

System/36 to AS/400 System Migration

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This edition applies to Release 2 of the IBM AS/400 System/36 Migration Aid (Program Number 5727-MG1) and of the IBM OS/400 Migration Aid (Program Number 5728-SS1) for use with the IBM Operating System/400 (Program Number 5728-SS1).

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Abstract

This document is intended to give the reader an understanding of the migration, from System/36 to the AS/400 system, of those items required for the operation of the system and the running of application programs. It does not discuss migration of application programs themselves. Application and office migration are covered in other publications.

A working knowledge of System/36 and a basic knowledge of System/38 or the AS/400 system are assumed.

ASYS

(93 pages)





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Preface

This document is intended to give the reader an understanding of the migration, from System/36 to the AS/400 system, of those items required for the operation of the system and the running of application programs. It does not discuss migration of application programs themselves. Application and office migration are covered in other publications.

A working knowledge of System/36 and a basic knowledge of System/38 or the AS/400 system are assumed.

This document has two major sections. Chapters 1 through 7 discuss the migration process itself. Chapters 8 through 16 discuss operating and managing the AS/400 system.

This document covers:

- System/36 configuration migration
- System/36 security migration
- Business Graphics Utility (BGU) migration
- Advanced Printer Function (APF) and Intelligent Printer Data Stream (IPDS) Advanced Function PRPQ migration
- How to migrate without using the Migration Aid
- Managing configuration and security
- Controlling jobs, printed output, and messages
- Save and restore differences



Related Publications

The following publications are considered particularly suitable for a more detailed discussion of the topics covered in this document.

Newsletters

- *AS/400 Application Recovery*, (GG24-3441)
- *AS/400 Communication Migration*, (GG24-3253)
- *AS/400 PC Support Guide*, (GG24-3255)
- *Converting System/36 Environment Applications to Native AS/400*, (GG24-3304)
- *System/36 to AS/400 Application Migration*, (GG24-3250)
- *S/36 and S/38 Office Migration to AS/400*, (GG24-3252)
- *S/38 Application Migration to AS/400*, (GG24-3251)

Manuals

- *Advanced Printer Function Guide*, (SC21-9668)
- *BGU Users Guide and Reference*, (SC09-1167)
- *CL Reference Manual*, (SC21-8103)
- *Communications Users Guide*, (SC21-9601)
- *Concepts & Programmers Guide for the System/36 Environment*, (SC21-9663)
- *Data Management Guide*, (SC21-9658)
- *Device Configuration Guide*, (SC21-8106)
- *Display Station Users Guide*, (SC21-9774)
- *Migration from System/36 Planning Guide*, (GC21-9623)
- *Operators Guide*, (SC21-8082)
- *Security Concepts and Planning*, (SC21-8083)
- *System Backup and Recovery Guide*, (SC21-8079)
- *System Reference for the System/36 Environment*, (SC21-9662)
- *System/36 to AS/400 Migration Aid Users Guide and Reference*, (SC09-1166)
- *Work Management Guide*, (SC21-8078)



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1. System/36 Configuration Migration to the AS/400 System

The System/36 to AS/400¹ Migration Aid includes functions that assist you in moving your System/36 configuration data from System/36 to the AS/400 system.

Moving (migrating) your System/36 master configuration to the AS/400 system results in AS/400 line, controller, and device descriptions. Though your current configuration can be migrated, all future maintenance after migration uses AS/400 menus and commands.

You can still use the CNFIGSSP procedure in the System/36 environment, but you get a message explaining that this function is available from the AS/400 menu CFGDEVCMN (Configure Devices and Communications). If you select option 0 to this message, you get the AS/400 system CFGDEVCMN menu.

Start by trying to learn and use the AS/400 commands, as the system accepts only these (outside of the System/36 environment), not their System/36 equivalents.

Use the Migration Aid to migrate the System/36 master configuration for all your local and remote devices, such as displays, printers, local and remote workstation controllers, and communications lines.

The unique automatic configuration on the AS/400 system gives you the option to let the AS/400 system configure all your local devices. You can just switch the cables between System/36 and the AS/400 system and let the AS/400 system recognize the displays and printers when you power them on. This auto-configure option also can configure your new local AS/400 devices, such as local controllers, diskette, and tape drives. Communications lines and their related controllers and devices must be migrated or created on the AS/400 system.

You can also use a combination of the two methods. First, use the Migration Aid to migrate remote lines, 5294 controllers, and the devices attached to them. Second, use the auto-configure function to configure all the local devices.

1.1 How to Start the Configuration Migration on System/36

After installing the Migration Aid on System/36 (for installation refer to *System/36 to AS/400 Migration Aid Users Guide and Reference*, enter the MIGRATE procedure command on the command line to get the migration main menu.

The first step in all migrations is to analyze your current system. The Migration Aid can analyze your master configuration for devices not supported and devices supported differently.

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Select option 5, Analyze the system, on the MIGRATE main menu to start the function. Then select option 5, Analyze configuration information, on the ANALYZE menu. The result of the analysis is a detailed report to identify the items that may require changes before migration to the AS/400 system.

1.2 Analyzing for Unsupported Functions

The following figure shows a sample configuration analysis report.

Master Configuration Record						
----- System/36 -----				-----AS/400 -----		
Member	Item	Name	Type/ Model	Object	Name	Type
#MASTER	TAPE	TAPE01				Device not supported
#MASTER	LCLCU	LCLC01		*CTLD	LCLC01	
#MASTER	DISPLAY	W0	3180	*DEVD	W0	3180 2
#MASTER	PRINTER	P1	4234	*DEVD	P1	4234 2
#MASTER	PRINTER	P2	3262			Device not supported
#MASTER	DISPLAY	A1	3196	*DEVD	A1	3196 A1
#MASTER	DISPLAY	A2	5291	*DEVD	A2	5291 1
#MASTER	PRINTER	P3	IPDS	*DEVD	P3	*IPDS 0

Figure 1. Sample Configuration Migration Analysis Report

Use the report to identify how the System/36 configuration items map to AS/400 configuration objects and to analyze for unsupported devices, like the 6157 or 8809 tape drive and the 3262 line printer.

If you make changes to the master configuration, rerun the analysis until you feel all items are sorted out. Device descriptions will not be created on AS/400 for unsupported device types.

1.3 Items Migrated

When migrated, master configuration records become:

- AS/400 line descriptions
- AS/400 controller descriptions
- AS/400 device descriptions.

Items not migrated are:

- CNFIGSSP configuration members
- Intersystem communications function (ICF) line and subsystem members
- All X.25 configuration members
- All X.21 configuration members
- Advanced program-to-program communications (APPC) and advanced peer-to-peer networking (APPN)
- Asynchronous communications

- System/36 configuration procedures
- Configuration items for unsupported hardware such as the 8809 or 6157 tape drive and the 3262 printer.

In this newsletter the migration is described for local devices only. The migration of remote controllers, devices, and other communications-related items is described in the newsletter *AS/400 Communication Migration*. For more information about communications configuration refer to the *Communications Users Guide*

1.4 System/36 Function Migration Table

Table 1. System/36 Configuration Migration	
System/36 Configuration Item	Migrated to the AS/400 System
Local Displays	Yes
Local Printers	Yes
Remote Displays	Yes
Remote Printers	Yes
Library Configuration members	No
ICF Subsystems	No
System/36 Configuration Procedures:	
- CNFIGSSP *	* These procedures map to AS/400 functions described below.
- CNFIGICF *	
- DEFINEID *	
- DEFINEPN *	
- DEFINLOC *	
- DEFINX21 *	
- DEFINX25 *	
- ALTERCOM *	
- SETCOMM *	
- ICFDEBUG **	
- MAINTX25 **	** These are not supported, but new functions replace them.

* When you call one of these System/36 procedures, the system accepts it, but does not process it. Instead, you get a message explaining that a similar function is available from the AS/400 menu CFGDEVCMN or DEFINE, or from the AS/400 command WRKCTLD; if you take the 0 option to this message, you get the CFGDEVCMN or DEFINE menu, or the WRKCTLD command, and can continue your configuration tasks from there.

** These procedure commands are not supported. But there are AS/400 functions that replace and enhance what is available on the System/36. For example, you can use AS/400 DEBUG, BREAKPOINT, and TRACE commands. Enter GO CMDDBG on the command line to view the CMDDBG menu, from which you can select these debug facilities.

Other problem solving items are found on the problem handling menu. If you are on the AS/400 main menu select item 8, Problem handling, or just enter GO PROBLEM on the command line. On the problem handling menu, you can then select item 3, NETPRB, to view the network problem handling menu.

1.5 Select Items to Migrate

Select option 6 on the MIGRATE menu to migrate the master configuration. You then see the selection screen.

```

                                SELECT ITEMS TO MIGRATE

Type choices, press Enter.
Migration run description ... 5363 in dept 977   15:07:40 88/02/02

                                LIST OF ITEMS
Select items using option 1, press enter.

OPTION  ITEM                                OPTION  ITEM
Libraries                                Data dictionaries
Files                                    1      Master CNFG record
Users                                    Network Resource Dir.
Document folders
Supplemental dictionaries


Cmd1=Select all      Cmd3=Go back      Cmd5=Cancel
Cmd6=Migrate         Cmd7=End        Cmd8=Reset
```

After selecting your items, press Enter, and reply to the confirmation display that follows. When you return to this display, press Cmd6. The next screen displays the save options, where you can select whether to save to tape, diskette, or data link. If you select tape or diskette, you have an option that gives you a diskette or tape number estimation. If you select data link, you must specify the library where the migration data link places the items migrated and the workstation IDs or device names for sending and receiving data. For more information refer to the newsletter *System/36 to AS/400 Application Migration*.

You can also change the default AS/400 library name QS36F for System/36 files, but it is recommended that you **not** change this default. All files should initially go into the same library. Migrate your applications and environment in steps. If you use different library names for the files, you must remember which files are in which library and update your procedures to reflect this fact. It is much easier to remember if all the files are in the QS36F library.

QS36F is also the System/36 environment's default library for all the System/36 file procedures (for example BLDFILE). Putting all the files in one library also makes the System/36 environment look like the System/36, where all the files are stored in a single area.

Beginning with Release 2.0, you can override the default System/36 environment files library for a display station session using the FLIB procedure or the // FILELIB OCL statement. This allows your applications to access files stored in a library different than that specified for the entire System/36 environment. Refer to *System/36 to AS/400 Application Migration* for more information.



Before the save starts, if you had chosen tape or diskette as save media, you are given the option to initialize the tape reels or diskettes you need to save your migrated items.

A record of all items you attempted to save is kept in an audit file on System/36. You can generate reports on migration status by selecting option 8 on the MIGRATE menu.



2. Restoring the Migrated Configuration on the AS/400 System

On the AS/400 system, a configuration description must exist for each piece of hardware, such as workstation controllers, displays, and printers. This description tells the system where the device is located and what specifications or attributes the device has. For example, the configuration description for a display includes the keyboard type (language) and the default printer. You can also use configuration descriptions to specify the characteristics of the devices so they perform the way you want them to.

There are five types of AS/400 configuration descriptions:

- Line descriptions, one for each communications line on your system
- Controller descriptions for local, remote, and communications controllers
- Device descriptions for local/remote workstations, tape, diskette, and APPC devices
- Mode descriptions only used for APPC
- Class-of-service descriptions only used for APPC.

2.1 Restoring the Configuration

After you have completed saving the migrated master configuration to tape, diskette, or library using data link, you can start restoring and complete your work on the AS/400 system.

Enter STRS36MGR on the AS/400 command line to get the AS/400 Migration Aid main menu. Select option 1 on this menu to display the restore options. You must have security officer authority to do the restore operation. The replace option of the restore operation must be used with caution because it gives you the authority to replace all existing objects on the system!

You can restore interactively or in batch mode. It is recommended that you use the interactive mode, even if it slows down your other interactive jobs. Tracking the migration is much easier in interactive mode, and you receive messages from the system that reflect the status of the job when you restore in the interactive mode.

You might see messages from other and previous activities on the system which are not related to your job. This is because the system operator's message queue (MSGQ QSYSOPR) is set to *BREAK delivery mode by the Migration Aid during interactive restore. (You can learn more about that later.) When a message appears, just press the Enter key to continue.

Even if your restore operation is carried out interactively, all the conversions and the configuration description you create are always submitted as batch jobs by the Migration Aid.

If you restore in batch mode, remember to check the system operator message queue (DSPMSG QSYSOPR) for any messages related to the status of the job.

You can also use the **WRKACTJOB** command to display the jobs active on the system and see how the job is progressing.

The Migration Aid generates an exception report at the end of every restore operation. Use it to verify that your configuration was successfully restored.

To verify the configuration descriptions created by Migration Aid you have three "work with" commands that allow you to do anything with the descriptions if you have the proper authority. The three commands are:

- **WRKLIND** (Work with Line Descriptions)
- **WRKCTLD** (Work with Controller Descriptions)
- **WRKDEVD** (Work with Device Descriptions)

From the "Work with ..." display, you may:

- Change descriptions
- Copy descriptions
- Delete descriptions
- Display descriptions
- Print descriptions

Use the display or print option to check the descriptions. "Managing Your AS/400 Configurations" on page 33 discusses how to change, add, and delete local devices.

3. System/36 Security Migration to the AS/400 System

The Migration Aid helps you organize and automate the migration of System/36 security. The analysis performed by the Migration Aid helps you identify and correct anomalous situations for AS/400 security.

This chapter covers the migration process; it does not cover security migration in special environments such as Office or Communications.

For more information about Office Security migration refer to *S/36 and S/38 Office Migration to AS/400*. For more information about Communication Security migration, see the *AS/400 Communication Migration* newsletter.

Migrating your System/36 security environment results in an AS/400 security environment similar to that on your S/36.

You can still use System/36 commands, such as SECEDIT USERID or SECEDIT RESOURCE, but you receive a message saying This function is available from Menu SECURITY. Select option 0 to view the AS/400 system SECURITY menu.

Therefore it is recommended that you start to learn and use AS/400 commands instead of using the System/36 equivalent commands. The system accepts only AS/400 commands.

3.1 How to Start the Security Migration on System/36

After installing the Migration Aid on System/36 (see the *System/36 to AS/400 Migration Aid Users Guide and Reference*), key in MIGRATE to go to the Migration Main Menu.

You must be a master security officer or a security officer to run the security migration functions. No other security utilities can be active at the same time.

To analyze security functions, select option 5 from the MIGRATE menu, and then option 3 from the ANALYZE menu. The following display appears:

```

                                ANALYZE SECURITY

Security information is analyzed to report on functions that are not
supported, or are supported differently on the AS/400 system.

A detailed report is generated to identify the items that may require
changes before migration to the AS/400 system.

Press Enter or Cmd4 to generate the analysis report.

Cmd3=Go back          Cmd4=Put on job queue          Cmd7=End
```

3.2 Analyzing Security

The results of the analysis are two different types of reports. The first one helps you to identify incorrect user IDs and passwords. The second one is a message summary that explains the error types encountered. An example printout of each type of report follows.

```
User ID : USER01      IBM AS/400 System/36 Migration Aid
                        User Identification Security File Analysis Report

                        Detail Analysis

User ID      SEV      ID      Message Text
*NULL        S      MIGR-3505 Invalid character in user ID.
*NULL        E      MIGR-3507 Invalid character in password.
USER01       E      MIGR-3507 Invalid character in password.
A**1         S      MIGR-3505 Invalid character in user ID.

      * * * * *  E N D   O F   A N A L Y S I S   * * * * *
```

Figure 2. Sample Security Migration Analysis Report

```
User ID : USER01      IBM AS/400 System/36 Migration Aid
                        User Identification Security File Analysis Report

                        Message Summary

Message
ID      Sev  Count  Message Text and Description
MIGR-3505 S    2    Invalid character in user ID.
                        Run the MIGRNAME procedure on the System/36 to migrate
                        User ID Names
                        Use the AS/400 RESMGNRNAM command to resolve the
                        User ID Names
MIGR-3507 E    2    Invalid character in password.
                        Change the password using the SECEDIT procedure

      * * *   E N D   O F   M E S S A G E   S U M M A R Y   * * *

      * * * * *   E N D   O F   L I S T I N G   * * * * *
```

Figure 3. Sample Security Migration Analysis Message Summary

Incorrect characters in a password must be corrected on System/36 using the SECEDIT USERID procedure prior to migrating the User IDs information. Valid characters for AS/400 passwords are A through Z, #, @, and \$ the first character only; and A through Z, and 0 through 9, #, @, \$, and _ for the remaining characters. The special characters listed are for use in the United States only. Do not use them to communicate with another system in another country. After correcting characters that are invalid, rerun analysis to ensure that all passwords are correct.

If you migrate a password that is not correct, the password is changed to *NONE. This means the user does not have a password and is not able to sign on until a password is provided by the security officer.

