Interactive System Productivity Facility (ISPF)

User's Guide Volume I

z/OS Version 1 Release 6.0

SC34-4822-03

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Note
Before using this document, read the general information under "Notices" on page 213.

Fourth Edition (September 2004)

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Preface

This document provides reference and usage information for programmers who develop applications with ISPF. It also provides conceptual and functional descriptions of ISPF.

About This Document

This document contains two parts. The first part provides introductory information about using ISPF:
- How to exploit the ISPF user interface
- An overview of ISPF
- How to use referral lists
- A description of ISPF commands
- How to use libraries and data sets
- How to prepare to run on MVS.

The second part contains the appendixes and provides:
- Information you need before you install the ISPF Client/Server component workstation interface
- APL and TEXT character conversion information
- Lists of abbreviations for commands, field values, keywords/operands, scroll amounts, and programming languages
- Descriptions of allocation data sets
- Descriptions and examples of the output listing formats.

Information about using ISPF Options is contained in the *ISPF User's Guide Volume II*.

Who Should Use This Document

This document is for application programmers using ISPF. Users should be familiar with coding CLISTs, REXX EXECs, or programs in the MVS environment.

What Is In This Document?

Chapter 1, "Overview of ISPF," describes ISPF uses and the functions provided by the ISPF licensed program.

Chapter 2, "The ISPF User Interface," provides an overview of the ISPF user interface. This chapter also describes the Graphical User Interface (GUI); that is, how ISPF runs on a workstation. Information is provided on:
- Panel formats and features
- Action bars
- Commands
- The ISPF Workstation Agent (which provides the GUI interface)
- The Primary Option Menu panel
- Splitting the screen

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Chapter 3, “Using Personal Data Set Lists and Library Lists,” describes the four types of referral lists, which are used to retrieve a stored data set or library to the currently displayed panel:
- Reference data set list
- Reference library list
- Personal data set list
- Personal library list.

Chapter 4, “Using Commands, Function Keys, and Light Pen or Cursor Selection,” describes ISPF system commands, the function keys and their default assignments, and the light pen and cursor select facilities.

Chapter 5, “Libraries and Data Sets,” describes how to allocate, create, and use libraries and data sets.

Chapter 6, “Getting Ready to Run on MVS,” helps you prepare to use ISPF data-element libraries.

Appendix A, “Installing the Client/Server Component,” provides information that you need to know before you begin to install the ISPF Client/Server component workstation software.

Appendix B, “Configuring Communications for the ISPF Client/Server” provides information that you need for configuring your communications protocols so you can use the ISPF Client/Server.

Appendix C, “Listing Formats,” describes and displays the kinds of listings you can produce using ISPF. The sample listings shown are for illustration purposes only. They are not intended to be exact replicas because printouts of ISPF listings vary according to the kind of printer you are using.

Appendix D, “APL and TEXT Character Conversion,” describes how APL and TEXT characters are converted by ISPF for internal storage.

Appendix E, “Abbreviations for Commands and Other Values,” lists commands, field values, keywords/operands, and scroll amounts that can be abbreviated.

Appendix F, “Allocation Data Sets,” provides information on ALLOC commands that ISPF issues based on ISPF libraries, data set names, list IDs, options, and additional input libraries.

Appendix G, “ISRDDN Diagnostic Utility,” provides information about ISRDDN, a program shipped with ISPF as a service aid.

Using LookAt to look up message explanations

LookAt is an online facility that lets you look up explanations for most of the IBM® messages you encounter, as well as for some system abends and codes. Using LookAt to find information is faster than a conventional search because in most cases LookAt goes directly to the message explanation.

You can use LookAt from the following locations to find IBM message explanations for z/OS® elements and features, z/VM®, VSE/ESA™, and Clusters for AIX® and Linux:
- The Internet. You can access IBM message explanations directly from the LookAt Web site at http://www.ibm.com/eserver/zseries/zos/bkserv/lookat/.

- Your z/OS TSO/E host system. You can install code on your z/OS or z/OS.e systems to access IBM message explanations, using LookAt from a TSO/E command line (for example, TSO/E prompt, ISPF, or z/OS UNIX® System Services running OMVS).
- Your Microsoft® Windows® workstation. You can install code to access IBM message explanations on the *z/OS Collection* (SK3T-4269), using LookAt from a Microsoft Windows command prompt (also known as the DOS command line).
- Your wireless handheld device. You can use the LookAt Mobile Edition with a handheld device that has wireless access and an Internet browser (for example, Internet Explorer for Pocket PCs, Blazer, or Eudora for Palm OS, or Opera for Linux handheld devices). Link to the LookAt Mobile Edition from the LookAt Web site.

You can obtain code to install LookAt on your host system or Microsoft Windows workstation from a disk on your *z/OS Collection* (SK3T-4269), or from the LookAt Web site (click **Download**, and select the platform, release, collection, and location that suit your needs). More information is available in the LOOKAT.ME files available during the download process.

Summary of Changes

z/OS V1R6.0 ISPF contains the following changes and enhancements:
- ISPF Product and Library changes
- ISPF Dialog Manager component changes (including DTL changes)
- ISPF PDF Component changes
- ISPF SCLM Component changes
- ISPF Client/Server Component changes

ISPF Product and Library changes

Changes to the ZENVIR variable. Characters 1 through 8 contain the product name and sequence number, in the format ISPF *x.y*, where *x.y* indicates the version number and release. Note that the *x.y* value is not necessarily the same as the operating system version. For example, a value of "ISPF 5.6" represents ISPF for z/OS Version 1 Release 6.0.

The ZOS390RL variable contains the level of the z/OS release running on your system.

The ZISPFOS system variable contains the level of ISPF that is running as part of the operating system release on your system. This might or might not match ZOS390RL. For this release of ISPF, the variable contains **ISPF for z/OS 01.06.00**.

ISPF Dialog Manager component changes

The DM component of ISPF includes the following new functions and enhancements:
- The new *REXX panel definition statement allows the inclusion of Rexx code within a panel's)INIT,)REINIT, or)PROC sections to perform arithmetic, verification, transformation, translation, and formatting of dialog variables.
- Enhancements to ISPF File Tailoring:
  - Added support for continuation of control statements.
  - Increased maximum imbed levels from 3 to 15.
  - Increased maximum select levels from 8 to 32.
  - Increased the maximum number of parameters on a control statement from 31 to 63.
  - Eliminated exclusive SPFEDIT enqueue on a skeleton member when processing a skeleton.
  - Improved skeleton processing by reading skeleton records into storage.
  - Added support for the)DO ...)ENDDO control statements.
  - Added support for the)IF ... THEN ...)ELSE control statements.
  - Added)ITERATE and)LEAVE control words for use within)DO ...)ENDDO loops.
  - Added the)NOP control word, which can be used with a null)IF or)ELSE statement.
  - Added TBSCAN support to the)DOT control word.
- The restriction that Language Environment-enabled programming languages can not be used for ISPF exits has been partially removed. Exits can now be written

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in languages that use the LE run-time environment, as long as all the dialogs and service routines are LE-conforming. A mixture of LE-conforming main dialog code and service routine code is not supported.

ISPF Configuration Utility changes:

- Added support for zero block size for dynamic allocation of the ISPLIST, ISPLOG, ISPCTL*x*, ISPLST*x*, and ISPWRK*x* data sets.
- Added support for specifying primary and secondary space for the ISPCTL0 and ISPLST*x* data sets.
- New keywords control what happens when an explicit member list request is made for an empty PDS/E:

  ```
  DISPLAY_EMPTY_MEMBER_LIST
  DISPLAY_EMPTY_MEMBER_LIST_PATTERN
  DISPLAY_EMPTY_MEMBER_LIST_FUNCTION
  RESET_EMPTY_MEMBER_LIST_OPTIONS
  ```

Dialog Tag Language (DTL) changes

There are no changes to Dialog Tag Language (DTL) for this release.

ISPF PDF Component changes

The ISPF PDF component contains the following new functions and enhancements:

- The TBQUERY service has been enhanced to return information about TBSORT and the last TBSARG issued against a table.
- The new QTABOPEN service allows an ISPF dialog to obtain a list of currently open ISPF tables. The TBSTATS or TBQUERY service can then be used to obtain more detailed information about each table.
- A new Edit primary command, COLS, displays a non-scrolling columns line in Edit or View.
- A new Edit primary command and edit macro command, HIDE, removes the excluded lines messages from the display. RESET HIDE restores the excluded lines messages.
- The CUT Edit primary command and edit macro commands now support two new flags: X specifies to cut only excluded lines to the clipboard. NX specifies to cut only nonexcluded lines.
- The MODEL edit macro command now issues RC=4 if the model exceeds the right hand margin of the data being edited.
- The VOLUME edit macro command is changed to permit return of the volume serial where the original data set is stored.
- The CURSOR edit assignment statement has been changed as follows: if the cursor is in the command area, the cursor value is column 0 of the first data line on the panel.
- When saving a member list to a dataset using the SAVE primary command, the new keyword LONG formats all dates in yyyy/mm/dd format for the member.
- Documentation has been added for the OVOLUME parameter on the LMQUERY service.

ISPF SCLM Component changes

The ISPF SCLM component contains the following new functions and enhancements:

- For each of the FLMCMD services a new panel has been added, providing the ability to select a service from a menu and then enter the service parameters in an ISPF interface panel. These panels can also be called directly, by entering the FLMCMD service command without parameters.
- The new Unit of Work utility allows you to use an ARCHDEF member as a member list from which you can use the standard SCLM functions such as select, edit, build, view build map, and promote. You can add your own customized line commands to work with the Unit of Work member List.
- The new SCLM Explorer utility provides the ability to select any architecture definition or part member and then navigate up or down the hierarchy of related ARCHDEFs or parts.

ISPF Client/Server Component changes

The ISPF Client/Server Component enables a panel to be displayed unchanged (except for panels with graphic areas) at a workstation using the native display function of the operating system of the workstation. ISPF documents call this ″running in GUI mode.″

There are no changes to the ISPF Client/Server for this release.

ISPF Migration Considerations

If you are migrating to z/OS V1R6.0 from an earlier release of z/OS or from OS/390 V2R10.0, no migration actions are needed. If you are migrating to z/OS V1R6.0 from an earlier release of OS/390, follow the migration actions for OS/390 V2R10.0.

When migrating from one version of ISPF to another, you must reassemble and relink the SCLM project definition.

Note

This book contains terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.

Starting with z/OS V1R2, you may notice changes in the style and structure of some content in this book—for example, headings that use uppercase for the first letter of initial words only, and procedures that have a different look and format. The changes are ongoing improvements to the consistency and retrievability of information in our books.

What's in the z/OS V1R6.0 ISPF library?

You can order the ISPF books using the numbers provided below.

z/OS V1R6.0 ISPF

Title	Order Number
z/OS V1R6.0 ISPF Dialog Tag Language Guide and Reference	SC34-4824–03
z/OS V1R6.0 ISPF Planning and Customizing	GC34-4814–03
z/OS V1R6.0 ISPF User's Guide Volume I	SC34-4822–03
z/OS V1R6.0 ISPF User's Guide Volume II	SC34-4823–03
z/OS V1R6.0 ISPF Services Guide	SC34-4819–03
z/OS V1R6.0 ISPF Dialog Developer's Guide and Reference	SC34-4821–03
z/OS V1R6.0 ISPF Reference Summary	SC34-4816–03
z/OS V1R6.0 ISPF Edit and Edit Macros	SC34-4820–03
z/OS V1R6.0 ISPF Messages and Codes	SC34-4815–03
z/OS V1R6.0 ISPF Software Configuration and Library Manager Project Manager's and Developer's Guide	SC34-4817–03
z/OS V1R6.0 ISPF Software Configuration and Library Manager Reference	SC34-4818–03

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Chapter 1. Overview of ISPF

ISPF is a multifaceted development tool set for the z/OS operating system. Since 1975, MVS programmers have used ISPF for host-based application development productivity. ISPF forms the basis of many TSO and CMS applications and provides extensive programmer-oriented facilities as well.

ISPF Components

ISPF helps programmers develop interactive applications called *dialogs*. Dialogs are *interactive* because ISPF uses them to communicate with terminal users through a series of panels while the users do application development tasks.

ISPF panels:
- Provide access to ISPF functions (menus)
- Request information (data entry panels)
- Provide information (scrollable data displays).

These are the main components of ISPF:
- Dialog Manager (DM): The Dialog Manager provides services to dialogs and end users. These include display, variable services, input and output, user and application profiles, table management, system interface services, dialog testing and debugging aids, and other services.
- Program Development Facility (PDF): The Program Development Facility provides services to assist the dialog or application developer. These include the edit and browse functions, data set and catalog utilities, TSO or CMS command interfaces, and data set search and compare functions.
- Software Configuration Library Manager (SCLM): The Software Configuration and Library Manager facility provides library management capabilities such as Versioning, Auditing, and Promotion. It also provides configuration management capabilities to track how all of the pieces of an application fit together - not just source, but objects, loads, test cases, documentation and other items. The Build function tracks and invokes the necessary compilers, assemblers and linkage editors.
- Client/Server component: The Client/Server component allows the users of ISPF applications to use a workstation running OS/2®, Windows, or UNIX to display the panels of an ISPF application. It does this using the Graphical User Interface of the workstation. Because of this, there is no requirement to change your existing ISPF applications to run in a GUI environment.

The following sections describe the functions provided by the ISPF licensed program.

ISPF Functions

ISPF can be used in the following ways:
- Managers can use ISPF Edit, SCRIPT/VS, and the Hardcopy utility or another print utility provided by their installation to prepare memos.
- Data processing administrators and system programmers can use ISPF to:
  - Monitor and control program libraries
  - Communicate with MVS through TSO commands, CLISTs, or REXX EXECs.

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- Programmers can use ISPF to develop a batch, interactive, or any other type of program and its documentation.
- Terminal users can call dialogs that use Dialog Manager (DM) component and Program Development Facility (PDF) component dialog services to do the work of the application.

The View, Browse, and Edit functions, a wide range of utilities, foreground and batch compilers, program library control, and other facilities are available to help you develop ISPF dialogs.

View, Browse, Edit, Edit Macros, and Models

The View, Browse, and Edit functions allow you to look at the contents of a dialog. While editing a dialog, you can change it by adding or deleting lines, typing over the existing source code, or copying lines from another dialog to the one being edited.

To enhance the existing Edit function, you can write edit macros. Edit macros allow you to combine several often-used functions so that you do not have to call each function separately. You can write initial edit macros that are automatically run when the Edit option is selected. Other uses for edit macros include:
- Overriding Edit commands
- Calling DM and PDF component dialog services
- Accessing cursor position and data location.

Also, ISPF provides online models that you can insert into the dialog. A *model* is an example of a service call, panel format, table format, or message that contains the proper syntax and all the available parameters for the programming language being used. Since these models are online, they can be called directly into the member being edited.

Refer to *ISPF Edit and Edit Macros* for more information.

Dialog Services

The PDF component provides View, Browse, Edit, and library access services that can be combined in a dialog with any of the ISPF services. The library access services carry out functions involving members of a programming library. These functions include adding, finding, and deleting members, and displaying member lists.

The PDF component includes a separate edit model of each service call for each programming language ISPF supports: CLIST, COBOL, EXEC, FORTRAN, PL/I, Pascal, C, and REXX. See *ISPF Services Guide* for complete information about the PDF component dialog services.

Note: For information about library access services that apply to the Software Configuration and Library Manager (SCLM), refer to the *ISPF Software Configuration and Library Manager (SCLM) Developer's and Project Manager's Guide*.

Utilities

ISPF provides a wide range of utilities. Utilities enable you to:
- Display and print library and data set member lists
- Reset statistics for ISPF library members
- Define commands to be used with specific dialogs

- Compare data sets and search for strings of data
- Move, copy, and print library and data set members.

Dialog Test, Foreground, and Batch

ISPF provides special facilities for testing dialogs. The Dialog Test option allows testing of individual dialog elements and complete dialogs.

After a program has been developed, you can either assemble it or compile and link it using either the Foreground or Batch option. The Foreground option allows you to watch the program being compiled. The Batch option frees the terminal, which helps when you compile a long program. If errors occur, you can use the debugging capabilities of the Dialog Test facility to correct them.

TSO Commands, CLISTs, and REXX EXECs

While using ISPF, you can call TSO commands, CLISTs, or REXX EXECs by:

- Prefixing a command with TSO and entering it from any command line
- Selecting the Command option and entering the TSO command, CLIST, or REXX EXEC on the panel
- Entering a TSO command, CLIST, or REXX EXEC in the Line Command field on a data set list display or a member list display.

Software Configuration and Library Manager (SCLM)

To help you maintain different levels or versions of a library member, ISPF includes the Software Configuration and Library Manager (SCLM). SCLM is a tool that helps you develop complex software applications. Throughout the development cycle, SCLM automatically controls, maintains, and tracks all of the software components of the application. And you can lock the version being edited in a private library and then promote it. Refer to *ISPF Software Configuration and Library Manager (SCLM) Developer's and Project Manager's Guide* for more information.

Other IBM Program Development Products

You might want to call another IBM program development product while using ISPF. The IBM Products option allows you to call the Tivoli Information Management, COBOL Structuring Facility, and Screen Definition Facility licensed programs without leaving ISPF.

Online Tutorial

Learning to use ISPF is made easier by the online help and tutorial facilities, which are available while using ISPF.

For example, if you need help filling in the data requested by an ISPF utility, you can use the tutorial to help you understand the data entry requirements for that utility.

Supported Data Types

ISPF supports partitioned (PDS), sequential (SEQ), and partitioned extended (PDSE) data sets. These data sets can be used in any of the ISPF options, such as Edit and Browse. ISPF does not support the following:

- VSAM data sets (except for creating, obtaining data set information, and deleting).

Note: VSAM data sets are supported for Edit, Browse, and View if the ISPF Configuration table has been customized to enable the support.

- Record format variable block spanned (VBS) data sets
- Direct access data sets
- Tape data sets
- Multivolume data sets for the ISRLEMX program, SCLM, and File Tailoring
- Generation data group (GDG) base data sets
- Deletion of data sets allocated with an esoteric device type
- Member aliases
- PDSEs as the ISPF control file
- Unmovable data sets under the ISPF Move/Copy utility (option 3.3) or using the LMMOVE or LMCOPY service
- Data sets allocated with the BUFNO parameter (ISPF handles its own buffering)
- Browse for packed multivolume data sets.

ISPF requires exclusive enqueues on data sets for many of its functions. If a data set is allocated as SHAREd to a user and then is operated on by one of these functions, the allocation will be converted to OLD by MVS dynamic allocation. This allocation of OLD may remain after ISPF frees its enqueue. This is a restriction of the MVS operating system.

Member Name Conventions

ISPF allows you to create member names that follow this ISPF naming convention:

1st character	Alphabetic or special (@ # $)
2nd–8th characters	Alphabetic, numeric, or special (@ # $)

Note: Special characters are as defined in the U.S. English code page (037):

@ (X'7C'), # (X'7B'), $ (X'5B')

All member names created within ISPF are converted to uppercase. If you create members outside of ISPF that do not meet these conventions, they are displayed in ISPF member lists and can be selected from those lists. These member names can also be specified for the Browse service with the exception of member names containing lowercase alphabetics. (ISPF converts the member name to uppercase before searching for the member and therefore cannot process a lowercase member.) Member names not meeting the ISPF naming convention are not supported for the other ISPF services.

Note: ISPF does not support using option M (member list) from a data set list and then selecting E to edit a member whose name contains lowercase letters. ISPF uses the Edit service in this case, and its services do not support lowercase member names.

Running ISPF

As an interactive dialog, ISPF communicates with you through panels and messages. Ordinarily, the first panel you see when you enter the ISPF command is the ISPF Primary Option Menu, shown in Figure 1 on page 8. Panels display data, selection lists, and data-entry fields, such as a data set name or an ISPF command.

ISPF responds interactively to the information or command you enter by displaying another panel, displaying a message, or carrying out a command. For more information about how panels and messages are displayed, see "Understanding ISPF Panels" on page 14.

One helpful aspect of your interaction with ISPF is the online tutorial. If you need information about using the online tutorial, see the section on the ISPF Tutorial Panels in *ISPF Dialog Developer's Guide and Reference*.

Starting ISPF

To start ISPF:

1. Log on to TSO.
2. When the READY prompt appears, type ISPF or PDF and press Enter.

   If your installation has established an alias for ISPF, such as SPF, you can enter that instead.

The ISPF and PDF commands are aliases of ISPF module ISRPCP. When you run ISRPCP or one of its aliases with no parameters, ISPF is started through this command:

```
ISPSTART PANEL(default_primary_panel) NEWAPPL(ISR)
```

The default primary panel is usually ISR@PRIM, the ISPF Primary Option Menu (see Figure 1 on page 8).

You can specify any of the ISPSTART parameters when invoking ISPF, PDF, or ISRPCP. However, if you do this you must ensure that you specify *all* the parameters that ISPSTART needs to run your application in the correct environment. This is because only those parameters you specify are passed to ISPSTART. For example, if you specify:

```
ISPF NEWAPPL(ABC)
```

ISPF is invoked with this command:

```
ISPSTART NEWAPPL(ABC)
```

Note that in this case ISPF does not pass PANEL(ISR@PRIM), part of its normal default string, to ISPSTART. Because the ISPSTART command generated does not contain a PANEL(...), PGM(...) or CMD(...) keyword, there is no primary panel to display.

For information about the syntax and options for ISPSTART, including the rules for specifying or overriding the default primary panel, refer to the *ISPF Dialog Developer's Guide and Reference*.

The Primary Option Menu panel

Figure 1 shows the first panel, the ISPF Primary Option Menu, with the license information.

```
  Menu  Utilities  Compilers  Options  Status  Help
 ------------------------------------------------------------------------------
                            ISPF Primary Option Menu

 0  Settings      Terminal and user parameters           User ID . : USERID
 1  View          Display source data or listings        Time. . . : 11:38
 2  Edit          Create or change source data           Terminal. : 3278
 3  Utilities     Perform utility functions              Screen. . : 1
 4  Foreground    Interactive language processing        Language. : ENGLISH
 5  Batch         Submit job for language processing     Appl ID . : ISR
 6  Command       Enter TSO or Workstation commands      TSO logon : ISPF
 7  Dialog Test   Perform dialog testing                 TSO prefix: USERID
 9  IBM Products  IBM program development products       System ID : MVS8
                                                  r     MVS acct. : IBMGSA
 Licensed Materials - Property of IBM                    Release . : ISPF 5.5
 5694-A01 (C) Copyright IBM Corp. 1980, 2003.
             All rights reserved.                 s
 US Government Users Restricted Rights -
 Use, duplication or disclosure restricted
 by GSA ADP Schedule Contract with IBM Corp.

 Option ===>
  F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
 F10=Actions  F12=Cancel
```

Figure 1. ISPF Primary Option Menu (ISR@PRIM) with license information

Press the Enter key to dismiss the license information. The full Primary Option Menu is displayed.

```
  Menu  Utilities  Compilers  Options  Status  Help
 ------------------------------------------------------------------------------
                            ISPF Primary Option Menu

 0  Settings      Terminal and user parameters           User ID . : USERID
 1  View          Display source data or listings        Time. . . : 11:49
 2  Edit          Create or change source data           Terminal. : 3278
 3  Utilities     Perform utility functions              Screen. . : 1
 4  Foreground    Interactive language processing        Language. : ENGLISH
 5  Batch         Submit job for language processing     Appl ID . : ISR
 6  Command       Enter TSO or Workstation commands      TSO logon : ISPF
 7  Dialog Test   Perform dialog testing                 TSO prefix: USERID
 9  IBM Products  IBM program development products       System ID : MVS8
 10 SCLM          SW Configuration Library Manager       MVS acct. : IBMGSA
 11 Workplace     ISPF Object/Action Workplace           Release . : ISPF 5.5

      Enter X to Terminate using Log/List defaults




 Option ===>
  F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
 F10=Actions  F12=Cancel
```

Figure 2. ISPF Primary Option Menu (ISR@PRIM)

ISPF Primary Options

When you select one of these options, ISPF displays the selected panel. These options are described in detail in the *ISPF User's Guide Volume II*. Brief descriptions follow:

Option Description

0 **Settings** displays and changes selected ISPF parameters, such as terminal characteristics and function keys. See the **Settings (Option 0)** chapter of the *ISPF User's Guide Volume II* for more information.

1 **View** displays data using the View or Browse function. You can use View or Browse to look at (but not change) large data sets such as compiler listings. You can scroll the data up, down, left, or right. If you are using Browse, a FIND command, entered on the command line, allows you to search the data for a character string. If you are using View, you can use all the commands and macros available to you in the Edit function. See the View (Option 1) chapter of the *ISPF User's Guide Volume II* for more information.

2 **Edit** allows you to create or change source data such as program code and documentation using the ISPF full-screen editor. You can scroll the data up, down, left, or right. You can change the data by using Edit *line commands*, which are entered directly on a line number, and *primary commands*, which are entered on the command line. See the Edit (Option 2) chapter of the *ISPF User's Guide Volume II*, and refer to *ISPF Edit and Edit Macros* for more information.

3 **Utilities** perform library and data set maintenance tasks, such as moving or copying library or data set members, displaying or printing data set names and volume table of contents (VTOC) information, comparing data sets, and searching for strings of data. See the Utilities (Option 3) chapter of the *ISPF User's Guide Volume II* for more information.

4 **Foreground** calls IBM language processing programs in the foreground. See the Foreground (Option 4) chapter of the *ISPF User's Guide Volume II* for more information.

5 **Batch** calls IBM language processing programs as batch jobs. ISPF generates Job Control Language (JCL) based on information you enter and submits the job for processing. See the Batch (Option 5) chapter of the *ISPF User's Guide Volume II* for more information.

6 **Command** calls TSO commands, CLISTs, or REXX EXECs under ISPF. See the Command (Option 6) chapter of the *ISPF User's Guide Volume II* for more information.

7 **Dialog Test** tests individual ISPF dialog components, such as panels, messages, and dialog functions (programs, commands, menus). See the Dialog Test (Option 7) chapter of the *ISPF User's Guide Volume II* for more information.

9 **IBM Products** allows you to select other installed IBM program development products on your system. Products supported are:
- Tivoli Information Management
- COBOL Structuring Facility foreground dialog (COBOL/SF)
- Screen Definition Facility II (SDF II) licensed program
- Screen Definition Facility II-P (SDF II-P) licensed program.

See the IBM Products (Option 9) chapter of the *ISPF User's Guide Volume II* for more information.

10 **SCLM** controls, maintains, and tracks all of the software components of an application. See the SCLM (Option 10) chapter of the *ISPF User's Guide Volume II*, and refer to *ISPF Software Configuration and Library Manager (SCLM) Developer's and Project Manager's Guide* for more information.

11 **Workplace** gives you access to the ISPF Workplace, which combines many of the ISPF functions onto one object-action panel. See the ISPF Object/Action Workplace (Option 11) chapter of the *ISPF User's Guide Volume II* for more information.

X **EXIT** leaves ISPF using the log and list defaults. You can change these defaults from the Log/List pull-down on the ISPF Settings panel action bar.

Primary Option Menu Action Bar Choices

The Primary Option Menu action bar choices function as follows:

Menu This choice is available from most panels within ISPF. It displays many of the options listed on the Primary Option Menu panel. See the chapter on the Primary Option Menu in the *ISPF User's Guide Volume II* for details on each choice.

Utilities
This choice is available from most panels within ISPF. It displays the options listed on the Utility Selection panel (Option 3). See the chapter on the Primary Option Menu in the *ISPF User's Guide Volume II* for details on each choice.

Compilers
The Compilers pull-down provides access to the foreground and background compilers listed under options 4 and 5, as well as the ISPPREP (Preprocessed Panel) utility and the ISPDTLC (Dialog Tag Language Conversion) utility.

Options
The Options pull-down provides access to many ISPF settings, including CUA attributes and colors, keylists, and point-and-shoot fields, and the Dialog Test Application ID pop-up. See the chapter on Settings (Option 0) in the *ISPF User's Guide Volume II* for details on each choice.

Status The Status pull-down enables you to control what is displayed in the status area of the Primary Option Menu.

Note: The current setting is shown as an unavailable choice. That is, in non-GUI mode it is colored blue (the default) with an asterisk as the first digit of the selection number. In GUI mode, the choice is *grayed*.

See the section about the status area on the Primary Option Menu in the *ISPF User's Guide Volume II* for more information about using these choices to tailor the status area.

Help The Help pull-down provides access to the online help and tutorial topics for the main ISPF options.

User Profiles

ISPF stores information in your user profile. This allows ISPF to insert a value in panel input fields by using the values you last entered on either the same panel or a similar type of panel. Sometimes default values are provided if you have not specified otherwise. Information maintained in your user profile includes:

- Project name, group names, and type
- Job statement information [1]
- SYSOUT class for printed output [1]
- Defaults for list and log allocation and processing
- Terminal characteristics and function key definitions
- Edit profiles, including mask, tabs, and bounds
- Current scroll amount for Browse, Edit, Data Set List, and member lists [1]
- Processing options for each of the language processors
- Data set allocation/information parameters.

ISPF maintains this information automatically from one session to another. If you are a new user, you have to enter certain information the first time. But then, you simply review the information and make whatever changes you want before proceeding.

