52
SNDPTFORD (Send Program Temporary Fix Order)
command 5-14, 5-22
software
license key 2-11
software service representative
calling 3-7

solving
install problems for PTFs 5-31
problem with power schedule 2-16
source file
definition 4-12
source for CL start-up program 4-14
source, configuration 4-12
SPCN (system power control network) 2-8
address display
fault display 2-9
spooled file
changing priority 1-13
sending 1-13
SRC (system reference code) 2-29
See also system reference code (SRC)
SST (system service tools)
starting 2-63
Start System Service Tools (STRSST) command 2-63
start-up program
source 4-14
start-up program name (QSTRUPPGM) system value 4-16
start-up program, changing 4-14
starting
See also ?
3270 device emulation 1-11
clean up 1-7
printer emulation 1-11
remote system 2-17
subsystem 2-31
system 1-10
attended IPL 2-18
methods 2-11
unattended IPL 2-12
system service tools 2-63
statistics
monitoring tape volume 2-63
status
configuration 1-2, 4-11
displaying system 1-7
orders, finding 5-24
printer output 1-13
program temporary fix (PTF)
displaying 5-25, 5-31
list 5-31
status light
8mm tape units
5.0GB, 7.0GB or 20GB 2-48
QIC-5010 2-42
stopping
interactive subsystem 2-32
job log 4-16
subsystem 2-31
system 1-10
considerations 2-32
immediately 2-33
methods 2-11
stopping *(continued)*
system *(continued)*
power pushbutton 2-35
releasing job queues 2-33
storage
collecting information on 1-7
printing report on 1-7
storage area
A 5-28
A (permanent) 5-27
B 5-28
B (temporary) 5-27
changing 5-28
IPL from 5-27
permanent 5-27, 5-28
temporary 5-27, 5-28
storage device
ready condition 2-66
storage pool
paging 5-59
storage pool paging
using CHGSHRPOOL command to adjust 5-59
storage pools
using to tune system automatically 5-57
storing data
1/2-inch tape cartridge 2-57
1/2-inch tape reel 2-59
1/4-inch mini tape cartridge 2-45
1/4-inch tape cartridge 2-45
8-mm tape cartridge 2-52
Magstar MP tape cartridge 2-57
STRSST (Start System Service Tools) command 2-63
submitting
batch job 1-4
subsystem
description
displaying 2-32
working with 2-31
ending 2-31
starting 2-31
working with 2-31
summary list
PTF, ordering 5-24
superseding
PTF with other PTFs 5-35
PTF,ordering 5-14
support contact information
changing 1-6
symptom
analyze problem with 3-15
system
attribute
changing during IPL 2-21
changing at IPL 2-21
cleaning up 1-7
defining at IPL 2-21

system *(continued)*
finding information about 1-4
hang condition 3-20
initial program load (IPL) 2-18
loop condition 3-20
password 2-28
powering down 1-10
powering on 1-10
sharing
3480, 3490, 3490E, or 3590 tape units 2-54
signing on 2-13
starting 1-10, 2-11
stopping 1-10
attention notice 2-32
what you need to know about 2-1
System Attention light 2-6
system console problem
vary off 3-21
vary on 3-21
system control panel
changing
system IPL 2-17
system date
changing 1-6
working with 1-6
System Model 150
control panel status form 3-41
problem summary form 3-27
System Model 170
control panel status form 3-43
problem summary form 3-27
System Model 4xx
control panel status form 3-44
problem summary form 3-27
System Model 5xx
control panel status form 3-45
problem summary form 3-27
System Model 600
control panel status form 3-41
problem summary form 3-27
System Model 620
control panel status form 3-41, 3-42
problem summary form 3-27
System Model 64x
control panel status form 3-46
System Model 65x
control panel status form 3-46
System Model S10
problem summary form 3-27
System Model S20
control panel status form 3-41, 3-42
problem summary form 3-27
system operator message queue
removing messages from 1-6
system password
bypassing 2-29
system password *(continued)*
changing 2-28
system power control network (SPCN) 2-8
address display
fault display 2-9
system reference code (SRC)
analyzing problem with 3-15
collecting 3-5
displayed during IPL 2-29
list 3-16
solving problem
with 3-16
working with 3-5
system service tools (SST)
starting 2-63
system status
displaying 1-7
system time
changing 1-6
working with 1-6
system tuning
automatic 5-57
system unit
version 4 release 2 2-1
system unit control panel 2-2
See also control panel
system value
automatic IPL after power is restored (QPWRRSTIPL) 2-23
changing 1-6
during IPL 2-21
methods 2-21
definition 2-21
description :I2.controlling IPL 2-22
displaying
during IPL 2-21
IPL
automatic IPL after power is restored (QPWRRSTIPL) 2-23
date and time (QIPLDATTIM) 2-22
QIPLDATTIM (IPL date and time) 2-22
QIPLSTS (IPL status) 2-23
QIPLTYPE (IPL type) 2-23
QPWRRSTIPL (automatic IPL after power is restored) 2-23
QRMTIPL (remote IPL) 2-23
QUPSDLYTIM (uninterruptible power supply delay time) system value 2-24
QUPSMSGQ (uninterruptible power supply) 2-24
remote IPL (QRMTIPL) 2-23
status (QIPLSTS) 2-23
type (QIPLTYPE) 2-23
uninterruptible power supply (QUPSMSGQ) 2-24
uninterruptible power supply delay time (QUPSDLYTIM) system value 2-24
QIPLDATTIM (IPL date and time) 2-22