Characters that are not correct in a user ID (the rules are the same as those for passwords) must be corrected on the AS/400 system. A specific function in the Migration Aid helps you collect all the names of the user IDs and to migrate them to the AS/400 system. The corresponding AS/400 function assists you in identifying and correcting user IDs that are not correct. The AS/400 system keeps track of these changes so that when you restore the user ID information, it is modified to reflect the previous changes (see "Migrating User ID and Office Item Names" on page 12 and "Resolving User ID and Office Names" on page 15).

On System/36, user IDs and passwords can begin with a number; this is not possible on the AS/400 system. The migration routines add the letter Q as the first character to all numeric user IDs and passwords. For example, the System/36 user ID 12345678 becomes Q12345678 on the AS/400 system and the System/36 password 1234 becomes Q1234 on the AS/400 system.

3.3 Selecting and Migrating Users

To select users for the migration, select option 6 from the MIGRATE Menu. Then select option 1, Users, from the Select Items to Migrate display.

SELECT USER ID TO MIGRATE

Type choices, press Enter.

ITEM	CHOICE	POSSIBLE CHOICES
User ID		
Position list to . . .		

Starting character(s) of user ID

LIST OF USERS More

Or select user IDs using option 1, press Enter.

OPTION	USER ID	COMMENT	MIGRATED	PS/36	PROFILE
	SECT	USER PROF SECRETARY	020188	Y	N
	USER01	AS/400 USER	N	Y	N
	USER02	AS/400 USER	N	Y	N
	USER03	AS/400 USER	N	Y	N
	USER06	AS/400 USER	020588	Y	Y

Cmd1=Select all
Cmd3=Go back
Cmd5=Cancel new

Cmd7=End
Cmd8=Reset
Roll=Page

*

The user ID list shown is generated from the user identification file, the list of Personal Services/36 users, and a list of users with session profile information (those who had used one or more of the following products: DisplayWrite/36, Query/36, PC Support/36, or IDDU/36).

All user security information, such as password, menu and current library, and resource security authorities, is migrated. In addition, all related information (mail, calendar, mail logs, and so on) and any eventual session profile information coming from DisplayWrite/36, Query/36, IDDU/36, or PC Support/36 is migrated for PS/36 users.

User IDs must be migrated before their associated items (files, libraries, ...) so that authorities are established correctly on the AS/400 system. Migrate all

user IDs in the same migration run to avoid incorrect authorities on the AS/400 system.

Ideally, items and their associated security files should be migrated at the same time to maintain the System/36 item/owner authorities. If you disable migration of security, then you may lose such authorities (see "Enabling/Disabling Migration of Security" on page 13).

After selecting the users, you can immediately save your choices using Cmd6. The prompt asks you for the medium (diskette, tape, or data link). If you select tape or diskette, you have an option that gives you a diskette or tape number estimation. If you select data link, you must specify the library where the migration data link places the items migrated and the workstation IDs or device names for sending and receiving data. For more information refer to *System/36 to AS/400 Application Migration*.

It is recommended that you not change the default AS/400 library name QS36F for System/36 files. All files should be in the same library, and authority holders created from the Migration Aid refer to this name. For more details about changing the default AS/400 library name, refer to "Select Items to Migrate" on page 4.

If you select tape or diskette as the save media, you have an option to initialize the tapes or diskettes you need to save your migrated items. A record of all items you attempted to save is kept in an audit file on System/36. You can generate reports on migration status by selecting option 8 on the MIGRATE menu.

3.4 Migrating User ID and Office Item Names

The "Migrate User ID and Office Item Names" function should be used if security analysis has identified any user ID that contains characters that are not valid, or if you are migrating user IDs from multiple System/36 systems to the AS/400 system, because it helps you to identify where names originated. You must run this function before you migrate the user IDs, so that you can prevent or correct any duplicate or invalid names. You do not select the names you want to migrate: the work with all your System/36 user names.

Note that this function does not migrate the users and office items themselves. Rather it migrates a list of their names, and it helps ensure that the names are valid and do not conflict with other names.

From the MIGRATE menu select option 9, and from the OTHER menu select option 1. You are prompted to select the medium (diskette, tape, or file) and system name and address. If PS/36 is installed, the default values from the Maintain PS/36 defaults display appear. Even if you can change them, it is best to leave the proposed values. System name is especially important if you are migrating more than one System/36 to the AS/400 system, because the name helps you to identify the system where a name originated. Do not change the name after you have migrated user ID names. The Migration Aid uses the system name to correctly identify and rename items.

3.5 Enabling/Disabling Migration of Security

You can use the Enabling / Disabling Migration of Security function to control whether security information is transferred with your migration run; the default is yes. If you disable security migration, this affects all your users and resources. If you disable security migration, no System/36 security information is migrated. For instance, if you migrate users with security migration disabled, resource authorities are not migrated. It is best to leave security migration enabled.



4. Restoring Security on the AS/400 System

System/36 security consists of user information, such as passwords and menus, and resource information, describing access rights to specific objects on the system. AS/400 security basically consists of user profiles and authorities given to the users to access resources. The Migration Aid creates AS/400 user profiles and establishes authorities using the migrated System/36 information.

4.1 Restoring User IDs

When you have completed saving your System/36 security information you can restore it on the AS/400 system. Type STRS36MGR on the AS/400 command line and select option 1 from the Migration Aid Main Menu.

Because security officer authority is required on the restore operation, you have the authority to replace any object in the system. The replace option must be used with caution to avoid accidentally replacing items on the system. User IDs are not replaced; if a duplicate is found, you can select whether to halt migration and resolve the conflict or continue. If you continue, the user profile information is not migrated for the duplicate user ID. Only the authorities for the duplicate user ID are migrated. If a user ID that is not valid is found in the restoring process on the AS/400 system, that user ID is not restored.

For a general discussion on the restore process, refer to "Restoring the Configuration" on page 7.

To verify the security information created by the Migration Aid, you can use the following AS/400 commands (Security Officer authority is required):

- WRKUSRPRF (Work with User Profiles)
- WRKOBJ (Work with Objects)
- WRKOBJOWN (Work with Objects by Owner)
- WRKAUTL (Work with Authorization Lists)
- DSPAUTHLR (Display Authority Holder)
- DSPOBJAUT (Display Object Authority)

4.2 Resolving User ID and Office Names

The "Resolve User ID and Office Names" function on AS/400 corresponds to the "Migrate User ID and Office Names" function on System/36. It helps you to identify and correct duplicate and incorrect names. You should run it before you migrate user IDs themselves. The Migration Aid automatically renames user IDs (and all related items) when you restore them, using the new names you have specified. To start the function, type STRS36MGR on the AS/400 command line and select option 7 from the Migration Aid main menu. The following display appears:

```

                                Resolve User ID and Office Names
Type choices, press Enter.

Option . . . . .      1=Restore names from medium
                      2=Print report of duplicate
                        and incorrect name
                      3=Select type of names to be resolved

F3=Exit              F12=Previous

```

Select option 1 to restore the names. If you are migrating from more than one System/36, restore all the names from all the systems before proceeding with the other options. Option 2 allows you to print a complete report of the names, which is useful for identifying user IDs and correcting user IDs and keeping track of the items changed. Select option 3 to view a display from which you can select the types of names you want to resolve.

From that display select option 1 to resolve user ID and office names. Names that are not correct and duplicate names are highlighted. You can correct them by typing the new name over the old one and pressing Enter. Your choices are stored for use when you restore user IDs.

```

                                Resolve User Profile Names
Position to . . .

Type user profile(s) and/or Office user ID(s), press Enter.

User      -----Office-----      -----System-----
Profile    User ID  Address      Name      Group
*NULL      *NULL
USER01     USER01   DEPT01   RCH36SC1  RCH36SC1
USER02     USER02
USER03     USER03   DEPT01   RCH36SC1  RCH36SC1

F3=Exit      F12=Previous

```

Remember that if you have files with names based on user IDs that have been renamed, you also must rename the file.

Other options are related to the office environment. See *System/36 to AS/400 Migration Aid Users Guide and Reference* for more information.

4.3 How System/36 Security is Mapped to AS/400 Security

This section introduces how System/36 security information is mapped to AS/400 security information when you move it using the Migration Aid. Due to the different methods of implementing security, not all System/36 definitions are compatible with the corresponding AS/400 definitions. Use the following tables to better manage your environment before or after migration.

System/36 system security classifications are mapped to AS/400 classifications as shown in the following table.

Table 2. Security Mapping	
System/36	AS/400 System Value
No security	QSECURITY = 10
Password security	QSECURITY = 20 (*)(**)
Resource security	QSECURITY = 30 (*)(**)
Maximum number of invalid sign on attempts allowed	QMAXSIGNON
Number of days of warning before a password expires	Not migrated
Maximum number of days a user can keep Password	Not migrated
Badge security	Not migrated

(*) An IPL is required to activate the change.

(**) If the AS/400 system uses a higher security level than System/36, the AS/400 QSECURITY system value is not changed back. For instance, if AS/400 QSECURITY = 30 and System/36 Security is not active, AS/400 QSECURITY value remains 30.

4.3.1 User IDs and User Profiles

System/36 user information is contained in the user identification file. It is used to tailor user environment and to give users specific authorities. This information is mapped to the AS/400 system user profile as shown in the following table.

Table 3. User Profile Information Mapping	
System/36	AS/400 System
User ID	User profile name
Password	Password
Security classification	User class
Service aid authority	Special authority
Badge number	Not migrated
Comment field	Text
Default user menu	Menu name
Default menu mandatory	Menu mandatory limit capability
Default sign-on procedure	Initial program
Sign-on proc mandatory	Program mandatory limit capability
default library name	Current library
Beginning help menu	Not migrated
Allow user to create folders	Not migrated (*)
Maximum folder size	Not migrated (*)
Password date last change	Password change date

(*) You must be enrolled in AS/400 Office to perform Office tasks.

System/36 security classifications determine what system control operations the user can perform; the same concept applies to the AS/400 user class, which determines a set of special authorities given to the user. The following table

shows how the System/36 security classifications are mapped to AS/400 user classes.

Table 4. Security Classification Mapping	
System/36	AS/400 System
M - Master security officer	*SECOFR - Security officer
S - Security officer	*SECADM - Security administrator
O - System operator	*SYSOPR - System operator
C - Subconsole operator	*SYSOPR - System operator
D - Display station user	*USER - User

4.3.2 Comparison of System/36 and AS/400 Resource Security

On System/36 the resource security information is contained in the resource security file. It applies to files, libraries, folders, subdirectories, folder members, and special resource types such as alternate index files, the system library, and groups of files, libraries, and folders. Resource authority information on the AS/400 system is contained both in individual objects (which identify, for example, the object's owner and the authority granted to the "public") and in user profiles (which contain a list of all objects the user has explicit authority to)

Moreover, a System/36 resource can have multiple owners or no owner; on the AS/400 system every object must have only one owner. Because of these differences, the AS/400 Migration Aid selects an owner when it is not clear who the owner is. The following rules apply:

Resource not secured: The owner for this resource is the user profile QDFTOWN, and the default access (public access on the AS/400 system) is *ALL. This means that anyone who can sign on to the AS/400 system can work with that object. This is the same as on System/36.

Resource secured without owner: The owner for this resource is the user profile QDFTOWN; anyone with specific authorities on System/36 has the same authorities to that object on the AS/400 system.

Resource has multiple owners: The owner for this resource is the first owner found. The remaining owners are given *ALL authority to the AS/400 object.

Library members: The owner for library members is the same as the owner of the library that contains them.

You can change the owner before migrating, using the SECEDIT RESOURCE procedure on System/36, or after migrating, using the CHGOBJOWN command on the AS/400 system.

The access levels to a resource provided from System/36 are different from AS/400 authorities. On System/36 the access level specifies which operations the user can perform on that resource (without distinguishing object from data).

On the AS/400 system, you can control user's object authority and data authority. Object authority is the capability to perform specific operations on an object (such as MOVE, RENAME, DELETE). Data authority is the capability to perform operations on the data contained in the object.

The following table shows how System/36 access levels are mapped to AS/400 authorities.

Table 5. Access Level Mapping	
System/36 Access Level	AS/400 Authority
O - Owner	OWNER & *ALL
C - Change	*OBJEXIST *CHANGE
U - Update	*CHANGE
R - Read	*USE
E - Run	*USE
N - None	*EXCLUDE

4.4 Migration Considerations

This section introduces special considerations for migrating resources and related security information.

4.4.1 Files

When an entry exists in the System/36 resource security file, an authority holder is created on the AS/400 system with the same name as the resource. The AS/400 authority holder has the same function as an entry in the System/36 resource security file, but it applies to program-described database files only.

User authorities are set from the users' records of the resource security file. For more information about Authority Holders see "Resource Security" on page 43.

If the resource does not exist on System/36, the Migration Aid always assumes that the resource is a file, even if it cannot verify this. The result could be undesired authority holders on the AS/400 system. If the file exists on System/36, the authority holder is created when you migrate the file; if no file is migrated, no authority holder is created.

4.4.2 Libraries

When a secured System/36 library is migrated to the AS/400 system, an authorization list is created with the same name as the library. It is used to secure the library and all the objects migrated into the library. These objects consist of procedures, source members, and programs. Each user record in the System/36 resource security file is added to this authorization list. If the library was not secured it is migrated with a public authority of *ALL.

4.4.3 MRT Programs

The multiple requesting terminals (MRT) program concept does not exist in the native AS/400 environment, but is supported in the System/36 environment. The CHGS36 command allows you to select which user profile is used by MRT programs (first MRT user or MRT program owner) and how to check the user authorization to referenced files (for the first user only or for all MRT users). The following figure shows the panel where you can make these choices.

```

CHANGE System/36 SECURITY

S/36 environment . . . . . : #LIBRARY

Type choices, press Enter.

User profile used by MRT program . . . 1 1=First user of MRT
                                         2=Owner of MRT

Check authority of user to files used
by MRT program . . . . . 1 1=All users
                           2=First user

F3=Exit  F5=Refresh  F10=Set to default values  F12=Previous

```

Selecting a user profile is important because all job authorizations to resources (except files) are checked against this user. For more information refer to *Concepts & Programmers Guide for the System/36 Environment*.

4.4.4 Group Names

An authorization list on the AS/400 system is created with the same name as the group name. All files and libraries containing this group name as part of their name are secured by the authorization list. Each user record in the resource security file is added to the authorization list with the appropriate access level.

4.4.5 Parent-Child

On System/36, parent-child is a way to define the relationship between two resources. The parent contains the resource security information for all its children. During migration an authorization list is created with the name of the parent, and all user records in the resource security file are added to the authorization list. The parent, as well as each file or library listed as a child, is secured by the authorization list.

4.4.6 System Library

#LIBRARY is created during migration if it did not exist before migration. #LIBRARY is owned by the QSYS user profile and is given a default public authority of *CHANGE. Objects migrated into #LIBRARY follow the same rules as objects in other libraries.

5. Business Graphics Utility

Business Graphics Utility (BGU) on the AS/400 system is different from BGU System/36. The BGU System/36 applications are partially migrated. For example, graph format members are not converted; you need to recreate them on the AS/400 system. This chapter presents a BGU migration example that illustrates how to have the System/36 BGU application working on the AS/400 system as well as on System/36.

5.1 Sample BGU Migration

This example shows how to migrate a library containing several BGU examples, some graph object files (GOF), and a graph data input file (GDIF).

5.1.1 How to Start BGU Migration

The Migration Aid must already be installed on System/36 and the AS/400 system, and the Graphics Support Tool must be loaded on the AS/400 system. If you need more information, refer to the *Migration from System/36 Planning Guide*.

Enter MIGRATE on the command line to get the Migration Main Menu displayed on the System/36. If this is the first run, select option 1 to get a System Summary Report (for details, refer to the *System/36 to AS/400 Migration Aid Users Guide and Reference*).

Select option 5 (Analyze the system), and then option 2 to analyze the library containing the samples. A report is then printed which helps you identify the unsupported functions.

5.1.2 Report Analysis

In the following report, there is a message MIGR-3813 for each user procedure that uses a System/36 BGU-supplied procedure. This is because these BGU procedures are not supported on the AS/400 system. The procedures that call them need to be modified after they are restored on the AS/400 system. See "AS/400 BGU Procedure Differences" on page 25 for more information.

IBM AS/400 to System/36 Migration Aid OCL and Menu Analysis Report				
Library . . . : BGULIB				
Detail Analysis				
Member	Statement Number	Function	Sev	Statement and Messages
CNVQRY	6	BGUDATA	E	// HELP BGUDATA,GDIFCOPY,BGUFORMB,BGUX MIGR-3813 BGUDATA PROC. NOT SUPPORTED
PRTBGU03	3	BGUGRAPH	E	BGUGRAPH BLDFILE,BGU01F,BGU01D MIGR-3813 BGUGRAPH PROC.NOT SUPPORTED
PRTBGU04	3	BGUGRAPH	E	BGUGRAPH BLDFILE,BGU02F,BGU02D MIGR-3813 BGUGRAPH PROC.NOT SUPPORTED
PRTBGU05	3	BGUGRAPH	E	BGUGRAPH BLDFILE,BGU03F,BGU03D MIGR-3813 BGUGRAPH PROC.NOT SUPPORTED
PRTBGU06	3	BGUGRAPH	E	BGUGRAPH BLDFILE,BGU04F,BGU04D MIGR-3813 BGUGRAPH PROC.NOT SUPPORTED
* * * * * E N D O F A N A L Y S I S * * * * *				

Figure 4. Migration Aid BGU Analysis Report

5.1.3 Items Migrated

Not all items migrate. The following items migrate successfully:

BGU System/36 Graph Data Members

These members become AS/400 database files or text chart formats, depending on whether they are numeric or textual.