ISPF maintains sets of job statements for:

- JCL for printing the Log and List data sets
- The Hardcopy utility (3.6)
- The Outlist utility (3.8)
- The SuperC utility (3.12)
- The SuperCE utility (3.13)
- The Foreground Print Options panel (option 4, excluding SCRIPT/VS)
- The Batch option (5)
- The SCLM option (10)
- SCRIPT/VS draft output (4.9)
- SCRIPT/VS final output (4.9)
- Ending ISPF

Thus, you can provide different job statement parameters for each of these functions. For more information, see "Job Statement Information" on page 143.

Getting Help

The HELP command (F1/13) shows you general information about an ISPF system command, ISPF option, or panel, or offers more information about a message that has been displayed in the upper-right corner of the screen.

For short messages, HELP displays a one-line explanation. To get further information, enter the HELP command a second time for the appropriate section of the tutorial. Long messages display (by default) in a pop-up window. Enter END (F3/15) or RETURN (F4/16) to return to the screen that you were viewing when you entered the HELP command.

Ending an ISPF Function or ISPF

To end an ISPF function without ending ISPF, enter END or RETURN.

1. This information is maintained separately for SCLM.

Notes:

1. If you are using the Hardcopy utility (option 3.6) or the Batch option (option 5), entering END or RETURN submits your job for processing. Type CANCEL (or press F12) to leave the Hardcopy utility without submitting a job.
2. If a SuperC or Search-For member list is displayed, END processes any members you have selected. Enter CANCEL or RETURN to leave one of these member lists without processing your selections.

To end ISPF from the ISPF Primary Option Menu, you can use the:
- EXIT command (F3)
- END command
- RETURN command
- Exit option (X).

If the display screen is split, taking one of the actions listed above ends ISPF on the active logical screen only. Refer to *ISPF Dialog Developer's Guide and Reference* for more information.

Exit Option (X)

The Exit option ends ISPF using any defaults for processing log and list data sets that you have specified using the Log/List pull-down on the ISPF Settings panel action bar. If you have not specified any defaults and if a log or list data set has been generated, the Exit option displays the Specify Disposition of Log and List Data Sets panel.

Jump Function

If you are not in split-screen mode (see "Splitting the Screen Horizontally or Vertically" on page 44), you can use the *jump function* to immediately leave ISPF from any panel by entering =X. There are two exceptions: If you are using any of the Dialog Test options (7.1–7.T) or the SCLM options (10.1–10.6), entering =X returns you to the ISPF Primary Option Menu. If you are at the Dialog Test or SCLM Primary Option Menu, enter either X or =X to return to the ISPF Primary Option Menu, then enter X or =X to end ISPF.

Chapter 2. The ISPF User Interface

ISPF provides an interface based on panels and action bars, and exploits many of the usability features of Common User Access® (CUA®) interfaces. Refer to *Object-Oriented Interface Design: IBM Common User Access Guidelines* for additional information.

Action bars give you an additional way to move around in the product, as well as the ability to nest commands. Command nesting allows you to *suspend* an activity while you perform a new one rather than having to end a function to perform another function.

This chapter primarily explains the panel structure, the action bar-driven interface and the use of ISPF's graphical user interface (GUI).

Some Terms You Should Know

The following terms are used in this document:

action bar
The area at the top of an ISPF panel that contains choices that give you access to actions available on that panel. When you select an action bar choice, ISPF displays a *pull-down menu*.

pull-down menu
A list of numbered choices extending from the selection you made on the action bar. The action bar selection is highlighted; for example, Utilities in Figure 5 on page 18 appears highlighted on your screen. You can select an action either by typing in its number and pressing Enter or by selecting the action with your cursor. ISPF displays the requested panel. If your choice contains an *ellipsis* (...), ISPF displays a *pop-up window*. When you exit this panel or pop-up, ISPF closes the pull-down and returns you to the panel from which you made the initial action bar selection.

ellipsis
Three dots that follow a pull-down choice. When you select a choice that contains an ellipsis, ISPF displays a *pop-up* window.

pop-up window
A bordered temporary window that displays over another panel.

modal pop-up window
A type of window that requires you to interact with the panel in the pop-up before continuing. This includes cancelling the window or supplying information requested.

modeless pop-up window
A type of window that allows you to interact with the dialog that produced the pop-up before interacting with the pop-up itself.

point-and-shoot text
Text on a screen that is cursor-sensitive. See "Point-and-Shoot Text Fields" on page 20 for more information.

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push button
A rectangle with text inside. Push buttons are used in windows for actions that occur immediately when the push button is selected (available only when you are running in GUI mode).

function key
In previous releases of ISPF, a programmed function (PF) key. *This is a change in terminology only*.

select In conjunction with point-and-shoot text fields and action bar choices, this means moving the cursor to a field and simulating Enter.

mnemonics
Action bar choices can be defined with a underscored letter in the action bar choice text. In host mode you can access the action bar choice with the ACTIONS command and parameter 'x', where 'x' is the underscored letter in the action bar choice text. In GUI mode you can use a *hot key* to access a choice on the action bar; that is, you can press the ALT key in combination with the letter that is underscored in the action bar choice text.

Understanding ISPF Panels

A *panel* is a predefined display image that you see on a display screen. ISPF formats all panels to fit on a 24-line by 80-character screen. On a 3278 Model 3 or 4, data that you can scroll occupies the full length of the screen (32 or 43 lines). On a 3278 Model 5, ISPF normally displays information in *default mode*; that is, 24 lines by 80 characters, with the same size characters as other models. "Browse" and "Edit" data that is wider than 80 characters is displayed with the smaller *native mode* characters, that is, up to 132 per line. You can use the Settings option (0) to override the automatic switching of modes.

Panel Format

Figure 3 shows how ISPF formats the first three and last few lines of each display:

```
Action Bar
_____________________________________________________________________
                              Title                          Short Message

 ⋮

Long Message
Option  ===>                                                Scroll ===>
 F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
```

Figure 3. Panel Format

Note: The **Panel display CUA mode** field on the ISPF Settings panel determines where the Command or Option line and long messages are displayed. The default setting selects **Panel display CUA mode**, which causes the Command or Option line to be displayed on the bottom of the panel. The default setting also selects **Long message in pop-up**, which causes long messages to be displayed in a pop-up window directly above the Command or Option line. To display the command or option line and long messages at the top of the panel, select option 0, deselect the **Panel display CUA mode** field, and deselect the **Command line at bottom** field. Refer to *ISPF Dialog Developer's Guide and Reference* if you need more information about the **Panel display CUA mode** and **Command line placement** fields.

The fields on Figure 3 on page 14 function as follows:

Action Bar
The action bar provides access to pull-down menus that give you a new and faster way to move around in the product as well as access to command stacking. See Figure 5 on page 18 for more information about using the action bar.

Title Identifies the function being carried out and, where appropriate, the library or data set information.

Short Message
Shows:

- Current line for Browse, and column positions for View, Browse, and Edit.
- Current row position in a table display if the short message area is not overlaid by a function-requested message.
- Successful completion of a processing function.
- Error conditions (with an audible alarm, if one is installed). Refer to *ISPF Dialog Developer's Guide and Reference* for information about coding an alarm.

Command/Option
Allows you to enter a command or, on a menu, to enter either a command or an option.

Scroll Indicates the scroll amount (if scrolling applies). You can type over it to change it. The valid scroll amounts are 0–9999, PAGE, HALF, MAX, CSR, and DATA.

Long Message
Displays an explanation of error conditions in a pop-up window when you enter the HELP command (see "Getting Help" on page 11). On some displays, data may be overlaid temporarily by a long message.

Function Keys
Displays settings for the function keys. These settings are controlled through the Function keys pull-down on the action bar on the ISPF Settings panel.

Panel Types

When using ISPF, you see three basic types of panels:
- Menus (selection panels)
- Data-entry panels
- Scrollable data displays.

Menus

A *menu*, or selection panel, allows you to type a number or letter in the **Option** field and press Enter to select one of the listed items. The number or letter can be typed in either uppercase or lowercase. Allowable numbers and letters are shown in high intensity. You can also enter ISPF commands. See Figure 4 on page 16 for an example of a menu.

Note: If the word `BLANK` or `blank` is listed, leave the **Option** field blank and press Enter to select that option. Do not type the word `blank`.

```
1  Menu  Utilities  Compilers  Options  Status  Help
 ------------------------------------------------------------------------------
                            ISPF Primary Option Menu
 2
0  Settings      Terminal and user parameters            User ID . : USERID
1  View          Display source data or listings         Time. . . : 13:13
2  Edit          Create or change source data            Terminal. : 3278
3  Utilities     Perform utility functions               Screen. . : 1
4  Foreground    Interactive language processing         Language. : ENGLISH
5  Batch         Submit job for language processing      Appl ID . : ISR
6  Command       Enter TSO or Workstation commands       TSO logon : ISPF
7  Dialog Test   Perform dialog testing                  TSO prefix: USERID
9  IBM Products  IBM program development products        System ID : MVS8
10 SCLM          SW Configuration Library Manager        MVS acct. : IBMGSA
11 Workplace     ISPF Object/Action Workplace            Release . : ISPF 5.5
12 OS/390 System OS/390 system programmer applications
13 OS/390 User   OS/390 user applications
14 IBMGSA        IBMGSA Development and Service Apps
P  PDF Tools     PDF development tools
S  SDSF          Spool Display and Search Facility

Option ===>  ____________________________________________________________________
3  F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
F10=Actions  F12=Cancel
```

1 Action bar. You can select any of the action bar choices and display a pull-down.

2 Options Menu. The fields in this column are point-and-shoot text fields.

3 Function Key bar. Displays the Function Keys that are active on the current panel.

Figure 4. Primary Option Menu showing key features

Data Entry Panels

A data-entry panel is a panel on which you specify information, such as data set names, job statement parameters, and language processing options. If you do not enter a required value or if you enter inconsistent values, ISPF prompts you with a message.

Some data-entry fields retain their previous values. If so, the next time you use the panel, you do not have to type them again. Just press Enter. If you do not want those values, type over them and then press Enter.

The retained values come from your user profile, which ISPF automatically builds and maintains across sessions. See “User Profiles” on page 10 for more information about user profiles.

Edit modes and defaults are also maintained in the Edit portion of your user profile. Refer to *ISPF Edit and Edit Macros* for more information.

Option Selection

You can select an ISPF option three ways:

- Select a choice from one of the pull-downs on the action bar. See Figure 5 on page 18 for more information.
- Select one of the point-and-shoot fields. See “Point-and-Shoot Text Fields” on page 20 for more information.

- Type an option number on the Option line and press Enter.

Many options have a secondary list of options. To bypass the second menu, type two selections, separating them with a period, on the ISPF Primary Option Menu. For example, entering 3.1 on the ISPF Primary Option Menu is the same as entering 3 on the ISPF Primary Option Menu and 1 on the Utility Selection Panel.

An even faster way to select an option is to bypass both the ISPF Primary Option Menu and the secondary menus. To do this, include your options in the ISPF (or alias) command. For example:

ISPF 2 To go directly to the Edit option.
ISPF 3.1 To go directly to the Library utility (3.1).

Action Bars

Action bars give you another way to move through ISPF. Most ISPF panels have action bars at the top; the choices appear on the screen in white by default. Many panels also have point-and-shoot text fields, which appear in turquoise by default. The panel shown in Figure 4 on page 16 has both.

How to Navigate in ISPF without Using Action Bars

If you use a non-programmable terminal to access ISPF and you do not want to take advantage of the command nesting function, you can make selections the same way you always have; by typing a selection number and pressing Enter.

How to Navigate in ISPF Using the Action Bar Interface

If the cursor is located somewhere on the panel, there are several ways to move it to the action bar:

- Use the cursor movement keys to manually place the cursor on an action bar choice.
- Type ACTIONS on the command line and press Enter to move the cursor to the first action bar choice.
- Press F10 (Actions) or the Home key to move the cursor to the first action bar choice.

  If mnemonics are defined for action bar choices, you can:
  - In 3270 mode, on the command line, type ACTIONS and the mnemonic letter that corresponds to an underscored letter in the action bar choice text. This results in the display of the pull-down menu for that action bar choice.
  - In 3270 mode, on the command line enter the mnemonic letter that corresponds to an underscored letter in the action bar choice text, and press the function key assigned to the ACTIONS command. This results in the display of the pull-down menu for that action bar choice.
  - In GUI mode, you can use a *hot key* to access a choice on an action bar or on a pull-down menu; that is, you can press the ALT key in combination with the mnemonic letter that is underscored in the choice text to activate the text.

Use the tab key to move the cursor among the action bar choices. If you are running in GUI mode (see “Running in GUI mode” on page 25, use the right and left cursor keys.

Notes:

1. ISPF does not provide a mouse emulator program. This document uses *select* in conjunction with point-and-shoot text fields and action bar choices to mean moving the cursor to a field and simulating Enter.

Note: Some users program their mouse emulators as follows:

- Mouse button 1 – to position the cursor to the pointer and simulate Enter
- Mouse button 2 – to simulate F12 (Cancel).

2. If you want the Home key to position the cursor at the first input field on an ISPF panel, type `SETTINGS` on any command line and press Enter to display the ISPF Settings panel. Deselect the **Tab to action bar choices** option.
3. If you are running in GUI mode, the Home key takes you to the beginning of the current field.

When you select one of the choices on the action bar, ISPF displays a pull-down menu. Figure 5 shows the pull-down menu displayed when you select Utilities on the ISPF Primary Option Menu action bar.

```
  Menu  Utilities 1  Compilers  Options  Status  Help
 ------ ------------------------ ------------------------------------------------
        |__  1. Library          | rimary Option Menu
        |    2. Data set         |
 0  Se  |    3. Move/Copy        | r parameters            User ID . : USERID
 1  Vi  |    4. Data Set List    | ata or listings         Time. . . : 11:44
 2  Ed  |    5. Reset Statistics | source data             Terminal. : 3278
 3  Ut  |    6. Hardcopy         | functions               Screen. . : 1
 4  Fo  |    7. Download...      | uage processing         Language. : ENGLISH
 5  Ba  |    8. Outlist          | anguage processing      Appl ID . : ISR
 6  Co  |    9. Commands...      | kstation commands       TSO logon : ISPF
 7  Di  |   *0. Reserved         | esting                  TSO prefix: USERID
 9  IB  |   11. Format           | lopment products        System ID : MVS8
 10 SC  |   12. SuperC           | Library Manager         MVS acct. : IBMGSA
 11 Wo  |   13. SuperCE          | on Workplace            Release . : ISPF 5.5
 12 OS  |   14. Search-For       | ogrammer applications
 13 OS  |   15. Search-ForE      | ications
 14 IB  |------------------------| nt and Service Apps
 P  PDF Tools     PDF development tools
 S  SDSF          Spool Display and Search Facility

 Option ===>
  F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
 F10=Actions  F12=Cancel
```

1 The selected action bar choice is highlighted.

Figure 5. Panel with an Action Bar Pull-Down Menu

To select a choice from the Utilities pull-down menu, type its number in the entry field (underlined) and press Enter or select the choice. To cancel a pull-down menu without making a selection, press F12 (Cancel). For example, if you select choice 9, ISPF displays the Command Table Utility pop-up, as shown in Figure 7 on page 19.

Note: If a choice displays in blue (the default) with an asterisk as the first digit of the selection number (if you are running in GUI mode, the choice will be *grayed*), the choice is unavailable for one of the following reasons:

- Recursive entry is not permitted here
- The choice is the current state; for example, the Status is currently set to Session in Figure 6 on page 19.

```
  Menu  Utilities  Compilers  Options  Status  Help
 ------------------------------------ +-------------------------------+ ----------
                            ISPF Prim |  *. Session                   |
                                      |  2. Function keys             |
 0  Settings      Terminal and user p |  3. Calendar                  |  USERID
 1  View          Display source data |  4. User status               |  15:09
 2  Edit          Create or change so |  5. User point and shoot      |  3278
 3  Utilities     Perform utility fun |  6. None                      |  1
 4  Foreground    Interactive languag +-------------------------------+  ENGLISH
 5  Batch         Submit job for language processing      Appl ID . : ISR
 6  Command       Enter TSO or Workstation commands       TSO logon : ISPF
 7  Dialog Test   Perform dialog testing                  TSO prefix: USERID
 9  IBM Products  IBM program development products        System ID : ISD1
 10 SCLM          SW Configuration Library Manager        MVS acct. : IBMGSA
 11 Workplace     ISPF Object/Action Workplace            Release . : ISPF 5.5
 12 OS/390 System OS/390 system programmer applications
 13 OS/390 User   OS/390 user applications
 14 IBMGSA        IBMGSA Development and Service Apps
 P  PDF Tools     PDF development tools
 S  SDSF          Spool Display and Search Facility

 Option ===>
  F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
 F10=Actions  F12=Cancel
```

Figure 6. An Unavailable Choice on a Pull-Down

If you entered a command on the command line before selecting an action bar choice, the command is processed, and the pull-down menu is never displayed. The CANCEL, END, and RETURN commands are exceptions. These three commands are not processed and the cursor is repositioned to the first input field in the panel body. If there is no input field, the cursor is repositioned under the action bar area. If you are running in GUI mode and select an action bar choice, any existingcommand on the command line is ignored.

```
  Menu  Utilities  Compilers  Options  Status  Help
 - +------------------------------- Commands -------------------------------+
   |                          Command Table Utility                          |
   |                                                                         |
 0 |   Specifications                        Command table search order      |
 1 |   Application ID . . ISR                Application table  . : ISR      |
 2 |   Enter "/" to select option            User table 1 . . . . : USER     |
 3 |      Show description field             User table 2 . . . . :          |
 4 |                                         User table 3 . . . . :          |
 5 |                                         Site table 1 . . . . : SITE     |
 6 |                                         Site table 2 . . . . :          |
 7 |                                         Site table 3 . . . . :          |
 9 |                                         System table . . . . : ISP      |
 1 |                                                                         |
 1 |  If no application ID is specified, the current application ID will be  |
 1 |  used. The name of the command table to be processed is formed by      |
 1 |  prefixing the application id to the string 'CMDS'.  For example:       |
 1 |  Application ID  . .  TST results in a command table name of 'TSTCMDS'. |
 P |                                                                         |
 S |  Command ===> ____________________________________________________      |
   |   F1=Help       F2=Split      F3=Exit       F7=Backward   F8=Forward    |
 0 |   F9=Swap      F12=Cancel                                               |
   +-------------------------------------------------------------------------+
 F10=Actions  F12=Cancel
```

Figure 7. Pop-Up Selected from an Action Bar Pull-Down

Point-and-Shoot Text Fields

Point-and-shoot text fields are cursor-sensitive; if you select a field, the action described in that field is performed. For example, if you select Option 0, Settings, in Figure 4 on page 16, ISPF displays the ISPF Settings panel.

Note: If you have entered a command on the command line, this command is processed before any point-and-shoot command unless you are running in GUI mode.

The cursor-sensitive portion of a field often extends past the field name. Until you are familiar with this new feature of ISPF, you might want to display these fields in reverse video (use the PSCOLOR command to set Highlight to REVERSE).

Note: You can use the Tab key to position the cursor to point-and-shoot fields by selecting the "Tab to point-and-shoot fields" option on the ISPF Settings panel (Option 0).

Function Keys

ISPF uses CUA-compliant definitions for function keys F1–F12 (except inside the Edit function). F13–F24 are the same as in ISPF Version 3. By default you see the CUA definitions because your "Primary range" field is set to 1 (Lower - 1 to 12).

To use non-CUA-compliant keys, select the "Tailor function key display" choice from the Function keys pull-down on the ISPF Settings (option 0) panel action bar. On the Tailor Function Key Definition Display panel, specify 2 (Upper - 13 to 24) in the "Primary range" field.

The following function keys help you navigate in ISPF:

F1 **Help**. Displays Help information. If you press F1 (and it is set to Help) after ISPF displays a short message, a long message displays in a pop-up window.

F2 **Split**. Divides the screen into two logical screens separated by a horizontal line or changes the location of the horizontal line.

Note: If you are running in GUI mode, each logical screen displays in a separate window.

F3 **Exit** (from a pull-down). Exits the panel underneath a pull-down.

F3 **End**. Ends the current function.

F7 **Backward**. Moves the screen up the scroll amount.

F8 **Forward**. Moves the screen down the scroll amount.

F9 **Swap**. Moves the cursor to where it was previously positioned on the other logical screen of a split-screen pair.

F10 **Actions**. Moves the cursor to the action bar. If you press F10 a second time, the cursor moves to the command line.

F12 **Cancel**. Issues the Cancel command. Use this command to remove a pull-down menu if you do not want to make a selection. F12 also moves the cursor from the action bar to the Option ==> field on the ISPF Primary Option Menu. See *ISPF Dialog Developer's Guide and Reference* for cursor-positioning rules.

F16 **Return**. Returns you to the ISPF Primary Option Menu or to the display from which you entered a nested dialog. RETURN is an ISPF system command.

Selection Fields

z/OS V1R6.0 ISPF uses the following CUA-compliant conventions for selection fields:

A single period (.)

Member lists that use a single period in the selection field recognize only a single selection. For example, within the Edit function you see this on your screen:

```
EDIT     USER1.PRIVATE.TEST                ROW 00001 of 00002
 Name         VV MM  Created   Changed  Size Init  Mod  ID
 . MEM1       01.00  94/05/12  94/07/22  40    0    0   USER1
 . MEM2       01.00  94/05/12  94/07/22  30    0    0   KEENE
```

You can select only one member to edit.

A single underscore (_)

Selection fields marked by a single underscore prompt you to use a slash (/) to select the choice. You may use any nonblank character. For example, the "Panel display CUA mode" field on the ISPF Settings panel has a single underscore for the selection field:

```
Options
  Enter "/" to select option
  _  Command line at bottom
  _  Panel display CUA mode
  _  Long message in pop-up
```

Note: In GUI mode, this type of selection field displays as a check box; that is, a square box with associated text that represents a choice. When you select a choice, the check box is filled to indicate that the choice is in effect. You can clear the check box by selecting the choice again.

An underscored field (____)

Member lists or text fields that use underscores in the selection field recognize multiple selections. For example, from the Display Data Set List Option panel, you may select multiple members for print, rename, delete, edit, browse, or view processing.

Entering Commands in ISPF

ISPF provides flexibility by accepting various types of commands and having many methods for entering them. Table 1 provides an overview of the entry methods and commands available.

Table 1. Entry Methods and Command Types

Entry Methods	TSO Cmds, CLISTs, and REXX EXECs	DM Commands	PDF Primary Commands	PDF Line Commands	WS Commands
ISPF Command Shell (option 6)	X				X
Option field	X	X			X (1)
Command field	X	X	X		X (1)

Table 1. Entry Methods and Command Types (continued)

Entry Methods	TSO Cmds, CLISTs, and REXX EXECs	DM Commands	PDF Primary Commands	PDF Line Commands	WS Commands
Line Command fields (1–6 characters)				X	
Line Command fields (9 characters)	X			X	
Note: (1) Available when prefixed by "WS"					

For example, to use the TSO ALLOCATE command, you could enter:

```
Command ===> TSO ALLOCATE
```

Also, CLIST names and REXX EXEC names can be preceded by a percent (%) symbol, as in:

```
Option ===> TSO %CLIST
```

This symbol informs TSO that the command is a CLIST or REXX EXEC, not a TSO command.

You can also use two command entry methods not shown in the table: the PA keys and the function keys. PA1 (ATTENTION) and PA2 (RESHOW) are hardware keys that you cannot redefine. You can use function keys to enter all commands.

Types of Commands

Three types of commands operate at three levels:

- TSO commands, CLISTs, and REXX EXECs

  You invoke high-level commands through the MVS/TSO operating system. These include TSO commands, CLISTs, REXX EXECs, and the commands assigned to the PA1 and PA2 keys.
- DM component commands

  You call middle-level commands through the DM component of ISPF.
- PDF component primary and line commands

  You call low-level commands through the PDF component of ISPF.

TSO Commands, CLISTs, and REXX EXECs

ISPF gives you access to the MVS/TSO operating system by letting you enter TSO commands, CLISTs, and REXX EXECs from within ISPF. *TSO Extensions Command Language Reference* and *MVS/XA TSO Extensions Command Language Reference* contain descriptions of all TSO commands.

You can enter most TSO commands, CLISTs, and REXX EXECs from all three panel types: data entry; menu; and scrollable data display. However, some TSO commands, such as LOGON and LOGOFF, can cause unwanted results when you enter them from ISPF. This is also true of CLISTs and REXX EXECs that contain these TSO commands. The rules for entering TSO Commands, CLISTs and REXX EXECS are described in the Command (Option 6) chapter of the *ISPF User's Guide Volume II*.

DM Component Commands

DM component commands are valid from all three types of panels. However, the validity of some commands depends on the type of panel displayed or the type of

terminal you use. For example, the scroll commands—UP, DOWN, LEFT, and RIGHT—are valid only on scrollable data displays, and the SPLITV command is valid only on a 3290 display terminal.

For a description of the ISPF commands, default function key settings, and the PA1 and PA2 keys, see "ISPF System Commands" on page 72.

PDF Component Primary and Line Commands

These commands are valid only when you call them within the PDF component. Exceptions are the primary and line commands for Edit (option 2), which are defined in *ISPF Edit and Edit Macros*, and those for SCLM (option 10), which are defined in *ISPF Software Configuration and Library Manager (SCLM) Developer's and Project Manager's Guide*. The ISPF primary option that you are using determines which commands are valid. For example, the CAPS primary command is valid only when using the Edit option.

For information about which commands are valid for a particular option, see the relevant chapter in the *ISPF User's Guide Volume II*, that describes the option.

PDF component primary commands can affect a complete data set or PDS member, but the line commands can affect only one or more specified lines within a data set (unless you specify all the lines in the data set). For example, the Edit COPY command can copy a complete data set, whereas the C or CC Edit line command can copy only lines or blocks of lines within a data set.

National Language Support

National Language Support (NLS) gives countries the option of translating commands and keywords so that users can enter them in the country's national language. In addition, panels, messages, and literal modules are shipped with the product. The supported languages are German, Swiss-German, and Japanese.

When national language support is enabled, users can be required to enter certain keywords in the national language and not in English.

When the Danish, French, Korean, Traditional Chinese, Simplified Chinese, Spanish, Brazilian-Portuguese, or Italian session language is specified, its respective literal module is used. However, the ISPF product panels and messages are displayed in English.

ISPF Command Syntax Notation

The notation conventions for ISPF command syntax follow.

- Uppercase commands and their uppercase parameters show required entry.
- Lowercase parameters show variables (substitute your values for them).
- Brackets([]) show optional parameters (required parameters do not have brackets).
- An OR (|) symbol shows two or more parameters you *must* select from.
- Stacked parameters show two or more parameters you *can* select from.
- Braces ({}) with stacked parameters show that you *must* select one.
- Underscores show defaults.

Stacking Commands

To enter more than one command, you can stack them by typing a special delimiter between them. The default delimiter is a semicolon. Use the Settings option (0) to change the delimiter. For example, to stack two Edit CHANGE commands, use:

```
Command ===> CHANGE ALL ABC XYZ;CHANGE ALL PQR GHIJK
```

The system variable for the delimiter is ZDEL. Refer to Appendix E in the *ISPF Dialog Developer's Guide and Reference* for more information about ZDEL.

Dual Command Processing

You can enter information on a command or option line in combination with pressing a related function key. The command is called first. For example, typing `4` on the command line and pressing F7 (UP command) is the same as typing `UP 4` on the command line and pressing Enter.

If the command you type is unrelated to the command assigned to a function key you press, ISPF passes the entry to the function in control, which either processes or ignores the entry. For example, if the Edit function is in control, ISPF may display an error message. However, if the Tutorial is in control, the command is ignored. ISPF processes any stacked valid commands.

Line Command Fields

Line command fields can take many forms. Some have headings, some do not. Most are blank, but some contain single quotation marks or sequence numbers. For some, you type one character; for others, you type up to nine characters (even typing over data set names). Table 2 shows the functions that provide the line command fields.

Table 2. Characteristics of the Line Command Field

Functions Providing Line Command Fields	Heading Displayed	Characters Allowed	Initial Contents
Member Selection List	None	1–9	Blank
Edit (option 2)	None	6	Quotes or numbers
Data Set List utility (option 3.4)	Command	9	Blank
Command Table utility (option 3.9)	None	4	Quotes
Format Specification utility (option 3.11)	None	1	Blank
SCRIPT/VS (option 4.9)	Line Cmd	1	Quotes
Dialog Test (option 7): Variables (option 7.3) Tables (option 7.4) Traces (option 7.7) Breakpoints (option 7.8)	None	4	Quotes

The line command field for member selection lists is blank and has no heading. This includes typical member lists, which have a 1-character line command field, and the member list displayed when you use option M of the Data Set List utility, which has a 9-character line command field.

Quotes appear when you create a new data set or member, or when you insert one or more lines. Sequence numbers appear if you have NUMBER ON in your Edit profile.

Data set lists with 9-character line command fields allow you to type over data set names, thus extending the length of the fields to allow you to type long TSO commands, CLIST names, and REXX EXEC names. For information about entering TSO commands, CLISTs, and REXX EXECs in a line command field, see the Data Set List Utility (Option 3.4) chapter of the *ISPF User's Guide Volume II*. Also, the rules for entering TSO Commands, CLISTs and REXX EXECS from within ISPF are described in the Command (Option 6) chapter of the *ISPF User's Guide Volume II*.

PDF Component Line Commands

Most PDF component line commands use only one letter, such as S, for selecting a member from a member list. Others, such as many of the Edit line commands, use more than one letter and sometimes allow you to add a number so the command affects more than one line. For example, the UC line command plus the number 3, as in `UC3`, converts three lines to uppercase.