system value *(continued)*
QIPLSTS (IPL status) 2-23
QIPLTYPE (IPL type) 2-12, 2-18, 2-23
QPWRRSTIPL (automatic IPL after power is restored) 2-23
QSTRUPPGM (start-up program name) 4-16
QUPSDLYTIM (uninterruptible power supply delay time) 2-24
QUPSMSGQ (uninterruptible power supply) 2-24
setting automatic power on 1-11
start-up program name (QSTRUPPGM) 4-16
uninterruptible power supply (QUPSMSGQ) 2-24
uninterruptible power supply delay time (QUPSDLYTIM) 2-24

T

tape 5-25
copying PTF cover letters from 5-15
displaying 1-12
displaying contents 1-12
duplicating 2-63
initializing 1-12, 2-61
reel
types 2-57
storing
8-mm tape cartridge 2-52
using 2-35
volume ID 2-61
volume statistics
1/2-inch tape cartridge 2-65
1/4-inch tape cartridge 2-65
1/4-inch tape reel 2-65
8-mm tape cartridge 2-65
Magstar MP tape cartridge 2-65
tape cartridge 2-52, 2-53
See also 8-mm tape cartridge
See also tape
1/2-inch 2-56
See also 1/2-inch tape cartridge
8-mm 2-52
See also 8-mm tape cartridge
checking
volume 2-42
cleaning
attention notice 2-56
copying 2-63
definition 2-36
humidity and temperature 2-46
tape leader
preparing 2-58
tape library
definition 2-36
tape problem 3-19
tape reel
definition 2-36
tape unit
1/2-inch
addressing 2-55
backing up data 2-55
cleaning 2-55
models 2-53
restoring data 2-55
1/2-inch reel
cleaning 2-60
when to clean 2-60
1/4-inch
cleaning 2-38
1/4-inch mini
cleaning 2-38
3480, 3490, 3490E, or 3590
sharing systems with 2-54
3570
cleaning 2-56
3590 2-56
8-mm
cleaning 2-47
tape cartridge to use 2-50
using 2-47, 2-50
attached to AS/400 system 2-1
automatic cartridge loader operation
1/2-inch 2-53
definition 2-36
Magstar MP tape unit 2-55
ready condition 2-66
removing tape cartridge
attention notice 2-41
using 1/2-inch 2-53
using 1/4-inch mini 2-38
verifying 2-37
tape units
using 2-35
tape volume 2-61
tape volume statistics
monitoring 2-63
temperature
effect on tape cartridges 2-46
temporarily applied PTF
definition 5-36
temporary PTF
applying
during an attended IPL 5-38
applying immediate
without an IPL 5-39
temporary storage area 5-27
time
changing system 1-6
turning off system 2-11
See also stopping system
turning on system 2-11
See also ?

U

unattended IPL
  applying Licensed Internal Code fixes 5-40
  applying PTFs permanently during 5-37
  definition 2-12
unavailable 2-37
uninterruptible power supply
  system value settings 2-24
uninterruptible power supply delay time (QUPSDLYTIM) system value 2-24
unit
  battery power 2-10
unloading 2-52
  See also removing
  1/4-inch mini tape cartridge 2-41
  1/4-inch tape cartridge 2-41
user enrollment 1-14
user job 1-3
user profile
  changing 1-14
  changing during IPL 2-21
  creating 1-14
  deleting 1-14
  enabling 1-14
users
  sending messages to signed-on 1-6
  signing off 1-7
using
  1/2-inch tape units 2-53
  1/4-inch mini tape cartridges
    guidelines 2-39
  1/4-inch mini tape units 2-38
  1/4-inch tape cartridges
    guidelines 2-39
  1/4-inch tape units 2-38
  communications 1-11
  Information Assistant options 1-4
  InfoSeeker option 1-4
  optical media library 2-69
  tape unit
    8-mm 2-47

V

value, system 2-12, 2-21
  See also system value
  changing 1-6
  changing date and time 1-6
  setting automatic power on 1-11
  working with 1-6
vary off 2-37
  system console problem 3-21
vary on
  system console problem 3-21
varying
  See also System Operation
  objects on and off 4-8
varying on
  device 1-2
Verify Optical Drive (VFYOPT) command 2-69
Verify Tape (VFYTAP) command 2-37
verifying
  installation
    PTF package 5-25
  PTF installation 5-30
  tape unit 2-37
VFYOPT (Verify Optical Drive) command 2-69
VFYTAP (Verify Tape) command 2-37
volume ID 2-61