BGU System/36 Graph Data Input Files (GDIF)

These members become AS/400 database files or text chart formats, depending on whether they are numeric or textual.

BGU System/36 Graph Object Files (GOF)

These files become AS/400 graphics data files (GDFs).

The following items are not migrated:

BGU System/36 Graph Format Members

You need to recreate them using BGU on the AS/400 system.

5.1.4 Select Items to Migrate

Use option 6 of the Migration Aid Main Menu to select the items to migrate. The Select Items to Migrate menu is then displayed.

Select option 1, Select Files and Libraries, from the menu. The Select Libraries to Migrate menu is then displayed. Use option 1 on the menu to select each library you want to migrate. Then press the Enter key, and the screen for file selection appears.

SELECT FILES TO MIGRATE

Type choices, press Enter.

ITEMCHOICE

POSSIBLE CHOICES

Option

1=Data file2=Forms control table

3=BASIC stream4=BASIC unformatted

5=BGU GDIF6=APF file

9=View

File name

Position list to . .

Starting character(s) of file name

LIST OF FILES

more

Or select files using above options, press Enter.

OPTION	FILE	CREATED	MIGRATED	OPTION	FILE	CREATED	MIGRATED
1	BGU01F	020488	N		BGU	021588	N
1	BGU02F	020488	N	5	BGUFORMB	021088	N
1	BGU03F	020488	N		BGUFORMX	090787	N
1	BGU04F	020488	N		BGUGRPH5	111386	N
1	BGU05F	020488	N		BGUINT33	090787	N

Cmd1=Select all

Cmd3=Go back

Cmd5=Cancel new

Cmd7=End

Cmd8=Reset

Roll=Page

***You have selected 6 items so far

Use option 5 to select GDIF files, and option 1 to select the graphic object files (GOFs). When you have selected your items, press the Enter key and then Cmd6. The next screen displays the save options. You are prompted to select the save media—tape, diskette, or data link.

If you choose tape or diskette you have an option that gives you a diskette or tape number estimate. If you choose data link, you must specify the library where the migration data link places the items migrated and the workstation IDs, or device names for sending and receiving data. For more information refer to *System/36 to AS/400 Application Migration*.

You can also change the default AS/400 library name QS36F for System/36 files, but it is recommended that you do not change this default. Refer to “Select Items to Migrate” on page 4 of this document for more details.

Before the save starts, if you choose tape or diskette as save media, you get an option to initialize the number of tape reels or diskettes you need to save the migrated items.

Then the save operation runs, and a migration status report is automatically printed. If you want more information about your migration, a record of all items you attempted to save is kept in an audit file on System/36. You can generate reports on migration status b selecting option 8 on the Migrate menu.

5.1.5 Restore Items Migrated

After you have completed saving your BGU application to tape, diskette, or data link, you can restore it on the AS/400 system using the AS/400 Migration Aid.

On the AS/400 command line enter STRS36MGR to get the AS/400 Migration Aid Main Menu. Select option 1 to view the restore options. You should have security officer authority to perform the RESTORE operation. See “Restoring the Configuration” on page 7. At the end of every RESTORE job, the Migration



6. Advanced Printer Function and the Intelligent Printer Data Stream Advanced Function PRPQ

Advanced Printer Function (APF) and the Intelligent Printer Data Stream (IPDS) Advanced Function PRPQ are different printing facilities available on System/36. Both of them are available to you when you migrate to AS/400.

6.1 Advanced Printer Functions

Advanced Printer Function (APF) migration should not be difficult because all the System/36 APF items are fully migrated. This chapter presents an APF migration example that illustrates how to have the System/36 APF application working on the AS/400 system as well as on the System/36.

6.1.1 Sample APF Migration

This example shows how to migrate three APF files:

- A logo file named PPLOGO.
- An alternate character set file named PPF1X1.
- A forms control file named PPFORM.

6.1.2 How to Start APF Migration

The Migration Aid must already be installed on System/36 and the AS/400 system, and APF must be loaded on the AS/400 system. For more information, see the *Migration from System/36 Planning Guide*.

Enter MIGRATE on the command line to get the Migration Main Menu displayed on the System/36. If this is the first run, select option 1 to get a System Summary Report (for details, see the *System/36 to AS/400 Migration Aid Users Guide and Reference*).

6.1.3 Items Migrated

All APF items migrate, including the following:

APF System/36 Alternate Character Set Files: These files become AS/400 symbol sets in the System/36 environment files library (normally QS36F).

APF System/36 Logo Files: These files become AS/400 symbol sets in the System/36 environment files library (normally QS36F).

APF System/36 Forms Control Files: These files become AS/400 forms descriptions in the System/36 environment files library (normally QS36F).

6.1.4 Select Items to Migrate

Use option 6 of the Migration Main Menu to select the items to migrate. The Select Items to Migrate menu is displayed.

From the menu, select option 1, and the screen for file selection appears.

SELECT FILES TO MIGRATE

Type choices, press Enter.

ITEMCHOICE

POSSIBLE CHOICES

Option

1=Data file

2=Forms control table

3=BASIC stream

4=BASIC unformatted

5=BGU GDIF

6=APF file

9=View

File name

Position list to . .

Starting character(s) of file name

LIST OF FILES

more

Or select files using above options, press Enter.

OPTION	FILE	CREATED	MIGRATED	OPTION	FILE	CREATED	MIGRATED
	BGU01F	020488	N		BGU	021588	N
	BGU02F	020488	N		BGUFORMB	021088	N
	BGU03F	020488	N	6	PPLOGO	090787	N
	BGU04F	020488	N	6	PPFORM	090787	N
	BGU05F	020488	N	6	PPF1X1	090787	N

Cmd1=Select all

Cmd3=Go back

Cmd5=Cancel new

Cmd7=End

Cmd8=Reset

Roll=Page

***You have selected 3 items so far

Select your files using option 6 (APF files). Then press the Enter key or Cmd6.

The next screen displays the save options. You are prompted to select a preferred save media—tape, diskette, or data link.

If you choose tape or diskette, you have an option that gives you a diskette or tape number estimation.

If you choose data link, you must specify the library where the migration data link places the items migrated and the workstation IDs or device names for sending and receiving data. For more information refer to *System/36 to AS/400 Application Migration*.

You can also change the default AS/400 library name QS36F for System/36 files, but it is recommended that you do not change this default. See “Select Items to Migrate” on page 4 for more details.

Before the save starts, if you choose tape or diskette as save media, you get an option to initialize the number of tape reels or diskettes you need to save the migrated items.

Then the save operation runs, and a migration status report is automatically printed. If you want more information on your migration, a record of all items you attempted to save is kept in an audit file on System/36. You can generate reports on migration status by selecting option 8 on the Migrate menu.

6.1.5 Restore Items Migrated

After you have completed saving your APF items to media, you can restore it on the AS/400 system using the AS/400 Migration Aid.

On the AS/400 command line enter STRS36MGR to get the AS/400 Migration Aid Main Menu. Select option 1 to view the restore options. You should have

security officer authority to perform the restore operation. For more information refer to “Restoring the Configuration” on page 7.

At the end of every restore job, the Migration Aid generates an exception report. Use it to verify that your APF files have been successfully restored. The files are created even if an error is detected during the conversion. If an error is detected, you can use STRAPF on the AS/400 system to correct the problem.

On System/36, you specified the names of logos when you printed the form. Using AS/400 APF, the logo name is specified in the form description. So, after the form description has been restored, use STRAPF to add the necessary logo names and locations.

6.1.6 AS/400 APF Differences

To start APF on the AS/400 system, you must use the STRAPF command to view the main menu with all AS/400 APF options:

Option 1: Work with Symbol Set: Use it to work with logos or with alternate character sets.

Option 2: Work with Form Descriptions: Use it to create and update form descriptions.

Option 3: Print Blank Form Descriptions Alternatively, you can use the MRGFORMD command.

Option 4: Merge Spooled Data With a Form Description: You can create, modify, and delete all your APF files, and you can immediately run your System/36 APF jobs. Alternatively, you can use the MRGFORMD command.

6.2 Intelligent Printer Data Stream Advanced Function PRPQ

All the Intelligent Printer Data Stream (IPDS) Advanced Function PRPQ subroutines used on the System/36 (SUBR50, SUBR51, SUBR52 for RPG, and PRTAPI, PRTGRC, PRTBAR for COBOL) are automatically supplied with the System/36 environment on the AS/400 system. These subroutines are in the QSSP library, and work correctly only with System/36 Environment applications.

You perform the migration of the applications using these subroutines in the same way as you perform the migration of other applications.

If you use the Migration Aid, the programs are automatically recompiled and ready to be run. For detailed information see *Concepts & Programmers Guide for the System/36 Environment*, Appendix D.



7. Migrating Without the Migration Aid

The Migration Aid is not mandatory if you want to migrate from System/36 to the AS/400 system, but it is strongly recommended. For example, it provides the conversion commands needed to migrate BASIC files, Business Graphics Utility (BGU) data, MSRJE forms control tables, or Query.

Still, you might need to restore System/36 items that had been saved using System/36 save procedures (that is, without using the Migration Aid). You can restore these items using either the Migration Aid, or AS/400 restore commands. The next sections briefly describe both ways.

Note: Not all of the System/36 items saved without the Migration Aid can be restored on the AS/400 system. See the chart at the beginning of Chapter 25 of the *System/36 to AS/400 Migration Aid Users Guide and Reference*. No security information associated with the items can be restored.

7.1 Restoring With the Migration Aid

To restore System/36 items using the Migration Aid menus and displays, call the STRS36MGR command from library QMGU on the AS/400 system. On the menu displayed, select option 6. Another prompt is displayed asking for media and so on. These options are the same as if you were running option 1 (normal migration using Migration Aid), and you have two more options:

Recompile: Answer Y (Yes). This way, all the compiles run automatically. Only those items with correct System/36 subtypes will be compiled automatically. The rest you must compile individually.

Country code: Leave the default value *SYSVAL if the AS/400 system uses the same language. Otherwise, specify the three-digit code corresponding to the language you are to use. See Chapter 25 of the *System/36 to AS/400 Migration Aid Users Guide and Reference*.

Then the RESTORE process begins. After it is finished, you can generate a report by using option 2 on the Migration Aid menu.

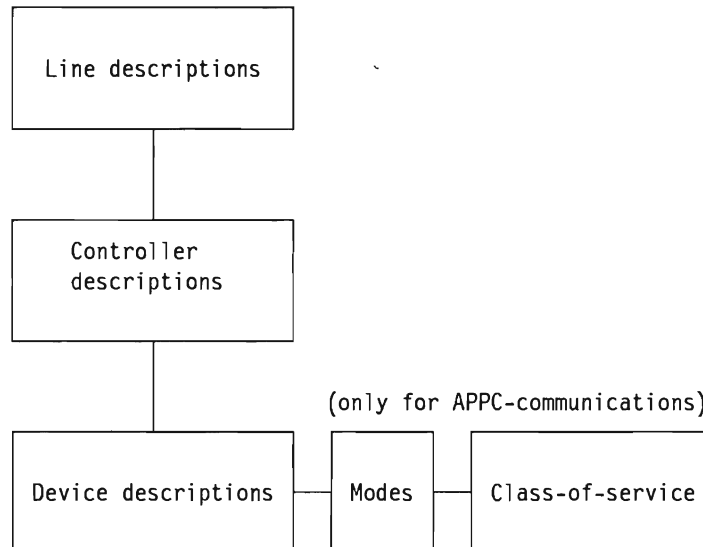
7.2 Restoring Without the Migration Aid

To restore System/36 items without using the Migration Aid, use the appropriate AS/400 restore commands. (See "Save/Restore Operations" on page 73 for more information.) You must recompile one by one all your programs, menus, and displays after they have been restored. You must also call the AS/400 convert commands as soon as you want to restore any special data, such as BGU or BASIC. An example might be the CVTBGUDTA command. See Chapter 28 of the *System/36 to AS/400 Migration Aid Users Guide and Reference*.



8. Managing Your AS/400 Configurations

Configuration descriptions are linked together to form a hierarchy, as shown in the following figure.



Each layer is attached to the previous layer. A line can have multiple controllers attached to it and a controller can have multiple devices attached. When you perform your configuration you should always create from the top—start with the line, then the controllers, and end with the devices, and if you need it, mode and class-of-service (APPC only).

Follow this sequence when you create device descriptions:

1. Diskette and tape descriptions
2. Printer descriptions
3. Display descriptions (last, because display descriptions refer to printer descriptions, and they have to exist).

8.1 Automatic Configuration

Through auto-configuration you can have all your local devices configured automatically, without doing an initial program load (IPL). When the system initially is set up or when you do an attended IPL, there are options on a display called Set Major System Options to control this function.