Another type of line command is the *block* line command, which affects the block of lines between and including the lines on which the commands are entered. For example, the UCC line command, when entered beside two different lines, converts all lines between and including the two commands to uppercase.

Command Nesting

You can use the action bars to *suspend* an activity while you perform a new one.

For example, if you are editing a data set and want to allocate another data set, select the Data set choice from the Utilities pull-down on the Edit panel action bar. ISPF suspends your edit session and displays the Data Set Utility panel. When you have allocated the new data set and ended the function, ISPF returns you directly to your edit session.

By contrast, if you used the jump function (=3.2), ISPF would end your edit session before displaying the Data Set Utility.

Running in GUI mode

In addition to the standard interface seen in terminals and terminal emulators, ISPF can be run from a workstation using the display functions of your workstation operating system. In the ISPF library this is called *running in GUI mode*.

The ability to run in GUI mode is provided via the ISPF Client/Server component, also known as the ISPF Workstation Agent (WSA). The WSA is an application that runs on your local workstation and maintains a connection between the workstation and the ISPF host. The WSA also allows you to edit host data on your workstation and workstation data on the host. In the ISPF library this is called *distributed editing*. For more information about distributed editing, see the 'Download Data Set to Workstation Utility (Option 3.7)' section of the *ISPF User's Guide Volume II*.

The ISPF WSA is supported on the following platforms:
- OS/2
- Microsoft Windows
- AIX
- HP-UX
- Solaris

Starting a GUI Session

Before you can start a GUI session, you must have performed the following actions:

- Successful installation and initialization of TCP/IP or APPC.

  'Appendix B: Configuring Communications for the ISPF Client/Server', in the *ISPF User's Guide Volume I*, contains procedures that will help you to test whether you have satisfied this requirement.
- Successful installation of the ISPF Workstation Agent component.

  See 'Appendix A: Installing the Client/Server component', in the *ISPF User's Guide Volume I* for additional information.
- Initialization of the ISPF WSA component.

  To initialize the WSA:

  – If you have created a shortcut on your desktop that automatically launches the WSA, double-click the icon.

  If you do not have a shortcut icon:

  1. Go to a command line in your operating system (Windows or Unix).
  2. Change to the directory that contains your WSA executable file.
  3. Enter WSA.

     The Workstation Agent window is displayed on your workstation.

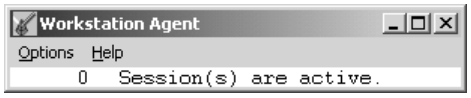

Figure 8. The Workstation Agent window

This window represents the executing ISPF C/S workstation program. For more information about this window, see "The Workstation Agent Window" on page 164 . You can minimize this window but you cannot close it while ISPF is running in GUI mode.

Note: If you do not close the WSA window after you end an ISPF C/S session, you will not have to repeat this step to start another ISPF C/S session; that is, as long as the ISPF C/S component has been started, you can start a workstation session.

To start a GUI session:

1. Display the Initiate Workstation Connection panel, using any of the following methods:
   - From the Primary Option Menu panel, select Option 0 (Settings), select Workstation from the Action Bar, then enter 1 (Workstation Connection).
   - From other panels, select Menu from the Action Bar, enter 1 (Settings), then select Workstation from the Action Bar and enter 1 (Workstation Connection).
   - On the Command line in any panel, enter the WSCON command.

```
                    Initiate Workstation Connection
                                                            More:     +
/  Save values in system profile?  (/=Yes)

Workstation Connection                    GUI Network Protocol
1  1. With GUI display                    1  1. TCP/IP
   2. Without GUI display                    2. APPC
                                             3. Use ISPDTPRF file

GUI Title
ISPF Client/Server
TCP/IP Address
9.190.173.227
APPC Address

Host Codepage  . . . ____      Host Character Set . . . ____

Command ===>
 F1=Help       F2=Split      F3=Exit       F7=Backward   F8=Forward
 F9=Swap      F12=Cancel
```

Figure 9. The Initiate Workstation Connection Panel

2. If necessary, type 1 in the Workstation Connection field. The remaining fields in this panel usually contain values saved when the WSA was installed and configured. For more information about the Workstation Connection panel, see the Settings (Option 0) chapter of the *ISPF User's Guide Volume II*.
3. Press Enter. The Incoming Connection dialog box is displayed.

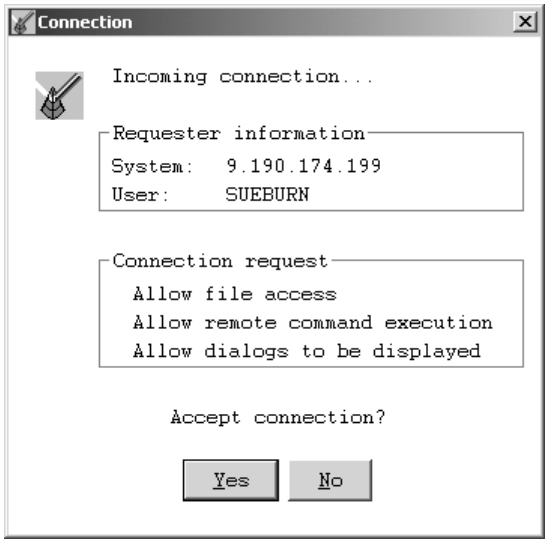

Figure 10. WSA Connection Panel

4. Click Yes to accept the connection. The panel that was active in ISPF before you opened the Workstation Connection panel is now displayed in the GUI dialog box.

What GUI Mode Looks Like

This section describes changes that you see when you run ISPF in GUI mode.

Figures 11 through 16 show the differences between ISPF panels displayed on a 3270 emulator and a GUI display. Emulator screens shown are from the Personal Communications Workstation Program. The GUI display panels are shown as they would be displayed on a workstation running Windows 2000.

Figure 11 shows the ISPF Primary Option Menu in 3270 mode within Personal Communications.

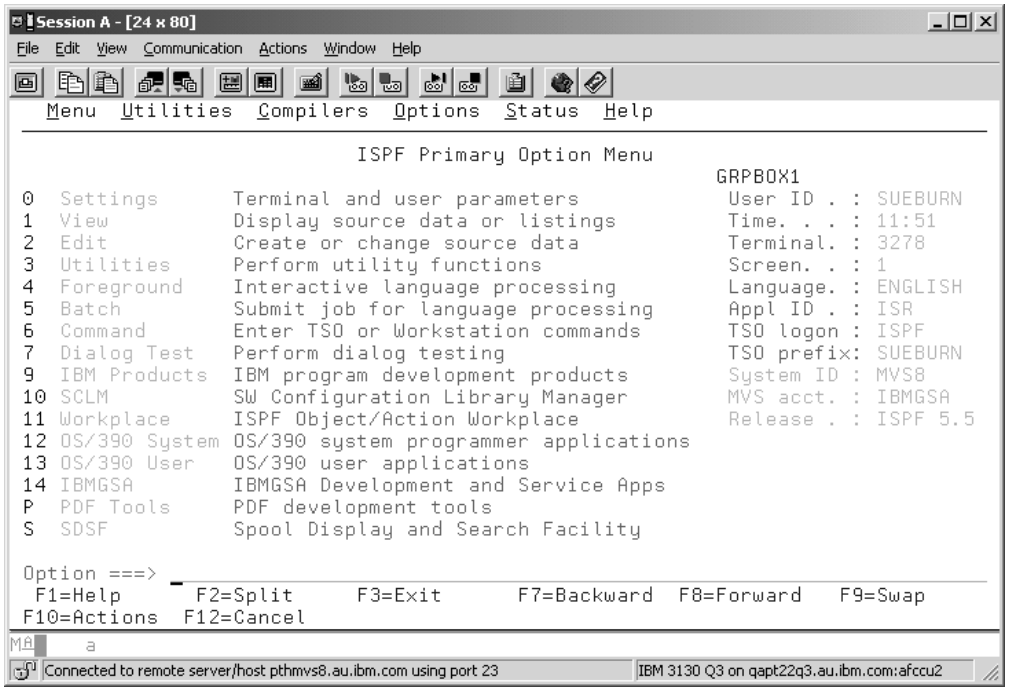

Figure 11. ISPF Primary Option Menu Displayed in Personal Communications

Figure 12 on page 29 shows this panel displayed on a workstation using ISPF WSA.

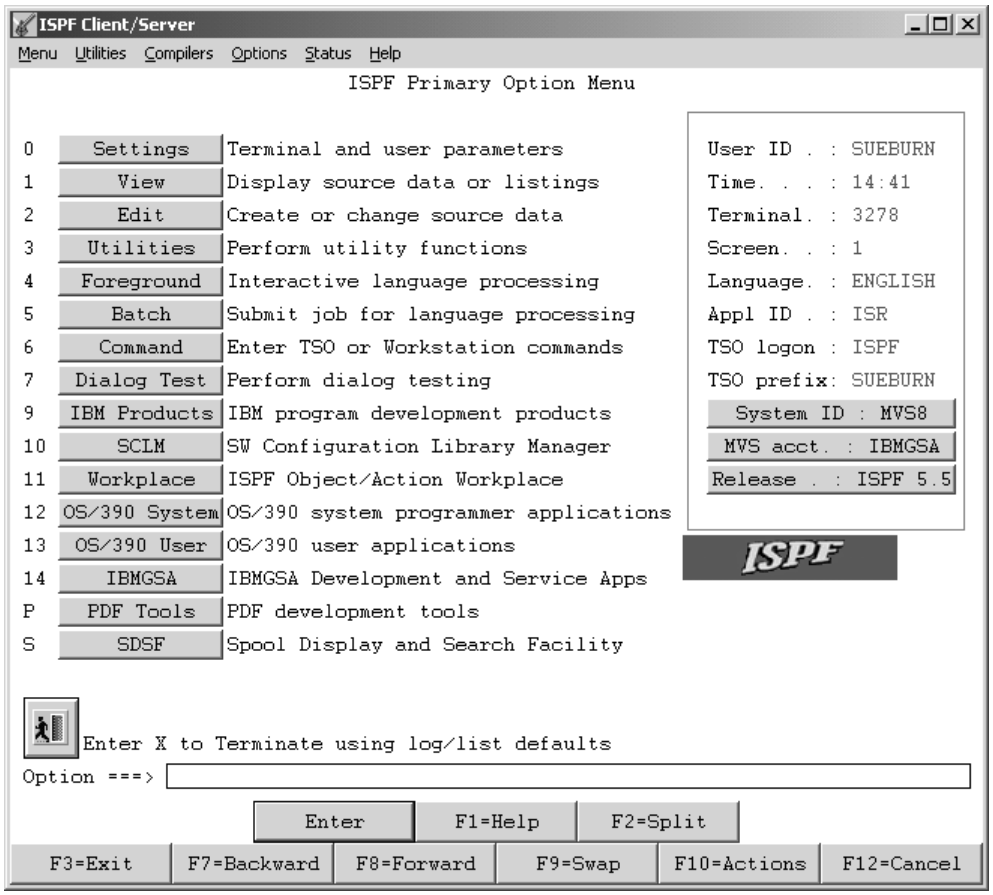

Figure 12. ISPF Primary Option Menu Displayed Using ISPF Workstation Agent

Action Bars and Pull-Down Menus

Action bars are responsive entities at the workstation; that is, pull-down menus display without issuing an interrupt to the host so you can browse the action bars quickly and easily. If you have entered a command on the command line, this command is ignored when you select a pull-down choice.

Title Bars

Various types of data can be displayed in the title bar. What data appears in the title bar depends on which of the following values ISPF finds data in first:

- The value defined in the application dialog variable ZWINTTL is used if the panel is displayed in a pop-up.
- The value defined in the application dialog variable ZAPPTTL.
- The value specified in the *title* variable on the TITLE parameter of the ISPSTART command.
- The value specified in the *title* variable on the TITLE parameter of the WSCON service.
- The value specified in the **GUI Title** field on the Initiate GUI Session panel available from option 0.
- Your user ID.

If PANELID is set to On, the panel ID displays in front of the window title (or your user ID, if no window title is defined) rather than on the first line of the panel.

Push Buttons

Function keys display as push buttons if FKA or PFSHOW is set to On. You can determine whether the F= prefix is shown on the push button by specifying PREFIX or NOPREFIX on the FKA command. Point-and-shoot output and text fields display as push buttons.

Note: If you entered a command on the command line, this command is ignored when you push a point-and-shoot push button.

Point-and-shoot input fields are cursor-selectable.

Cursor Movement

The up and down cursor keys move the cursor vertically through a group of input fields, point-and-shoot fields, and pull-down choices. Use the right and left cursor keys to move through the choices on an action bar.

You can group pushbuttons and checkbox fields together by using Cursor Groups. If you choose to use Cursor Groups in an application, the cursor up and cursor down keys move the focus through each of the fields within a group, and the TAB key moves the focus out of the group.

You can also set Radio buttons in an application. When the focus is within a radio button group, the up and down keys move the focus and the selection through the radio button choices.

Messages

Long and short messages are displayed as they are in non-GUI mode. If the message would appear in a pop-up window, it will be displayed in a message box. The message box will have CANCEL and HELP push buttons as well as the appropriate CUA-defined icon:

- An *i* in a circle (the international symbol for information) signifies an informational message.
- An exclamation point (!) signifies a warning message.
- A red circle with a diagonal line across it signifies an error message.

Note: You can force long messages into pop-ups using ISPF option 0.

Mnemonics

You can use a *hot key* to access a choice on an action bar or on a pull-down menu; that is, you can press the ALT key in combination with the letter that is underscored in the choice to activate the choice.

Check Boxes

A selection field that is marked by a single underscore on the host displays as a check box (that is, a square box with associated text that represents a choice) if the attribute for the entry field has CKBOX(ON) and it is a valid check box field.

When you select a choice, some operating systems make a character (e.g. ✓) appear in the check box to indicate that the choice is in effect. You can clear the check box by selecting the choice again. Some operating systems (AIX and HP-UX) treat the check box as a pushbutton.

List Boxes

A control that enables you to display scrollable lists of choices in boxes. You can select a choice by tabbing to the desired choice and pressing Enter, or by positioning the mouse pointer on the desired choice. A single click

selects the choice, a double click selects the choice and processes an Enter action. The vertical scroll bar of the list box enables you to scroll through the choices. The horizontal scroll bar enables you to scroll horizontally through the choices.

Drop-down Lists
A variation of a list box. A drop-down list only displays one item until you take action to display the other choices. You can select a choice by tabbing to the desired choice and pressing Enter, or by positioning the mouse pointer on the desired choice. A single click selects the choice, a double click selects the choice and processes an Enter action. The vertical scroll bar of the drop-down list enables you to scroll through the choices.

Combination Boxes
A combination box combines the functions of an entry field with a drop-down list. It has an entry field and contains a list of choices to select from to complete the entry field. The list of choices is hidden until you take action to display it.

You can also type text directly into the entry field. The text does not have to match one of the list choices.

The width of the combination box is the width of the input field.

Separator bars
You can provide visual distinction between two adjacent areas within a pull-down menu by coding a separator bar between the two areas.

Accelerators
You can use an accelerator to invoke an application-defined function from a pull-down menu. An accelerator is a key or combination of keys that you define.

Radio buttons
A radio button is a control that shows a fixed set of mutually exclusive choices, one of which is usually chosen.

To select a radio button, you can use your mouse pointing device to press the desired button. You can also use the TAB key to move the focus of your session to the currently selected radio button group, then use the cursor keys to move to the desired choice within the group. If the focus is on a radio button choice, the TAB key moves the focus to the next field or group of fields following the first radio button choice. After one of the radio buttons is selected, you cannot blank it back out. Some applications handle this situation by using a radio button choice of NONE.

Unavailable Choices
Radio button, checkbox, and push button choices can display as unavailable choices. The unavailable choice is colored gray and audible feedback occurs if you try to select it.

Function Keys
Function keys display as push buttons.

Panel Display CUA Mode
When you are running in GUI mode, the “Panel display CUA mode” option on the ISPF Settings panel is set to On.

Enter Key
An Enter key appears as a push button, by default, on all panels. You can control the display of this key from the GUI Settings panel (option 0).

Color, Intensity, and Highlighting
The Global GUI Color Change Utility allows you to map host colors to workstation colors. For more information, see the section on the Global GUI Color Change Utility in the Settings (Option 0) chapter of the *ISPF User's Guide Volume II*. Character-level color, intensity, and highlighting are not supported; field-level intensity and highlighting are not supported.

Split Screen
When you split a screen, the new screen is displayed as a new physical window that is added to the window list. Each modeless window is single-threaded to MVS. SPLIT without parameters always acts as SPLIT NEW in GUI mode. Splitting a screen after the maximum number of screens is reached acts as a SWAP command. If you have only two split screens, SWAP simply toggles between the two. If you have more than two split screens, SWAP displays the Swap List.

PRINT Command
The PRINT, PRINT-HI, PRINTL, PRINTLHI, and PRINTG commands are not available in GUI mode.

WINDOW Command
The WINDOW command is not available in GUI mode.

WS Command
The WS command modelessly invokes the command you specify to provide a seamless interface between host and workstation applications. For example, this command opens a modeless window and invokes the workstation editor on the file named "myfile":

```
WS e.exe myfile
```

APL/TEXT Character Sets
The ZGE variable is set to Off when you are running in GUI mode. Any character defined with the GE(ON) attribute displays as a blank.

Graphic Areas
Graphic areas are not supported. When a GRINIT statement is encountered, you receive a message that panels with graphics cannot be displayed. You may choose to continue. When a panel with graphics is encountered, a pop-up is displayed that allows you to specify that the panel be displayed on the host emulator session or on the workstation without the graphic.

Notes:

1. If you are in split screen mode, the graphic area panel cannot be displayed on the host session.
2. If you specified GUISCRD or GUISCRW values on the ISPSTART invocation that are different from the actual host screen size, GDDM® cannot be initialized, and the GRINIT service ends with a return code of 20.

Input Fields
See "Sample Screens" on page 33 for more information about how input fields are displayed in GUI mode.

Note: Blank fields and trailing blanks are displayed as nulls in GUI mode in order to avoid the need to delete blank characters when replace mode is not available.

Fonts All GUI displays use the font that you specify in the **Font** option on the

Workstation Agent window. If the GUI display of your panels does not appear as you expect, try using a monospace font.

Codepages and Character sets

Users invoking ISPF GUI from a terminal or emulator that does not support code pages (indicated in the terminal query response) should specify code page and character set parameter values if values other than English are preferred when translating host data to workstation data.

Use the CODEPAGE and CHARSET parameters of the ISPSTART command, and the Host Codepage and Host Character Set fields on the ISPF Settings Initiate Workstation Connection panel, to set your chosen values. Refer to appendix on Extended Code Page Support in the *ISPF Dialog Developer's Guide and Reference* for code page and character set values supported by ISPF.

Images

ISPF supports image files in the graphic interchange format (GIF) when running in GUI mode.

ISPF ships sample files in the sample library SISPSAMP. The panel ISR@PRIM uses three of the images (ISPFGIFL, ISPFGIFS, and ISPEXIT).

To use images, store the image files on the host in a partitioned data set and allocate this image data set to ddname ISPILIB before invoking ISPF. For more information about allocating this image library see "Allocating Optional Image ISPF Library" on page 152.

Sample Screens

Note the following about GUI panels:

- Input fields appear as input boxes.
- If an input field wraps multiple lines on a 3270, the field scrolls horizontally in the GUI input box. Blank lines are displayed for those lines of the input field that would have wrapped on a 3270 display.
- For a panel not displayed in a pop-up window, only the amount of panel necessary to display the information is used; that is, ISPF does not generate useless blank space at the bottom of the panel. ISPF does display blank space coded into the panel.
- ISPF maintains the original window size on a pop-up window. If the panel exceeds the width or depth of the physical display, scroll bars are automatically added to allow you to view the hidden portions of the screen.

Figure 13 shows the ISPF Dialog Test Display Panel displayed on a 3270 emulator.

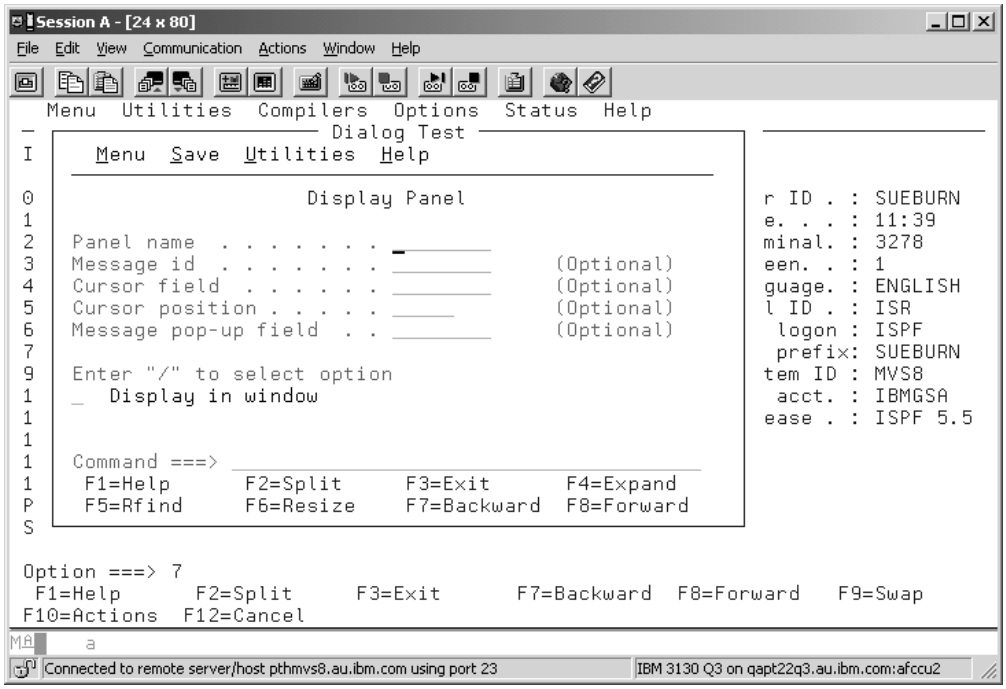

Figure 13. ISPF Dialog Test Display Panel Displayed on a 3270 Emulator

Figure 14 shows this panel displayed on a programmable workstation using ISPF WSA.

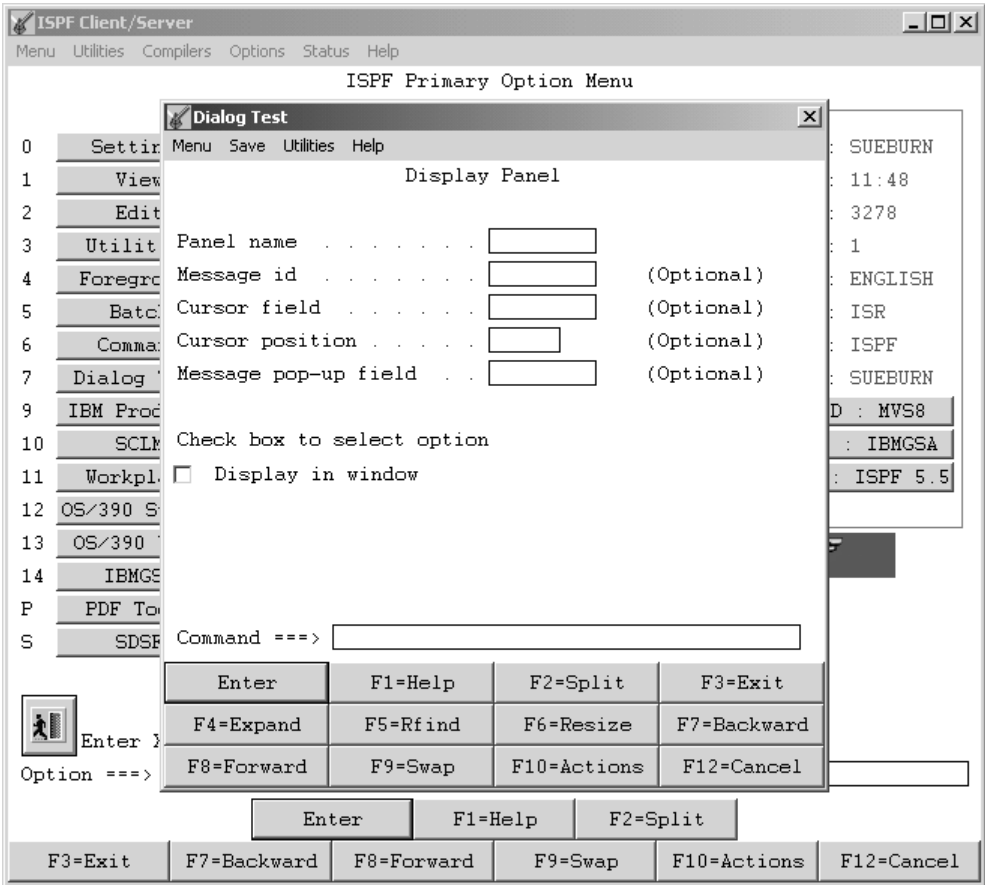

Figure 14. ISPF Dialog Test Display Panel Displayed Using ISPF Workstation Agent.

Figure 15 shows a pull-down with an unavailable choice (Session) displayed on a 3270 emulator.

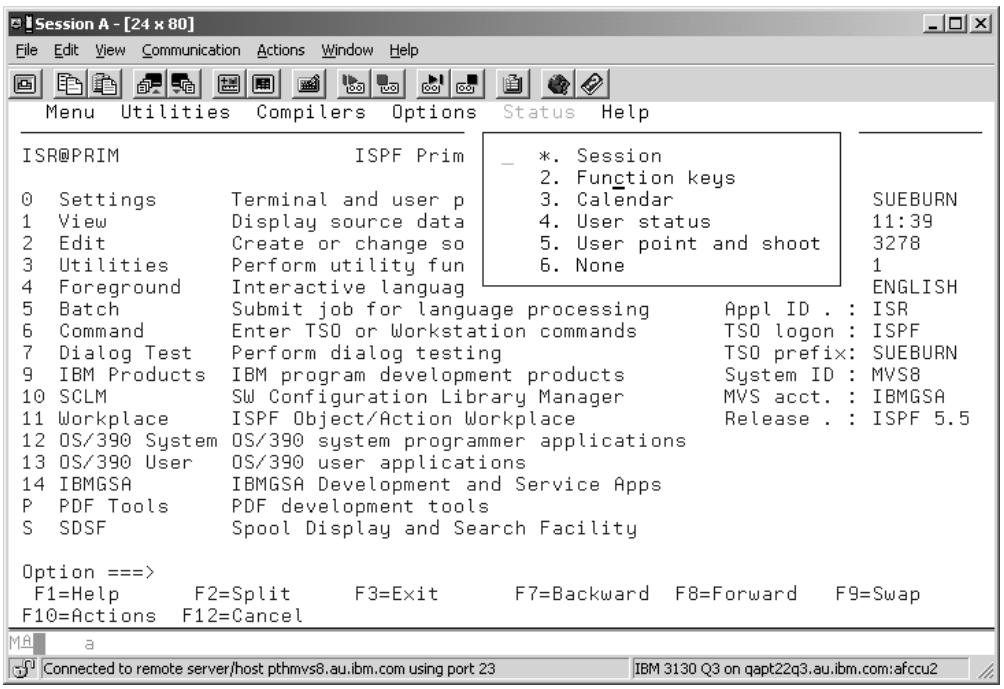

Figure 15. A Pull-Down Menu with an Unavailable Choice Displayed on a 3270 Emulator

Figure 16 shows this panel displayed on a programmable workstation using ISPF WSA.

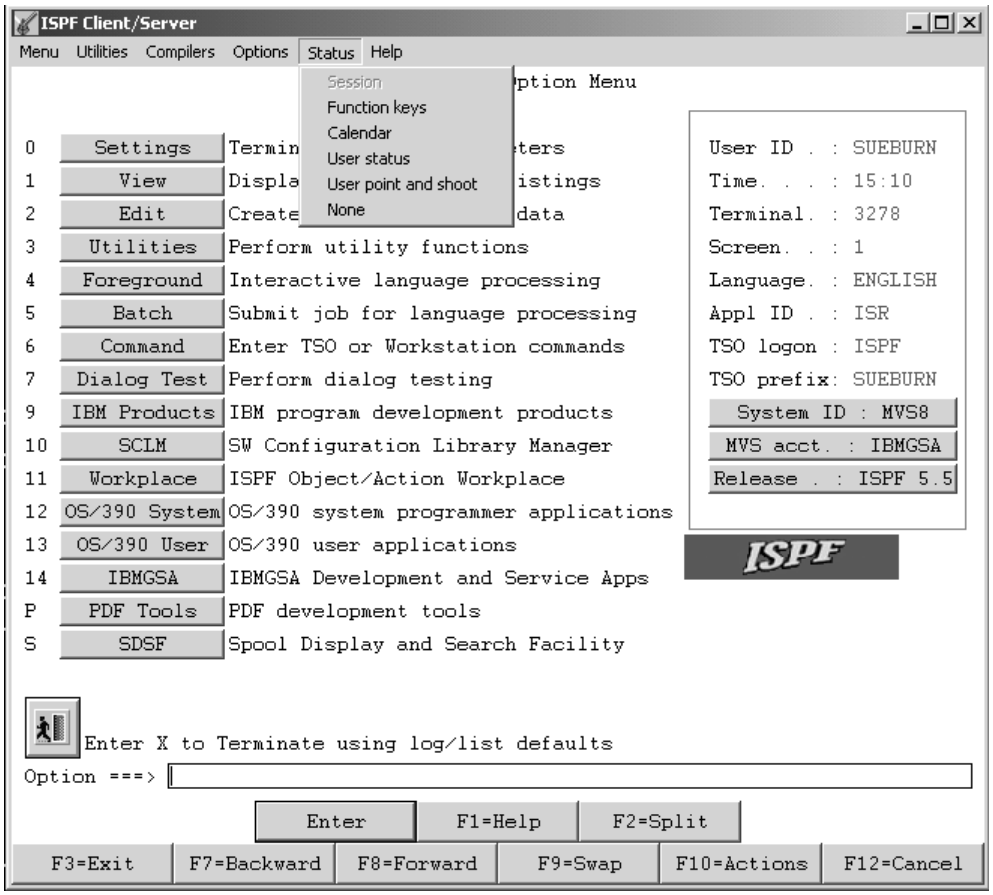

Figure 16. A Pull-Down Menu with an Unavailable Choice Displayed Using ISPF Workstation Agent

Switching Between GUI Mode and 3270 Mode

You can switch logical screens back and forth between GUI mode and 3270 mode by issuing the SWITCH 3270 or SWITCH GUI commands. See "The SWITCH Command" on page 48 for more information.