W

work management
  performance tuning 5-57
work station
  attached to AS/400 system 2-1
Work with Device Description (WRKDEVD) command 2-54
  attention notice 2-54
Work with Problem (WRKPRB) command 3-5, 3-8, 5-14
Work with Subsystem Descriptions (WRKSBSD) command 2-31
"Work with.." display'. 4-4
  example 4-2, 4-5
  Work with Device Descriptions display 4-2, 4-5
"Work with.." displays'. 4-2, 4-5
  Work with Configuration Status display 4-11
working with
  configuration status 1-2
    example 4-11
  contact information 1-6
  directory entries 1-11
  example 4-11
  file 1-7
  interactive jobs 1-4
  job queue 1-3, 1-4
  messages 1-5, 1-6
  network files 1-12
  printer 1-12
  printer output 1-12
  problem 5-14
  problems 1-9
  remote job entry session 1-12
  spooled file 1-12
  subsystem descriptions 2-31
  system values 1-6
  user batch job 1-3
  user job 1-3
  writer 1-13

workstation failure
  recover 3-19
writer, printer 1-13
WRKDEVD (Work with Device Description)
 command 2-54
  attention notice 2-54
WRKPRB (Work with Problem) 3-8
WRKSBSD (Work with Subsystem Descriptions)
 command 2-31

Communicating Your Comments to IBM

AS/400e series
Basic System Operation, Administration,
and Problem Handling
Version 4

Publication No. SC41-5206-01

If you especially like or dislike anything about this book, please use one of the methods listed below to send your comments to IBM. Whichever method you choose, make sure you send your name, address, and telephone number if you would like a reply.

Feel free to comment on specific errors or omissions, accuracy, organization, subject matter, or completeness of this book. However, the comments you send should pertain to only the information in this manual and the way in which the information is presented. To request additional publications, or to ask questions or make comments about the functions of IBM products or systems, you should talk to your IBM representative or to your IBM authorized remarketer.

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

If you are mailing a readers' comment form (RCF) from a country other than the United States, you can give the RCF to the local IBM branch office or IBM representative for postage-paid mailing.

- If you prefer to send comments by mail, use the RCF at the back of this book.
- If you prefer to send comments by FAX, use this number:
  - United States and Canada: 1-800-937-3430
  - Other countries: 1-507-253-5192
- If you prefer to send comments electronically, use this network ID:
  - IBMMAIL(USIB56RZ)
  - IDCLERK@RCHVMW2.VNET.IBM.COM

Make sure to include the following in your note:

- Title and publication number of this book
- Page number or topic to which your comment applies.

Readers' Comments — We'd Like to Hear from You

AS/400e series
Basic System Operation, Administration, and Problem Handling
Version 4

Publication No. SC41-5206-01

Overall, how satisfied are you with the information in this book?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction	□	□	□	□	□

How satisfied are you that the information in this book is:

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Accurate	□	□	□	□	□
Complete	□	□	□	□	□
Easy to find	□	□	□	□	□
Easy to understand	□	□	□	□	□
Well organized	□	□	□	□	□
Applicable to your tasks	□	□	□	□	□

Please tell us how we can improve this book:

Thank you for your responses. May we contact you? □ Yes □ No

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

Name _____ Address _____

Company or Organization _____

Phone No. _____

Readers' Comments — We'd Like to Hear from You
SC41-5206-01

IBM®

Cut
Alon

Fold and Tape | **Please do not staple** | Fold and Tape

NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

IBM CORPORATION
ATTN DEPT 542 IDCLERK
3605 HWY 52 N
ROCHESTER MN 55901-7829

Fold and Tape | **Please do not staple** | Fold and Tape

Cut
Alor

Readers' Comments — We'd Like to Hear from You

AS/400e series
Basic System Operation, Administration, and Problem Handling
Version 4

Publication No. SC41-5206-01

Overall, how satisfied are you with the information in this book?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction	□	□	□	□	□

How satisfied are you that the information in this book is:

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Accurate	□	□	□	□	□
Complete	□	□	□	□	□
Easy to find	□	□	□	□	□
Easy to understand	□	□	□	□	□
Well organized	□	□	□	□	□
Applicable to your tasks	□	□	□	□	□

Please tell us how we can improve this book:

Thank you for your responses. May we contact you? □ Yes □ No

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

Name _____ Address _____

Company or Organization _____ _____

Phone No. _____ _____

Readers' Comments — We'd Like to Hear from You
SC41-5206-01

IBM®

Cut
Alo

Fold and Tape | **Please do not staple** | Fold and Tape

NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

IBM CORPORATION
ATTN DEPT 542 IDCLERK
3605 HWY 52 N
ROCHESTER MN 55901-7829

Fold and Tape | **Please do not staple** | Fold and Tape

Cut
Alo

Part Number: 87G3599

Printed in the United States of America
on recycled paper containing 10%
recovered post-consumer fiber.

SC41-5206-01