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
```

Auto-configuration is enabled with Y (yes), which is the default. On the second line you can select the naming convention to be used: *NORMAL (AS/400 names), *DEVADR (names reflecting device addresses), or *S36 (two-character device names). *NORMAL is the default.

If you want all users automatically to have access to the System/36 environment, enter *S36 in the Default special environment on line 3. This value is linked with the special environment (PCENV) keyword on the Create User Profile (CRTUSRPRF) command. By combining these options you can have all, some, or none of your System/36 users auto-attached to the System/36 environment. For more details on this subject, see Chapter 2 in *Concepts & Programmers Guide for the System/36 Environment*.

Device	*NORMAL	*S36	*DEVADR
Workstation controllers	CTL01,CTL02, ...	CTL01,CTL02, ...	CTL01,CTL02, ...
Tape controllers	TAPCTL01, TAPCTL02, ...	TAPCTL01, TAPCTL02, ...	TAPCTL01, TAPCTL02, ...
Displays	DSP01,DSP02, ...	W1,W2, ...	DSP010101, DSP010102
Printers	PRT01,PRT02, ...	P1,P2, ...	PRT010101, PRT010102
Diskette	DKT01,DKT02, ...	I1	DKT01,DKT02, ...
Tape units	TAP01,TAP02, ...	T1,T2,TC	TAP01,TAP02, ...

Notes:

1. Only one System/36 diskette name is allowed; the second diskette is assigned DKT01, the third DKT02, and so on.
2. If you have more than three tape units, and use the System/36 naming convention, they are named T1, T2, TC, TAP01, TAP02.
3. Auto-configuration does not assign the names to the devices to match their order or physical location on the cables. The system does not sense which device is closest to it. It senses and assigns names to devices in the order in which they were powered on when attached to the system. Only when the *DEVADR naming convention is used does the system use port and address information in the name.

4. The first display turned on is the system console, with the device name DSP01, W1, or DSP010101. The system console must be located on port 0.
5. The first printer turned on is the default system printer. System value QPRTDEV provides the name for the default system printer. If you are using the *S36 naming convention, you should change QPRTDEV to P1, or to a two character name of your choice.
6. System values used by auto-configuration are:
 - QAUTOCFG** Can be Y=Yes or N=No
 - QDEVNAMING** Can be *NORMAL (default), *S36, or *DEVADR
 - QPRTDEV** Name of default system printer. PRT01 is the initial setting.

8.1.1.1 Auto-Configuration of Personal Computer and PS/2

If you installed and configured the necessary 5250 emulation software in your personal computer or PS/2², the AS/400 system is also able to auto-configure these devices as AS/400 workstations when the 5250 emulation function is started. Following is a list of the personal computer and PS/2 models and the required software:

- Personal computer (models 5150, 5160, 5170) running 5250 Emulation Program Version 2.1 or 2.12
- Personal computer (models 5150, 5160, 5170) running AS/400 PC Support
- PS/2 (8530) running 5250 Emulation Program Version 2.12
- PS/2 (8550, 8560, 8580) running Work Station Emulation Program Version 1
- PS/2 (8530, 8550, 8560, 8580) running AS/400 PC Support.

8.2 Adding, Moving, and Changing Local Devices

The easiest way to tailor your configuration or add a device description is to use the configuration menus. There are different paths for different types of configurations. The "Work with" commands related to configuration descriptions and management are:

- WRKLIND (for lines)
- WRKCTLD (for controllers)
- WRKDEVD (for devices)
- WRKCFGSTS (for status information about the configuration, such as active, varied off, varied on)

Use these four commands to do anything you want with configuration descriptions. The authority you need is listed in Chapter 1 of the *Device Configuration Guide*.

A configuration description remains in the system until you change it. The easiest way to change it is, from a "Work with" display, to select option 2

² PS/2 is a registered trademark of the International Business Machines Corporation.

(change) next to the device you want to change. You cannot change the description name, type, or model. If you want a new name for a device (description), you must delete the old description and create a new one with the new name. Before you delete the old one, print a copy of it as a record.

Auto-configuration assigns the default system printer name PRT01 to the first printer turned on. To change the name to P1, SYSPRT, or whatever else you might prefer, you must delete and re-create the configuration descriptions as described in the preceding paragraph. Remember also to change the name in the system value QPRTDEV to the new default system printer name.

If you do not use auto-configuration and want to add a device, all the necessary parameters are described in Chapter 8 of the *Device Configuration Guide*.

When you move a display or printer to a new location, a new device description is created if auto-configuration is active (QAUTOCFG=Y). However, the old description is not deleted. It exists until a new device is put into that specific location. Then it is deleted and a new description is created.

On the System/36 you can, by using the CNFIGSSP procedure, display a chart of your workstations, their locations on each System/36 port, and their address. This is very nice for documentation purposes, and it is a quick way to get an overview of not-used addresses on the port.

On the AS/400 system you can use the PRTDEVADR command to print a configuration matrix of addresses for devices attached either to ASCII local workstation controllers or to twinaxial local workstation controllers. You can get the same result through the Work with Controller Description display using option 12. You can also use the WRKDEVD command to display or print the device descriptions (type, model, address, and so on).

8.3 System/36 Environment Configuration

AS/400 provides a System/36 environment configuration facility, through which you can specify values used to run your System/36 jobs on the AS/400 system.

Most of the information you specify concerns the mapping between AS/400 device names and the System/36 environment device IDs. AS/400 device names can be up to 10 characters long but System/36 device IDs can only be 2 characters.

Mapping display, printer, tape, and diskette device names permits your System/36 OCL and application programs that depend on a 2-character ID to run without change.

For instance, an AS/400 display DSP01 can be mapped to System/36 device ID such as W1. The AS/400 diskette DKT01 can be mapped to System/36 diskette ID I1, and so on.

After you have installed the System/36 environment and started your subsystems, the system automatically creates the tables and loads the current device configurations into the tables. When you add or delete devices, the system automatically updates the device mapping tables.

You can use the ?DEV'unit'? expression in a procedure to convert the System/36 environment unit ID (specified in the unit parameter) to the 10-character AS/400 system name. Beginning with Release 2.0, from any high-level language you can call the QEXCVTDV program to convert the AS/400 device names to the corresponding System/36 environment device names and vice versa.

If you want to display or change the values in the tables use DSPS36 or CHGS36 (Display or Change System/36 environment). Along with mapping between the AS/400 device names and the System/36 environment device IDs, you can also specify System/36 environment values for the files library, the default session library, date-differentiated files, shared open of files, record blocking when sharing files, printer information, 3270 device emulation and MRT security, and performance.

Part of this information helps you tailor the environment for System/36 users (such as default session library and printer information) and is similar to what you specify using the CNFIGSSP procedure on System/36.

You can change the default library containing files to other than QS36F, but be careful in doing it. On a job basis you can also override it using the // FILELIB OCL statement or the FLIB procedure. For more information, see *System/36 to AS/400 Application Migration*. For MRT security see "Migration Considerations" on page 19; shared open of files and record blocking are discussed in *System/36 to AS/400 Application Migration*. If you need additional information see *Concepts & Programmers Guide for the System/36 Environment*, Chapter 3.

There are some system values that affect your System/36 environment:

- QCONSOLE** Used by the IF CONSOLE conditional expression. To display or change the current value, use the DSPSYSVAL or CHGSYSVAL QCONSOLE command. If you change this value, the device description must exist for the new name. The console device must be located on port 0.
- QPRTDEV** Printer name used as default or system printer. To display or change the current value use the DSPSYSVAL or CHGSYSVAL QPRTDEV command
- QSPCENV** Can be *S36 or *NONE. This system value works together with the SPCENV parameter in the user profile. SPCENV can be *NONE, *S36, or *SYSVAL

User Profile Parameter	System Value	
	QSPCENV = *S36	QSPCENV = *NONE
SPCENV = *NONE	See Note 1	
SPCENV = *S36	See Note 2	
SPCENV = *SYSVAL	See Note 2	See Note 1
Note: <ol style="list-style-type: none"> 1. This user has to start the S/36 environment (STRS36). 2. This user can work in the S/36 environment all the time. 		

QDEVNAMING If the value is *NORMAL, the AS/400 system naming convention is used. If the value is *S36, two character device names are used. If the value is *DEVADR, device names reflect their device addresses. The Migration Aid does NOT change this system value to *S36 (System/36 naming convention) automatically. If you want this value, you have to change it manually (CHGSYSVAL). It is recommended that the same device name is used in both the AS/400 system and System/36 environment if using System/36 naming convention.

Note: The AS/400 system uses output queues as the System/36 uses a spool file. On the System/36 you can only have one spool file, but on the AS/400 system you have an output queue for each printer on the system or an output queue for each user. An output queue is created by the system when you configure a printer.

When a printer description is deleted the corresponding output queue is also deleted if it contains no entries, so you do not have to worry about unused output queues.

If you want printer spooling to be similar to what you are used to on System/36, use System/36 device names for your printers (P1, P2). Then both the printer and the output queue have the name of P1 or P2, and less confusion arises in managing your print function.

8.4 Starting and Ending the System/36 Environment

When you sign on to a display station the following can start the System/36 environment for your job:

- A system value (QSPCENV)
- Your user profile (SPCENV parameter)
- The STRS36 command
- The STRS36PRC command (for temporary access)

The system then adds #LIBRARY, QSSP, and the files library (default=QS36F) to the job's library list if they are not already there. They are added to the top of the user portion of the library list.

If you do not know whether the System/36 environment is started for you, type some characters on the entry line. If they show in UPPER CASE, System/36 environment is started.

Another way to determine whether the System/36 environment is started is to use the DSPJOB option (*STSA) and then check in the Special Environment option to see whether a *S36 is displayed.

You can also enter GO USER2. If you see the options 50, 51, and 52 (System/36 options), the System/36 environment is started.

If you used STRS36 to start the System/36 environment for you job, the command ENDS36 ends the System/36 environment. (Your job remains active.)

8.5 Libraries Used by the System/36 Environment

This section describes the various AS/400 libraries that are used during a System/36 environment job.

QSSP The System/36 environment system library. This library is restored on the AS/400 system when you install the System/36 environment. It contains the programs, procedures, and utilities necessary to allow System/36 programs to run on the AS/400 system. Do not place user-created objects in QSSP, as these would be replaced if a new version of the System/36 environment is installed. Instead, use #LIBRARY.

#LIBRARY

The System/36 environment user library. It contains user created objects. Because the system searches #LIBRARY when locating objects, you can use it to contain objects shared by many System/36 environment users. This library also contains objects created by the AS/400 system that relate to the System/36 environment such as mapping between AS/400 device names and System/36 device IDs.

QSYS The AS/400 system library.

QUSRSYS

The user system library. Use it for output queues and office items.

QHLPSYS The system help library. It contains all the help texts.

#RPGLIB, #SDALIB, #DFULIB, ...

All the licensed System/36 program libraries.

QS36F The System/36 files library. A default library created by Migration Aid to contain System/36 files.

Application libraries

Your own created libraries.

8.6 Library List

A library list is an ordered list of libraries. When your job uses a library list, each library in the list is searched in the order of its occurrence until the system finds an object of the specified name and type.

The library list consists of the following:

- System part

A list of libraries specified by the QSYSLIBL system value. Initially, QSYSLIBL specifies QSYS, QHLPSYS, and QUSRSYS. Library QSYS is the AS/400 system library.

- Product libraries
- Current library
- User part

A list of libraries specified by the QUSRLIBL system value. Initially, QUSRLIBL specifies QGPL and QTEMP.

You should change the QSYSLIBL and QUSRLIBL values to fit your own operating environment.

When running System/36 programs in the System/36 environment your System/36 current library is added (by the system) to the library list. It is inserted after the system part.

8.7 Configuration Summary and Conclusion

Auto-configuration is the best approach in most situations. It takes care of all the tedious work of creating your configuration descriptions. You just have to tailor it to your special requirements (For example, you can change the TEXT field of each device description to reflect the location and user of the device.)

You do not have to IPL the system or terminate and start subsystems to get a newly added or moved device ready to work. Just make sure the device has a different address than other devices on the port, connect it to the system, and turn on the power switch.

Migration of your System/36 master configuration can be an alternative when you want to preserve all your old device IDs from System/36 (W1, W2, W3, ..., P1, P2, ...) and bring them over to the AS/400 system as device description names. This is especially important if you want to keep your System/36 remote workstation configuration, which cannot be auto-configured. Migration Aid is very easy to work with, and the time it takes to migrate your configuration is negligible.

Try to tailor your System/36 environment using the CHGS36 command to best fit your needs. Also remember to change the system values of QSPCENV, QSYSLIBL, and QUSRLIBL to operate your system most efficiently.

Finally, after configuring your new system and tailoring it to fit your requirements, remember to save your work! Enter GO SAVE on the command line and select option 21, Entire system, on the save menu. You should do this regularly or whenever major changes are made to your configuration environment.

9. Managing Your AS/400 Security

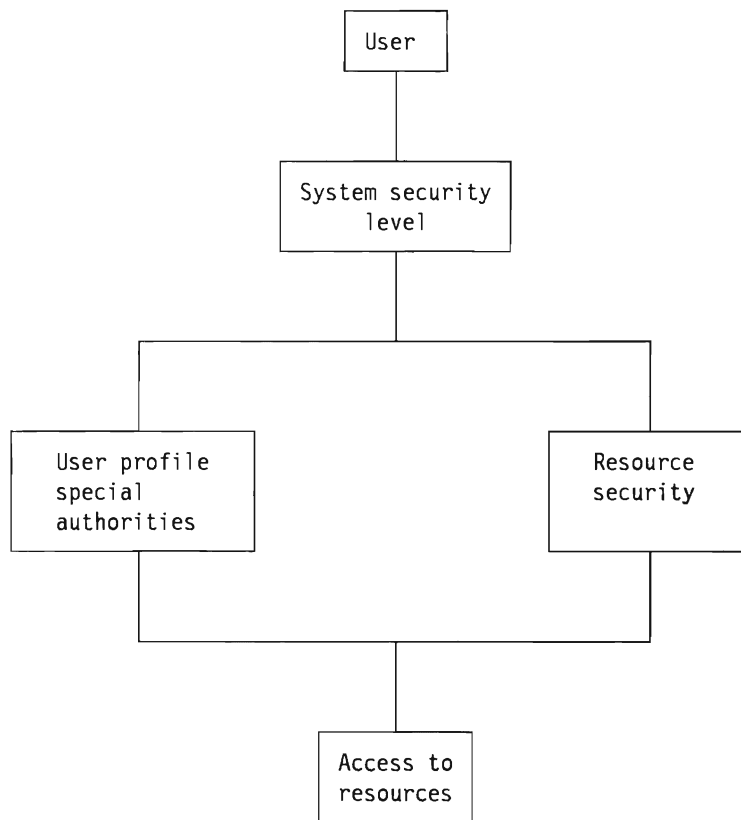
This chapter briefly introduces AS/400 security concepts for System/36 users.

9.1 Introduction

Security on the AS/400 system can limit access to the system in the following ways:

- Identifying users to the system by creating user profiles.
- Authorize users to resources by giving the user authority to use those resources.

The following figure summarizes authorities that can be specified for a user:



9.2 Security Levels

The AS/400 system has three security levels; these levels are similar to System/36 security levels. You can select the level of security for your system by changing the system value QSECURITY (CHGSYSVAL command) and then doing an initial program load (IPL). The following table shows the relationship between the security levels and the functions available.

Table 6. AS/400 Security Levels		
Level 10 Physical	Level 20 Password	Level 30 Resource
Need Only User ID to sign on	Need User ID and password to sign on	Need User ID and password to sign on
System creates user profile if it doesn't exist	User profile must exist	User profile must exist
Can use all objects	Can use all objects	Can use only objects to which have authority
Menu and initial program security are not active	Menu and initial program security are active	Menu and initial program security are active
Do not need to manage authorities	Do not need to manage authorities	Need to manage authorities
Minimal security active Password security not active	Minimal security active Password security active	Security active Password and resource security active

9.3 User Profiles

User profiles are used by the AS/400 system to identify who can sign on as users and what functions those users can perform on the system resources after signing on. User profiles have the same function as user IDs on System/36, but with more capabilities. On System/36 you manage user IDs by using the SECEDIT USERID procedure, on System/36 you can use WRKUSRPRF. Using this command you can control the way each user profile works on the system. Several parameters are available: only the most important are discussed in this document. If you need more information refer to *Security Concepts and Planning*.

9.3.1 Password Security

Password security is active only when the system security level is 20 or 30. Users must specify a correct combination of user name and password to sign on to the system. Use the CHGPWD command to change user passwords.

9.3.2 User Class

Through this function you can specify the system control operations users can perform and the menu options they can use, depending on the QSECURITY level of your system. These classifications are similar to System/36 security classifications. For a complete list of special authorities, see Special Authority on page 35. The user classes available are:

- *SECOFR Security Officer
- *SECADM Security Administrator
- *PGMR Programmer

***SYSOPR** System Operator

***USER** General User

9.3.3 Special Authority

If the system-provided user classes do not fit your needs, you can specify a different combination of special authorities given to the user. Special authorities available are:

***ALLOBJ** Access to all resources in the system

***SAVSYS** Save and restore operations for all resources

***JOBCTL** Work with queues, jobs, spool, IPL the system

***SERVICE** Alter service functions

***SPLCTL** Spool control functions

9.3.4 Initial Program Security

This parameter specifies which program must be run when the user signs on. This is similar to System/36 default sign-on procedure. You can also prevent unintended changes to the initial program through the limited capability parameter.

9.3.5 Current library

You can assign users' current libraries to store user-created objects. Limit user ability to change the current library by using the limited capability parameter.

9.3.6 Menu Security

On the AS/400 system you can specify which menu is displayed when users sign on. This is similar to the System/36 default user menu. It is possible to limit the user ability to change the menu by using the limited capability parameter.

9.3.7 Limited Capability

Limited capability is similar to forcing a mandatory menu, procedure, or current library on System/36. Users cannot modify (or can only partially modify) the program menu, and current library specified in their user profiles.

9.4 Resource Security

Resource security helps you to control users' access to resources, determining the users' authority to resources. On the AS/400 system you can control both user object authority and data authority. Object authority is the capability to perform specific operations on an object such as MOVE, RENAME, and DELETE. Data authority is the capability to perform operations on the data contained in an object.

On System/36 you manage resources using the SECEDIT USERID procedure. Grant Object Authority (GRTOBJAUT) or Edit Object Authority (EDTOBJAUT) are the AS/400 commands you can use to specify user access to a resource. Object authority consists of:

***SYSOPR** System Operator

***USER** General User

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On System/36 you manage resources using the SECEDIT USERID procedure. Grant Object Authority (GRTOBJAUT) or Edit Object Authority (EDTOBJAUT) are the AS/400 commands you can use to specify user access to a resource. Object authority consists of:

- *OBJOPR** Object operational (use the object as determined in the data authorities)
- *OBJMGT** Object management (secure, move, rename, add members)
- *OBJEXIST** Object existence (control ownership and existence, delete, save, restore)
- *AUTLMGT** Authorization list management (add, change, remove users from an authorization list)

Data authority consists of:

- *READ** Read (display contents or run a program)
- *ADD** Add (add entries in an object)
- *UPDATE** Update (change the entries in an object)
- *DELETE** Delete (remove entries from an object)

You can specify any combination of object and data authority to tailor user access to a resource, or you can use system defined-authorities.

The following table shows the system-defined authorities and the capabilities given a user.

Table 7. System-Defined Authorities							
Authority	Object			DATA			
	Oper	Mngt	Exist	Read	Add	Update	Delete
*ALL	X	X	X	X	X	X	X
*CHANGE	X			X	X	X	X
*USE	X			X			
*EXCLUDE	No authority			No authority			

9.4.1 Public Authority

Public authority determines the default authority for any user who does not have explicit authority to the resource. Public authority consists of a user name called *PUBLIC created by the system. When you define the public authority for a resource you grant authorities to this user. Public authority has the same function as default user access on the System/36 resource security file.

9.4.2 Library Security

You can use a library to secure your objects, placing the objects in the library and then limiting the library access. This is not equivalent to securing a library on System/36. In the System/36 environment, a library's authority is not extended to the objects contained in it.

9.4.3 Authorization Lists

An authorization list is a list of users and their authorities. Different authorities may be specified for different users. The WRKAUTL command allows you to perform all the operations on an authorization list. When you have created the authorization list, you can use it to secure an object using the GRTOBJAUT or EDTOBJAUT OS/400 commands.

A single authorization list can be used for different objects. The advantages are evident: All the users on the list are given authority to objects in one operation; adding, changing, removing users from an authorization list applies to all objects secured via the authorization list.

9.4.4 Authority Holders

Authority holders keep authority for program-described data files even when the files do not exist on the system. This function is similar to that provided by the System/36 resource security file. Authority holders can be used by System/36 applications that often delete and recreate a file. Through authority holder, the authority for that file is not lost when the file is deleted.

When you create an authority holder using the CRTAUTHLR command, all authorities for the file are copied to the authority holder. In this situation you can display authorities for an object (DSPOBJAUT) even if the file does not exist.

9.5 Managing System/36 Security Environment after Migration

To manage security in the System/36 environment you must use AS/400 system commands. You can view the SECURITY menu by typing GO SECURITY on the command line. From the resulting menu you can perform all the security-related functions.