Special characters or symbols

This topic describes techniques that can be used to display special characters or symbols while running ISPF in GUI mode. Although some are similar, the techniques are platform specific. In each case, the text refers to a number (sometimes in hexadecimal form) which is the codepoint of the character or symbol within the current (in use) code page. Note that the codepoint for a symbol may have different values depending on the code page being used. For example, the codepoint for the host 'not' sign (¬) on OS/2 (using either code page 437 or 850) is decimal 170. On Windows, the codepoint for the host 'not' sign (using ANSI code page 1252) is 172.

Windows

Use Microsoft's Character Map program to find the special character that you want to insert into your document or entry field. The Character Map program is available from the Start menu under the Accessories folder.

After you have found the special character, select it by clicking with your mouse. Notice that the key sequence used to generate the character displays in the lower right portion of the window. You can use this key sequence in an entry field or GUI editor to display the character. Alternatively, you can use the Character Map program to copy the character to the clipboard, then paste it into your document.

When entering a character using its key sequence, remember that you must use the numeric keypad. For example, the key sequence for the host 'not' sign (¬) is ALT+0172. To enter this key sequence, press and hold the ALT key, then press the numbers 0172 on the keypad, then release the ALT key. Note that the leading zero is important and must be specified in order to display the character using the current (in use) character set. Without the leading zero, the OEM (or DOS) character set is used. Also note that within an entry field, some key sequences only work if NumLock is ON.

Refer to the Microsoft online help for the Character Map program for more information about using the program.

OS/2
OS/2 does not have a character map program like Microsoft Windows. However, you can still enter a key sequence to generate a special character or symbol. For example, the key sequence for the host 'not' sign (¬) is ALT+170. To enter this key sequence, press and hold the ALT key, then press the numbers 170 on the keypad, then release the ALT key. Note that within an entry field, some key sequences only work if NumLock is ON.

UNIX (AIX)
On AIX you can enter a key sequence to generate a special character or symbol. The technique described for OS/2 works for AIX. Use ALT+172 instead of ALT+170.

UNIX (SOLARIS and HP)
SOLARIS and HP do not support this transformation technique. Instead, you can remap the keyboard. Remapping the keyboard works on all UNIX systems (AIX, SOLARIS, and HP). The following example shows how to remap **shift 6** to be the host 'not' sign (¬).

1. Execute the following command:

   ```
   /usr/openwin/bin/xmodmap -pke > output.file
   ```

   This will dump the current mapping into the file named output.file.
2. Edit output.file and replace **keycode 42 = 6 asciicircum** with **keycode 42 = 6 0XAC** (AC is the ASCII equivalent of the not symbol)
3. Execute `/usr/openwin/bin/xmodmap output.file`.

Once the keycode you are going to change is known, the change can also be made by executing the following command: `/usr/openwin/bin/xmodmap -e 'keycode 42 = 6 0XAC'` (the single quotes are required).

Note: The remap only affects new windows created after the command is run. Any existing windows will not honor the change. Also note that the change is only for the life of the current session. You might want to put the commands into some kind of startup that executes when you start a session. For more information about **xmodmap**, check the online documentation on your system.

ISPF GUI Support of TSO Line Mode Output and Input

When running ISPF in GUI mode, users connected by TCP/IP on a z/OS UNIX system, and all users connected by APPC, have the option to display all non-fullscreen TSO data in an ISPF/TSO GUI window. This window is scrollable and it contains an input field for entering required user responses. The data in the window can be selected and copied to a file of your choice.

This support enables you to minimize the emulator window from which you logged on without missing any messages that might appear in the emulator window.

Figure 17 shows the ISPF/TSO GUI window.

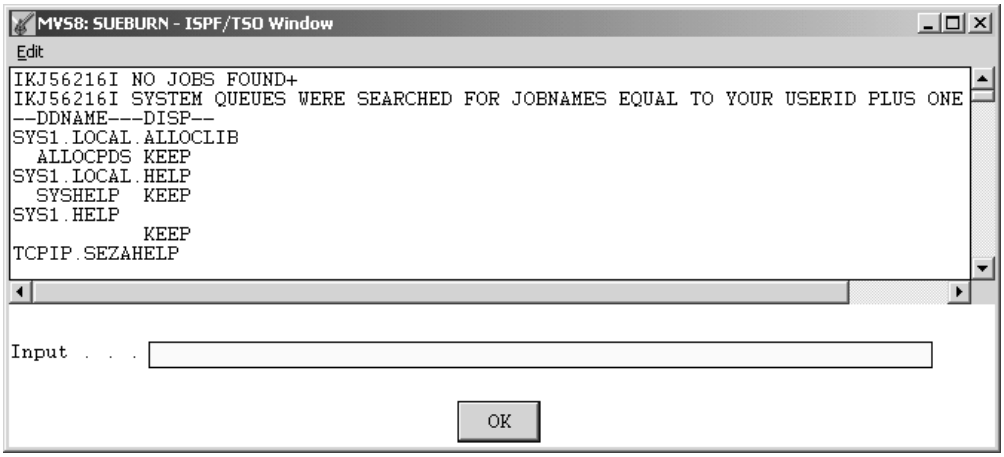

Figure 17. ISPF/TSO GUI Window

The ISPF/TSO window has one item on its action bar: **Edit**. Clicking on this option causes a pull-down menu to appear.

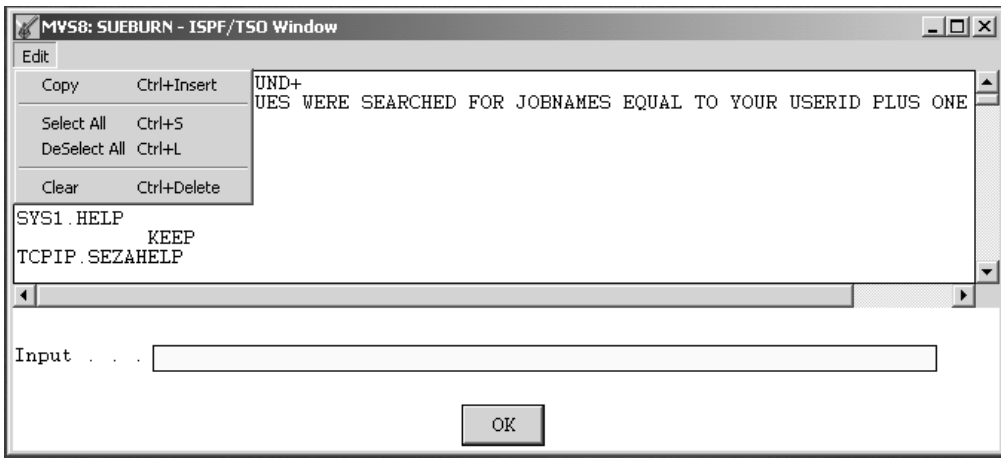

Figure 18. ISPF/TSO GUI Window with Pull-Down Menu

The options on the menu are as follows:

Copy Enables you to copy the lines of the window that you have marked. You designate a line to copy by clicking on it in the window.

Select All Mark all of the lines in the window for further action. The ISPF/TSO window is scrollable, and can contain 30,000 bytes of data in Windows, and 60,000 bytes of data in the other supported environments.

Deselect All Unmark all lines in the TSO window.

Clear Erase everything in the ISPF/TSO window.

The ISPF/TSO Window title contains the system name of the host system that you logged on to and your User ID. The system name is the SYSNAME value defined by your system programmer in the IEASYS*xx* member of SYS1.PARMLIB. For ISPF to display the line mode data in this ISPF/TSO Window, you must log on to TSO using a logon procedure that invokes the alternate entry point IKJEFT1I. In addition, for users running TCP/IP communications, your system programmer must update the ISPF Configuration table, changing the value of the USE_MVS_OPEN_EDITION_SOCKETS keyword to YES, and rebuilding the configuration table load module. For more details on installation requirements for TSO line mode support, refer your system programmer to *ISPF Planning and Customizing*.

When you make a connection to the workstation to run ISPF in GUI mode, an additional connection is made for the ISPF/TSO Window. The window is created on your workstation when the first TSO message needs to be displayed. All messages are appended to this scrollable window until you end your ISPF session. At that time, the ISPF/TSO Window is closed and all TSO data from that point on is displayed on the 3270 emulator session.

Note: You cannot close the ISPF/TSO Window during the ISPF GUI session.

When running ISPF in GUI mode, if TSO input is required from the user, the ISPF/TSO Window is displayed in the foreground and the input field is enabled for you to enter your data.

Note: A maximum of 256 characters can be entered in this input field. When input is not being requested, the input field is disabled.

The ISPF/TSO window has a maximum capacity of approximately 32000 bytes of data in a Windows environment, and 60000 bytes of data in all other ISPF-supported operating environments. After these limits are reached, a message is displayed informing you that the ISPF/TSO window will be cleared before appending the next line of data. This gives you a chance to use the data in the window. Using the options under the Edit menu item, you can select lines from the window, copy them, and paste them to any file of your choice. After you respond `OK` to the informational message, the window is cleared and any following TSO data is appended from the top of the window.

Restrictions for the TSO GUI Line Mode Support

Applications issuing TGETs must ensure that their TGET buffer is large enough for the user's response. The maximum allowable response is 256 characters. Normally, exceeding this limit results in a return code of 12 or 28 being returned. With the TSO GUI line mode support, a zero (0) return code is returned, and only the amount of data that fits in the supplied buffer is returned.

Users running in a Session Manager environment in the 3270 session will see any cross memory messages that appeared in the ISPF/TSO Window displayed again in the session manager screen after the ISPF GUI session ends.

Fullscreen TSO Data: Fullscreen TPUTs will continue to be displayed in the 3270 emulator session. Required input to satisfy a fullscreen TGET must be entered in the 3270 emulator session. For example, if the user from ISPF GUI mode invokes SDSF through its fullscreen TPUT interface (that is, the user enters `TSO SDSF` from an ISPF command line) the SDSF screens are displayed in the 3270 emulator screen.

However, if the user invokes SDSF through the ISPF interface `ISPEXEC SELECT PANEL(ZSDSFOP2) NEWAPPL(ISF)` then the SDSF screens are displayed in the ISPF GUI mode window just like any other ISPF panel.

Users running fullscreen applications like RMFMON, CSP, and OMVS from an ISPF GUI session with GUI TSO line mode support should first suspend the ISPF/TSO Window. This forces all fullscreen and line mode data to appear in the 3270 screen until the completion of the fullscreen application. The ISPF/TSO Window should be resumed at the completion of the fullscreen application processing.

You can query the current status of the ISPF/TSO Window using the `CONTROL TSOGUI QUERY` service. You can suspend and resume the window using one of the following methods:

1. ISPF Service

   `CONTROL TSOGUI  QUERY|OFF|ON`

   QUERY
   Calls for the current status of the ISPF/TSO window. One of the following return codes is shown:
   - **0** — Either the user is not running ISPF GUI with TSO line mode support or TSOGUI is off. All TSO input and output is directed to the 3270 session.
   - **1** — All TSO line mode output displays in the ISPF/TSO window and line mode input must be entered into the ISPF/TSO window's input field.

   OFF Specifies that the ISPF/TSO window is suspended and all fullscreen and line mode data appears in the 3270 window until CONTROL TSOGUI ON is issued.

   ON Specifies that the ISPF/TSO window is resumed and all TSO line mode output and input is directed to the ISPF/TSO window.

   Notes:

   a. If you do not run ISPF GUI with TSO line mode support, issuing a CONTROL TSOGUI results in no operation being performed (NOP).

   b. CONTROL TSOGUI defaults to ON during ISPF GUI session initialization.

   Example CLIST:

```
PROC 0
ISPEXEC CONTROL TSOGUI QUERY
SET &TSOGUIST= &LASTCC
IF (&TSOGUIST = 1) THEN +
  DO
   ISPEXEC CONTROL TSOGUI OFF
  END
ISPEXEC SELECT CMD (OMVS)
IF (&TSOGUIST = 1) THEN +
  DO
   ISPEXEC CONTROL TSOGUI ON
  END
```

2. ISPF command — TSOGUI

   The TSOGUI command is found in the ISPF command table as:

   ```
   SELECT PGM(ISPISM) PARM(TSOGUI,&ZPARM)
   ```

   From any ISPF command line you can enter `TSOGUI OFF` or `TSOGUI ON` to achieve your desired results.

Bi-directional Language Support

The ISPF workstation agent supports two bi-directional (bidi) languages: Arabic and Hebrew. This enablement of the workstation agent is supported on the following operating systems:

- OS/2
- Windows 2000.

Shortcut Keys

With bi-directional versions of the OS/2 and Windows operating systems, support for special key sequences called shortcut, or "hot", keys, is provided to control bi-directional behavior within an application. For example, within an entry field on OS/2 you can press the keys Alt and Numlock to perform a field reverse.

The ISPF workstation agent supports these existing hot key combinations whenever possible. However, the workstation agent does provide some new or modified hot key combinations. The new or modified hot keys follow.

Note: The abbreviations "LtR" and "RtL" refer to the orientation of a field or application. LtR means *Left to Right* orientation. RtL means *Right to Left* orientation.

Screen Reverse (Alt+Enter): The term "screen reverse" is a remnant of ISPF's native 3270 support. Within an OS/2 or Windows application, this hot key combination reverses the application window, *not* the whole desktop screen. On both the OS/2 and the Windows operating systems, Alt+Enter is used to toggle the orientation of the screen.

Note: On an Arabic 102 keyboard, the Enter key is called **New Line**.

Auto Reverse (Alt+Numpad5): This key combination is used to automatically reverse the orientation of specific entry fields. On both OS/2 and Windows operating systems, use Alt+Numpad5 to toggle between Auto Reverse ON and Auto Reverse OFF.

When Auto Reverse is ON, all *numeric only* entry fields switch to LtR orientation, and alphanumeric entry fields switch to RtL orientation.

When Auto Reverse is OFF, all entry fields have the same orientation as the application screen.

Field Reverse (Ctrl+Left/RightShift): This combination works on Windows only, and has been modified from its normal Windows processing.

On the Windows operating system, the key combination Ctrl+Left/RightShift performs a field reverse. The effect of this is to change the keyboard language so that it matches the new typing direction. In a standard Windows application, this keyboard language change is global to the whole application window.

On a native 3270 display, the keyboard language change (resulting from a field reverse) affects only the target field, not the whole screen.

The ISPF workstation agent follows the behavior of a native 3270 display when this key combination is used on Windows.

Modifications to Arabic OS/2

These changes are applicable only to the Arabic OS/2 version of the ISPF Workstation Agent. The following menu items, because their effect is global to all open ISPF application windows, have been added to the System Menu.

Note: The abbreviations "LtR" and "RtL" refer to the orientation of a field or application. LtR means *Left to Right* orientation. RtL means *Right to Left* orientation.

Symmetric swapping: Select this menu item to toggle Symmetric swapping ON or OFF. The default condition is OFF. When symmetric swapping is ON, a check mark appears beside the menu item.

Symmetric swapping determines whether directional (symmetric) characters are automatically swapped within text segments when they are displayed RtL. For example:

```
Storage buffer: (1)Hello
Display:     olleH)1( -Visual, RtL text without symmetric swapping
Display:     olleH(1) -Visual, RtL text with symmetric swapping
```

Numeric swapping: Select this menu item to toggle Numeric swapping ON or OFF. The default condition is OFF. When numeric swapping is ON, a check mark appears beside the menu item.

Numeric swapping affects how host numerals are displayed on the workstation. If numeric swapping is ON, host numbers that are in Hindi are displayed in Arabic. Likewise, host numbers that are in Arabic are displayed in Hindi on the workstation.

Numeric display: Numeric display is a cascaded menu with three choices: **Arabic numerals**, **Hindi numerals**, and **Passthru numerals**. A check mark appears next to the menu item that has been chosen. The default choice is Arabic numerals.

Numeric display enables you to choose how numbers are displayed, either in Arabic form or Hindi form. Passthru is a special choice that prevents the operating system from performing any numeral conversions.

Note: If numeric *swapping* is ON, the numeric display is automatically set to Passthru numerals. Any previous setting is retained in the workstation agent INI file. When numeric swapping is turned OFF, the original numeric display setting is automatically restored.

Bi-directional File Transfer Limitations

Data files that contain all LtR text are not affected by the limitations described in this section. Neither is the workstation build function.

The ISPF Workstation Agent does not perform any transformations on the contents of files that are transferred to or from the host in text mode. The implications of this depend on how the files are edited on the workstation. If your host files contain Arabic or Hebrew text, consider the following points before editing them on the workstation:

- Host data is stored in Visual form. If you download a file to the workstation and edit it with an editor that expects the file contents to be in implicit form, the file can become corrupted.
- For Arabic OS/2, consider the following scenarios using the OS/2 System Editor:
  1. if the file editing is done in two steps (first download the file, then edit the file), and the editor is customized for Visual shaped data, then there is no problem.
  2. if the file download and editor invocation are done in one step (such as when using the Workstation Edit feature of ISPF), then there is a problem. The editor will, by default, work in Implicit base shapes. This is not compatible with the host.
- On Arabic Windows, the contents of a data file can become corrupted if the file is downloaded to the workstation then uploaded back to the host. This is because the host Arabic code page (420) supports shaped characters, while the Windows Arabic code page (1256) does not. Therefore, it is possible to lose shaping during the file transfer process.

Attention: If your host files contain Arabic or Hebrew text, *do not* edit them in GUI mode. Instead, edit these files on the host using the ISPF editor in its non-GUI mode.

Ending a GUI Session

You can end a GUI session in one of the following ways:

- Terminate the ISPF session.
- Issue the WSDISCON command. See the WSDISCON entry of Table 3 on page 72 for more information.
- Invoke the WSDISCON dialog service. Refer to the *ISPF Services Guide* for more information.

After invocation of WSDISCON, the GUI screen continues to display back in the 3270 emulator session.

Closing the ISPF Client/Server Workstation Agent Component

If the ISPF WSA component window is closed while ISPF is running in GUI mode, ISPF issues a 989 abend on the host, unless the “3270 mode after losing workstation connection” field is selected on the GUI Settings panel. If this field is selected, the GUI session continues in your 3270 emulator session.

If the GUI session has been ended and the Client/Server WSA component is no longer needed, the Workstation Agent window can be closed.

Splitting the Screen Horizontally or Vertically

While using a dialog, you can use the SPLIT command to partition the display into two or more logical screens. The logical screens are treated as though they are independent ISPF sessions.

The maximum number of screens available to you depends on the value of the MAXIMUM_NUMBER_OF_SPLIT_SCREENS keyword in the ISPF Configuration table. ISPF ships with a default figure of 8. Support for up to 32 split screens is available for all terminal types except the 3290.

Note: If you are running in GUI mode, when you split a screen, the new screen is displayed as a new physical window. If you want, representations of every screen can be displayed at once. Although a 3270 screen can only display two screens at one time, there can be other screens (up to 32) that are not visible. You can select which logical screen to display by using the SWAP LIST command to display a list of logical screens.

The SPLIT Command

You enter split-screen mode by using the SPLIT command. You also use this command to reposition the horizontal line that separates the two logical screens on a 3270 display. On a 3270 display the location of the cursor identifies the active logical screen. On a 3270 display, the horizontal divider line that separates the logical screens is not considered part of either logical screen. If the cursor is placed on this horizontal divider line and a function key is pressed, the result is the same as if the ENTER key was pressed and the cursor is positioned on the active logical screen's command line. Because ISPF runs in both host and GUI modes, the SPLIT command behaves differently in each.

SPLIT command without parameters, in 3270 mode:

If only one screen is currently being used, the physical display is divided into two logical screens with a divider at the cursor. If two or more screens exist, the divider line is moved, but no new screen is started.

SPLIT command without parameters, in GUI mode:

A new logical screen is added each time the command is given, until the maximum number is reached. After the limit is reached, a message appears when the command is issued again.

SPLIT NEW command, in 3270 mode:

A new logical screen is added each time the command is given, until the maximum number is reached. After the limit is reached, a message appears when the command is issued again. Each new logical screen is added below the cursor, where the split line appears. If two or more screens already exist, the new one replaces the screen in which the SPLIT command was *not* entered.

SPLIT NEW command, in GUI mode:

This command behaves the same as the SPLIT command without parameters.

End split-screen mode by ending the application on all but one logical screen. The remaining logical screen is then expanded to the full size of the display screen.

The SWAP Command

Although you can alternately use any logical screen, only one of the logical screens is considered active at a time. The location of the cursor identifies the active screen. You make a screen active by using the SWAP command and its parameters to choose the desired screen.

The parameters on the SWAP command–LIST, PREV, NEXT, *screen_name*, and *n*–control which screens you see displayed.

SWAP command without parameters in 3270 mode:

If only one screen exists, this command has no effect. If more than one screen exists, this command moves the cursor between the two logical screens that are displayed.

SWAP command without parameters in GUI mode:

If only two screens are present, the cursor moves to the one that it is not currently on. If more than two screens exist, this command defaults to the SWAP LIST command and causes the ISPF task list to display in a pop-up window. See "SWAP LIST command in GUI mode" for more information.

SWAP PREV|NEXT|screen_name|n commands in both modes:

Entering SWAP PREV changes the focus (for GUI mode) or display (for 3270 mode) to the next lower screen number from the one where the command is entered. Repeatedly issuing the same command causes each lower-numbered screen to display until screen number 1 is reached, then the counter wraps back to screen number 32 (or your installation's maximum number).

Entering SWAP NEXT changes the focus (for GUI mode) or display (for 3270 mode) to the next higher screen number from the one where the command is entered. Repeatedly issuing the same command causes each higher-numbered screen to display until screen number 32 (or your maximum) is reached, then the counter wraps back to screen number 1.

Entering SWAP *screen_name* changes the focus (for GUI mode) or display (for 3270 mode) to the screen named *screen_name* if it is active.

Entering SWAP *n* changes the focus (for GUI mode) or display (for 3270 mode) to the screen numbered *n* (ZSCREEN variable) if it is active.

SWAP LIST command in 3270 mode:

This command displays the ISPF Task List, from which you can select which screen to display. The screen you select replaces the screen on which you entered the command.

SWAP LIST command in GUI mode:

This command displays the ISPF Task List (Figure 19), from which you can select which screen to focus on.

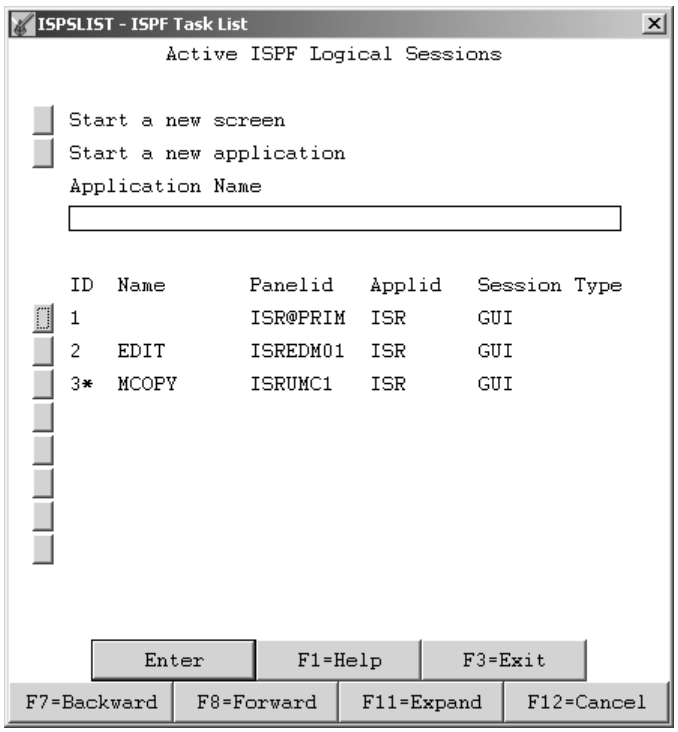

Figure 19. ISPF Task List

All of the fields on the ISPF Task List panel are point-and-shoot fields. The results when choosing one are as follows:

Start a new screen
Starts a new logical ISPF screen.

Start a new application
This field is used in conjunction with the Application Name field. If you choose "Start a new application" you must enter an application name in the "Application Name" field.

Application Name
The name of an application you want to start by choosing the "Start new application" field on the ISPF Task List panel. This application is started in a new logical screen. ISPF invokes the application through the ISPF START command, so any application name and parameters that are valid for the START command are valid in the Application Name input field. If you need more space to enter the application name and parameters, press the Expand PF key to display a pop-up window that contains a longer input field.

For example, if a user types "keylist" in the Application Name input field and presses Enter, the ISPF KEYLIST application is invoked in a new logical screen.

Select a screen from the list of active sessions
Provides a list of active sessions for you to choose from.

The SWITCH Command

In addition to using the swap command to change the focus of your session from one screen to another, if you are running the ISPF Client/Server you can use the SWITCH command to change the way the screen is displayed, either GUI mode or 3270 mode.

From any GUI screen you can enter the command SWITCH 3270. The GUI screen disappears and the screen is then displayed fullscreen on your 3270 display. The 3270 screen is now operational. If you had been in split screen mode, the remaining GUI screens remain in GUI, but are disabled. To swap back and forth between the GUI and 3270 sessions now, you must use the SWAP commands (SWAP *x*, SWAP LIST, and so forth). The SWAP LIST panels ISPSLIST and ISPTLIST have a field indicating the session type (GUI or 3270).

If you want to switch your 3270 screen back to GUI mode, enter SWITCH GUI on the command line.

Rules for Splitting and Swapping 3270 and GUI Screens

The rules for splitting and swapping screens when you have combinations of both 3270 and GUI screens are as follows:

- If you have only one 3270 screen and enter **split**, the new logical screen is displayed in GUI mode.
- If you have two or more 3270 screens and enter **split** from one of them, the next 3270 screen is displayed fullscreen, but no new screen is started.
- If you enter **split** from a GUI screen, a new GUI screen is started (until the maximum number is reached).
- If you enter **split new** from either a GUI or 3270 screen, the new logical screen is displayed in GUI mode.
- If you have one 3270 screen and one GUI screen, then entering **swap** from either of these screens causes a swap to the other.
- If you have two GUI screens and one 3270 screen, **swap** from one of the GUI screens swaps you to the other GUI screen. **Swap** from the 3270 screen does nothing.
- If you have one GUI screen and two 3270 screens, **swap** from one of the 3270 screens swaps to the other 3270 screen. **Swap** from the GUI screen does nothing.
- If you have two GUI screens and two 3270 screens, **swap** from one of the GUI screens swaps you to the other GUI screen. **Swap** from one of the 3270 screens swaps you to the other 3270 screen.
- If you have more than two GUI screens and enter **swap** from one of them, the SWAP LIST panel appears.
- If you have more than two 3270 screens and **swap** from one of them, you swap to the next 3270 screen.
- Entering **SWAP PREV|NEXT|screen_name|n** commands in either GUI or 3270 mode swaps as described in "The SWAP Command" on page 45.
- After a GUI screen is enabled, you can swap to other GUI screens using your mouse pointer.

SWITCH Command Restrictions

At the completion of ISPF command processing, ISPF does not reprocess the panel from which the command was invoked. The panel is simply relaunched to the screen without processing, for example, the panel's)INIT section. Therefore, if certain constructs are defined within the panel sections based on the ZGUI variable

(nonblank indicating connected in GUI mode), these constructs are not defined properly until after the Enter key is pressed following the SWITCH invocation.

The following are some known restrictions for the SWITCH command:

- When switching to GUI mode, the first panel displayed in GUI mode cannot contain group boxes and images that are defined on the panel. After the user presses the Enter key, causing the panel to be reprocessed, then these constructs are visible in GUI mode.
- When switching to 3270 mode, the name of any group boxes defined on the panel that the SWITCH was issued from display on the screen in 3270 mode. After the user presses the Enter key, causing the panel to be reprocessed, these group box names disappear and any panel text under these names reappears.
- If a 3270 screen already exists when the SWITCH 3270 command is invoked from another GUI screen, the screen from which the SWITCH was invoked is displayed in the full 3270 emulator session without a split line, regardless of the user's ***Always show split line*** setting. The other 3270 sessions are hidden and available for display if the appropriate swap command is entered.
- If pop-up windows are displayed in GUI mode when the SWITCH 3270 command is invoked, those pop-up windows are suspended on the 3270 session and the panels are displayed as fullscreen panels. If new addpops are then invoked, these new panels are displayed as pop-ups.
- The user cannot switch to 3270 mode when running in batch GUI mode.
- When running in GUI mode, if at least one screen has been switched to 3270 mode, then the user is not allowed to change the screen format in ISPF Settings.
- If you started GUI mode from ISPSTART and specified **GUISCRD** or **GUISCRW** values different than your actual emulator session, then you are not allowed to switch to 3270 mode.

3290 Terminals

On 3290 terminals, in addition to splitting the screen horizontally, you can use the SPLITV command to split the screen vertically, for a total of four logical screens. In the case of the 3290 terminal, four is the maximum number of screens possible. (The SPLITV function is not active if the data being displayed on a screen is more than 80 characters wide.) Figure 20 shows the effect of SPLIT and SPLITV, starting in single-screen mode.

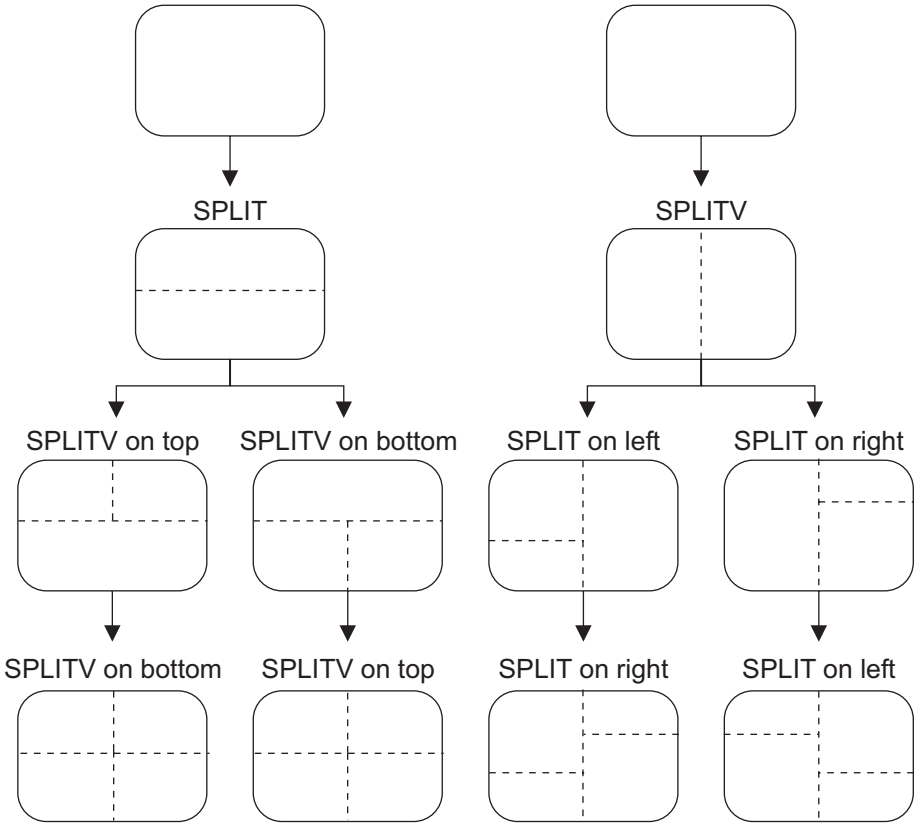

Figure 20. Splitting the 3290 Screen

Notes:

1. ISPF logical screens are separate subtasks that do not share subpool 0 (attached with SZERO=NO parameter.) Thus, VSAM data sets cannot be accessed from more than one logical screen.
2. If you are in a VSAM application, perform a split screen operation, then enter another VSAM application in the second session, you must be sure to end the second session before you end the first session, or an abend can occur.
3. On 3290 hardware, using the jump function to move from screen to screen might result in the loss of data that has been typed but not processed. The use of the 3290 hardware jump is not recommended.
4. In split-screen mode, if you type a command on the command line and swap screens before pressing Enter, the command is erased.
5. You cannot start ISPF in GUI mode if you are configured to run ISPF in 3290 partition mode.

Chapter 3. Using Personal Data Set Lists and Library Lists

Personal lists are named lists of data sets and ISPF libraries that you can use to speed up access to frequently used data sets. You can use personal lists to fill in panel fields quickly and to create data set lists that are built from more than one level name. **Personal data set lists** contain data set names and volumes. **Personal library lists** contain lists of ISPF library names and concatenations.

ISPF provides four types of personal lists:

Personal data set list
: Lists of up to 30 data set names. Each name can include a member name or a volume name, or both. Personal data set lists can also contain workstation file names and data set name levels. See "Personal Data Set Lists" on page 53.

Personal library list
: Lists of up to eight ISPF library names or ISPF library concatenations. ISPF library names contain three qualifiers called ***project***, ***group***, and ***type***. Personal list entries can optionally contain a member name. See "Personal Library Lists" on page 54.

Reference data set list
: A special kind of personal data set list in which ISPF saves the names of the most recently used data sets. This list is always named REFLIST. See "Reference Data Set List" on page 54.

Reference library list
: A special kind of personal library in which ISPF saves the names of the most recently used ISPF libraries. This list is always named REFLIST. See "Reference Library List" on page 54.

You can have a personal data set list with the same name as a personal library list. ISPF reserves the name REFLIST as the name of the reference lists, so there is a personal data set list called REFLIST, and a personal library list called REFLIST.

Reference lists are active lists of data sets and libraries that you have referenced in your ISPF session. ISPF adds a data set name to the data set reference list when you enter a data set name in the **Other Partitioned or Sequential Data Set Name** field. A library is added to the library reference list when you enter a library in the **ISPF Library** field. Only data sets and libraries that are successfully allocated by ISPF's ALLOCATE routine are added to the reference lists.

Note: Reference lists can be manipulated just like any other personal list, but ISPF might dynamically change reference lists when new data sets or libraries are referenced by ISPF.

Current lists are the most recently opened or the last list to which something was saved from within the personal list panels. One named data set list, and one named library list, are the current lists at any time. The current list is used for the **NRETRIEV** key, and in the RefList pull-downs. The current list names are shown in the RefList pull-down choices, and in the lists of personal lists.

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```
  Menu  RefList  RefMode  Utilities  Workstation  Help
 ─────  ┌──────────────────────────────────────┐ ──────────────────────────────
        │ _  1. Current Data Set List (TEST)   │
        │    2. Current Library List (MYLIST)  │
ISPF    │    3. List of Personal Data Set Lists │
   Pr   │    4. List of Personal Library Lists │
   Gr   └──────────────────────────────────────┘                 . . .
   Type  . . . . SOURCE
   Member  . . .                (Blank or pattern for member selection list)

Other Partitioned, Sequential or VSAM Data Set:
   Data Set Name . . .
   Volume Serial . . .          (If not cataloged)

Workstation File:
   File Name . . . . .
                                        Options
Initial Macro  . . . .                     Confirm Cancel/Move/Replace
Profile Name . . . . .                     Browse Mode
Format Name  . . . . .                     View on Workstation
Data Set Password  . .                  /  Warn on First Data Change
                                           Mixed Mode
Command ===>
 F1=Help      F3=Exit     F10=Actions  F12=Cancel
```

Figure 21. RefList Pull-Down Menu

Note: The RefList pull-down is unavailable from Utilities options 8, 9, and 13; it does not offer library list choices from options 4 and 6.

You can use personal lists for data set selection from the View Entry, Edit Entry, and most of the Utilities panels. You can access lists in two ways:

- From the RefList pull-down menu on the action bar of the View Entry, Edit Entry, and most Utilities panels, as shown in Figure 21.
- Through the command interface (or fast path) described in "Command Interface (Fast Path) to the Personal List Function" on page 65.

Personal List Modes

The action taken when you select a data set from a list depends on how you have the Mode set. All personal lists can be set to either Retrieve or Execute mode from the RefMode pull-down on the action bar of the View Entry, Edit Entry, and most Utilities panels, as shown in Figure 22 on page 53. List Retrieve displays in blue (the default) with an asterisk as the first digit of the selection number (if you are running in GUI mode, the choice is *grayed*), which indicates that RefMode is currently set to Retrieve.

```
  Menu  RefList  RefMode  Utilities  Workstation  Help
 ---------------  ---------------------  ------------------------------------
                  | 1  1. List Execute |  ry Panel
                  |    *. List Retrieve|
ISPF Library:      ---------------------
   Project . . . USERID
   Group . . . . TEST     . . .          . . .          . . .
   Type  . . . . SOURCE
   Member  . . .                 (Blank or pattern for member selection list)

Other Partitioned, Sequential or VSAM Data Set:
   Data Set Name . . .
   Volume Serial . . .           (If not cataloged)

Workstation File:
   File Name . . . . .
                                        Options
Initial Macro  . . . .                     Confirm Cancel/Move/Replace
Profile Name . . . . .                     Browse Mode
Format Name  . . . . .                     View on Workstation
Data Set Password  . .                  /  Warn on First Data Change
                                           Mixed Mode
Command ===>
 F1=Help      F3=Exit     F10=Actions  F12=Cancel
```

Figure 22. RefMode Pull-Down Menu

The RefMode pull-down offers you the following choices:

List Execute Sets personal data set lists and personal library lists to Execute mode; that is, when you select an entry from the list, the information is placed into the **ISPF Library** or **Other Data Set Name** field, and ISPF proceeds as if you also pressed the Enter key.

List Retrieve Sets personal data set lists and personal library lists to Retrieve mode; that is, when you select an entry from the list, the information is placed into the **ISPF Library** or **Other Data Set Name** field, but the simulated pressing of the Enter key is not performed. This allows you to set other options before you press Enter.

Personal Data Set Lists

You can build lists of personal data sets that contain up to 30 data set names. You can have as many lists as you like as long as each has a unique name. Personal data set lists are a good way to group (by project, for example) those data sets that you use frequently. You can use personal data set lists to avoid typing in data set names and to create customized data set lists similar to those using ISPF Option 3.4. To create or use a personal data set list, do one of the following:

- Select the Personal Data Set List choice from the RefList pull-down on the View Entry, Edit Entry, or Utilities panel action bar
- Enter the REFACTD command from the command line.
- Use the "Save As" action when viewing the data set reference list (REFLISTD command).

The REFACTD command displays the Personal Data Set List panel, as shown in Figure 23 on page 57. If you have one or more personal data set lists, ISPF displays

the current list. If you have no personal data set lists, ISPF displays the reference list called REFLIST, which is updated by ISPF whenever a new data set is used by ISPF.

Personal Library Lists

You can build personal library lists of up to eight ISPF libraries. You can have as many lists as you like as long as each has a unique name. Personal library lists are a good way to group (by project, for example) those libraries that you use frequently. To create or use a personal library list, select the Personal Library List choice from the RefList pull-down on the View Entry, Edit Entry, or Utilities panel action bar. You can also use the REFOPENL command from any ISPF command line and use the Save As action to save the reference library list as a personal library list.

Note: Personal library lists are not available from RefList pull-downs for any options that do not support library names. For example, the data set list utility and data set print utilities do not support personal library lists.

Personal library list can be used with the NRETRIEV name retrieve command.

Personal library lists are used, created, and maintained with facilities similar to those of personal data set lists. Select the library list options from the RefList pull-downs to access the library list functions. As with personal data set lists, the list named REFLIST is the reference list that contains the most recently referenced ISPF libraries and library concatenations.

Reference Data Set List

The Reference Data Set List is a special personal data set list that contains a list of up to 30 data set names (and the volumes on which they are located) that you have referenced (that is, entered on panels or called with services) throughout ISPF. Data set names are also added to the list when ISPF refers to them; for example, during a MOVE/COPY operation or a DELETE function.

The reference data set list is a personal data set list with the name REFLIST. The name REFLIST is reserved by ISPF to refer to the reference list, but you can use the list just like any other list. If you save a personal list under the name REFLIST, the reference list reflects the names you save into it, but it is still updated when other data set are referenced by ISPF.

You can turn off the automatic updating of reference lists by using the settings panel on any personal list, or by using the DSLIST Settings panel of the data set list facility (ISPF option 3.4).

ISPF does not automatically store workstation file names or data set name levels in the data set reference list, though you can add them manually.

Reference Library List

The reference library list is a special personal library list named REFLIST that contains a list of up to 30 library names that you have referenced through panels or ISPF services. The reference library list is updated by the system when ISPF uses ISPF libraries. In all other respects, it functions like a regular personal library list.

How to Get a List of Your Personal Lists

To see a list of your personal lists, do one of the following:

- Select the **List of Personal Data Set Lists** or the **List of Personal Library Lists** choice from the RefList pull-down on the Edit Entry, View Entry, or Utilities panel action bar.
- Select the **Open List of Lists** choice from the File pull-down on the Personal Data Set List or Personal Library List panel action bar.
- Type MORE on the command line of the Personal Data Set List panel or the Personal Library List panel.
- Enter the REFOPEND (for data set lists) or REFOPENL (for library lists) on any ISPF command line.

How to Create a Personal List

There are several ways to create personal lists:

- Type data set names into an empty list.
  1. Select the **New** choice from the File pull-down on the Personal Data Set List panel action bar or use the NEW primary command to display an empty temporary list.
  2. Type in the data set names.
  3. Save the list.
- Use the reference data set list as a starting point.
  1. Display the reference data set list by selecting the **Reference Data Set List** choice from the RefList pull-down on the View Entry, Edit Entry, or Utilities panel action bar.
  2. If you want to save this entire list as a personal data set list, select the **Save as...** choice from the File pull-down on the Reference Data Set List panel action bar.
  3. If you want to save some subset of the reference data set list, see the next item for more information.
- Use an existing list as a base, edit it, and save it.
  1. Display an existing list.
  2. Modify this list by typing over data set names or adding new ones. Do not *select* any lists.
  3. Select the **Save** choice from the File pull-down on the Personal Data Set List panel action bar.

     Note: Closing the list display (eg. via Exit or End) will Save the list. It is possible to have a single list open on multiple screens. It is therefore recommended that a list only be open on one screen if modifications are to be made. This will prevent the loss of updates when an unchanged list display is closed after a modified one.
- Use an existing list as a base and save it under another name.
  1. Display an existing list.
  2. Modify this list by typing over data set names or adding new ones. Do not select a choice.
  3. Select the **Save as...** choice from the File pull-down on the Personal Data Set List panel action bar and assign a unique name to this list.
  4. ISPF displays the new list.
- Issue the REFADDx command and specify a new list name.

- Issuing 'REFADDD NEWLIST' from the command line creates a new personal dataset list called NEWLIST. The list will contain the last referenced dataset name.
- Issuing 'REFADDL NEWLIST' from the command line creates a new personal library list called NEWLIST. The list will contain the last referenced library specification.

Retrieving Data From Personal Lists

You have three choices for retrieving data from personal lists.

- Use the NRETRIEV function key. Assign a function key to the value ***NRETRIEV***. On panels where NRETRIEV is available (such as edit, view, and some of the utilities), pressing the NRETRIEV key fills in the library name fields, data set name field, or workstation name field based on where the cursor is when the key is pressed. See "Command Interface (Fast Path) to the Personal List Function" on page 65 for more information.
- Use the RefList pull-down on the View Entry, Edit Entry, Utilities, or other panels that have the RefList pull-down available. From within these options, you can point to a data set or library name and press enter to retrieve or use the name you selected. See "Personal List Modes" on page 52 for more information.
- Use the command interface (fast path commands) described in "Command Interface (Fast Path) to the Personal List Function" on page 65.

Using Personal Lists to Create Customized DSLIST Displays

You can use any personal data set list or personal library list to create a data set list (similar to ISPF option 3.4) which contains multiple level names. The easiest way to use a Personal Data Set List to create a DSLIST is to type

```
DSLIST listname
```

on an ISPF command line. *Listname* is the name of the personal data set list. If you are already viewing a DSLIST, you can add names listed in a personal data set list by typing

```
APPEND listname
```

on the command line.

You can also create a list with the **L** action while displaying a list or a list of lists.

Personal Data Set List Panel

```
  File  View  Options  Help
 ------------------------------------------------------------------------
                            Personal Data Set List

 Enter a list action to perform or select a data set entry to retrieve.
 Action: S=Save A=Save As  D=Delete this list  E=Extended Edit  L=DSLIST

 Action  Name      Description                   Created      Referenced
 _       TEST      ___________________________                              More:     +
 Select Partitioned, Sequential Data Set or DSLIST Level         Volume
 .  ____________________________________________________________     ______
 .  ____________________________________________________________     ______
 .  ____________________________________________________________     ______
 .  ____________________________________________________________     ______
 .  ____________________________________________________________     ______
 .  ____________________________________________________________     ______
 .  ____________________________________________________________     ______
 .  ____________________________________________________________     ______
 .  ____________________________________________________________     ______
 .  ____________________________________________________________     ______
 .  ____________________________________________________________     ______
 Command ===> ____________________________________________________________
  F1=Help      F3=Exit     F11=ChgView  F12=Cancel
```

Figure 23. Personal Data Set List Panel (ISRPDSNL)

You can work with your personal data set lists in three ways:

- Use the choices in the File, View, or Options pull-downs.
- Select one of the point-and-shoot options (for example, Save As).
- Type an action mnemonic in the **Action** field and press Enter. Actions are listed at the top of the panel.

Note: The commands and actions on the Personal Data Set List panel are similar to those on the Personal Library List panel. The descriptions here apply to both panels, although the Library List panel does not contain the Sort options.

There are two commands you can use on this panel:

MORE
Displays the list of all of your personal data set lists. This is the same action as selecting *Open List of Lists* from the **File** pull-down.

NEW Saves the current list and displays a new empty list. This is the same action as selecting *New List* from the file pull-down.

Personal Data Set List Panel Action Bar Choices

The Personal Data Set List panel action bar choices function as follows:

File The File pull-down offers you the following choices:

1. **New List** Displays an empty (temporary) personal data set list. After you save this list, it is permanent until you delete it.
2. **Open List of Lists** Displays a list of your personal data set lists. You can open a list to change it and make it the current active list.
3. **Save** Saves the current contents of a personal data set list.

4 **Save as...** Saves the current contents to a new personal data set list. You are prompted for a list name and optional description.

5 **Delete** Deletes the current personal data set list. You are not asked to confirm the delete action. After the current list is deleted, ISPF displays an empty personal data set list as if you had requested a **New** action.

6 **Edit** Enters the personal list edit dialog.

7 **DSLIST** Builds a DSLIST based on list entries.

8 **Cancel** Cancels the function.

9 **Exit** Returns you to the panel from which you accessed the personal list.

View The View pull-down offers you the following choices:

1 **Show data sets** The list contains the data set entries.

2 **Show data sets and notes** The list contains the data set entries with notes.

3 **Sort by data set name** The data set list is sorted by **data set name** field. The sort routine deletes duplicate names, sorts blank entries to the end of the list, saves the list, and redisplays the personal list.

Note: If a volume or entry description exists without a data set field entry, the volume and description are deleted by the sort routine.

4 **Sort by data set volume** The data set list is sorted by data set volume field. The sort routine deletes duplicate names, sorts blank entries to the end of the list, saves the list, and redisplays the personal list.

Note: If a volume or entry description exists without a data set field entry, the volume and description are deleted by the sort routine.

5 **Sort by data set note** The data set list is sorted by data set note field. The sort routine deletes duplicate names, sorts blank entries to the end of the list, saves the list, and redisplays the personal list.

Note: If a volume or entry description exists without a data set field entry, the volume and description are deleted by the sort routine.

Options

The Options pull-down offers you the following choices:

1 **Personal List Settings** Displays the Personal List Settings panel (ISRRFOPT). From this panel, you can alter all settings that affect personal lists.

2 **Browse shared lists**

Help The Help pull-down offers you the following choices:

1 Tutorial index...
2 Appendices
3 Index

Personal Data Set List Panel Fields

The fields on the Personal Data Set List Panel function as follows:

Action

The following choices are valid in the Action field:

Note: The dots in the **Action** field are point-and-shoot selectable. If you select a data set or library name, and you invoked this dialog from a panel that supports the RefList pull-down, ISPF retrieves the selected data set or library name, terminates this panel, and places the name you selected in the ISPF Library or Other Data Set Name field. If you have the RefMode set to *List Execute*, ISPF also simulates pressing the Enter key on the panel.

S=Save Saves the current list. If the list is new, you are prompted to enter a name for the list.

A=Save as Saves the current list with a different list name.

D=Delete this list
Deletes the personal data set list that you are working with. You are asked to confirm this delete action. The currently active list cannot be deleted.

E=Extended edit
Invokes the personal list editor dialog. This enables you to insert, repeat, and delete lines in the list.

L=DSLIST Invokes DSLIST based on list entries.

Name The name of the personal data set list.

Description
A brief description of the personal data set list. The **Description** field is an input field. You can change the description for all personal lists except the reference list (REFLIST).

Created
The date the personal data set list was created.

Referenced
The last date/time the personal data set list was referenced.

Personal Data Set Lists Panel

```
  File  View  Options  Help
 ------------------------------------------------------------------------
 Active: TEST               Personal Data Set Lists               List 1 of 3

 Action: O=Open  A=Save As  D=Delete  E=Edit  L=DSLIST

    Name              Description                    Created   Referenced
 _  REFLIST           Last 30 referenced data sets   02/06/26  03/02/04 14:20
 _  TEST              Test list                      02/10/01  02/10/01 12:06
 _  TEST2             Second Test List               02/10/01  02/10/01 12:05
    **End**

 Command ===> ____________________________________________ Scroll ===> PAGE
  F1=Help      F3=Exit      F4=Settings  F5=ShrList  F11=ChgView  F12=Cancel
```

Figure 24. Personal Data Set Lists Panel (ISRPLTAB)

The Personal Data Set Lists panel shows a list of your personal data set lists. You can show the Personal Data Set Lists panel by selecting it from the RefList pull-down or by using the REFOPEND command.

The Personal Library Lists panel is similar. You can display a list of personal library lists by selecting the choice from the RefList pull-down or by using the REFOPENL command.

Personal Data Set Lists Panel Action Bar Choices

The Personal Data Set Lists Panel action bar choices function as follows:

Note: The current setting is shown as an unavailable choice; that is, it displays in blue (the default) with an asterisk as the first digit of the selection number. If you are running in GUI mode, the choice is *grayed*.

File The File pull-down offers you the following choices:

1. **New List** Displays a new personal list.
2. **Open** Displays the personal list entries.
3. **Save as...** Saves the current list entries to a new list.
4. **Delete...** Deletes the list.
5. **Edit** Invokes the personal list edit dialog.
6. **DSLIST** Invokes DSLIST based on list entries.
7. **Exit** Returns you to the panel from which you accessed the Open dialog.

View The View pull-down offers you the following choices:

1 **Standard View** Displays a list of personal lists with list name, list description, and list statistics.

2 **Extended View** Displays a list of personal lists with list name, list description, list statistics, and a partial view of list entries.

3 **Sort by name** Sorts the displayed list alphabetically by the **Name** field.

4 **Sort by description** Sorts the displayed list alphabetically by the **Description** field.

5 **Sort by created** Sorts the displayed list in descending order by the **Created** field.

6 **Sort by referenced** Sorts the displayed list in descending order by the **Referenced** field.

Options
The Options pull-down offers you the following choices:

1 **Personal List Settings...** Displays the Personal List Settings panel, from which you can alter all settings that affect personal lists.

2 **Browse shared lists...** Displays shared personal data set lists. See "Shared Personal Lists" on page 62 for additional information.

Help The Help pull-down offers you the following choices:
1 Tutorial index...
2 Appendices
3 Index

Personal Data Set Lists Panel Fields

The fields on the Personal Data Set Lists Panel function as follows:

Action
The following choices are valid in the Action field:

Note: The dots in the **Action** field are point-and-shoot selectable. If you are in GUI mode and select the action field, ISPF displays the Personal List Commands pop-up so that you can select the action you want to take. In 3270 mode, selecting a list opens the list. This means that you can open a list by moving the cursor to the action field and pressing Enter.

N=New Displays an empty (temporary) personal data set list. Once you save this list, it is permanent until you delete it.

O=Open Opens the selected list to modify it, perform actions, or selections of data sets.

A=Save as Saves the current contents of the selected list to a personal data set list. You will be prompted for a list name and optional description.

D=Delete Deletes the selected personal data set list. You will be asked to confirm the delete action. The currently active list cannot be deleted.

E=Edit Invokes the personal list editor dialog.

L=DSLIST Invokes DSLIST based on list entries.

Name The name of the personal data set list. The **Name** field is a point-and-shoot sort field. The current (Active) list is indicated to the left of the panel title.

Description
A brief description of the personal data set list.

Created
The date the personal data set list was created. The **Created** field is a point-and-shoot sort field.

Referenced
The last date/time the personal data set list was referenced. The **Referenced** field is a point-and-shoot sort field.

Note: A personal list is updated whenever a save action is performed against it.

The LOCATE command is supported as follows:
L *xxxxxxxx*
LOC *xxxxxxxx*
LOCATE *xxxxxxxx*

where: *xxxxxxxx* is the name of the list you wish to locate.

An asterisk is supported in the last position of the list name. For example, enter `LOCATE PRIV*` to locate the list named PRIVATE.

The SELECT command is supported as supported as follows:
S *nnnnnnnn A*
SEL *nnnnnnnn A*
SELECT *nnnnnnnn A*

where: *nnnnnnnn* is the name of the list you want to select and *A* is the action to perform.

An asterisk is supported in the last position of the list name. For example, enter `SELECT PRIV* L` to select the list named PRIVATE, with a DSLIST action of *L*.

Shared Personal Lists

Personal lists (library and data set) can be shared with other users on the system. Tables ISRPLSHR for data sets and ISRLLSHR for libraries are shared lists. They are kept in an ISPTLIB concatenated data set. Private lists are tables ISRPLIST (for data set lists) and ISRLLIST (for library lists). They are kept in the ISPPROF user profile data set.

Shared lists are created by using ISPF option 3.3 to copy an existing personal list table from a user profile data set to a data set concatenated to ISPTLIB. You must rename the table to ISRPLSHR (for data set lists) or ISRLLSHR (for library lists) during the copy operation. You can open a shared list and use it; you cannot update or delete a shared list. You can also save it to a private list using the Save As function available from the Personal Data Set Lists panel (ISRPLTAB) and the Personal Library Lists panel (ISRLLTAB). You must save the shared list to a personal list before you can retrieve names from it.

Use the Options pull-down on these two panels to view the shared lists and to save them locally. When you specify shared lists, the following actions are available:

- Open (to interact with the list in any supported way)

- Save As (to save the contents of the current list to a new list)

Name Retrieval with the NRETRIEV command

The ISPF command table contains an entry named NRETRIEV. On enabled panels (such as edit and browse), NRETRIEV retrieves the library names from the current library referral list, or data set or workstation file names from the current data set referral list. The user is responsible for assigning the NRETRIEV command to a PF key.

When the cursor is *not* in the Other Data Set Name field, the Volume Serial field, or the Workstation File Name field, and the NRETRIEV key is pressed, the ISPF library fields are filled in from the current list. As long as the cursor is not placed in these fields, subsequent presses of the NRETRIEV key will retrieve the next library concatenation from the list.

When the cursor *is* in the Other Data Set Name field, the Volume Serial field, or the Workstation File Name field, and the NRETRIEV key is pressed, the data set name or workstation name is filled in from the current data set list. ISPF attempts to determine if the name in the list is a workstation or data set name. As long as the cursor is placed in these fields, subsequent presses of the NRETRIEV key will retrieve the next data set or workstation name from the list.

Use the personal list settings panel to force the NRETRIEV command to verify the existence of a data set before retrieving it. If verification is active, then a check is made to see if a data set name exists before a retrieval attempt. If a volume name is not in the personal list entry, then the catalog is checked to see if the data set name is cataloged. If a volume name exists, an OBTAIN macro is used to check the volume for the data set. Verification does not check ISPF library names or workstation names, and does not check for the existence of PDS(E) members. In the data set list Dsname Level field, verification is inactive and workstation names are never retrieved.

NRETRIEV is enabled on the following options:

- View, including extended move, copy, create, and replace panels
- Edit, including extended move, copy, create, and replace panels
- Library Utility (Option 3.1)
- Data Set Utility (Option 3.2)
- Move/Copy Utility (Option 3.3)
- Data Set List (Option 3.4)
- Reset ISPF Statistics (Option 3.5)
- Hardcopy Utility (Option 3.6)
- Workstation Transfer (Option 3.7.2)
- SuperC (Options 3.12, old and new, and Option 3.14)
- SCLM Options:
  - View (Option 1)
  - Edit (Option 2)
  - Member list (Option 3.1)
  - Migration (Option 3.3)
  - Build (Option 4)
  - Promote (Option 5)

SCLM Considerations for NRETRIEV

The NRETRIEV command is enabled to work in several of the SCLM options. There are certain restrictions and considerations to keep in mind when you choose to use NRETRIEV in SCLM.

SCLM Restrictions

- The NRETRIEV key within SCLM does not use the standard reference list or personal lists. Instead, it uses a stack that is stored internally. The stack is not editable. The stack is saved from session to session as a single-line table called ISRSLIST.

  Note: In the SCLM View option, the Other Data Set Name field *does* use the standard reference list because the Other Data Set Name field has no particular meaning to SCLM.
- In SCLM, there is no validation of saved or retrieved names. That means that if you type in a library name and press Enter, it is added to the list of saved names, even if SCLM does not process it. This contrasts with the standard reference list processing, which does not add a data set or library name until the data set or library is successfully allocated.
- On name retrieval (when the NRETRIEV key is pressed) there is no validation of the existence of data sets or libraries.
- The regular NRETRIEV command is screen independent (it uses a separate list indicator for each screen in split screen mode). There is only 1 position locator for SCLM lists. This means that split screens with SCLM NRETRIEV will use the same pointer into the list. An NRETRIEV on screen 1 followed by an NRETRIEV on screen 2 will get list entries 1 and 2 respectively.

Stack Management for SCLM

A library name (or concatenation) is added to the list of saved library names by pressing Enter on a panel that supports saving names. If the library or concatenation exists in the list already, it is moved to the top of the list. Where the Project field or the first Group field is an output field (SCLM options 2, 3, 4, and 5), the output fields are not used in the comparison between what was typed on the panel and what is already in the list. This enables you to work in different but similar projects.

In other words, on the edit screen that has both the Project and Group1 as output fields, the concatenation:

```
SCLM Library:
   Project...: PDFTDEV
   Group ....: DGN      ....STG    ....INT    ....SVT
   Type .....: ARCHDEF
   Member ...:
```

would match

```
SCLM Library:
   Project...: PDFTOS25
   Group ....: JSM      ....STG    ....INT    ....SVT
   Type .....: ARCHDEF
   Member ...:
```

Similarly, where groups 2, 3, and 4 are not used, those groups are not used when checking to see if the name already exists.

If a match is found, the existing entry in the list is moved to the top of the list.

Command Interface (Fast Path) to the Personal List Function

You can use the following commands to access the referral list function rather than using the action bar pull-down menus:

REFLISTD xx
Start the personal data set list dialog with the reference data set list and retrieve the data set in position *xx*. The *xx* parameter is optional. This sets the current data set list to the reference list (REFLIST).

REFLISTL xx
Start the personal library list dialog with the reference library list and retrieve the data set in position *xx*. The *xx* parameter is optional. This sets the current library list to the reference list (REFLIST).

REFACTD nnnnnnnn xx
Start the personal data set list named *nnnnnnnn* and retrieve the data set in position *xx*. For example, enter

```
REFACTD MYLIST 2
```

to retrieve the second data set from the personal data set list named MYLIST and place it in the **Data Set Name** field. The *nnnnnnnn* and *xx* parameters are optional.

REFACTL nnnnnnnn xx
Start the personal library list named *nnnnnnnn* and retrieve the library in position *xx*. For example, enter

```
REFACTL MYLIB 1
```

to retrieve the first library from the personal library list named MYLIB and place it in the **Library** field. The *nnnnnnnn* and *xx* parameters are optional.

REFOPEND
Start the personal data set open dialog.

REFOPENL
Start the personal library open dialog.

REFADDD nnnnnnnn
Update the personal data set list named *nnnnnnnn* with the most recently referenced data set. For example, enter

```
REFADDD NEWLIST
```

to add the most recently referenced data set to the personal data set list named NEWLIST.

REFADDL nnnnnnnn
Update the personal library list named *nnnnnnnn* with the most recently referenced library. For example, enter

```
REFADDL NEWLIB
```

to add the most recently referenced library to the personal library list named NEWLIB.

NRETRIEV
Retrieve a name from the current library or data set list on panels which support NRETRIEV commands. This command is normally assigned to a program function (PF) key. NRETRIEV uses the position of the cursor to

determine what type of personal list to use and what fields on the panel to fill in. See “Name Retrieval with the NRETRIEV command” on page 63 for more information about NRETRIEV.

Using Function Keys with Personal Lists

You can set function keys to process any of the fast path commands, as shown in Figure 25.