The following section approaches the security environment from a user point of view, specifying which commands you can use to secure objects in the system and how the security environment affects the application itself.

9.5.1 Files

To secure a file using a System/36 approach you can create an authority holder using the CRTAUTHLR command. Specify the default authority needed as the public authority. For each user to have access to the file, grant a private authority by using the Grant Object Authority (GRTOBJAUT) command. As with an entry in the System/36 resource security file, the authority holder can be created before or after the file is created.

You can also secure a file without using an authority holder, just like all the objects in the system. However, if the file is deleted and then recreated, all the authorities previously granted are lost.

AS/400 files are always placed in a library, so you need the right access level to the library to perform operations on those files.

9.5.2 Libraries

A System/36 secured library migrated to the AS/400 system is secured by using an authorization list. The authorization list specifies the user access level to the library and to all the objects contained in the library.

Using the AS/400 system command WRKAUTL you can perform all the functions on an authorization list: Adding or removing users, changing their access levels, creating new authorization lists. If you create a new library you can secure the library and all its objects using an authorization list. But when you add objects to the library you must explicitly grant authorizations to secure the new objects.

9.5.3 Group Names

Group names are secured by the authorization list created by the Migration Aid. If you create a new file in the System/36 environment with the group name as part of the file name, the new file is automatically secured through this authorization list. This is true only for System/36 files created through the BLDFILE, COPYDATA, ... procedure, not for libraries or objects. This system support for automating and updating the group authorization list is only available in the System/36 environment using System/36 procedures.

9.5.4 Parent-Child

A better way to maintain the same concept on the AS/400 system is to use a unique authorization list for the parent and all children. This is the approach the Migration Aid uses in the migration process from System/36 to the AS/400 system. Note that if you delete and then recreate a child, it is no longer secured.

9.5.5 Creating New Objects

When you create a new AS/400 object it **always** has an owner (usually the user who created it) **and** a public authorization (the default public access is *CHANGE). This is different from System/36, where even on a secured system you can have secured resources that are not secured.

If an authority holder does not exist when you run System/36 environment jobs, the user profile of the job which is creating the object is used as owner. The default public authority is *ALL, to be consistent with System/36, where a resource that is not secured can be accessed by all users.

Note: This is true only for objects created in System/36 environment, such as database file (BLDFILE ...) and libraries (BLDLIBR ...).

9.6 System/36 and AS/400 Commands Comparison

This table shows the AS/400 command that corresponds to the System/36 security procedure commands. *****

S/36 Procedure	AS/400 Equivalent Function
SECDEF USERID CREATE DELETE ACTPW DEACTPW ACTBDG DEACTBDG STRTDAT STOPDAT	Always on system Not supported QSECURITY = 20 QSECURITY = 10 Not supported Not supported QPWDEXPITV QPWDEXPITV
SECDEF RESOURCE CREATE DELETE ACTRES DEACTRES	Always on system Not supported QSECURITY = 30 QSECURITY = 10/20
SECEDIT USERID RESOURCE	WRKUSRPRF WRKOBJ GRTOBJAUT EDTOBJAUT
SECLIST USERID RESOURCE	Not supported Not supported
SECSAVE USERID RESOURCE	SAVSECDTA (See Note 1) SAVSECDTA (See Note 1)
SECREST USERID RESOURCE	RSTUSRPRF RSTAUT (See Note 2)
PASSWORD	CHGPWD
Note: 1. The SAVE SECURITY DATA command saves all user profiles, authorization lists, authority holder and internal Office distribution objects on the system. 2. Owner and public authority are restored with the objects themselves.	

9.7 Security Summary

Security is an important and significant part of AS/400 architecture. For a System/36 user it is fundamental to understand how it works. In fact, although basic concepts are similar (system-provided security, user IDs and user profiles, resource security), implementation and capabilities provided by the two systems are different.

AS/400 security is more complete and granular than System/36; functions and possibilities the AS/400 system offers you are generally superior to the System/36 equivalents. They allow you to secure every object, all data, resources, and functions in the system. Display stations and printers, and every command and program in a library can be secured by requiring the proper authority to use them.

A good migration approach, if you are moving from a System/36 that is not secured, could be to start with minimal active AS/400 security. You could gradually set up your own environment, creating user profiles and assigning authorities, before changing the security level to 20 or 30.

If you are migrating from a secured System/36, check your security information and the way it is converted before moving. This could save time and avoid too high (or too low) user access levels to resources.

10. Starting and Stopping the System

This chapter discusses the different methods to start and stop the AS/400 system.

10.1 Starting

To start the AS/400 system you need to perform an initial program load (IPL). The IPL process loads the necessary system control programs from disk storage so the AS/400 system becomes operational.

On the AS/400 system there are different ways to perform an IPL:

1. IPL from disk (normal)

Use normal IPL if the system is stopped during the night, for example, and you want to start it again in the morning. This is the same as on the System/36.

2. Remote IPL

Use remote IPL to start a system in a remote location if no personnel are at the location to perform a normal IPL. Using a remote IPL procedure, you dial your system through modems and telephone lines. The connection triggers the IPL.

3. Timed IPL

Use timed IPL on a predetermined day and time that you specify in the system values.

4. Auto IPL

Use automatic IPL if you want the system to do an automatic IPL after a power failure. When the power is restored, the system starts by itself.

There are different system values available to control the way you want to IPL the system. You can use the DSPSYSVAL and CHGSYSVAL commands to display and change the values.

10.2 Stopping

Stopping the system is normally done with the Power Down System (PWRDWSYS) command. A parameter on the command allows you to delay the power down sequence by a specified (or unlimited) amount of time.

You can also power down immediately. This causes all subsystems and jobs to end immediately, and programs are not able to complete in a normal way. This could mean loss of data!

Do not stop your system without notifying all active users (for example, by using the SNDBRKMSG command). Give them time to complete their work. You can use the WRKACTJOB command to display the active users and programs that are running on the system.

There is a manual switch to turn off the power to the system. Use the command instead.

The Emergency Power Off switch should **only** be used in case of an emergency, in which you have to turn off power immediately. You may have unpredictable results in your data after using this switch.

For detailed step-by-step instructions on how to perform start and stop procedures, see the *Operators Guide*.



11. Controlling Jobs and System Activity

This chapter describes job and system activity concepts, job queue, and system activity operations using System/36 commands, and using AS/400 commands as alternatives to System/36 commands for more flexibility and advanced functions.

11.1 Jobs and Jobs Processing

In the System/36 environment a job is a unit of work done by the system. It is composed of one or more programs. A job step is a unit of work done by one program. A job that runs two programs has two job steps.

The System/36 environment concept of an interactive job is different from the System/36 concept of an interactive job. On System/36, when you sign on to the system you are not yet running a job. On the AS/400 system when you sign on you are running a job. In this chapter the term *job* refers to the System/36 concept of job.

11.2 How the System Runs Jobs

When you enter a command or select a menu item, the System/36 environment **command processor** processes the request to determine whether it should start a job.

If the entry or menu item is a control command, the System/36 environment command processor does not start a new job; it passes control to a System/36 environment routine that immediately processes the control command.

If the entry or menu item is a procedure or OCL statement, the System/36 environment command processor passes the statement to the System/36 environment initiator function. The initiator function reserves system resources for the job, finds the programs, and passes the control to the programs in the job.

A System/36 environment function called **system input** processes statements entered from a display station or from a procedure member. After reading the statement, system input processes all the substitutions and functions specified by the statements. After processing a statement, system input returns the statement to the calling function.

For a detailed discussion, see the *Work Management Guide* and the *Concepts & Programmers Guide for the System/36 Environment*.

11.3 Job Management and Job Scheduling

The system allows you to manage and schedule your jobs. You can determine how your programs use main storage with different processing priorities and the order in which the system processes your job using the different job queue priorities.

Priority is the relative order of importance of jobs. For example, a job with high run priority should run before a job with medium or low priority. You can specify the processing priority for a job through the ATTR OCL statement. The following table shows the mapping of System/36 environment priorities to AS/400 priorities. If your job does not specify a run priority, the system assigns it a normal priority.

Table 8. Processing Priority	
System/36 Environment Priority	AS/400 Priority
Yes	10
No	20 (interactive) 50 (batch)
High	10
Medium	20
Low	50
Default	20 (interactive) 50 (batch)

Processing priority is different from job queue priority. **Processing priority** is the order in which jobs already running on the system are assigned system resources. **Job queue priority** determines the order in which the jobs are presented to the system for processing.

By default the processing priority of a job placed in the job queue is Low. However if you specify a different run priority (by using the ATTR OCL statement), and then you use this procedure to submit a job to the job queue, the job has the same run priority as the procedure. This might be High, Medium, or Low.

11.4 Using Job Queues

The System/36 environment submits batch jobs to the following job queues:

Job Queue Jobs

When you specify the Job Queue (JOBQ) command or the // JOBQ OCL statement, the system submits jobs to job queue QBATCH in library QGPL.

Evoke Jobs

When you specify the // EVOKE OCL statement, the system submits jobs to job queue QS36EVOKE in library QGPL. This job queue has maximum active jobs set to *NOMAX.

Nonrequester Terminal (NRT) Jobs

When you specify the // ATTR RELEASE-YES OCL statement for a SRT job, the system submits jobs to job queue QS36EVOKE in library QGPL.

Multiple Requester Terminal (MRT) Jobs

MRT jobs are submitted to job queue QS36MRT in library QGPL. This job queue has the maximum active jobs parameter set to *NOMAX.

There is no maximum for the number of job queue jobs that can be active at one time in the system, but for each job queue you should check the maximum active jobs (MAXACT) parameter. Job queue QBATCH in QBASE defaults to 1; job queue QBATCH in QBATCH defaults to 3.

11.5 Working with Job Queues

The following sections discuss how a System/36 user can work with job queues in the AS/400 System/36 environment.

The following table shows System/36 control commands that are supported and not supported in the System/36 environment.

Table 9. System/36 and AS/400 Job Control Command Comparison		
System/36 Control Commands	Supported in System/36 Environment	AS/400 Equivalent Function
C J	No	WRKJOBQ or ENDJOB
G PRTY	No	CHGJOB RUNPTY
G J	No	WRKJOBQ or CHGJOB
G JOBS	Yes	CHGJOBQE
H J	No	WRKJOBQ or HLDJOB
PRTY	No	WRKUSRJOB or CHGJOB
L J	No	WRKJOBQ or RLSJOB
S J	Yes	CHGJOBQE or RLSJOB
D U	Yes	WRKUSRJOB
P J	Yes	CHGJOBQE
D J	Yes	WRKJOBQ
S JOB	No	WRKUSRJOB or RLSJOB
P JOB	No	WRKUSRJOB or HLDJOB
Note: All these commands affect only job queue QBATCH in QGPL.		

System/36 commands are mapped to AS/400 commands. After issuing the System/36-supported command, an AS/400 screen is displayed. Help screens or prompts are not available for most of the System/36 commands. So unless you know the parameters, you cannot use the System/36 command. It is easier to use the AS/400 equivalent command and be prompted for the parameters.

11.5.1 Working with Job Queues Using D J

Key in D J to get to the Work with Job Queue display, where you view all the jobs currently on the job queue in the order in which they are to be selected for processing. Only one job queue (QBATCH in QGPL) is displayed.

The D J command maps to the Work with Job Queue command with the following parameters: WRKJOBQ JOBQ(QGPL/QBATCH). There are no prompts for the D J command.

11.5.2 Working with Job Queues Using WRKJOBQ

You can use the Work with Job Queue (WRKJOBQ) command as an alternative to D J. Key in WRKJOBQ and press F4 (prompt) to specify the queue and library names. If you press the Enter key without going through the prompts, the display defaults to all job queues.

The Work with Job Queue display screen shows you the name of the queue you wish to work with and the library where the job queue resides. Status values show whether the job queue is held (HLD), released and attached to a subsystem (RLS/SBS), attached to a subsystem and held (HLD/SBS), or released (RLS).

11.5.3 Processing Using The Work with Job Queue Display

Using the Work with Job Queue display, you may CHANGE, HOLD, END, WORK WITH, or RELEASE jobs. Type an option before one or more jobs. When you press the Enter key, the function is processed using one of the following:

2=Change: Use the 2=CHANGE option to run the Change Job (CHGJOB) command to change the jobs attributes. Pressing the Enter key or F4 prompts you for the CHGJOB command. Otherwise, you can specify parameters on the input field.

3=Hold: Use the 3=HOLD option to Hold the Job (HLDJOB).

4=End: Use the 4=END option to End the Job (ENDJOB).

5=Work with: Use the 5=WORK WITH option to display the Work With Job menu display. This provides you with many more options for working with a specific job.

6=RELEASE: Use the 6=RELEASE option to release a previously held job. When you take this option, the Release Job (RLSJOB) command is processed.

11.5.4 Work with Job Option (WRKJOB)

While using the WRKJOBQ display, you can opt to work with a specific job. Select option 5=Work with. You then view the Work with Job (WRKJOB) display. The following are the options on this display:

1. The Display Status Attributes option is displayed whether the job is active, on the output queue, or on the job queue, and shows the identifying characteristics and status of the job, such as status, entered system (date, time), started (date, time), subsystem.

2. The Work with Job Definition Attributes option is showed whether the job is active, on the output queue, or on the job queue, showing the definition attributes that are in the job description associated with the job.

4. The Display Spooled Files option displays information about a job's input or output files.

10. The Display Job Log option and all the options following this option appears when the job is active.

11.5.5 Change Job Queue Entry (CHGJOBQE)

The Change Job Queue Entry (CHGJOBQE) command changes the existing job queue entry in the specified subsystem description. This command can be issued while the subsystem is active or inactive.

You can base these decisions on the subsystem description and the library that contains the job queue entry being changed. Also consider the specified name and library of the job queue that is the source of the jobs started by the subsystem. You can specify the maximum number of active jobs that can be started at the same time from this job queue and the maximum number of jobs that can be started for a specified priority.

11.6 Job Management Using Menus

Do the following when you want to process jobs from the system menus:

1. Go to the Main Menu (GO MAIN).
2. Select Option 1, User Tasks.
3. Press the Enter key and the User Tasks menu appears. Four options are displayed that relate to jobs and job processing:

Option 1: To display or change your job (WRKJOB) which causes the Work with Job (WRKJOB) menu to be displayed.

Option 4: To submit a job, which causes the Submit Job Screen to be displayed.

Option 6: To work with batch jobs, which causes the Work with Submitted Jobs screen to display.

Option 60: To display more user tasks display options, where you can select Option 1 for remote jobs.

Note: The options listed above are the only options available when using menus. For more flexibility and more options for job processing, you can use the CMDJOB or CMDJOBQ menus.

11.7 Other Job Processing Commands

If you only use the System/36 commands, you are not able to fully take advantage of the functions of the AS/400 system. The following sections contain other common AS/400 system commands that you may use.

11.7.1 Work with Active Jobs (WRKACTJOB) Command

Use the Work with Active Jobs (WRKACTJOB) command to view the performance and status information for jobs that are currently running on the system. All information is gathered on a job basis. The display shows you jobs that run in a subsystem and system jobs.

The WRKACTJOB display shows all jobs on active status on the Work with Job (WRKJOB), Work with Subsystem Jobs (WRKSBSJOB), Work with Submitted Jobs (WRKSBMJOB), and Work with User Jobs (WRKUSRJOB) displays.

11.7.2 Work with User Jobs (WRKUSRJOB)

The Work with User Jobs (WRKUSRJOB) display shows the names and status information of user jobs running on the system, on job queues, or on output queues.

Available options are Change, Hold, End, Work with, Release, and Work with spooled files.

You can access this command by keying in D U and pressing Enter. There are no prompts, nor is the Help key available. All user jobs of any type are displayed.

The D U command is equivalent to WRKUSRJOB USER(*ALL) STATUS(ACTIVE). Through this display, you can gain access to the Work With Spooled Files display as well as the Work with Jobs display.

You can use WRKUSRJOB to view all jobs of a specific user profile. For example, if you want to view all active jobs for user USER1, the command is WRKUSRJOB USER(USER1) STATUS(ACTIVE).

12. Controlling Printed Output

This chapter discusses print spooling concepts, guidelines, and operations.

12.1 How the System Handles Printed Output

Printed output is handled by the system in two ways:

1. Printer Data Management handles print requests from a program, inserts the proper control codes for the printer being used, and sends the information to be printed.
2. System List handles all output from the AS/400 utility programs. It determines whether the output should be printed or displayed and sends it to the printer or display station.

12.2 New Print Spooling Concepts

As on the System/36, print spooling under the AS/400 system is capable of storing printed output for later printing.

The AS/400 system has output queues like the System/36 spool files, except that there can be one output queue for every printer configured on the system. The output queues are created during system configuration. If you want print spooling to be similar to that of the System/36, configure your printers with 2 character device name such as P1 and P2. To do this, use the Change System Value (CHGSYSVAL) command with the QDEVNAMING parameter specifying *S36.

Also, individual users may have their own output queues.

To have the System/36 environment run like System/36, specify that the output created by a job should be put in output queue *DEV. Specifying the *DEV value indicates that output for a printer should be placed in the output queue for that printer. For example, output for printer P1 is placed in output queue P1, output for printer P2 in output queue P2, and so on.

Spool Writer Messages are sent to the message queue that you specified during configuration. If you want all the messages to go to the system operator queue, specify the QSYSOPR message queue in library QSYS. To display the status of all the active spool writers on the system, or the message queue associated with a particular spool writer, use the STATUS WRT command.

12.3 Printer Control Guidelines

This section summarizes the System/36 commands and procedures used to control printing and their equivalent AS/400 commands.

The System/36 spool control commands are listed in the following table.

Table 10. System/36 and AS/400 Spool Control Command Comparison

System/36 Control Commands	Supported in System/36 Environment	AS/400 Equivalent Function
D P	Yes	WRKSPLF DSPFMT(*S36FMT)
G COPIES *	Yes	WRKSPLF or CHGSPLFA COPIES
G DEFER *	Yes	WRKSPLF or CHGSPLFA SCHEDULE
G FORMS *	Yes	WRKSPLF or CHGSPLFA FORMTYPE
G ID *	Yes	WRKSPLF or CHGSPLFA DEV
G P *	Yes	WRKSPLF or CHGSPLFA OUTPTY
G SEP	Yes	WRKSPLF or CHGSPLFA FILESEP
H P *	Yes	WRKSPLF or HLDSPFLF
L P *	Yes	WRKSPLF or RLSSPLF
C P *	Yes	WRKSPLF or DLTSPFLF
RESTART	No	ENDWTR and STRPRTWTR PAGE or HLDWTR and RLSWTR PAGE
S P	Yes	WRKWTR or STRPRTWTR
D WRT	Yes	WRKWTR DSPFMT(*S36FMT)
P P	Yes	ENDWTR
V ON/OFF,PRT *	Yes	VRYCFG
Note: * These commands have required parameters. Since there is no Help key or any prompt, and unless you know the required parameters, it is simpler to use the equivalent AS/400 commands and be prompted.		

The following printer definition and control functions are also available:

- Changing the session printer: the PRINT procedure
- Changing the system list device: the SYSLIST procedure
- Changing the system printer: the CHGSYSVAL procedure with the SYSVAL(QPRTDEV) parameter
- Changing printer configuration information: the SET procedure
- Changing printer information in a procedure: FORMS, PRINTER OCL statements.

12.4 Working with Spooled Files

You can work with spool files using the D P command in the System/36 environment. An alternative to the D P command is the Work with Spooled Files (WRKSPLF) command. This section discusses the D P command, the Work with Spooled Files command, and other AS/400 commands that help you process your spool files more effectively.

12.4.1 Working with Spooled Files Using D P

When you key in D P, the Work With Spooled File Status displays showing all the output files that are currently on the system. The display shows the spool ID of your output files. From this display you can do the following:

- Select Change entries or use the Change Spooled File Attributes (CHGSPLFA) command.
- Select Hold entries or use the Hold Spooled File (HLDSPFLF) command.
- Select Delete entries or use the Delete Spooled File (DLTSPLF) command.
- Select Display entries. (You do not have to key in the COPYPRT command to display your spool files. Just select this option.) This is also the Display Spooled File (DSPSPLF) command.
- Select Release entries or use the Release Spooled File (RLSSPLF) command.
- Select Show attributes or the Work with Spooled File Attributes (WRKSPLFA) command.

This screen displays the following:

- The Spool ID.
- The procedure that was running when the spooled file was created.
- The user.
- The printer specified when the spooled file was created.
- The printer ID specified for this file in the System/36 environment.