```
                              Keylist Utility
  File
 ------------------------------------------------------------------------------
 SHARED                  ISR Keylist ISRSAB Change         Row 1 to 10 of 24

 Make changes and then select File action bar.

 Keylist Help Panel Name . . . ISRSABH

 Key       Definition                                  Format  Label
 F1 . . .  HELP                                        SHORT   Help
 F2 . . .  SPLIT                                       LONG    Split
 F3 . . .  EXIT                                        SHORT   Exit
 F4 . . .  REFACTD MYLIST 2                            SHORT   Refd2
 F5 . . .  REFACTL MYLIB 1                             SHORT   Refl1
 F6 . . .  REFACTD MYLIST                              SHORT   Refd
 F7 . . .  BACKWARD                                    LONG    Backward
 F8 . . .  FORWARD                                     LONG    Forward
 F9 . . .  SWAP                                        LONG    Swap
 F10  . .  ACTIONS                                     SHORT   Actions

 Command ===>                                          Scroll ===> PAGE
  F1=Help     F3=Exit    F10=Actions F12=Cancel
```

Figure 25. Defining Function Keys to Issue Referral List Commands

If you used these function key settings, you could do the following:

- Press F4 to place the second data set name on the personal data set list named MYLIST in the Data Set Name field.
- Press F5 to place the first library name on the personal library list named MYLIB in the Library field.
- Press F6 to display the personal data set list named MYLIST so that you can select a data set to process.

  Note: You could also type a number on the command line and press F6 to place the data set name in the specified position on the personal data set list named MYLIST in the Data Set Name field; for example, if you type 6 on the command line and press F6, the sixth data set on MYLIST would be placed in the Data Set Name field.

Example of an ISPF Panel That Uses a Referral List

Figure 26 on page 67 shows the panel definition for a panel that uses a referral list.

```
)PANEL KEYLIST(ISRSAB,ISR)
)ATTR DEFAULT(...) FORMAT(MIX)
 0B TYPE(AB)
 04 TYPE(ABSL)
 05 TYPE(PT)
 09 TYPE(FP)
 0A TYPE(NT)
 0C TYPE(NT) SKIP(ON)
 11 TYPE(SAC)
 12 TYPE(CEF) PADC(USER)
 13 TYPE(NEF) PADC(USER)
 19 TYPE(DT)
 22 TYPE(WASL) SKIP(ON)
 08 TYPE(CH)
 10 TYPE(ET)
)ABC DESC('RefList')
 PDC DESC('Reference Data Set List')
   ACTION RUN(ISRRLIST) PARM('RL1')
 PDC DESC('Reference Library List')
   ACTION RUN(ISRRLIST) PARM('LR1')
 PDC DESC('Personal Data Set List')
   ACTION RUN(ISRRLIST) PARM('PL1')
 PDC DESC('Personal Data Set List Open')
   ACTION RUN(ISRRLIST) PARM('PL2')
 PDC DESC('Personal Library List')
   ACTION RUN(ISRRLIST) PARM('LL1')
 PDC DESC('Personal Library List Open')
   ACTION RUN(ISRRLIST) PARM('LL2')
)ABCINIT
   .ZVARS=REFLIST
```

Figure 26. Example Panel Definition Using a Referral List (Part 1 of 2)

```
)ABC DESC('RefMode')
 PDC DESC('List Execute') UNAVAIL(ZRME1)
   ACTION RUN(ISRRLIST) PARM('EEX')
 PDC DESC('List Retrieve') UNAVAIL(ZRME2)
   ACTION RUN(ISRRLIST) PARM('ERT')
)ABCINIT
   .ZVARS=LISTFILE
  VGET (ZELIST) PROFILE
  IF (&ZELIST = 'EXECUTE')
    &zrme1 = 1
    &zrme2 = 0
    &listfile = 2
  ELSE
    &zrme1 = 0
    &zrme2 = 1
    &listfile = 1
)BODY  CMD(ZCMD)
   :
)INIT
   :
)REINIT
   REFRESH (PRJ1,LIB1,LIB2,LIB3,LIB4,TYP1,MEM,DSN) /*refresh panel vars*/
)PROC
  /* the following is the logic for reference or personal data set list*/
 VGET (ZRDSN) SHARED            /* get data set reflist key var     */
 IF (&ZRDSN ^= ' ')             /* if reflist has set dsname var    */
   &DSN = &ZRDSN                /* set panel other dsname to zrdsn  */
   VGET (ZREFVOLM) PROFILE      /* get volume retrieve mode         */
   IF (&ZREFVOLM = 'ON')        /* if volume retrieve on            */
     &VOL = &ZRVOL              /* set panel volume to zrvol        */
   &ZRDSN = ' '                 /* blank zrdsn                      */
   &ZRVOL = ' '                 /* blank zrvol                      */
   VPUT (ZRDSN ZRVOL) SHARED    /* return blank reflist vars        */
   .CURSOR = DSN                /* set cursor to panel dsname field */
   VGET (ZELIST) PROFILE        /* get edit execute/retrieve mode   */
   IF (&ZELIST ^= 'EXECUTE')    /* determine if retrieve or execute */
     .MSG = ISRDS003            /* force redisplay if retrieve mode */
  /* End of logic for reference or personal data set list        */
  /* the following is the logic for reference or personal library list */
 VGET (DSALSEL) SHARED          /* get library reflist key var      */
 IF (&DSALSEL ^= ' ')           /* if reflist has set lib indicator */
   VGET (DSA1,DSA2,DSA3,DSA4,DSA5,DSA6,DSA7) SHARED /* get vars  */
   &PRJ1 = &DSA1                /* set panel project                */
   &LIB1 = &DSA2                /* set panel library 1              */
   &LIB2 = &DSA3                /* set panel library 2              */
   &LIB3 = &DSA4                /* set panel library 3              */
   &LIB4 = &DSA5                /* set panel library 4              */
   &TYP1 = &DSA6                /* set panel type                   */
   &MEM  = &DSA7                /* set panel member                 */
   &DSN = ' '                   /* blank panel other dsname         */
   &DSALSEL = ' '               /* blank reflist lib indicator      */
   VPUT (DSALSEL) SHARED        /* return to shared pool            */
   .CURSOR = MEM                /* set cursor to panel member field */
   VGET (ZELIST) PROFILE        /* get edit execute/retrieve ind    */
   IF (&ZELIST ^= 'EXECUTE')    /* determine if retrieve or execute */
     .MSG = ISRDS003            /* setmsg if retrieve mode          */
  /* End of logic for reference or personal library list         */
)END
```

Figure 26. Example Panel Definition Using a Referral List (Part 2 of 2)

Example of an ISPF Panel That Enables NRETRIEV

Figure 27 shows the panel definition for a panel that uses a referral list.

```
)BODY
%---------------------------  NRETRIEV Test Panel  ---------------------------%
%COMMAND%===>_ZCMD
               +
+
+  Project ===>_PROJECT +
+  Group   ===>_GROUP1  +===>_GROUP2  +===>_GROUP3  +===>_GROUP4  +
+  Type    ===>_TYPE    +
+  Member  ===>_MEMBER  +

+  DS Name ===>_OTHERDSN                                      +
+  Volume  ===>_VOLUME+

+  Workstation File ===>_WSFILE                                +
)INIT
 .NRET = ON                      /* Make NRETRIEV key active  */
)REINIT
   REFRESH (*)
   .NRET = ON                    /* Make NRETRIEV key active  */
)PROC
.NRET = OFF          /*IMPORTANT - Make NRETRIEV key inactive */
VGET (ZVERB) SHARED
 IF (&ZVERB = NRETRIEV)          /* if NRETRIEV was entered   */
  IF (.CURSOR NE OTHERDSN, VOLUME, WSFILE)
    .NRET = LIB                  /* Reset data set counter    */
    IF (&ZNRLIB = YES)           /* If library retrieve was OK*/
      .CURSOR = MEMBER           /* set cursor to member field*/
      &PROJECT  = &ZNRPROJ       /* set library variables from*/
      &GROUP1   = &ZNRGRP1       /* the variables set by      */
      &GROUP2   = &ZNRGRP2       /*  NRETRIEV                 */
      &GROUP3   = &ZNRGRP3
      &GROUP4   = &ZNRGRP4
      &TYPE     = &ZNRTYPE
      &MEMBER   = &ZNRMEM
      &OTHERDSN = &Z             /* Blank out odsn field      */
      &VOLUME   = &Z             /* Blank out volume field    */
      &WSFILE   = &Z             /* Blank out workstation file*/
      .MSG = ISRDS013            /* Indicate good retrieval   */
    ELSE .MSG = ISRDS011         /* Else bad library list     */
   ELSE
    .NRET = DSN
    IF (&ZNRDS = YES)            /* If dsname retrieve was OK */
      IF (&ZNRWSN = H)           /* If ISPF thinks it's host  */
        .CURSOR = OTHERDSN       /* Move cursor to dsn name   */
        &OTHERDSN = &ZNRODSN     /* Set other dsn name        */
        &VOL      = &ZNRVOL      /* Set volume variable       */
        &WSFILE   = &Z           /* Blank out workstation file*/
      ELSE                       /* ISPF thinks it's a wsfile */
        .CURSOR = WSFILE         /* Set cursor to ws file     */
        &WSFILE   = &ZNRODSN     /* Set ws file name variable */
        &VOL      = &Z           /* Blank volume and data set */
        &OTHERDSN = &Z           /* To avoid visual confusion */
      .MSG = ISRDS014            /* Indicate good retrieval   */
    ELSE .MSG = ISRDS012         /* Else bad ds referral list */
)END
```

Figure 27. Example Panel Definition Enabling NRETRIEV

Chapter 4. Using Commands, Function Keys, and Light Pen or Cursor Selection

This chapter explains how to use the ISPF system commands, the function keys and their default assignments, and the light pen and cursor-select facilities.

You can use commands to request processing functions. These are the levels of commands:

System commands
: Provided by the DM component and always available to a user, unless explicitly overridden by an application, a user, or a site.

User or Site commands
: Defined by the site administrator (in the ISPF Configuration table) and available to a user, in addition to the system commands.

Application commands
: Available to a user throughout the processing of an application.

Function commands
: Meaningful only while using a particular function within an application.

System, user, site, and application commands are defined by using command tables. The DM component processes these commands. System, user, site, and application command processing is generally transparent to the dialog functions. For example, HELP is a system command.

Function commands include all commands that are processed by a dialog function. For example, the NUMBER command within the ISPF Editor (option 2) is a function command.

You can enter a command by:

- Typing the information on the command line, or in the command field, and pressing the Enter key. This includes the command field in View, Browse, Edit, and Table Displays, as well as the command field on a panel.
- Pressing the function key set to the desired command.
- Selecting an **Attention** field by using the light pen or the cursor-select key. The cursor-select key is a hardware feature on 3179, 3179G, 3180, 3278, 3279, and 3290 terminals.

ISPF intercepts all commands, regardless of whether the command is typed in the command field or entered with a function key, light pen, or cursor-select key. The DM component performs the command if it matches an entry in the application, user, or system command table. Otherwise, it is assumed to be a function command and is passed to the dialog function.

You can pass commands to the operating system by entering the appropriate ISPF-provided command (TSO) followed by the actual TSO command. For example:

```
===> TSO LISTC LEVEL(Z77PHJ)
```

You can stack commands to be run by entering a special delimiter between the commands. For example, entering:

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```
===> UPDATE BLDG DEPT NAME; MENU ABC
```

causes the UPDATE command to run first. When it completes, the MENU command starts. The default delimiter is a semicolon (;), which you can change with the ISPF SETTINGS option (see the Settings (Option 0) chapter of the *ISPF User's Guide Volume II*).

Commands cannot be stacked following the:
- HELP command. HELP processing deletes any remaining commands in the stack.
- RETRIEVE command.

ISPF System Commands

Table 3 describes the ISPF system commands in alphabetical order.

Table 3. ISPF System Commands

Command	Description
ACTIONS	Moves the cursor between the action bar and the panel body.
AUTOTYPE	Allows you to type a partial data set or member name, then press a function key and have ISPF complete the name. **Note:** AUTOTYPE is not a true ISPF system command because it is not built into the base code of ISPF and it works only on panels that are written to understand it.
BACKWARD	Alias for the UP command. Scrolls toward the top of the data.
BOTTOM	Alias for the DOWN MAX command. Scrolls to the bottom of the data.
CANCEL	If CANCEL is requested from an action bar pull-down, the action taken depends on whether you are running in host or GUI mode: • In host mode, the pull-down is removed and the cursor is positioned on the first action bar choice. • In GUI mode, the CANCEL command is returned to the dialog. If CANCEL is requested from a panel displayed using the DISPLAY, TBDISPL, or SELECT service calls, the DM component places the command in ZCMD and sets a return code of 0 from the display screen. If CANCEL is requested from a panel displayed using the DISPLAY or TBDISPL service calls and the panel was defined with a PANEL tag (DTL) or a)PANEL statement, the DM component returns the command in ZVERB and sets a return code of 8 from the display screen.
CMDE	If CMDE is entered on any command line, a pop-up panel (ISPCMDE) with a 234-character command input field is displayed. You can enter up to 234 characters using the entry field provided. ISPF allows TSO commands, CLISTS, and REXX execs and parameters to be entered in the input field. This panel is processed much like the PDF Option 6 panel. Data passed to this panel is translated to uppercase characters. Data passed from this panel remains as it appears on the panel. If input has been entered on the panel from which CMDE was called, it is saved and displayed when the pop-up panel ISPCMDE is displayed.
COLOR	Changes the default colors on seven-color display devices.

Table 3. ISPF System Commands (continued)

Command	Description
CRETRIEV	The actions of the CRETRIEV (conditional retrieve) command are based on the position of the cursor when you enter the command: • If the cursor is within the primary input field when you enter the CRETRIEV command, the command does the same processing as the RETRIEVE command; the DM component places the previous command entered, if any, in the command input field. • If the cursor is not within the primary input field, the CRETRIEV command does the same processing as a CURSOR command; the DM component places the cursor at the beginning of the first input field on the panel, which is usually the option or command field.
CUAATTR	Changes the default values of panel colors, intensities, and highlights for CUA panel element attributes.
CURSOR	Moves the cursor to the first input field on the panel being displayed, generally the option or command field, or moves the cursor to the alternate command field if one has been designated on the)BODY statement. If invoked a second time on a panel with scrollable data, this command causes the cursor to be moved to the second input field. Scrollable data panels include a View, Browse, Edit, or table display panel or a panel with a scrollable dynamic area.
DOWN	Scrolls toward the bottom of the data.
DSLIST [list name | DSname level]	Enables you to build a data set list from any command line. You can specify either a personal data set list name or a data set list name level on the command. If you do not put quotation marks around the dsname level, the TSO prefix is used as the first qualifier in the dsname level. By issuing the command with no parameters, you cause a list of available personal data set lists to be displayed.
DTEST *parameter number*	Enables you to start, or change the conditions of, a dialog test. Specifying a parameter number is required, and different conditions of dialog test result. For example, if you enter DTEST 8 while running an application under Dialog Test, the 7.8 Breakpoints panel is displayed. After setting the breakpoints, you return to your application with the new breakpoints activated. The panels that you can call up with DTEST are: **1** Invoke Functions panel **2** Invoke Display Panel panel **3** Invoke Variables panel **4** Invoke Tables panel **5** Display Browse log panel **6** Invoke Dialog Services panel **7** Invoke Traces selection panel **8** Invoke Breakpoint panel

Table 3. ISPF System Commands (continued)

Command	Description
END	Stops the current operation and returns to the previous menu. If the ISPF Primary Option Menu is displayed, this command ends ISPF. See "Log and List Data Set Processing at the End of a Session" on page 139 for a description of the processing that occurs when the END command is entered from the ISPF Primary Option Menu. When entered on a selection panel displayed by the SELECT service, the END command causes a redisplay of the next higher menu in the hierarchy. When entered on a panel displayed by the tutorial program, it stops the tutorial and causes a redisplay of the menu from which the tutorial was started or the panel from which HELP was requested. When the END command is entered on a panel displayed by a dialog function through the DISPLAY or TBDISPL service, the dialog function must take whatever action is appropriate to terminate and return control. Entry of the END command is signaled by a return code of 8 from the DISPLAY or TBDISPL service.
ENVIRON [ENBLDUMP[ON|OFF]] [TERMTRAC[ON|ERROR|DUMP|OFF]] [TERMSTAT [QUERY]]	Allows you to reduce service time by gathering data that can be helpful in diagnosing problems. Functions provided include: • Enabling Abend dumps when ISPF is not in TEST mode • Tracing and dumping ISPF terminal input and output data and errors • Collecting terminal characteristic information.
EPDF datasetname [Browse] [View] [Macro macroname] [Profile profilename] [Panel panelname] [Recover] [Format formatname] [Mixed YES|NO]	Enables you to edit, browse, or view a data set from a command line. **Browse** Invoke Browse instead of edit. **View** Use View mode (End/Save/Cancel disabled). **Macro macroname** Invoke the editor or view using the initial macro specified by *macroname*. Not valid with Browse. **Profile profilename** Invoke the editor or view using the edit profile specified by *profilename*. Not valid with Browse. **Panel panelname** Use alternate panel name specified by *panelname*. **Recover** Perform edit recovery if a recovery is pending. If edit recovery is used, the file name and macro specified on the command are ignored. If no edit recovery session is pending, the file is edited as usual. Not valid with Browse. **Format formatname** Invoke the editor using the format table specified by *formatname*. **Mixed YES|NO** Use mixed option for 5550 terminals.
EXHELP	Provides general information about the contents of a panel.

Table 3. ISPF System Commands (continued)

Command	Description
EXIT	Requests that the current function be ended. When entered on a panel displayed by the tutorial program, EXIT stops the tutorial and causes a redisplay of the menu from which the tutorial was started or the panel from which HELP was requested. • If EXIT is requested from a panel displayed using the DISPLAY, TBDISPL, or SELECT service calls, the DM component returns the command in ZCMD and sets a return code of 0 from the display screen. • If EXIT is requested from a panel displayed using the DISPLAY or TBDISPL service calls and the panel was defined using a PANEL tag (DTL) or a)PANEL statement, the DM component returns the command in ZVERB and sets a return code of 8 from the display screen.
EXPAND	Displays a variable in a dynamic area in a pop-up expand window. This only applies if the cursor is within a scrollable field. If the scrollable field is input, you will be able to update the variable in the expand window.
FKA [ON | SHORT | OFF | PREFIX | NOPREFIX]	Toggles through the different forms of the function key area. The first time you enter the FKA command (without parameters), the long form of the function key area is displayed. The long form includes the keys that have a format specified as either long or short in the keylist. If you enter the command again, the short form is displayed. The short form displays only those keys that have the short format specified in the keylist. If you enter the command once again, the keys are removed from the display. Therefore, if you continue to enter the command, the different choices are toggled: • Long form (default) • Short form • No display. The form that you select affects all panels displayed in the session. The DM component updates the system variable ZFKA to represent the current state of the function key area form and saves the value in the system profile. FKA ON displays the long form of the function key area. FKA SHORT displays the short form of the function key area. FKA OFF specifies that the function key area will not be displayed. If you are running in GUI mode, FKA PREFIX displays the F= prefix on the push button. If you are running in GUI mode, FKA NOPREFIX removes the F= prefix from the push button.
FORWARD	Alias for the DOWN command. Scrolls toward the bottom of the data.
HELP	Displays additional information about an error message, or provides tutorial/help information for panels, fields on panels, commands, and options.
INT	Starts the ISPF Workstation Tool Integration dialog. Use the dialog to configure workstation tools and file extensions for ISPF actions and services for Edit and View when used in conjunction with workstation edit and view. For more information, see the section on Workstation Tool Integration in the Settings (Option 0) chapter of the *ISPF User's Guide Volume II*.

Table 3. ISPF System Commands (continued)

Command	Description
ISPDTLC	Invokes the ISPF DTL Conversion Utility. See the *ISPF Dialog Tag Language Guide and Reference* for additional parameters and calling options.
ISPFVAR [LMSG(ON|OFF) | ABTAB(ON|OFF) | PSTAB(ON|OFF) | SESM(ON|OFF) | JUMP(ON|OFF) | EDPRT(ON|OFF) | EURO(ON|OFF) | SPLTLINE(ON|OFF) | SCRML(ON|OFF)]	Sets the following system variables: **LMSG** Display long message in pop-up **ABTAB** Tab to action bar choices **PSTAB** Tab to point-and-shoot fields **SESM** Select Session Manager mode **JUMP** Jump from leader dots **EDPRT** Edit the PRINTDS command **EURO** Enable the EURO currency symbol **SPLTLINE** Always show split line **SCRML** Scroll member list
ISPFWORK	Starts the ISPF Workplace.
ISPLIBD [libtype]	Invokes the LIBDEF Display Utility. The optional parameter, libtype, identifies a specific LIBDEF library definition to be displayed. All LIBDEF definitions for the current logical screen are displayed if the parameter is omitted, if the parameter is longer than eight characters, or if the parameter specifies ISPPROF as the library name. See *ISPF Dialog Developer's Guide and Reference* for more information about the ISPLIBD command.
ISPPREP	Allows you to create preprocessed panels, those for which ISPF has partially processed the panel definition before it is stored in the panel data set, either interactively or in batch mode.
ISRRLIST	The action bar interface into referral lists.
ISRROUTE	The action bar interface into the ISPF command stacking routing. ISRROUTE also provides an interface to the SELECT service from the ACTION/RUN statement within a pull-down choice. The parameters are the same as the ISPEXEC interface to the SELECT service.

Table 3. ISPF System Commands (continued)

Command	Description
KEYLIST [PRIVATE|SHARED|OFF|ON]	The parameters on this command determine where, or if, ISPF looks for keylists. The default setting for KEYLIST is equivalent to issuing the KEYLIST PRIVATE command, which means that the program looks in the user's profile table for the keylist specified on a panel before looking in the xxxxKEYS table allocated in ISPTLIB. The KEYLIST SHARED command means that ISPF looks only in the xxxxKEYS table allocated in ISPTLIB for the keylist. Using either the PRIVATE or SHARED parameter performs an implicit KEYLIST ON command. Both of the parameters are local to each application, so setting PRIVATE for application X does not affect application Y, which might be using SHARED. By specifying KEYLIST OFF, you cause ISPF to ignore the keylist on all logical screens and use the ZPF variables for controlling function keys. This is in effect only for the application for which you enter the command. The KEYLIST ON command causes ISPF to recognize keylists again, with the parameter (SHARED or PRIVATE) that was in effect immediately before the KEYLIST OFF command. KEYLIST ON and OFF are equivalent to the Enable and Disable keylist choices on the Function keys pull-down. Keylist Settings are discussed in the Settings (Option 0) chapter of the *ISPF User's Guide Volume II*. SHARED and PRIVATE also appear on the Function keys pull-down in "Keylist Settings". The KEYLIST command with no parameters causes the Keylist utility to start.
KEYS	Displays the PF Key Definitions and Labels panel, which allows you to change the ZPF variable settings (ZPFVARs), as in previous versions of ISPF. However, if the KEYS command is issued from a panel with an *active* keylist, the associated Keylist Utility panel Change pop-up window is displayed. **Note:** If the KEYLIST SHARED command has been issued, or the SYSTEM parameter has been specified on the KEYLIST keyword on the)PANEL statement, this action causes only a BROWSE of the keylist. Refer to the *ISPF Dialog Developer's Guide and Reference* for more information about the SYSTEM parameter in the)PANEL statement.
KEYSHELP	If KEYSHELP is defined, KEYSHELP provides you with a brief description of each key defined for a panel.
LEFT	Scrolls left. If your cursor is in a scrollable field, this scrolls towards the beginning of the field.
LIST [PRINT|DELETE|KEEP]	Allows you to process the list data set without exiting ISPF. See "Processing the Log and List Data Sets" on page 137 for a description of using the LIST command.
LOG [PRINT|DELETE|KEEP]	Allows you to process the log data set without exiting ISPF. See "Processing the Log and List Data Sets" on page 137 for a description of using the LOG command.

Table 3. ISPF System Commands (continued)

Command	Description
MSGID [ON|OFF]	With no parameters, displays a message indicating the message ID of the last message displayed. With a parameter of ON or OFF, indicates whether a message number is to be added to the beginning of interactive long message text. During entry to ISPF, the mode is initialized to OFF, and the message ID is not displayed as part of the long message text on interactive displays. If the addition of the message ID would cause long message text to be truncated, the message is displayed in a pop-up window. Messages that have the message number included in the long message text will continue to display the message number, even when MSGID OFF is in effect. Also, the message number will appear twice when MSGID ON is in effect. The MSGID ON/OFF command affects only the current logical screen, so when you are running in split screen, one screen can have MSGID ON and the other MSGID OFF. The MSGID command will return only the MSGID of a message for its own logical screen. An option on the Log Data Set Defaults and List Data Set Defaults panels, which are choices on the Log/List pull-down on the ISPF Settings panel, `Log Message ID . . . _  (/ = Yes)` allows you to select whether the message ID is written to the log data set as part of the long message text. The initial default is deselected. Note that not all lines in the log data set originate from a message member. Therefore, not every line in the log data set will have a message number associated with it. **Note:** This facility does not affect long message text returned by the GETMSG service, messages displayed in the Error Box, or messages displayed by TRACEX.
NOP	The classic *no operation* command.
NRETRIEV	Data set and library name retrieved. See “Name Retrieval with the NRETRIEV command” on page 63 for more information.
PANELID [ON|OFF]	Indicates whether the panel identifier (ID) is to be displayed. If you enter PANELID without any parameters, the command toggles the display of the panel ID. If an action bar is present, the ID is displayed immediately below the action bar, indented one space. If an action bar is not present, the DM component displays the ID indented one space in the left corner of line 1 on the panel. **Note:** In GUI mode, the panel identifier is placed on the title bar rather than on the first line of the panel. During initial entry to ISPF, the PANELID is set to OFF. The ID is displayed only if the panel contains a protected-field attribute byte in row 1 column 1 (relative to the action bar) and is padded with one blank.