- The status of the spooled file, whether it is Ready, Closed, Held, Saved, or Writer (if the file is currently produced on an output device by a writer), pages, current page, and the number of copies remaining to print. Using F10 and F11 you can get more AS/400 system information, such as the file number, priority, and queue.

12.4.2 Working with Spooled Files Using the WRKSPLF Command

Similar to the D P command, when you issue the WRKSPLF command and press F4 (prompt), you see the WRKSPLF prompt display. The commands use different defaults, and you can get different displays by using the DSPFMT keyword. D P defaults to *S36FMT, so System/36 terminology is used on the display. WRKSPLF defaults to *INLENV. The format and terminology used is determined by the SPCENV value specified in the user profile.

When using the WRKSPLF command, you can use the F4 (prompt) and the next display has Help text available.

You can select a subset of the spooled files you want to view. For example, you could display only files for USER1. The command is "WRKSPLF SELECT(USER1)". You can do this by either:

- Enter "D P" and F4 (Prompt), which displays the WRKSPLF prompt, or
- Enter "WRKSPLF" and F4.

12.4.3 Working with Writers Using the STATUS WRT Command

When you key in the STATUS WRT command, there are no prompts or Help key available.

This displays the Work with Spool Writer Status display shows all the printers that are defined to the System/36 environment. Status information for the printers is displayed, and several options are available:

- Start or the Start Print Writer (STRPRTWTR) command
- Change or the Change Writer (CHGWTR) command
- Hold or the Hold Writer (HLDWTR) command
- End or the End Writer (ENDWTR) command
- Work with or the Work with Writer (WRKWTR) command, which displays the writer that is active to the printer.
- Release or Release Writer (RLSWTR) command
- Messages or Display Message (DSPMSG) command to display the message queue with the operational messages for this printer
- Queue or the Work with Output Queue (WRKOUTQ) command, where you can display the output queue for this printer.

An important field is the Status field, which describes whether the writer is:

- Started (STR)
- Ended (END)
- Currently on the job queue (JOBQ)
- Held (HLD)
- Waiting for a reply to an inquiry message (MSGW).

Only STR indicates that printing is occurring. If printing is not occurring, check the OUTQ status. If the status is Held (HLD), use the RLSOUTQ command to change it to RLS.

The ID column shows the System/36 environment name for the printer. You can press F11 to see the Device column, which shows the AS/400 name for the printer.

12.4.4 Working with Writers Using the WRKWTR Command

Issuing the Work with Writers (WRKWTR) command brings you to the Work with Writers screen. Unlike the STATUS WRT command that defaults to a predefined selection, you can use F4 (prompt) for parameters. You can select and specify a specific spooling writer or all spool writers, or all printers.

Or you may choose to take the default, which is WRKWTR WTR(*PRT), and display all the printers and the writers that started those printers. You can get the same display by using either the STATUS WRT command or the WRKWTR DSPFMT(*S36FMT) command.

12.4.5 Using SET

To define information for the display station environment, and thereby control how information is printed, use the SET procedure in the System/36 environment. You can specify the number of lines printed per page, the printer to be used, the forms number, and so on. The changes remain in effect after you sign off. Be aware that certain fields are ignored (%) and invalid (&). For more information refer to *System Reference for the System/36 Environment*.

12.4.6 Using PRINT

Use the PRINT procedure to specify printer information such as printer ID, number of lines per page, lines per inch, and characters per inch during a display station session. For more information refer to *System Reference for the System/36 Environment*.

12.4.7 Using SYSLIST

Use the SYSLIST procedure to direct system list output in the following ways:

- Listed on the printer
- Displayed at the display station
- Not listed.

For more information refer to *System Reference for the System/36 Environment*.



13. Handling Messages

This chapter contains information about:

- Message concepts
- Sending, receiving, and displaying messages
- Managing message queues
- System/36 and AS/400 system differences

Messages provide a means of communication between the system and the users of the system, as well as within the system itself. When you enter a command, the system may respond with a message indicating the status of your request. Programs processing work on the system may also communicate through messages.

As the system operator, you receive messages from your system users and system programs that communicate conditions to you and indicate actions you need to take. As a system user, you receive messages in response to your entries at a display station.

13.1 Message Concepts

The system and your programs use messages to communicate with you and your application users.

The following are types of displayed messages:

- Informational messages that indicate the status of a job that is running or has completed.
- Prompting messages that ask the user to enter information.
- Error messages that indicate an error has occurred. The system waits for a response.

13.2 Working with Messages

This section discusses sending, receiving, and displaying messages.

13.2.1 MSG Command

The System/36 environment on the AS/400 system provides support comparable to the System/36 Message (MSG) command. This command allows you to send a message to such destinations as a System/36 environment display station, an AS/400 display station, all display stations, a user ID, or a personal computer location.

You can also use the MSG command to display waiting messages. The System/36 environment uses AS/400 support to display both the user and the workstation message queues.

13.2.2 Sending Messages

There are two AS/400 commands you can use to send messages: the Send Message (SNDMSG) command, and the Send Break Message (SNDBRKMSG) command.

13.2.2.1 Send Message (SNDMSG) Command

To send a message you can use the Send Message (SNDMSG) command to do the following:

- Send a message from your display station to one or more message queues (display station or user message queue).
- Request a reply from the receiver of your message.

This message may not be viewed immediately by the receiver, depending on what delivery mode the receiver's message queue is set to.

To send an urgent message and ensure that the receiver sees it immediately, send a BREAK MESSAGE.

Use the following steps to send a message:

1. Type SNDMSG on the command line.
2. Press F4 (prompt), and the display prompts you for your message.
3. MSG and TOUSR parameters are required entries.
4. Type in the kind of message you want to send: informational (*INFO) or inquiry (*INQ).
5. Type the name of the message queue if you are sending an inquiry message.

13.2.2.2 Send Break Message (SNDBRKMSG) Command

Using the Send Break Message (SNDBRKMSG) command you can:

- Send a message from your display station to one or more display stations.
- Send a message to display station message queues. You cannot send a break message to individual user message queues.
- Send a message that requires a reply.

You should send a break message if your message requires immediate attention, for example, "The system will be powered down in five minutes."

Use the following steps to send a break message:

1. Type the SNDBRKMSG command.
2. Press F4 (Prompt) and answer the prompts.
3. MSG and TOUSR are required parameters.
4. Type the message you want to send.
5. Type the display station message queue you want to send the message to.
6. Indicate the kind of message you want to send: informational (*INFO) or inquiry (*INQ).

7. If you are sending an inquiry message, type the name of the message queue you want the response to your inquiry to be sent to. The default provided is QSYSOPR.

13.2.3 Receiving and Displaying Messages

As a user of the system, you receive system completion or diagnostic messages in response to your requests. As the system operator, you receive messages through the system operator message queue, from the system, and from individual users at display stations.

The way in which messages are displayed depends on which display you are currently using and, for messages sent to your message queue, the delivery mode of your queue.

13.2.4 System Messages

Messages in response to your entered commands are automatically displayed on the current display you are using.

For additional information about a message, you can request an Additional Message Information Display by pressing the Help key or F1.

For errors related to the use of the display station itself, a message number or message text appears at the bottom of the display and the input inhibited light is on. You can press the Help key for additional information.

If the information on the message line and the additional messages do not give sufficient information to solve a problem, you can display all the messages that have been sent to the job log.

Use the following steps to display your job log:

1. Type DSPJOBLOG to display the job log.
2. Press F10 (Display Detailed Messages) to display all the messages for the command that failed.

13.2.5 Message Identifier

The message identifier is used to distinguish the message from others in the message file, (CPF, CPA, CPC, etc.). For more information about the message identifier please refer to the *Operator's Guide*.

13.2.6 Message Text Levels

You can display more information about an error message by placing the cursor anywhere on the message line and pressing the Help key. This displays additional information.

13.2.7 Displaying Messages From a Queue

Unless a message queue is in break mode, the message sent to the queue is not automatically displayed. You must take some action to obtain the message. Your current display is then replaced by a separate message display.

13.2.8 Obtaining the Message Display

If your message queue is in break mode:

- You receive the message automatically if you specified PGM (*DSPMSG) in the CHGMSGQ command. This is the way to obtain messages from the system operator message queue if you have not changed its delivery mode since starting the system.
- You receive the message when you respond as indicated to the program that is running if you changed your message queue to specify such a program to handle break delivery.
- If your message queue is in notify, hold, or default mode, you obtain the display by entering the Display Messages (DSPMSG) command. You can select the message queue you want to display or show the system operator message queue (QSYSOPR). You can optionally display only specific message types, part of a message queue, or specific messages with a severity level equal to or greater than the one you specify.

For information on interpreting the message display, refer to the *Operator's Guide*.

13.3 Changing a Message Queue

To change the delivery mode or another characteristic of the message queue, use the Change Message Queue (CHGMSGQ) command:

You can use the CHGMSGQ command to:

- Change the message queue delivery mode to break, notify, or hold.
- Change the message queue severity level or the break handling program.

To change a message queue:

1. Type CHGMSGQ.
2. Press F4 (prompt).
3. Type the name of the message queue you want to change.
4. Type the delivery mode you want to use to *BREAK, *NOTIFY, *HOLD, or *DEFAULT.
5. Type the program to be called if you specified break delivery mode.
6. Type the severity code for delivery of messages if the message queue is set to break or to notify delivery mode.
7. Type any text to be included in the message queue description.
8. Press the Enter key; the message queue is changed.

13.4 Using the System Request Menu to Display and Send Messages

To suspend your AS/400 job and work with messages, do the following:

1. Press the System Request key, then press Enter.
2. Type the option to Display messages, Send a message, or Display system operator messages.
3. Press the Enter key.

13.5 System/36 and AS/400 System Terminology Differences

Terminology between the System/36 and the AS/400 system is different, and in some cases, the same terms are used for different things. The following shows the relationship of message handling between the System/36 and the AS/400 system:

Table 11. Comparison of System/36 and AS/400 Message Terms	
System/36 Term	AS/400 Term
Message file	Message queue(s)
Message member	Message file
Auto response	Default response
Console	System Operator queue
Subconsole	Printer message queue
Halt message (response) * Option response * Data response	Inquiry message
MSG OCL command	SNDMSG, SNDNETMSG, and DSPMSG commands

13.5.1 Console (System) Operator Messages

On System/36, messages are sent to the console, a subconsole, or a workstation. On the AS/400 system in the System/36 environment, the concept of console has been replaced by the QSYSOPR message queue. There is no direct support for subconsoles. The System/36 environment use of the message queues associated with each printer replaces the support for subconsoles.

To get the equivalent function for a subconsole you must allocate the appropriate message queue in either notify or break mode.

13.5.2 Enhancements and Restrictions

In general, using the AS/400 system provides more flexibility than using System/36. The following describes some of the enhancements and restrictions regarding message handling:

13.5.2.1 User, Device, and Operator Message Enhancements

- On System/36, no more than 25 messages could be sent to the message file and operator. This is no longer a restriction. In the System/36 environment you have the option of holding messages (default). Paging a message off the screen no longer automatically deletes it.
- Since the System/36 environment uses AS/400 message queues, you can also use any AS/400 message sending commands. This means that you can send inquiry messages to a user or device queue.
- You no longer have to wait until the end of the job to view your messages or interrupt the job with the Attn key to display messages. The AS/400 CHGMSGQ command can place the message queue in break mode. When the appropriate severity is issued, the message automatically “breaks” into the display.

13.5.2.2 User, Device, and Operator Message Restrictions

Message notification: If you sign on the system twice, the user queue is placed in notify or break mode only for the first sign-on. The queue may only be in notify or break mode in one job at a time. The CHGMSGQ command controls the mode of each message queue.

MSG command: You can only send messages to the users defined in a user profile. For messages sent to workstations, the 2-character workstation identifier specified as recipient of the message must be identified in the System/36 environment workstation table of the sending machine. The associated AS/400 device must have been created.

Subconsole: Although the concept of subconsoles is replaced by printer message queues, the functional support is more restrictive than in the System/36. When a message was sent on the System/36 to an inactive subconsole, the message was instead routed to the operator. On the AS/400 system, the message is always sent to the subconsole-associated message queue.

14. Other Topics

This chapter briefly summarizes information needed by the System/36 user, but not discussed in the previous chapters. Information is included about the following topics:

- Library list
- Managing the status of your configuration
- Displaying job logs
- System/36 and AS/400 system comparison

14.1 Commands

All AS/400 commands are available from the menu.

When you use System/36 environment commands, the system looks for the equivalent AS/400 command and subsequently shows an AS/400 display. It does not usually display System/36 screens.

Most AS/400 object commands are built from several elements. The first word is usually a verb, such as Create, Delete, Change, Display, and Work with. Functions that can be performed on objects are a combination of verb and the objects upon which the action is performed.

The phrase Work with is very common. If you want to work with job queues then the command is WRKJOBQ (WRK for work—JOBQ for job queue). Other examples are:

- Working with Spool Files (WRKSPLF)
- Work with Active Jobs (WRKACTJOB)

To view all AS/400 commands, select F4 (prompt) on the command entry screen. When keying in AS/400 commands, the prompt (F4) is always available, and the Help text is displayed by pressing the Help key. These facilities are not always available with the System/36 commands.

It is important that you learn to use not only System/36 commands, but also the AS/400 commands, which give more function and flexibility.

14.2 Library List

A library list is an ordered list of libraries. If you use a library list, each library in the list is searched in the order of its occurrence until the system finds an object of the specified name and type. If more than one object of the same name and type exists in the list, the system uses the object from the library that appears first in the library list.

The library list consists of the following:

1. System part. The system libraries, specified by the QSYSLIBL system value, that contain objects needed by the system.

2. Product libraries. Up to two product libraries used to support languages and utilities for the job.
3. Current library. The current library for the job. This can be a duplicate of the library in the user part of the library list.
4. User part. The object referred to by the system's users and applications.

The following are Library List commands you can use to manage your library list:

- Use Add Library List Entry (ADDLIBL) to add a library name to the user portion of the library list.
- Use Change Library List (CHGLIBL) to change the user's portion of the current job's library list with the list of libraries specified by the user. This command only affects the current job's library list. You must have object operational authority for all the specified libraries before the current job's library list is changed.
- Use Change System Library List (CHGSYSLIBL) to change the system portion of the library list for the job in which the command is entered. You can specify whether the library is added to the beginning of the system portion of the library list or removed from the list. The library QSYS cannot be added or removed from the system portion of the library list. You need to be a security officer or user with *ALLOBJ special authority to do this.
- Use Display Library List (DSPLIBL) to display the system portion of the library list along with the current library entry and the user portion of the library list.
- Use Edit Library List (EDTLIBL) to allow users to make changes to the user portion of the library list.
- Use Remove Library List Entry (RMVLIBLE) to remove a library name from the user portion of the library list after the current library entry.

14.3 Managing the Status of Your Configuration

To work with your configuration status, for example, to Vary On, Vary Off, Hold Device, Release Device, and so on, you can type the Work with Configuration Status command (WRKCFGSTS) and F4 (prompt). To work with devices, enter the parameters WRKCFGSTS CFGTYPE(*DEV).

If you key in D W, you get the same screen as when you key in the above parameters. But you can select parameters with the WRKCFGSTS command and get more functions.

14.4 Displaying Job Logs

The Display Job Log (DSPJOBLOG) command shows command and related messages for a job when its job log has not been written. This command also shows commands for a job on a job queue that has not started processing.

The Display Log (DSPLOG) command shows the system history log (QHST). The history log contains information about the normal operation of the system and the system status. You can specify the system log that is shown, the

period, start time, start date, log data for the current day, log data from the beginning of the log that is shown, and end time. For more information refer to *System/36 to AS/400 Application Migration*.

14.5 System/36 and AS/400 Comparison

The following table lists some System/36 commands, whether they are supported in the System/36 environment, and their AS/400 counterparts.

Table 12. System/36 and AS/400 Command Comparison		
System/36 ¹ Control Commands	Supported in System/36 Environment	AS/400 Equivalent Function
ASSIGN	No	
C S	No	CNLJOB/WRKUSRJOB
CONSOLE	No	CHGMSGQ
MENU	Yes	GO
MSG	Yes	See "Handling Messages" on page 63 for more information about SNDMSG and DSPMSG.
POWER OFF	No	PWRDWN SYS
REPLY	No	DSPMSG
TIME	Yes	
HISTORY	No	GO CMDLOG DSPLOG LOG(QHST)
CATALOG	Yes	
D W	Yes	WRKCFGSTS

14.6 Use of the Attention Key

The Attention key is not used in the same way as on System/36. The System Request key is used instead. For a more detailed explanation of use of the System Request key, see Chapter 2 in the *Concepts & Programmers Guide for the System/36 Environment*.

The Attention key can be used to automatically run a program defined in the user profile. For a more detailed explanation of use of the Attention key, see Chapter 3 in the *Work Management Guide* and Chapter 3 in the *Security Concepts and Planning* manual.



15. Save/Restore Operations

Save/restore procedures are used for:

Backup and recovery. As on your System/36 you must define a backup and recovery strategy to supply a way to restart as soon as possible your application(s), your system, or another system, depending on the type of failure: object loss, system loss, or site loss.

Data interchange. You can also use these procedures to exchange data between your AS/400 system and another AS/400 system, a System/36, or another IBM system.

15.1 Procedure Differences

When you move from System/36 to the AS/400 system, you must be aware of the changes concerning the save/restore procedures in the System/36 environment. We will discuss these, as well as the AS/400 system commands.

Some System/36 procedures have not been changed, some have been modified or are no longer supported, and some others are not compatible with System/36. For example, all procedures referring to a diskette magazine should be modified because there is no diskette magazine available on the AS/400 system. The disk location parameter is always ignored, because the AS/400 system automatically manages disk space and allocation.

15.1.1 Procedures That Are Not Supported

POST	This System/36 procedure copies special E-format diskette files to disk files. These special E-format diskettes are created by the IBM 5260 retail system.
XSAVE	This S/34 procedure (supported by System/36 procedure SAVEEXTN) is used to save the extended character file (DBCS SSP version).
XREST	This S/34 procedure (supported by System/36 procedure RESTEXTN) is used to restore the extended character file (DBCS SSP version).
SAVEEXTN	This System/36 procedure is rerouted to the CPYIGCTBL command.
RESTEXTN	This System/36 procedure is rerouted to the CPYIGCTBL command.

15.1.2 Modified Procedures

RESTLIBR This procedure restores the entire contents of a library from a diskette or tape file. Library and directory sizes are ignored.

Note: RESTLIBR only restores libraries that had been saved on an AS/400.

BLDLIBR This procedure creates a library. It also creates two source files (QS36SRC and QS36PRC) where source and procedure members can be stored. Library and directory sizes are ignored.

15.1.3 Procedures Not Modified

FROMLIBR This procedure copies one or more library members to disk, diskette, or tape. The LIBRFILES created by the FROMLIBR procedure can be in sector-mode or record-mode format. See 81 for more information. LIBRFILES saved in sector mode can only be restored on an AS/400 system. To save files so they can be restored on System/36, use the FROMLIBR procedure in record mode or use the SAVS36LIBM command.

JOBSTR This procedure copies a diskette or tape file that contains procedure and source members to a specified library. You can also specify a procedure to run after copy.

SAVE This procedure saves one or more files on diskette or tape.

Note: The files saved can only be restored on an AS/400 system. Use the SAVS36F command to save a file to be restored on System/36.