Table 3. ISPF System Commands (continued)

Command	Description
PFSHOW [ON |OFF|TAILOR]	Toggles through the different forms of the function key area. The first time you enter the PFSHOW command (without parameters), the long form of the function key area is displayed. If you enter the command again, the short form is displayed. If you enter the command once again, the keys are removed from the display. Therefore, if you continue to enter the command, the different choices are toggled: • Long form (default) • Short form • No display. The form that you select affects all panels displayed in the session. The DM component updates the system variable ZPFSHOW to represent the current state of the function key area form and saves the value in the system profile. PFSHOW ON displays the long form of the function key area. PFSHOW OFF specifies that the function key area will not be displayed. PFSHOW TAILOR displays a panel that lets you specify the set of function keys (primary, alternate, or all) for which definitions are to be displayed and the number of keys per line to display in each function key definition line.
PRINT	Records a snapshot of the physical screen image in the list data set for subsequent printing. For the PRINT, PRINT-HI, PRINTL, and PRINTLHI commands, a screen image can exceed 121 characters. When it does, the line must be split when the output is being directed to a printer other than a 3800. The line length is obtained from a user-modifiable specification on the ISPF Settings panel for the list data set. The default length for printing is 121 characters. **Using Print Commands with DBCS** The print commands are affected in the DBCS environment as follows: • DBCS character printing Because shift-out and shift-in characters do not occupy positions on a printer, ISPF inserts a blank character before each shift-out and after each shift-in. • Fields affected by the OUTLINE keyword Field-outlining information is embedded in the record as a set-attribute (SA) order. Each SA order occupies three bytes. One SA is required to start field-outlining, one to end field-outlining, and one to change field-outlining. Therefore, each affected field normally takes six additional bytes. Thus, the record-length of print command output is larger than the screen width. The LIST file should be large enough to contain the expanded records. If not, the output might not print correctly. **Note:** The PRINT command is disabled if you are running in GUI mode.

Table 3. ISPF System Commands (continued)

Command	Description
PRINTG	Allows you to send the information on the current logical screen to a Graphical Data Display Manager (GDDM) graphics printer. **Notes:** 1. In split-screen mode, ISPF adds the split line to the top logical screen. If you issue the PRINTG command from the top screen, the split line is printed along with the logical screen. 2. Also, in split-screen mode, PRINTG prints all data in the visible portion of the logical screen, but only the graphics area data in the nonvisible portion of the logical screen. If you use the other print commands (PRINT, PRINT-HI, PRINTL, and PRINTLHI) to print screen images containing a graphics area, the part of the screen containing the graphics area prints as blanks. If you issue the PRINTG command as a COMMAND option on a DISPLAY service request, only data already defined to GDDM at the time the service request is issued will be printed. Any GDDM fields defined by the dialog (using GDDM commands) before issuing the DISPLAY service request will be printed. Before issuing the PRINTG command from a command line you must first have initialized the GDDM graphic interface using the GRINIT service. PRINTG does not provide return codes to a dialog; however, it does display completion or error messages. For information about how to specify parameters related to using the PRINTG command, see the section on Print Graphics Parms in the Settings (Option 0) chapter of the *ISPF User's Guide Volume II*. **Note:** The PRINTG command is disabled if you are running in GUI mode.
PRINT-HI	Same as PRINT, except that high-intensity characters on the screen are printed with overstrikes to simulate the dual-intensity display. See Using Print Commands with DBCS under the PRINT command on page 79. **Note:** The PRINT-HI command is disabled if you are running in GUI mode.
PRINTL	Causes a *snapshot* of the logical screen image to be recorded in the ISPF list file for subsequent printing. In split-screen mode, the PRINTL command prints what would be seen if split-screen were not in effect. See Using Print Commands with DBCS under the PRINT command on page 79. **Note:** The PRINTL command is disabled if you are running in GUI mode.
PRINTLHI	Same as PRINTL, except that high-intensity characters on the logical screen are printed with overstrikes to simulate the dual-intensity display. See Using Print Commands with DBCS under the PRINT command on page 79. **Note:** The PRINTLHI command is disabled if you are running in GUI mode.

Table 3. ISPF System Commands (continued)

Command	Description

PSCOLOR	Globally alters the color, intensity, and highlighting of point-and-shoot fields through a pop-up dialog. Valid choices include the following:
	`Color` `Intensity` `Highlight`
	`RED` `HIGH` `NONE`
	`PINK` `LOW` `BLINK`
	`GREEN` `REVERSE`
	`YELLOW` `USCORE`
	`BLUE`
	`TURQ (Turquoise)`
	`WHITE`
	To restore the ISPF default values, delete any new values you have entered (leaving the entry fields blank) and press Enter, or select the **Defaults** field.

RCHANGE	Repeats the action of the previous CHANGE command (change one character string to another) (Edit and View only).
REFACTD *nnnnnnnn xx*	Calls the personal data set list named *nnnnnnnn* and retrieves the data set in position *xx*. See "Command Interface (Fast Path) to the Personal List Function" on page 65 for additional information.
REFACTL *nnnnnnnn xx*	Calls the personal library list named *nnnnnnnn* and retrieves the data set in position *xx*. See "Command Interface (Fast Path) to the Personal List Function" on page 65 for additional information.
REFADDD *nnnnnnnn*	Updates the personal data set list named *nnnnnnnn* with the most recently referenced data set. See "Command Interface (Fast Path) to the Personal List Function" on page 65 for additional information.
REFADDL *nnnnnnnn*	Updates the personal library list named *nnnnnnnn* with the most recently referenced library. See "Command Interface (Fast Path) to the Personal List Function" on page 65 for additional information.
REFLISTD *xx*	Calls the reference data set list dialog and retrieves the data set in position *xx*. See "Command Interface (Fast Path) to the Personal List Function" on page 65 for additional information.
REFLISTL *xx*	Calls the reference library list dialog and retrieves the library in position *xx*. See "Command Interface (Fast Path) to the Personal List Function" on page 65 for additional information.
REFOPEND	Calls the personal data set open dialog. See "Command Interface (Fast Path) to the Personal List Function" on page 65 for additional information.
REFOPENL	Calls the personal library list open dialog. See "Command Interface (Fast Path) to the Personal List Function" on page 65 for additional information.
RESIZE	Increases the size of a pop-up window to fill the entire 3270 physical display area. The initial RESIZE command increases the pop-up window to its maximum size, and the following RESIZE reduces the window to its original size.
RETF	Retrieves commands from the command stack moving in the direction from the oldest command in the command stack toward the most recent commands in the command stack. Forward retrieve (RETF) retrieves the oldest command on the command stack, if RETF is entered immediately after a command is executed, before performing a RETRIEVE. See "RETF Command" on page 88 for more information.

Table 3. ISPF System Commands (continued)

Command	Description
RETP	Causes a pop-up panel to be displayed with a list of the last 20 commands in the retrieve stack. Retrieve pop-up (RETP) enables you to select by number the command to be retrieved. The command selected is retrieved to the command line, as it is when using other retrieve commands. You will not be able to change the commands in the retrieve pop-up until the command is selected and retrieved to the command line. The RETP pop-up panel has an OPTIONS action bar choice that allows you to set the minimum number of characters required to save a command in the retrieve stack and to choose whether to position the cursor at the beginning or end of the retrieved command when the command is retrieved to the command line. RETP displays the pop-up panel if the retrieve stack is empty, which allows the user to change the retrieve options. See "RETP Command" on page 88 for more information.
RETRIEVE	Repeatedly entering RETRIEVE causes the commands most recently entered from the primary input field, usually the ZCMD field, to be displayed on the command line. The commands are displayed one at a time, in the reverse sequence to which they were entered (last-in, first-out). This allows you to easily recall a command for resubmission from the command line. You can edit the command before entering it if you wish. See "RETRIEVE Command" on page 86 for more information.
RETURN	Causes an immediate return to a primary option menu or to the display from which you entered a nested dialog. The RETURN command simulates repeated END commands, up to some appropriate stopping point, without displaying intervening panels. See "Using the RETURN Command" on page 89 for more information.
RFIND	Repeats the action of the previous FIND command (find one or more occurrences of a specific character string) or the FIND part of the most recent CHANGE command (Browse, Edit, and View only).
RIGHT	Scrolls right. If your cursor is in a scrollable field, this scrolls towards the end of the field.
SAREA	Displays the Status Area pop-up window.
SCRNAME *screen name* [PERM|ON|OFF]	Causes the logical screen in which the command is entered to be given the *screen name* specified. The name can be any set of 2 to 8 characters that conform to member naming rules, except NEXT, PREV, LIST, ON, and OFF. PERM is an optional parameter to indicate that ISPF does not allow the SCRNAME parameter on a SELECT statement, or the setting of the modifiable system variable ZSCRNAME, to override the value being assigned by this SCRNAME command. The PERM setting lasts for the duration of the logical screen. After you end the logical screen, the setting is no longer active. SCRNAME ON causes the name that you specify for the screen to be displayed in the *panelid* area of the screen, if panelid is OFF. SCRNAME OFF removes the screen name from visible display.
SETTINGS	Displays the ISPF Settings panel.

Table 3. ISPF System Commands (continued)

Command	Description
SPLIT [NEW]	Causes the screen to be divided into two logical screens separated by a horizontal line or changes the location of the horizontal line. If you have de-selected the *Always show split line* option in Settings, there is no split line in 3270 mode. In GUI mode, each screen is shown as a separate physical window. See "Splitting the Screen Horizontally or Vertically" on page 44 for more information.
SPLITV	On 3290 terminals, causes the screen to be separated into two vertical logical screens. The SPLITV function is not active if the actual screen data display is more than 80 characters wide.
START	Starts a dialog in a new logical screen. If a logical screen does not exist, it will be created. You can use the START command to do the following: • Issue a command from the ISPF command table; for example, START KEYLIST • Issue a command with parameters (in single quotes; for example, `START 'ISRROUTE BRI'` • Start a dialog; for example, `START PANEL(ISRUTIL)` **Notes:** 1. If you are running in GUI mode, issuing the START command creates a new window. 2. If you are running on the host and invoke START from a pull-down choice, the screen will be split where your cursor is located within the pull-down. 3. This function does not change the limitation number of logical screens. If ISPF already has the maximum number of screens when the START command is issued, the screen is re-split; that is, the split line might move on the host, or a window is reused if you are running in GUI mode.

Table 3. ISPF System Commands (continued)

Command	Description
SWAP [LIST | PREV | NEXT | *screen name* | *n*]	When no parameters are given (in 3270 mode), moves the cursor to where it was previously positioned on the other logical screen of a split-screen pair. When operating in split-screen mode, pressing the SWAP key (F9) causes ISPF to ignore any entry on the command line. When no parameters are given (in GUI mode) and there are more than two screens present, defaults to SWAP LIST. Entering SWAP LIST displays the ISPF task list. The task list displays the following information about all of the active logical screens: • Screen ID (ZSCREEN) • Screen name • Panel ID • Application ID • Session type (GUI or 3270) You can select from this list the screen you want to display or start a new screen or application. The screen you select replaces the screen from which you issued the command. Using a listed parameter changes the focus (in GUI mode) or display (in 3270 mode) to the PREVious, NEXT, or specified logical screen. PREV changes the focus or display to the next lower screen number until reaching 1, then wraps back to 32 or the last number used. NEXT displays the next highest screen number until the last number used is reached (ISPF maximum 32, your installation might vary), then will wrap back to number 1. SWAP *screen name* changes the display or focus to the screen called *screen name*, if it is active. See the SCRNAME command for more information about screen names. SWAP *n*, where *n* is a number, changes the display or focus to the specified screen number, if it is active.
SWITCH (3270 | GUI)	Switches the mode of screen display between GUI and 3270.
TOP	Alias for the UP MAX command. Scrolls to the top of the data.
TSO	Allows the user to enter a TSO command, CLIST, or REXX command procedure. Do not enter the following commands after the TSO command: • LOGON, LOGOFF • ISPF, PDF, ISPSTART, and SPF • TEST • Commands that are restricted by TSO or PCF You can enter a CLIST or REXX name after the TSO command, but the following restrictions apply: • The CLIST or REXX command procedure cannot invoke the restricted commands shown in the preceding list. • Restrictions that apply to CLIST attention exits are described in *ISPF Dialog Developer's Guide and Reference*. • TERMIN command procedure statements cause unpredictable results.

Table 3. ISPF System Commands (continued)

Command	Description
TSOCMD	Displays the ISPF Command Shell panel.
TSOGUI [ON | OFF]	ON specifies that the ISPF/TSO window is resumed and all TSO line mode output and input is directed to the ISPF/TSO window. OFF specifies that the ISPF/TSO window is suspended and all fullscreen and line mode data appears in the 3270 window until TSOGUI ON command is issued.
TUTOR [panelid]	Calls the ISPTUTOR program to display specified tutorial panels. To display a particular tutorial panel, enter the TUTOR command along with the panel identifier of the desired tutorial panel as a parameter. If you issue the TUTOR command without a parameter, the general tutorial help panel (ISP00000) is displayed.
UP	Scrolls toward the top of the data.
WINDOW	Moves a pop-up that is currently displayed. If more than one pop-up is displayed on your logical screen, only the active (or most recent) pop-up will move. A pop-up can only be moved within the logical screen from which it originated. **Note:** The WINDOW command is disabled if you are running in GUI mode.
WS	Modelessly starts the command you specify, providing a seamless interface between host and workstation applications. For example, when running in GUI mode, you can enter the following command to invoke a workstation editor on a file named test.fil: `WS e.exe test.fil`
WSCON	Displays the *Initiate Workstation Connection* panel. Using this panel, you can start a workstation connection. There are some restrictions to consider if you choose to start a workstation connection with this command: • At the completion of ISPF command processing, or program, clist, or REXX exec execution, ISPF does not reprocess the panel from which the command was invoked. The panel is simply relaunched to the screen without processing, for example, the panel's)INIT section. So, if certain constructs are defined within the panel sections based on the ZGUI variable (nonblank indicating connection in GUI mode), these constructs are not defined properly until after the Enter key is pressed following the WSCON command. • When connecting to the workstation in GUI mode, the first panel displayed in GUI mode might not contain group boxes and images that are defined on the panel. After you press the Enter key, causing the panel to be reprocessed, these constructs are visible in GUI mode.

Table 3. ISPF System Commands (continued)

Command	Description
WSDISCON	Disconnects your workstation connection. There are some restrictions to consider if you choose to disconnect from a workstation with this command: • At the completion of ISPF command processing, or program, clist, or REXX exec execution, ISPF does not reprocess the panel from which the command was invoked. The panel is simply relaunched to the screen without processing, for example, the panel's)INIT section. So, if certain constructs are defined within the panel sections based on the ZGUI variable (nonblank indicating connection in GUI mode), these constructs are not defined properly until after the Enter key is pressed following the WSDISCON command. • When disconnecting from GUI mode, the name of any group boxes defined on the panel from which you issued WSDISCON, will display on the screen in 3270 mode. After you press the Enter key, causing the panel to be reprocessed, these names disappear and any panel text under the names reappears. • If in GUI mode and in split screen mode when you invoke the WSDISCON command, you are disconnected from the workstation and the screen from which you issued WSDISCON is displayed in the full 3270 emulator session without a split line, regardless of how "Always show split line" is set. The other ISPF sessions are hidden and available for display after the swap command is entered. Additional split requests cause the split line to be redisplayed, provided the "Always show split line" setting is selected. • If pop-up windows are displayed in GUI mode when the WSDISCON command is issued, those pop-up windows are suspended on the 3270 session and the panels display as fullscreen panels. If new addpops are then invoked, these new panels display as pop-up windows. • You **cannot** disconnect using the WSDISCON command when running in **batch** GUI mode. • If the CODEPAGE and CHARSET parameters were specified (on the WSCON service, the Initiate Workstation Connection panel, or the ISPSTART GUI statement) when your workstation connection was made, these values might no longer be the host code page and character set in 3270 mode following a WSDISCON command. The values returned from the terminal query are restored as the active code page and character set. If your emulator does not support code pages, the CODEPAGE and CHARSET parameter values originally specified on your ISPSTART statement are used. If these ISPSTART parameters were not specified, ENGLISH is the default specification.
ZKEYS	Displays a panel that lets you view and change the current function key variables. This command is equivalent to selecting the Global PF Key settings choice from the Function keys pull-down on the ISPF Settings panel.

Using the RETRIEVE, RETF, and RETP Commands

This section describes how to use the RETRIEVE, RETF, and RETP commands.

RETRIEVE Command

The RETRIEVE command causes the most recently entered command to be displayed on the command line. If the command recalled by RETRIEVE is longer than the current primary input field, ISPF truncates the command to the size of the primary input field for display purposes. Only the data displayed in the primary

input field is processed and stored in the command retrieval stack when you press Enter or a function key. However, the original command retains its full length in the retrieval stack.

If the current panel has no input fields, then the size of the primary input field is zero and the retrieved command is not displayed. Normal stack processing occurs, however, and the internal pointer is incremented to the next saved command. This can result in an unexpected command being recalled when RETRIEVE is issued on a subsequent panel that has input fields.

If you issue the RETRIEVE command when the stack is empty, ISPF presents you with a blank command line with the cursor in the first position. If the stack is not empty, ISPF places the cursor immediately following the retrieved command.

If you are in the process of recalling a string of commands by issuing successive RETRIEVE commands, you can cause ISPF to recycle to the top of the command retrieval stack by pressing Enter when the primary input field (normally the command line) is blank.

When you are operating in split-screen mode, one stack retains commands for all logical screens.

There are five cases for which ISPF does not retain an entered command for retrieval:

- Commands entered using attention fields, such as light pen-selectable fields or cursor-select fields.
- Commands entered through the use of function keys. This includes any portion of a compound command that results from pressing a function key. For example, if you key PAGE into the primary input field and then press the function key set to the DOWN command, only the PAGE portion of the DOWN PAGE command is retained as a single element in the retrieval stack. The entire character string entered from the primary input field in conjunction with a function key is always retained, whereas any portion of the command resulting from the function key value is not retained.
- The RETRIEVE command, if entered as a single command. If RETRIEVE is one of the commands of a chain being processed by ISPF, the entire chain is placed on the retrieval stack. However, processing of the command chain ends when ISPF interprets the RETRIEVE command and displays the next command in the stack. Any commands following RETRIEVE in the chain are not processed.

  RETRIEVE can be part of a stack element as a parameter of another command. For example, you might enter FIND RETRIEVE as a command.
- Commands entered on the COMMAND option of the DISPLAY service.
- Jump function (extended return) commands entered from a nondisplay field.

You can issue any retrieved command, as is, while it is being displayed, or you can edit the command line and then issue the modified version.

Command retrieval works on a last-in, first-out basis. For example, assume that the last three commands you have issued are PRINT, DOWN, and RIGHT, in that order. Now suppose that you want to again issue the PRINT command. Assuming that F12 is set to RETRIEVE, the sequence of operations is:

1. Press F12. RIGHT displays on the command line.
2. Press F12 again. DOWN displays on the command line.
3. Press F12 a third time. PRINT displays on the command line.

4. Press Enter.

You can also use the RETRIEVE command to check and correct errors made in keying commands. For example, suppose that you mistakenly enter PFSHOW TAYLOR. When ISPF advises you that TAYLOR is not a valid parameter, you would:
1. Press F12. PFSHOW TAYLOR displays on the command line.
2. Type over the Y with an I.
3. Press Enter.

Each ISPF session supports only one command retrieval stack, to be shared by all logical screens. The number of commands that ISPF saves for retrieval depends on:
- The size of the stack area allocated for this purpose by the installation. Refer to *ISPF Planning and Customizing* for the appropriate material on changing the size of the stack area allocated for RETRIEVE command processing.
- The lengths of the individual command lines that are saved.

As a command is entered, it goes to the top of the stack, pushing all other commands down. If there is not enough room at the bottom of the stack to hold the entire bottom command, it is dropped from the stack.

Duplicate commands are allowed in the stack, except when the command being entered is a duplicate of the command at the top of the stack. All command lines (except the RETRIEVE command) are placed in the stack as entered, regardless of validity. Actually, these commands can be any character string, up to 255 bytes each, entered from the screen's primary input field (not necessarily the ZCMD field).

Jump function commands are stored in the stack unless they are entered from a nondisplay field, regardless of whether the field is the primary input field or not.

If the RETRIEVE command is repeatedly entered until the bottom command in the stack displays, issuing the RETRIEVE command once more causes the command at the top of the stack to be displayed again. To force a return to the top of the stack, clear the command field and press Enter. Then, the next RETRIEVE command causes the command line to be set to the command at the top of the stack.

RETF Command

The forward retrieve (RETF) command recalls commands from the command retrieval stack from the oldest command in the stack towards the most recent commands in the stack. This is useful when you RETRIEVE too many times in an attempt to retrieve a specific command. RETF enables you to return to the desired command without having to cycle through the entire retrieval stack.

RETP Command

The retrieve pop-up (RETP) command causes a pop-up panel to be displayed with the last 20 commands in the command retrieval stack listed. You can select the command you want to retrieve by number. The selected command is retrieved to the command line. When using the RETP command, the following considerations apply:
1. If a command in the command retrieval stack is too long to fit in the retrieve pop-up, the last visible character of the command is changed to a > to show that some characters are not displayed. However, the entire command is retrieved to the command line when it is selected to be retrieved.
2. The default for the minimum number of characters is one, so any command entered is saved on the retrieval stack. The user has the option of setting the

value from 1–99 for the minimum number of characters to save. Therefore, if you select three characters for the minimum number to be saved in the retrieval stack and a one- or two-character command is entered, it is not added to the retrieval stack. This prevents short commands that can be easily retyped from taking up space in the retrieval stack. Changing the minimum number of characters to save in the retrieval stack does not affect commands already in the retrieval stack. This setting is saved in the variable ZRETMINL, which is saved in the user's ISPF system profile table ISPSPROF and across ISPF invocations.

3. The default for the cursor position when a command is retrieved is at the end of the command. The cursor position setting is saved in the variable ZRETPOSC, which is saved in the user's ISPF system profile table ISPSPROF and across ISPF invocations.

Using the RETURN Command

The RETURN command causes the immediate return to a primary option menu or to the display from which you entered a nested dialog. When a RETURN command is entered, the DM component takes the following action:

1. It simulates the END command on the panel that is currently displayed; that is, the DISPLAY or TBDISPL service returns a code of 8.
2. For subsequent requests, made through the DISPLAY or TBDISPL service, for display of a different panel, the panel is not displayed, and a return code of 8 is issued by the service.
3. However, when two consecutive display requests name the same panel, normal operation of the DISPLAY and TBDISPL services is restored and processing proceeds as though RETURN had not been entered. The DM component decides whether to proceed. Generally, because RETURN signals the application user's desire to end the current processing, a developer can limit processing after the RETURN is received to clean up and do final processing before returning control to the dialog element from which the function was started.
4. If two consecutive requests do not specify the same panel, processing continues in the mode described in item 2 until control is returned to a primary option menu or a nested dialog completes. Then, normal operation of the DISPLAY and TBDISPL services is restored.

It might be necessary to suspend processing of a panel temporarily so that other panels can be displayed. Issue a CONTROL DISPLAY SAVE request to save the contents and control information of the panel whose processing is to be suspended. Before resuming the processing of this panel, issue CONTROL DISPLAY RESTORE to reinstate the contents and control information for the panel. If non-ISPF screens have been displayed, issue CONTROL DISPLAY REFRESH to clear the screen.

This mode of operation continues until either a primary option menu is encountered or a nested dialog completes. If a primary option menu is encountered, it is displayed. If a nested dialog completes, the panel from which it was invoked is redisplayed. This panel is exactly as you last saw it, except that the command field is blank. In either case, this completes the action of the RETURN command.

Note: A nested dialog is one invoked from any panel by a SELECT action command. The HELP and KEYS commands invoke nested dialogs. In addition, the TSO system commands invoke nested dialogs when they are used to execute a CLIST procedure that displays panels through ISPF services.

If a dialog function needs to distinguish between END and RETURN, it can do so in one of the following ways:

- If the panel was defined using the panel definition statements, upon return from the DISPLAY or TBDISPL service, with a return code of 8, the function can examine variable ZVERB in the shared pool. It contains either END or RETURN.
- If the panel was defined using the DTL, upon return from the DISPLAY or TBDISPL service, with a return code of 8, the function can examine variable ZVERB in the shared pool. It contains either EXIT or CANCEL.
- Upon return from the SELECT service when the PANEL keyword was specified, the dialog function can examine the return code from SELECT. Return code 0 indicates that the END command was entered on the selected menu panel. Return code 4 indicates that the RETURN command was entered on the selected menu panel or on some lower-level menu.

Using the Jump Function

The jump function allows you to go directly to any valid option from the primary option menu currently in effect. Refer to *ISPF Dialog Developer's Guide and Reference* for information about coding primary option menus. To use the jump function, enter the option on the command line or in the command field of any panel, preceded by an equal sign and followed by a blank. For example:

```
Command ===> =3.1
```

takes you directly to the first suboption of option 3 on the primary option menu in effect.

The action is as follows:

- If not entered on a primary option menu, the jump function causes repeated END commands to be simulated until a primary option menu is encountered. What follows the equal sign is then used on the primary option menu, and pressing of the Enter key is simulated. The primary option menu is not displayed.
- If entered on a primary option menu, the jump function equal sign is ignored and the specified option is selected.

Unlike the RETURN command, the jump function is not affected by nested dialogs. For example, from the ISPF Edit option, you enter a HELP command to enter the tutorial. Then from the tutorial, you enter =1. This causes the tutorial to end, Edit to end, and primary option 1 to be started.

For convenience, you can enter a jump function in two other places:

- Any field that is preceded by an arrow. The arrow must consist of at least two equal signs followed by a greater-than sign (==>). Also, the arrow must immediately precede the input attribute byte.
- Any field preceded by leader dots (that is, ... or . .). ISPF looks at the three characters preceding the field; they must be either three consecutive dots or two dots separated by a blank.

The command field is the only field that can be initialized to =n by the dialog and have the jump function recognize it. Modifying the ZCMD field in the)PROC or)INIT section can affect jump function operation.

If ISPF encounters an error during jump function processing, the processing stops with the jump function in error displayed on the command line, unless that function was entered from a nondisplay field.

Because a jump request generally signals a user's desire to end the current processing, the dialog developer must limit processing to cleaning up and completing processing before returning control to the selection in the jump request. Otherwise, the dialog developer can cancel the jump request/return mode by providing two consecutive displays with the same panel name.

For compatibility with the SPF licensed program, the jump function can be entered in conjunction with the RETURN command or RETURN function key. For example, you type =2 and then press the RETURN function key rather than pressing Enter. The action is just the same as if you had typed =2 and pressed Enter.

Using the Scrolling Commands

You can use the scrolling commands if the dialog function invokes the DISPLAY service for panels with scrollable areas or scrollable dynamic areas, the table display service (TBDISPL), or the interfaces to the PDF component VIEW, BROWSE, and EDIT services. During processing of the tutorial, ISPF interprets these commands as follows:

UP (F7/19)	Same as the UP command
DOWN (F8/20)	Same as the SKIP command
LEFT (F10/22)	Same as the BACK command
RIGHT (F11/23)	Same as the Enter key (display the next page).

When scrollable data is displayed, scrolling enables you to move the screen *window* up, down, left, or right across the information. When the cursor is within a scrollable field, scrolling enables you to move left or right within the *variable data*. Only up and down scrolling is allowed for table displays and scrollable areas.

When scrolling is allowed, a scroll amount is commonly displayed at the top of the screen (line 2). This amount determines the number of lines, or columns, scrolled with each use of a scroll command. To change the scroll amount, move the cursor to the scroll field and type over the displayed amount. Valid scroll amounts are:

ZXSMIN–ZXSMAX
The minimum and maximum scroll values as defined in the configuration table. The defaults are 0–9999. Specifies the number of lines (up or down) or columns (left or right) to be scrolled.

Note: If you specify a scroll amount of **0**, no scrolling occurs.

PAGE Specifies scrolling by one page.

For scrolling purposes, a *page* is defined as the amount of information currently visible on the logical screen. Function key definition lines are not a part of the page. In split-screen mode, for example, a Browse display might have 12 lines by 80 columns of scrollable data. In this case, a scroll amount of PAGE moves the text up or down by 12 lines, or right or left by 80 columns. If the cursor is within a scrollable field, PAGE will move the text right or left the equivalent of the display field length.

DATA For up and down scrolling, specifies scrolling by one line less than a page. For left and right scrolling, it is one column less than a page. Within a scrollable field, it is one column less than the display field length.

HALF Specifies scrolling by half a page. Within a scrollable field, it is half the display field length.

MAX Specifies scrolling to the top, bottom, left margin, right margin, beginning of field or end of field, depending upon which scrolling command is used

and the current cursor position. For scrollable fields, the maximum right position is the field length minus the display length and the maximum left position is 1.

CSR Specifies scrolling based on the current position of the cursor. The line or column indicated by the cursor is moved to the top, bottom, left margin, or right margin of the screen, depending upon which scrolling command is used. If the cursor is not in the body of the data or if it is already positioned at the top, bottom, left margin, or right margin, a full-page scroll occurs.

Note: Scroll amount is not used for scrollable areas.

The current scroll amount is saved in the application profile. There are three scroll amount values: one for Browse (ZSCBR), one for Edit and View (ZSCED), and one for member lists (ZSCML). When you type over the scroll amount, the new value remains in effect until you change it again. The value MAX is an exception. Following a MAX scroll, the scroll amount reverts to its previous value.

The scroll amount field is optional. If the input field following the command field in the panel body is exactly four characters long, it is assumed to be the scroll amount field. If there Otherwise, the system variable ZSCROLLD, which can be set by the dialog, is used to determine the default scroll amount. is no scroll amount field and ZSCROLLD has not been set, the default is PAGE.