SAVELIBR This procedure saves the entire contents of a library on diskette or tape.

Note: The library saved can only be restored on an AS/400 system. Use the SAVS36LIBM command to save source and procedure members to be restored on System/36.

TAPECOPY This procedure copies or adds a disk file to an exchange tape file. It also copies or adds an exchange file from tape to a disk file.

Note: This procedure cannot be used with a tape cartridge (TC) drive.

RESTORE This procedure restores a saved file, a set of saved files, or a part of a set of saved files from diskette or tape to disk.

TOLIBR This procedure copies into a library a disk, diskette, or tape file that contains one or more library members.

TRANSFER This procedure copies basic data exchange or I-exchange diskette files to a sequential or an indexed disk file. It also creates basic data exchange or I-exchange diskette files from a sequential, direct, or indexed disk file.

15.1.4 Commands Used for Data Exchange between the AS/400 System and System/36

The following is an overview of AS/400 commands:

CPYFRMDKT This command copies one or more data files from diskette to a database file.

CPYFRMTAP This command copies records from a tape to a database file.

CPYTODKT This command copies a database file (for example, physical or logical) or a device file to a diskette file.

CPYTOTAP This command copies records to a tape file.

RSTS36F	This command restores a single file or a group of files from a SAVE ALL set. The diskette or tape file may have been created using SAVE (System/36) or SAVS36F (AS/400). Restoring a set of files is a Release 2.0 enhancement.
RSTS36LIBM	This command restores source and procedure members saved with the FROMLIBR or SAVELIBR procedures on System/36, or the SAVS36LIBM command on the AS/400 system.
SAVS36F	This command saves a database physical or logical file to disk, diskette, or tape. On System/36 the file can be restored using the RESTORE procedure.
SAVS36LIBM	This command saves source and procedure members in record mode to disk, diskette, or tape. On System/36 the members can be restored using the TOLIBR procedure.

15.1.5 Backup and Recovery and Data Exchange Commands

The following is a list of commands used for backup and recovery and for data exchange between one AS/400 system and another in the AS/400 system environment:

RSTLIB	This command restores one or all user libraries from diskette, tape, or savefile.
RSTOBJ	This command restores a single object or a group of objects that were saved on a diskette, tape, or savefile.
RSTLICPGM	This command restores licensed program libraries from tape.
RSTAUT	This command restores the private authorities to user profile from tape.
RSTCFG	This command restores a device configuration object that was saved to tape by the SAVSYS command.
RSTUSRPRF	This command restores the basic parts of a user profile or of a set of user profiles saved by the SAVSYS or the SAVSECDTA command. The information can be restored from diskette, tape, or savefile.
SAVCHGOBJ	This command saves one or more changed objects to diskette, tape, or savefile.
SAVLIB	This command saves from 1 to 50 libraries, or all user libraries, to diskette, tape, or savefile.
SAVLICPGM	This command saves licensed program libraries to tape.
SAVOBJ	This command saves one or more objects to diskette, tape, or savefile.
SAVSAVFDTA	This command saves the contents of a savefile to diskette or tape.
SAVSTG	This command saves the licensed internal code and the content of auxiliary storage to tape. It produces an image copy of disks.
SAVSECDTA	This command saves all security information without requiring a dedicated system. This includes: <ul style="list-style-type: none"> • User profiles • Authorization lists

- Authority holders
- Internal office distribution objects

SAVSYS This command saves a copy of the QSYS library in a format compatible with the installation process.

Note: If you need more information refer to *System Reference for the System/36 Environment*, *CL Reference Manual*, and the *System Backup and Recovery Guide*.

15.2 Transferring, Saving, and Restoring Files and Libraries

This section discusses the relationship between the procedures used on a System/36 and the commands on an AS/400 system, the different media available, the different formats used on diskette and tape, and the procedures or commands used for backup and recovery or data interchange operations.

The following four figures clarify the relationship between System/36 procedures and AS/400 commands.

- Table 13 on page 77 shows the relation between the System/36 diskette procedures and the AS/400 diskette commands. If you want to exchange files or library members, remember that *only source and procedure members* of a library can be *exchanged* between System/36 and the AS/400 system. This figure is divided into two parts:
 - Left part: From the AS/400 system to System/36
 - Right part: From System/36 to the AS/400 system

These two parts have been subdivided into two subparts: *SOURCE* and *TARGET*. *SOURCE* is the system on which you perform the SAVE operation. *TARGET* is the system on which you perform the RESTORE operation. These two subparts are split into two others to define the environment (System/36 environment or "native" AS/400) in which you perform the SAVE/RESTORE:

- Table 14 on page 77 is the same as Table 13 on page 77, but it refers to tape operations.
- Table 15 on page 78 shows the different exchange possibilities between two AS/400 systems. Table 15 on page 78 is built like Table 13 on page 77 and Table 14 on page 77

Note: Not only source and procedure members, but any library objects are referred to, because between two AS/400 systems you can exchange entire libraries.
- Table 16 on page 79 shows the different exchange possibilities between two AS/400 systems using AS/400 commands.

Table 13. Relationship Between System/36 Procedures and AS/400 Commands for Diskette					
AS/400 to System/36			System/36 to AS/400		
Source (AS/400)		Target (Sys/36)	Source (Sys/36)	Target (AS/400)	
Sys/36 env.	Native	System/36	System/36	Sys/36 env.	Native
Files					
TRANSFER SAVS36F	CPYTODKT SAV36F	TRANSFER RESTORE	TRANSFER SAVE	TRANSFER RESTORE	CPYFRMDKT RST36F
Source and Procedure Members					
FROMLIBR (record mode)	SAV36LIBM	TOLIBR	FROMLIBR	TOLIBR or JOBSTR	RSTS36LIBM
FROMLIBR (record mode)	SAV36LIBM	JOBSTR	SAVELIBR	TOLIBR or JOBSTR	RSTS36LIBM

15.2.1.1 Example 1

Q: Which procedures should you use to save a file on an AS/400 system and restore it on a System/36?

A: You have two ways:

1. TRANSFER in the System/36 environment or CPYTODKT on the AS/400 system and TRANSFER on System/36.
2. Save information using SAVS36F on the AS/400 system and RESTORE it on System/36.

Table 14. Relationship Between System/36 Procedures and AS/400 Commands for Tape					
AS/400 to System/36			System/36 to AS/400		
Source (AS/400)		Target (Sys/36)	Source (Sys/36)	Target (AS/400)	
Sys/36 env.	Native	System/36	System/36	Sys/36 env.	Native
Files					
TAPECOPY SAVS36F	CPYTOTAP SAV36F	TAPECOPY RESTORE	TAPECOPY SAVE	TAPECOPY RESTORE	CPYFRMTAP RST36F
Source and Procedure Members					
FROMLIBR (record mode)	SAV36LIBM	TOLIBR	FROMLIBR	TOLIBR or JOBSTR	RSTS36LIBM
FROMLIBR (record mode)	SAV36LIBM	JOBSTR	SAVELIBR	TOLIBR or JOBSTR	RSTS36LIBM

15.2.1.2 Example 2

Q: Which procedures should you use to save a file on a System/36 and restore it on an AS/400 system?

A: You have two ways:

1. You can do a TAPECOPY on System/36, and TAPECOPY in System/36 environment or CPYFRMTAP on the AS/400 system.
2. You can perform a SAVE operation on System/36 and a RESTORE in the System/36 environment or RSTS36F on the AS/400 system.

Table 15. Relationship Between Two AS/400 Systems (with System/36 Environment)

Source		Target	
S/36 environment	Native	S/36 environment	Native
Files			
TRANSFER SAVE SAVS36F TAPECOPY	CPYTODKT SAVOBJ SAVS36F CPYTOTAP	TRANSFER RESTORE RST36F TAPECOPY	CPYFRMDKT RSTOBJ RSTS36F CPYFRMTAP
Library members			
FROMLIBR SAVELIBR	CPYF for Src/Prc SAVOBJ for Pgms SAVLIB	TOLIBR RETLIBR	CPYF for Src/Prc RSTOBJ for Pgms RSTLIB

15.2.1.3 Example 3

Q: Which procedures should you use to save a file on an AS/400 system and restore it on another AS/400 system?

A: Here are two ways:

1. Perform TAPECOPY in the System/36 environment or CPYTOTAP in the AS/400 system and TAPECOPY in System/36 environment or CPYFRMTAP in the AS/400 system on the target.
2. Perform SAVS36F on source the AS/400 system and RSTS36F on the target AS/400 system.

Table 16. Commands for AS/400 Exchange, Backup, and Recovery

Source AS/400	Target AS/400
SAVSYS	RSTAUT RSTCFG RSTUSPRF
SAVLICPGM	RSTLICPGM
SAVLIB	RSTLIB
SAVOBJ	RSTOBJ
SAVCHGOBJ	RSTOBJ
SAVSAVFDTA	RSTOBJ
SAVSECDTA	RSTUSPRF
SAVSTG	N/A

15.2.1.4 Example 4

Q: Which commands should you use to save a library on an AS/400 system and restore it on another AS/400 system?

A: You can use SAVLIB on the source and RSTLIB on the target.

15.2.2 Media Available

This chapter explores the different devices you can use on the AS/400 system for your SAVE/RESTORE operations. Some devices used on the System/36 are no longer supported, some others are new. A list follows:

1. Diskette Devices:

- Diskette 1** An 8-inch single-side diskette.
- Diskette 2D** An 8-inch double-side diskette, single or double density.
- Diskette 2HC** A 5-1/4-inch diskette, also called 96TPI or 2QD or 2HD. This is also a double-side diskette, single or double density.

These three types of diskettes can be used for data interchange between the AS/400 system and System/36.

2. Tape Devices:

- Model 8809** This System/36 tape is not supported on the AS/400 system. Tapes created on System/36 can be read on the AS/400 system, and the tapes created on the AS/400 system (density must be 1600) can be read on System/36.
- Model 6157** This System/36 tape cartridge is not supported on AS/400. The tape cartridges created on System/36 can be read on models 9346/6346, but the cartridges created on the AS/400 system cannot be read on System/36.
- Model 9347** This AS/400 tape drive is a 1/2-inch open reel drive that records at either 1600 BPI in start/stop or 3200 BPI in streaming mode.

Model 2440	This AS/400 tape drive is a 1/2-inch open reel drive that records at either 1600 BPI in start/stop, or 6250 BPI in streaming mode.
Model 9346/6346	This AS/400 tape drive is a 1/4-inch tape cartridge drive that records in streaming mode. This tape can be used only for SAVE/RESTORE operation.
Model 3422	This AS/400 tape drive is a 1/2-inch reel drive that records at either 1600 BPI or 6250 BPI.
Model 3430	This AS/400 tape drive is a 1/2-inch reel drive that records at either 1600 BPI or 6250 BPI.
Model 3420	This AS/400 tape drive is a 1/2-inch reel drive that records at either 1600 BPI or 6250 BPI.
Model 9348	This AS/400 tape drive is a 1/2-inch reel drive that records at either 1600 BPI or 3200 BPI.

15.2.3 Before Starting a SAVE/RESTORE Operation

Following are steps to take before starting any SAVE operation in the System/36 environment:

1. Initialize your diskettes or tapes.

- Use INIT or INZDKT for diskettes.
- Use TAPEINIT or INZTAP for tapes.

After that, depending on the purpose of the SAVE operation (backup or exchange) and the parameters used for the initialization (density and sector size for diskette; IBM standard label or unlabeled for tape), the data is saved into different file formats. These formats are the same as for System/36:

- Diskette Formats

- Basic data exchange (diskette 1)

A diskette sector is 128 bytes. A TRANSFER procedure with parameter EXCHANGE, \$MAINT with parameter BASIC=YES or SAVS36LIBM with parameter *BASIC creates this type of file if the record length of the file is not greater than 128 bytes.

- H-DATA exchange (diskette 2D and 2HC)

The diskette sector is 256 bytes. Use the TRANSFER procedure with parameter EXCHANGE, \$MAINT with parameter BASIC=YES or SAVS36LIBM with parameter *BASIC to create this type of file.

- I-DATA exchange (diskette 1, 2D, 2HC). The diskette sector is 128 or 512 bytes on diskette 1. The diskette sector is 256 or 1024 bytes on 2D or 2HC diskettes. Using the TRANSFER procedure with parameter IFORMAT creates this type of file. If you run the CATALOG procedure in the System/36 environment, the values that you can find under the column Exchange Type are:

Blank This is a basic exchange file on a diskette 1.

- H** This is a H-DATA exchange file on a diskette 2D or 2HC.
- I** This is a I-DATA exchange file on a diskette 1 or 2D or 2HC.

- Tape Formats

- IBM standard label

Used on all types of tapes, mainly for SAVE/RESTORE operations with systems that support IBM standard label types.

- NONLABELED

Use tapes that are not labeled only with systems that do not support the IBM standard label types.

2. Calculate how many diskettes or tapes are needed for the save operation.

On System/36 you can use the CATALOG procedure to determine the size of the files and LISTLIBR DIR,SYSTEM,libname for each library you want to save. On the AS/400 system, files are stored in libraries. When you migrate your files they are placed in the System/36 environment files library (normally QS36F).

To estimate the number of diskettes needed to SAVE all your System/36 environment files, use the command "DSPLIB fileslib *PRINT", where "fileslib" is the name of your System/36 environment files library (normally QS36F). On the output produced you can read the total size (in bytes) of the library. You can use the same command for each library you want to save.

You can save library members in either *sector-mode* or *record-mode* format:

- Sector Mode

The library members are saved in the internal format used by the AS/400 system. This mode is used by the SAVELIBR procedure and is the default mode used by the FROMLIBR procedure. All the library members can be saved using this mode, but they can only be restored to another AS/400 system.

- Record Mode

Each record in a record mode file contains one statement from the member. All records have the same length (40 to 120 bytes). Each member in the file starts with a COPY statement and ends with a CEND statement. This mode is used by FROMLIBR if a record length is specified, and by SAVS36LIBM procedures (only source and procedures members are saved). This file can be read by other IBM systems, such as a System/36.

Note: You can use different formats depending on the media used and the way the SAVE operation is performed. However, if you exchange the files and library members between a System/36 or an AS/400 system, you must use the existing procedures, which have default values allowing you to exchange data without any problem.

15.2.4 Saving and Restoring for Backup and Recovery

This section covers how to save system and user libraries in the System/36 environment and how to restore a user's information on the same or another AS/400 system.

Important: The system libraries (such as QSYS, QSSP, and #LIBRARY) must *not* be restored on another AS/400 system. Save them for backup and recovery purposes only.

QSYS: This library contains the IBM-supplied programs, commands, files, and messages for the AS/400 system.

QSSP: This library contains the IBM-supplied programs, commands, files, and messages for the System/36 environment. On System/36 they are stored in #LIBRARY.

#LIBRARY: This library contains the System/36 environment configuration object and may contain USER-written programs. You can place applications run by many users in #LIBRARY.

Licensed program libraries: These libraries contain the IBM-supplied programming support for the programming languages and utilities. For example: #RPGLIB, #COBLIB, and so on.

User's files: AS/400 files are stored in libraries. The System/36 environment files library is normally QS36F.

User's libraries: These libraries contain all user's applications.

If System/36 environment is active, you can use either the System/36 procedures (SAVELIBR, FROMLIBR, SAVE) or the AS/400 commands.

15.2.4.1 System/36 Environment Procedures

You can use either the SAVELIBR or the FROMLIBR procedure to save user libraries, including #LIBRARY. Run the procedure for each library you want to save.

Note: If you use SAVELIBR or FROMLIBR with defaults, these libraries are saved in *sector-mode* and are restorable only on an AS/400 system.

Use the SAVE procedure for saving files.

Note: Files are restorable only with RESTORE and *only* on an AS/400 system.

15.2.4.2 AS/400 System Commands

Start using AS/400 commands so you can really take advantage of the possibilities of your new system. Following are some items to remember when using AS/400 commands:

- QSYS can only be saved using the SAVSYS command. You need the *SAVSYS authority to use this command.
- Product libraries (including, for example, QSSP and #RPGLIB) should be saved using the Save Licensed Program (SAVLICPGM) command.

- All user libraries (including QS36F library) can be saved using the AS/400 command SAVLIB. You can specify up to 50 libraries at a time. Use the RSTLIB command to restore them.

Note: A restriction exists concerning the devices you can select in SAVE operations: diskette 1 cannot be used in SAVE/RESTORE operations. (The SAVE procedure needs diskettes 2HD or 2HC initialized with a FORMAT2 parameter.)

15.2.5 Saving and Restoring for Data Interchange

This section covers the exchange possibilities between an AS/400 system and a System/36 or any other IBM system. The following table shows the relationship between the procedure or the command used, the file type produced, how it appears on the catalog printout, and the target system that can read the diskette or tape. Remember that you must use a format readable by the target system.

AS/400 Procedures or Commands	S/36 Env. Catalog	S/36 Catalog	Exchange With
CPYTODKT with basic or H CPYTOTAP SAVS36LIBM with *basic TAPECOPY TRANSFER with EXCHANGE	Blank or H Blank or H Blank or H (See note 1)	Exchange Exchange Exchange Exchange Exchange	Any system Any system Any system Any system Any system (See note 2)
CPYTODKT with IFORMAT TRANSFER with IFORMAT	I I	IFORMAT IFORMAT	Any system Any system (See note 3)
FROMLIBR in RECORD-MODE SAVS36LIBM with *E	E E	LIBRFILE LIBRFILE	S/36 or AS/400 S/36 or AS/400
SAVS36F	E	COPYFILE	S/36 or AS/400
Note: <ol style="list-style-type: none"> 1. Blank if BASIC exchange and H if H-data exchange. 2.. ANY means any systems which support BASIC or H-data exchange. 3. ANY means systems which support IFORMAT data exchange. 			

Example 1:

- Q:** I want to exchange a file named FILEA (record length = 120) with a System/32 or S/34. Which procedure can I use?
- A:** In the System/36 environment you can use TRANSFER (with EXCHANGE parameter) on diskette 1 for S/32 and on diskette 2D for S/34. The AS/400 command is CPYTODKT (with BASIC parameter) on diskette 1 for S/32 and on diskette 2D for S/34.

Example 2:

- Q:** I want to exchange a file named FILEB (record length=320) and some library members with a System/36. Which procedure can I use?
- A:** In System/36 environment you can use TRANSFER (with IFORMAT parameter) for FILEB and FROMLIBR (in *record-mode*) for the library. The AS/400 commands are CPYTODKT (with IFORMAT parameter) or SAVS36F for FILEB, and SAVS36LIBM (with *E parameter) for the library.

Again, it is best to start using the AS/400 commands because they give you more possibilities. For example, if you want to save procedures and source members in BASIC or H-DATA format, in the System/36 environment you must use the \$MAINT utility program. The AS/400 command is SAVS36LIBM with *BASIC.

15.3 Tips for Saving Time During SAVE/RESTORE Operations

To help you save time during SAVE and RESTORE operations, you should be aware of:

Job priority: Change the job priority to run it faster using the CHGJOB command. Remember that this could affect the performance of other users.

Dedicated system: Performance is improved if you have all the subsystems ended.

User profile: Check if the user profile running the job has the special authority *SAVSYS. If yes, no authority checks your job, and you save time.

Choice of the media: The media you select affects considerably the time spent for the SAVE/RESTORE operation. The transfer rate starts with 60 MB/hour for the diskette to 1500 MB/hour for the Model 2440 tape. If you need more information about the SAVE/RESTORE operations, refer to the *System Backup and Recovery Guide*.

16. New Recovery Functions for the System/36 User

For a System/36 user, the AS/400 system offers a number of new recovery functions that help recover data in case of a failure.

Recovery planning is a project in itself. Many aspects have to be examined because most of the recovery functions have an impact on the performance of your system. To compensate, you might consider upgrading your configuration by adding more disk drives. The more functions you want to implement, the more carefully you have to plan.

This section contains brief descriptions of some of the major new functions. Before you begin using any of these recovery functions, read the *AS/400 Backup and Recovery Guide* for a full explanation of all aspects of recovery. Other useful sources with information related to this subject are S/38 Technical Bulletin *Availability and Recovery* and *AS/400 Application Recovery*.

16.1 Journal Management

When a user changes a file, journal management records the changes in an object, called a *journal receiver*, before recording it in the file. The journal receiver always has the latest database information. It records all activities against a file regardless of which application or user initiated the change. The entries logged in the journal receiver also include information on user, job, time, and date. You have the option of recording both before- and after-images of your updated records. Two journal receivers can be defined for extra security.

You can use the records in the journal receiver to recover damaged database file members and access paths (logical files). You can also use journal management to decrease your backup time, since you only need to save the journal receivers if you are journaling all your database files. Journal management also provides you with an audit trail.

Journaling is a system function that is also available in the System/36 environment.

16.2 Commitment Control

Commitment control is an extension of the journal management function. It allows you to define several changes to database files as one *transaction*. If you have complex applications that update several database files as a result of an operation, for example, a financial application updating several accounts as a result of one posting, you can define a transaction as a group of changes that appear to the user as a single change. By doing this, you ensure that updates are synchronized—either all updates are performed or none are—in case the system or the job ends abnormally.

You can also use commitment control to roll back or remove changes made during a transaction when the user determines that an error was made.

If you use commitment control you also have to use journaling, and journaling is changed automatically by commitment control to record both before- and after-images. Record locking performed by commitment control could influence other applications using the same database files.

Note: To use commitment control you must use native AS/400 programming languages. There is no way to implement this function into migrated System/36 RPG II or COBOL programs.

16.3 Checksum

Checksum protection minimizes vulnerability and recovery time when a disk drive failure occurs. It allows you to recover without having to reload the entire system.

Checksum protection operates like a parity bit. It combines data residing on several disk devices onto one other device in such a way that, if any one of the devices fails, its contents may be recovered by recombining the data on the remaining units.

If a disk drive fails because it is damaged, the system ends immediately regardless of whether checksum is active. Checksum does not prevent the system from terminating, but it helps avoid a total system initialization and reload if the failing drive must be replaced.

16.4 Recovery Conclusion

Before implementing any of these recovery facilities, be sure you understand how they work, their benefits, and what they cost in terms of performance, additional DASD, and operational changes.

Appendix A. System/36 Migration Aid Menus and Screens

This appendix includes some of the key Migration Aid menus.

```
COMMAND                                MIGRATE
                                AS/400 System/36 Migration Aid main menu
Select one of the following:

1. Generate system summary report
2. Identify and change subtypes
3. Convert SFGR, menu and message load members into source
4. Convert BASIC SUBR members into source
5. Analyze the system
6. Select items to migrate
7. Save selected items to media
8. Generate reports on migration status
9. Perform additional functions
```

Cmd3-Previous menu Home-Sign on menu

Ready for option number or command

```
COMMAND                                ANALYZE
                                Analyze the system
Select one of the following:

1. Analyze entire system
2. Analyze libraries
3. Analyze security definitions
4. Analyze data dictionaries
5. Analyze configuration information
```

Cmd3-Previous menu Home-Sign on menu

Ready for option number or command

SELECT ITEMS TO MIGRATE

Type choices, press Enter.

Migration run description . . . S/36 Migration to AS/400 21:26:09 90/01/10

LIST OF ITEMS

Select items using option 1, press Enter.

OPTION	ITEM	OPTION	ITEM
	Libraries		Data dictionaries
	Files		Master CIIFG record
	Users		Network Resource Directory
	Document folders		
	Supplemental dictionaries		

Cmd1=Select all

Cmd3=Go back

Cmd5=Cancel

Cmd6=Migrate

Cmd7=End

Cmd8=Reset

SAVE OPTIONS

Migration run description

Type choices, press Enter.

S/36 Migration to AS/400 21:26:09 90/01/10

ITEM	CHOICE	POSSIBLE CHOICES
Save media	1	1=Diskette 2=Tape 3=Data link
AS/400 library for S/36 files . . .	QS36F	
Provide diskette/tape estimation . .	2	1=Yes 2=No

Cmd3=Go back

Cmd7=End

Cmd8=Reset

SAVE TO DISKETTE

ITEM	CHOICE	POSSIBLE CHOICES
Initialize diskettes	2	1=Yes 2=No
Volume ID of diskette	IBMIRD	
Location of diskette	S1	S1, S2, S3, M1.nn, H2.nn
Automatic advance to next slot or magazine	AUTO	AUTO, NDAUTO

Cmd2=Page back

Cmd3=Go back

Cmd7=End

Cmd8=Reset

**Specify save options

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SELECT ITEMS FOR STATUS REPORT

Type choices, press Enter.

ITEM	CHOICE	POSSIBLE CHOICES	
Item status	2	1=Not migrated 3=Analyzed	2=Migrated
Sorted by	2	1=Migration run	2=Item name

LIST OF ITEMS

Select items using option 1, press Enter.

OPTION	ITEM	OPTION	ITEM
	Libraries		Data dictionaries
	Files		Master CNFG record
	Users		Network Resource Directory
	Document folders		
	Supplemental dictionaries		

Cmd1=Select All Cmd2=Page back Cmd3=Go back
 Cmd4=Put on job queue Cmd7=End Cmd8=Reset

COMMAND OTHER

Perform additional functions

Select one of the following:

1. Migrate user ID and office item names
2. Enable/disable migration of security information
3. Migrate the entire system
4. Set subtypes for the entire system

Cmd3-Previous menu Home-Sign on menu

Ready for option number or command Cmd1-Resume job

OS/400 Migration Aid

Select one of the following:

1. Restore items saved by Migration Aid
2. Select migration status report type
3. Select compiler options
4. Start or retry compiles and conversions
5. Display or change migration defaults
6. Restore items saved outside the Migration Aid
7. Resolve names of user IDs and office items

Selection or command
 ===> _____

F3=Exit F4=Prompt F6=Messages F12=Cancel

Restore from Media

Type choices, press Enter.

Restore medium	1	1=Diskette, 2=Tape 3=Files
Restore mode	1	1=Interactive 2=Batch
Replace item if exists	N	Y=Yes, N=No

F3=Exit F5=Refresh F6=Messages F12=Cancel
F17=Change defaults

Display or Change Migration Defaults

User profile . . . : MPA

Type choices, press Enter.

Job description	QBATCH	name
Library	QGPL	*CURLIB, *LIBL, name
Job queue	*JOBQ	*JOBQ, name
Library		*CURLIB, *LIBL, name
Message queue	QMGUHSQ	name
Library	QMGU	*CURLIB, *LIBL, name
Message delivery mode	5	1=*BREAK, 2=*HOLD 3=*NOTIFY, 4=*DFT 5=*SAME
System operator message	1	1=*BREAK, 5=*SAME
Printer device	*PRINT	*PRINT, name

F3=Exit F5=Refresh F6=Messages
F12=Cancel F15=Change job description

Restore from Media

Type choices, press Enter.

Restore medium	1	1=Diskette, 2=Tape
Restore mode	1	1=Interactive
Replace item if exists	N	Y=Yes, N=No
Recompile source	Y	Y=Yes, N=No
Country code	*SYSVAL	System country code, *SYSVAL

F3=Exit F5=Refresh F6=Messages F12=Cancel
F17=Change defaults

Resolve User ID and Office Names

Type choice, press Enter.

Option - 1=Restore names from medium
2=Print report of duplicate
and incorrect names
3=Select type of names to be resolved

F3=Exit F12=Cancel

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