When you enter a scroll request, the variables ZSCROLLA and ZSCROLLN are set. ZSCROLLA contains the value of the scroll amount field, such as MAX or CSR. ZSCROLLN contains the number of lines or columns to scroll, computed from the value in the scroll amount field. For example, if a dialog is in split-screen mode, 12 lines are currently visible and you request DOWN HALF, ZSCROLLN contains a `6`. The system variable ZVERB contains the scroll direction (DOWN in this case). If the value of ZSCROLLA is MAX, the value of ZSCROLLN is not ignored.

You can also use any valid scroll amount as part of the scroll command. For example, type:

```
Command ===> UP 3
```

and press Enter, or type:

```
Command ===> 3
```

and press the UP function key. Either form results in a temporary, one-time override of the scroll amount.

If ISPF does not recognize the value specified on the command line as a valid scroll amount, such as PAGE, DATA, HALF, MAX, CSR, or a positive integer, the value is interpreted as a command and passed to the function in control.

Using the EXPAND Command

The expand panel displays the variable in a scrollable dynamic area. Standard up and down scrolling is supported. You can display the variable in character and hexadecimal using the following primary command. The setting will be remembered for subsequent expand processing.

HEX ON/OFF Turn hexadecimal display on and off.

Using Command Tables to Define Commands

ISPF implements system, user, site and application commands through the use of command tables.

A system command table (ISPCMDS) is distributed with ISPF in the table input library. An application can provide an application command table by including a table named *xxxx*CMDS in its table input library, where *xxxx* is a 1- to 4-character application ID. You can also add up to 3 user command tables and up to 3 site command tables to the ISPF Configuration table. This is a permanent place for your set of user-defined commands. When IBM updates the ISPF command table, you do not need to re-add your commands. By setting the Before or After option, you can search the site command tables either before or after the ISP command table. The default option is Before. If the application's table input library is defined with the LIBDEF service, the LIBDEF must be active when the SELECT service call that invokes the application is issued, and the PASSLIB parameter must be specified.

You can define an application command table using either:

- The command table utility described in the Command Table Utility (Option 3.9) section of the *ISPF User's Guide Volume II*.
- The Dialog Tag Language (DTL) and ISPF conversion utility. Refer to the *ISPF Dialog Tag Language Guide and Reference* for the tags you must use.

When a user enters a command, the DM component searches the application command table (if any), then the user command tables (if any), then the site command tables (if any), and finally the system command table, ISPCMDS. This is the default search order, which assumes the option Before for the site command tables. If you choose the option After for these tables, they are searched after ISPCMDS. If it finds the command, action is taken immediately. If it does not find the command in the application or system tables, the command is passed to the dialog, unaltered, in the command field. The dialog must then take appropriate action.

Command Table Format

A command table is an ISPF table in which each row contains the specification for one command. Each column contains a variable for the command. The variables are:

ZCTVERB Specifies the name of the command. A command name must be from 2–8 characters long and must begin with an alphabetic character. Note that the terms *command name* and *command verb* are synonymous and are used interchangeably.

ZCTTRUNC Specifies the minimum number of characters that you must enter to find a match with the command name. If this number is zero or equal to the length of the name, you must enter the entire name. This number must not be one, or be greater than the length of the name.

ZCTACT Specifies the action to be performed when the command specified in ZCTVERB is entered. Can be up to 240 characters.

ZCTDESC Contains a brief description of the purpose of the command. This variable is optional. It is not used by the DM component in processing the command, but it is displayed by the command table utility. The description is limited to 80 characters.

The dialog manager treats ZCTVERB, ZCTTRUNC, ZCTACT, and ZCTDESC as defined function variables. They are not accessible to dialogs.

The valid actions that can be performed (ZCTACT) are:

SELECT Followed by selection keywords causes the selected dialog (command, program, or menu) to be given control immediately.

ALIAS Followed by another command and any parameters allows specification of command aliases.

PASSTHRU Causes the command to be passed to the dialog instead of continuing to search the system table.

SETVERB Causes the command to be passed to the dialog with the command verb stored in ZVERB separately from the parameters. The ISPF system commands distributed with the product that have SETVERB as an action are not always passed through to the dialog. Refer to "Passing Commands to a Dialog Function" on page 98 for further discussion.

NOP Causes the command to be inactive. ISPF displays an inactive command message in this case.

Blank (no action)
Causes the table entry to be ignored. Scanning continues, searching for additional entries with the same name.

A variable name
The name begins with an ampersand and can be one of the actions described in this list. This allows dynamic specification of command action.

Additional action keywords are used to indicate system commands for which special processing is required. These are CURSOR, PRINT, PRINTG, PRINT-HI, PRINTL, PRINTLHI, SPLIT, SPLITV, SWAP, and RETRIEVE. Although these are valid actions, they are intended for use only in the system command table distributed with ISPF and are intended to be used only with the associated command verb. They are not intended for use in application command tables.

Customizing the ISPCMDS Command Table

Use the following steps to customize your ISPCMDS command table:

1. Copy the ISPCMDS into a data set concatenated before the '*.SISPTENU' data set in the ISPTLIB DD statement.
   - Name the new member using a unique prefix of up to 4 characters, for example: RSMCMDS or MOD1CMDS.
   - Allocate the copied-to data set to the ISPTABL DD card. You can use the following CLIST to do a LIBDEF against ISPTABL if you have a ISPTABL DD allocated:

     ```
     PROC 0
     ISPEXEC LIBDEF ISPTABL DATASET ID(the_dataset_name)
     WRITE &LASTCC
     END
     ```

     If your logon procedure does not allocate an ISPTABL DD card:

     ```
     PROC 0
     ALLOC F(ISPTABL) DA(the_dataset_name)
     END
     ```
2. Using option 3.9, customize this member with your new commands.

- Option 3.9 will search the ISPTLIB DD for this member.
- Option 3.9 will save (UPDATE) this customized member to the output data set pointed to by ISPTABL.

3. After you have customized this member, you can use option 3.1 or 3.4 member list to rename this member to ISPCMDS.
4. Exit ISPF.
   - This will nullify the LIBDEF on ISPTABL.
5. Re-invoke ISPF.
   - When ISPF searches the ISPTLIB DD concatenation, your customized ISPCMDS will be found first.

SELECT Action Commands Temporarily Invoke a New Dialog

A SELECT action command can be specified in a command table. The action is coded exactly the same as for the SELECT service. All SELECT keywords are valid, including NEWAPPL.

The selected dialog is started immediately when a SELECT action command is entered on the command line of any panel. This temporarily suspends the current dialog. When the selected dialog completes, the screen is refreshed and the suspended dialog resumes.

Examples of SELECT action commands:

ZCTVERB	ZCTTRUNC	ZCTACT
UPDATE	0	SELECT PGM(PQRUPDT) PARM(&ZPARM)
PREPARE	4	SELECT CMD(XPREP &ZPARM) NEWPOOL
MENU	4	SELECT PANEL(&ZPARM)

In the example, the ZCTTRUNC variable indicates that the UPDATE and MENU command names cannot be truncated. PREPARE, however, can be truncated to PREPAR, PREPA, or PREP. The functions and keywords in the ZCTACT field indicate the actions that the commands perform.

The ZPARM variable that appears in the SELECT keywords indicates that command parameters are to be substituted at that point. For example, if the following commands were entered:

```
===> UPDATE BLDG DEPT NAME
===> PREPA LOG LISTING
===> MENU PQRMENU1
```

the following SELECT actions would result:

```
SELECT  PGM(PQRUPDT) PARM(BLDG DEPT NAME)
SELECT  CMD(XPREP LOG LISTING) NEWPOOL
SELECT  PANEL(PQRMENU1)
```

ZPARM, a dummy variable, is used only to substitute user-entered parameters into SELECT action commands. It is not stored in a variable pool and is not accessible to dialogs.

Notes:

1. Take care with ACTIONs that use ZPARM, as the ISPF parser will add a matching parenthesis if one appears to be missing. Consider an entry of "SELECT CMD(%CMD &ZPARM) NEWAPPL(ISR)". If "(XYZ" is passed then the command will receive "(XYZ) NEWAPPL(ISR)" as a parameter.

2. Use of SELECT action commands can cause recursive entry into dialog functions, which the DM component allows. The dialog developer should either design functions for recursive use or display a message if a user attempts to reenter a nonrecursive function.

The ISPF DISPLAY and TBDISPL services can be used recursively. The current display environment is automatically saved whenever a SELECT action command is entered and is restored upon completion of the command.

Assigning Command Aliases

A command alias is an alternate way of expressing a command. For example, you might assign to the command UP MAX an alias of TOP to make it easier to remember and to issue. In the case of a command that includes lengthy parameters, using an alias can be a much more efficient way of entering the command. Also, using aliases can be helpful for writing dialogs in languages for which single words can meaningfully replace multiword command-parameter expressions. Normally, alias entries are used in an application command table to refer to system commands, which might or might not include parameter fields. Issuing the command or its alias causes the same result.

An alias must precede, in the command table, any reference to the command to which it refers. You can establish an alias by setting values in two command table variables. Set:

- ZCTVERB to the value you wish to use as the alias for an existing command
- ZCTACT to the keyword ALIAS followed by the command, including any parameters, for which you are establishing the alias. Thus, the value of the ZCTACT variable can be either a single-word command, such as HELP, or it can be a multipart command, such as UP MAX.

You can set the value of ZCTTRUNC in the command table to the minimum number of characters of the alias name that must be entered. For example, for the alias FORWARD, if you set ZCTTRUNC to a value of 3, issuing the first three characters (or more) has the same effect as issuing FORWARD. If you assign a value of 0 in the ZCTTRUNC field, the complete alias name must be issued.

The maximum length of the value you can specify in ZCTACT, including the keyword ALIAS, followed by a blank, and the command verb plus any parameters, is 240 characters. This leaves a maximum of 234 characters for the command, at least one blank following the command, and any parameters. ISPF interprets up to the first 8 characters in the command name. ISPF issues an error message for command names that do not contain from 2–8 characters.

Any parameters included in the ZCTACT command table field take precedence over any parameters included with that command's alias issued from a command line. Thus, if you issue a command alias that includes parameters, ISPF:

- Recognizes the command alias verb
- Ignores the parameters you specified with the alias
- Substitutes the parameters included with the command verb in ZCTACT.

If the command verb in ZCTACT does not include parameters, ISPF accepts parameters specified with the command's alias from a command line. This can be useful when a command's parameters do not fit into the 240 character spaces available in ZCTACT.

You can create a chain of command-parameter aliases in a command table as long as the result is a valid executable action. The last command verb and parameter

values that ISPF encounters in the alias chain within the command table are the ones that are executed. The command verb and the parameter values do not necessarily come from the same table entry. For example:

ZCTVERB	ZCTTRUNC	ZCTACT
EASYKEY	0	ALIAS CMD PARM1 PARM2
CMD	0	ALIAS CMD1 PARM3
CMD1	0	ALIAS CMD2

In this example, if you entered EASYKEY from a command line, the command that would ultimately be executed would be CMD2 PARM3.

Some other examples of defining alias values are:

ZCTVERB	ZCTTRUNC	ZCTACT
QUIT	0	ALIAS END
FORWARD	3	ALIAS DOWN
*TOP	0	ALIAS BACKWARD MAX
*BACKWARD	0	ALIAS UP
*ENDFILE	4	ALIAS LOW
*LOW	0	ALIAS DOWN MAX

*These four entries represent two-level chaining.

This example defines QUIT as an alias of END, FORWARD as an alias of DOWN, and so on. For example, if you enter QUIT, the system responds as though you had entered END.

Looking at the two-level chaining examples, if you enter TOP, ISPF responds as though you had entered UP MAX. This is because, at the second level when BACKWARD is replaced with UP, there is no second-level parameter to replace MAX. In the case of ENDFILE, ISPF responds as though you had entered DOWN MAX. ISPF replaces the verb LOW with DOWN and the blank parameter value with MAX.

Note: Command aliases shipped with ISPF in table ISPCMDS include TOP (UP MAX), BOTTOM (DOWN MAX), BACKWARD (UP), and FORWARD (DOWN).

Overriding System Commands

An application can override any system command simply by including the same command name in the application command table. For example:

ZCTVERB	ZCTTRUNC	ZCTACT
HELP	0	PASSTHRU
TSO	0	NOP

In this example, the dialog has overridden both the HELP and TSO commands. During ISPF processing, if you enter HELP, the command is passed to the dialog function in control, which determines the action to be taken. The action specified for the TSO command is NOP, which disables the TSO command. ISPF displays an inactive command message when a NOP action command has been processed.

Passing Commands to a Dialog Function

Any command that is not found in the application or system command table is passed, unaltered in the command field, to the dialog. This occurs regardless of whether the command was typed in the command field or entered by use of a function key or the attention field.

You can force a command to be passed to the dialog, even if the command exists in the command table, by typing a greater-than symbol (>) in front of the command.

Any command in the command table that has an action of PASSTHRU is processed as though the command were not found in the table. It is passed in the command field to the dialog.

Commands can also be passed to the dialog using the SETVERB action. This action causes the dialog manager to separate the name from the command parameters, if any. The command is stored in variable ZVERB, which is in the shared pool. The left-justified command parameters are passed in the command field to the dialog. For example:

ZCTVERB	**ZCTTRUNC**	**ZCTACT**
QUERY	0	SETVERB

The verb QUERY is stored in variable ZVERB and the character string, such as `DEPT 877` in the following examples, is passed in the command field.

The following actions produce the same results:

- Typing `QUERY DEPT 877` in the command field and pressing Enter.
- Typing `DEPT 877` in the command field and pressing a function key that has been equated to the character string `QUERY`.
- Pressing a function key that has been equated to the character string `QUERY DEPT 877`.
- Using the light pen or cursor-select key to select an attention field that contains the character string `QUERY DEPT 877`.

The following system commands, distributed with the DM component, are defined as SETVERB action commands:

END	UP
RETURN	DOWN
RFIND	LEFT
RCHANGE	RIGHT

The ZVERB variable can be used to distinguish between END and RETURN. The effect of END and RETURN on the DISPLAY service is the same because RETURN is used to simulate repeated END commands, until a primary option menu is reached.

RFIND and RCHANGE are used only by ISPF View, Browse, and Edit. Thus, these commands are not passed back to a user dialog in ZVERB.

The commands UP, DOWN, LEFT, and RIGHT are only active when a scrollable panel is displayed. Use of these commands from a nonscrollable panel results in a command is not active message.

Specifying Command Actions Dynamically

You can specify a command action dynamically (as part of function processing) by the use of a dialog variable. A variable action can be used to *share* commands, such as UP, DOWN, LEFT, and RIGHT, with the DM component. It can also be used to enable or disable commands during certain points in the dialog. Suppose, for example, an application command table includes the following entries:

ZCTVERB	ZCTTRUNC	ZCTACT
UP	0	&SCRVERT
DOWN	0	&SCRVERT

You can use the variable SCRVERT to dynamically control the action of the UP and DOWN vertical scroll commands as follows:

- If SCRVERT is set to NOP, the commands are not available.
- If SCRVERT is set to PASSTHRU, the commands are passed to the dialog.
- If SCRVERT is set to blank, command scanning continues. In this case, the system definitions for UP and DOWN in the system command table take effect.
- If SCRVERT is set to an action that is not valid, the commands are not available, as in NOP.

For this particular example, setting SCRVERT to SETVERB would have the same effect as setting it to blank, because UP and DOWN are defined in the system command table as SETVERB action commands.

If the dialog overrides or shares the use of the scroll commands, it becomes that dialog's responsibility to ensure that the commands have been redefined with an action of blank, or with SETVERB. This must be done before starting any ISPF function that requires View, Browse, Edit, and Table Display. The same rule applies to the RFIND command used by Browse and Edit and the RCHANGE command used by Edit.

Using a Function Key

Under ISPF, function keys are not automatically assigned to special functions. You equate each function key to a character string. When you press a function key, it simulates command entry. The processing is the same as if you had typed the character string in the command field and pressed the Enter key.

Note: On a 3270 display, the horizontal divider line that separates the logical screens is not considered part of either logical screen. If the cursor is placed on this horizontal divider line and a function key is pressed, the result is the same as if the ENTER key was pressed and the cursor is positioned on the active logical screen's command line.

A dialog function cannot distinguish the difference between a command entered by a function key and a command entered by typing in the command field. If the character string with which the function key is equated is longer than the screen's command field, the string is truncated without warning.

Using a Function Key

If you type information on the command line and then press a function key, the function key definition, followed by a blank, is concatenated ahead of the contents of the command field. For example, suppose F7 is equated to the character string `UP`. If you type `4` in the command field and then press F7, the results are exactly the same as if you had typed `UP 4` in the command field and pressed the Enter key.

ISPF does not require function keys for its operation. Commands can be entered in the command field of any display, including View, Browse, Edit, and Table Display. However, for ease of use, function keys are strongly recommended.

The default function key assignments distributed with ISPF for the 3x4 key pad on the right side of the keyboard are shown in Table 4. These are function keys 1–12 on a 12-key terminal or keys 13–24 on a 24-key terminal.

Table 4. Function Key Arrangement

F1	HELP
F2	SPLIT
F3	END
F4	RETURN
F5	RFIND
F6	RCHANGE
F7	UP
F8	DOWN
F9	SWAP
F10	LEFT
F11	RIGHT
F12	RETRIEVE

Function keys can be displayed at the bottom of a panel. Using the FKA or PFSHOW command, you can display either the long or short form of the keys, or remove the keys from the panel. See "ISPF System Commands" on page 72 for a complete description of how to display or remove the function keys.

For panels defined without the)PANEL section, the long and short form of the function key area is the same. If you use a)PANEL section, you can use the KEYLIST command or the **Keylist settings...** choice from the Function keys pull-down on the ISPF Settings panel to determine which keys appear in each form. For more information on Keylist settings, see the 'Settings (Option 0)' chapter of the *ISPF User's Guide Volume II*.

Long Displays the keys that appear in the short form along with all other keys you indicated should appear for the long form. The long form is the default. An example of the long form follows:

```
Option ===> ____________________________________________________________
  F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
 F10=Actions  F12=Cancel
```

Short Displays the keys that appear in the short form. An example of the short form follows:

```
Option ===> ____________________________________________________________
  F1=Help      F3=Exit     F10=Actions  F12=Cancel
```

No Removes the function key area, making the space available for the application. The keys are still active but are not displayed.

Defining Function Key Values

You can define function key values three ways:

- Use the KEYS command to display the Keylist Utility panel or the PF Key Definitions and Labels panel, then change the function keys for the panel you are on.
- Use the ZKEYS command or select the **Non-Keylist PF Key settings** choice from the Function keys pull-down on the ISPF Settings panel. Use this method to define the function keys when the)PANEL statement has been coded on the panel. All DTL-generated panels have a)PANEL statement. For more information on working with Function Keys and Keylists, see the 'Settings (Option 0)' chapter of the *ISPF User's Guide Volume II*.
- Use the KEYLIST command or select the **Keylist settings...** choice from the Function keys pull-down on the ISPF Settings panel. Use this method to define the function keys when the application panels are defined with the DTL. For more information on Keylist settings, see the 'Settings (Option 0)' chapter of the *ISPF User's Guide Volume II*.

Changing the Format of the Function Key Area

The FKA and PFSHOW commands let you change the visual display of the function keys on a panel. You can display the keys in long form or short form, or remove them completely. You can also use the PFSHOW command with the TAILOR parameter or the **Tailor function key display...** choice from the Function keys pull-down on the ISPF Settings panel to display the Tailor Function Key Definition Display panel shown in Figure 28 on page 102.

```
                                ISPF Settings
s                   Tailor Function Key Definition Display

    For all terminals:
O     Number of keys  . . 2  1. 12
                             2. 24

      Keys per line . . . 1  1. Six
                             2. Maximum possible

      Primary range . . . 1  1. Lower - 1 to 12
                             2. Upper - 13 to 24

    For terminals with 24 PF keys:
      Display set . . . . 1  1. Primary - display keys 1 to 12
                             2. Alternate - display keys 13 to 24
                             3. All - display all keys

    Press ENTER key to save changes.  Enter END to save changes and exit.
T

    Command ===> _____________________________________________________
C    F1=Help     F3=Exit    F12=Cancel
```

Figure 28. Tailor Function Key Definition Display Panel (ISPOPFA)

This panel lets you select:

- The number of function keys available for display.

  See the 'Tailor Function Key Definition Display' section of the 'Settings (Option 0)' chapter of *ISPF User's Guide Volume II* for a discussion of the rules governing the number of keys available for display.
- The number of keys per line to display in each function key definition line. System variable ZPFFMT holds the value selected.

Choice	Description	ZPFFMT value
Six	Always displays six keys per line	SIX
Maximum possible	Displays as many keys as will fit on each line.	MAX

  Note: The Maximum possible option is forced when you select the Panel display CUA mode option on the ISPF Settings panel.
- The set of function keys that are to be the primary and alternate keys. System variable ZPRIKEYS holds the value selected.

Choice	Description	ZPRIKEYS value
Lower - 1 to 12	Primary keys are 1–12	LOW
Upper - 13 to 24	Primary keys are 13–24.	UPP

  The default value is Lower - 1 to 12.
- The set of function keys on terminals with 24 function keys for which definitions are to be displayed. System variable ZPFSET holds the value selected.

Choice	Description	ZPFSET value
Primary - display keys 1 to 12	Primary set (1–12)	PRI
Alternate - display keys 13 to 24	Alternate set (13–24)	ALT
All - display all keys	All keys (1–24).	ALL

ISPF ignores these values for terminals with only 12 function keys.

Variables ZPFFMT, ZPRIKEYS, and ZPFSET are stored in the application profile pool. Dialogs can set these values directly by using the VPUT statement in a panel definition, or by using the VPUT service in a dialog function.

Dialog developers can control how the PFSHOW command behaves by using the ZPFCTL system variable. ZPFCTL is also stored in the application profile pool. Its possible values are:

USER The user can control the display of function key definition lines by using the PFSHOW command. This is the default value.

ON ISPF unconditionally displays function key definitions on all panels. Issuing PFSHOW OFF, FKA OFF, or toggling to the *no display* setting causes ISPF to issue an error message.

OFF ISPF does not display function key definition lines. If PFSHOW ON, PFSHOW TAILOR, FKA ON, or toggling to the long or short form setting of either command is issued, ISPF displays an error message.

Applications can set the ZPFCTL variable value to either USER, ON, or OFF by using the VPUT service or by using a VPUT statement with the PROFILE keyword.

Note: The ZPFCTL variable is ignored if the PFSHOW/FKA command is invoked from a panel containing a)PANEL statement or if the panel was created using DTL.

Similarly, keylists can be controlled to some degree by the application.

The ZKLUSE can be set to Y or N. If KEYLIST is ON, the value in ZKLUSE in the application profile is Y. If KEYLIST is OFF, it is N. If an application VPUTs the variable to the application profile, the keylist setting is altered.

The following variables can be used by an application to determine what keylist is being used, and where it comes from.

- ZKLNAME - If KEYLIST is ON and it is a panel with the)PANEL statement, ZKLNAME contains the name of the keylist currently being used. Otherwise it is blank.
- ZKLAPPL - If KEYLIST is ON and it is a panel with the)PANEL statement, ZKLAPPL contains the application ID that the keylist currently being used came from. Otherwise it is blank.
- ZKLTYPE - If KEYLIST is ON and it is a panel with the)PANEL statement, ZKLTYPE contains either P (private) or S (shared), depending on the keylist currently being used. Otherwise it is blank.

Function key definitions appear at the bottom of each logical screen. There can be more than one logical screen, such as when you are using the split-screen function. If the application has not issued an ADDPOP service call, ISPF displays no more than four function key definition lines on one panel. If the application has issued an ADDPOP service call and the set of keys to be displayed is primary or alternate, ISPF displays no more than two lines. If all of the keys are to be displayed, no more than four lines appear. If all of the keys will not fit on the lines, ISPF wraps the keys and truncates the last keys.

Saving Function Key Definitions

This section applies only if you created your application panels using the ISPF panel definition statements and used the ZKEYS command or selected the **Global PF Key settings** choice from the Function keys pull-down on the ISPF Settings panel. It does not apply for keys defined with the KEYLIST command or through the **Keylist settings...** choice from the Function keys pull-down on the ISPF Settings panel.

Function key definitions are kept in a set of system variables named ZPF01, ZPF02, ... ZPF24. Labels are kept in a set of system variables named ZPFL01, ZPFL02, ... ZPFL24.

When you set the **Primary range** field on the Tailor Function Key Definition Display panel to Upper - 13 to 24, variables ZPF13–ZPF24 and ZPFL13–ZPFL24 contain the *primary* PF key definitions and labels. For 24-key terminals, these definitions correspond to physical keys 13–24. For 12-key terminals, these definitions correspond to physical keys 1–12. Variables ZPF01–ZPF12 contain the *alternate* key definitions, and are meaningful only for terminals with 24 function keys.

When you set the **Primary range** field on the Tailor Function Key Definition Display panel to Lower - 1 to 12, variables ZPF01–ZPF12 and ZPFL01–ZPFL12 contain the *primary* PF key definitions and labels. For 24-key terminals, these definitions correspond to physical keys 1–12. For 12-key terminals, these definitions correspond to physical keys 1–12. Variables ZPF13–ZPF24 contain the *alternate* key definitions and are meaningful only for terminals with 24 function keys.

Current values for all 24 keys (variables ZPF01–ZPF24 and ZPFL01–ZPFL24) are kept in the application profile. Hence, unique function key definitions can be associated with different applications.

An application can provide default function key settings for a new user by providing a default profile. An application can prevent the user from changing the default function key settings by overriding the ZKEYS command. It does this by assigning the command to NOP in the application command table.

Using the Light Pen and Cursor-Select Key

ISPF permits fields on a panel to be detected with a light pen or the cursor-select key. The cursor-select key is a hardware feature on 3179, 3179G, 3180, 3278, 3279, and 3290 terminals. Only the *attention* mode of light pen selection is used.

Panel fields that are detectable by light pen or cursor selection can simulate a command entry, or give you an alternate means of selecting options from a menu. Each field must be defined as an attention field. Use an attribute character that has been defined with the ATTN(ON) keyword. The panel designer must provide the number of blank characters that are required by the terminal hardware before and after the attention attribute character.

Processing of light pen or cursor-selected fields is handled in much the same way as function key processing. The entire contents of the selected field are treated as a command and processed as though they had been typed into the command field. If the command is found in the tables, it is performed immediately. If the command is not found in the tables, it is inserted into the command field, and the entire command field is passed to the dialog. But unlike function keys, information in the command field is not concatenated with the contents of the attention field. They

should not be used on data entry panels, because any information that is typed in an input field, including command fields, is lost when the attention occurs.

Attention fields can be used on a menu to simulate option selection. The panel designer must truncate any unwanted characters resulting from an attention entry into the command field. An example is shown in Figure 29.

```
)ATTR
  $ TYPE(TEXT) ATTN(ON)
)BODY
%------------------------------ SOME MENU ------------------------------
%SELECT OPTION ===>_ZCMD                                                +
%
$   1 - BROWSE   +DISPLAY SOURCE DATA OR LISTINGS
$   2 - QUERY    +FIND OUT INFORMATION ABOUT SOMETHING

⋮

)PROC
 &ZCMD = TRUNC (&ZCMD, ' ')
 &ZSEL = TRANS (TRUNC (&ZCMD, '.')
                1, 'PGM(ISPBRO)'
                2, 'PANEL(XYZ)'


⋮
```

Figure 29. Use of Light Pen Attribute

In Figure 29 a light pen or cursor-selection of the first option would place the character string `1 – BROWSE` in the ZCMD field and simulate the Enter key. In the)PROC section, the contents of the ZCMD field are truncated at the first blank before the ZSEL variable is set, based on a translation of the ZCMD field.

Panels that are shipped with the ISPF product do not contain the ATTN(ON) keyword in the attribute section. If light pen or cursor selection is used, it is the user's responsibility to add the ATTN(ON) keyword to the attribute section of the desired panel. Refer to the *ISPF Dialog Developer's Guide and Reference* for complete descriptions of the various panel sections.

How Program Access (PA) Keys Affect ISPF Operation

The two Program Access (PA) keys are defined as follows. These definitions cannot be changed.

ATTENTION (PA1)
: Normally, you should not use this key while you are in ISPF full-screen mode. The text following discusses exceptions.

RESHOW (PA2)
: Redisplays the contents of the screen. PA2 can be useful if you have pressed the ERASE INPUT or CLEAR key accidentally or have typed unwanted information but not yet pressed the Enter key or a function key.

Generally, PA1 is used to terminate TSO commands or CLISTs running under ISPF. However, some TSO commands and CLISTs process PA1 in their own way.

Notes:

1. If you are running in GUI mode, you must switch back to your host session to process PA1.

2. If you are running in GUI mode, you must press Alt-Home (that is, hold down the Alt key and press the Home key) to process PA2 from the GUI display.

Restrictions that apply to CLIST attention exits are described in the *ISPF Dialog Developer's Guide and Reference*. Also, ISPF should not be started from a CLIST that contains an attention exit because results are unpredictable.

If PA1 is pressed while ISPF is in full-screen mode after the keyboard has been unlocked, it is treated as a RESHOW request. If PA1 is pressed again, the current function is terminated and either the primary option menu or a top-level selection panel supplied by the dialog developer is displayed.

When an ISPF function is running, if the RESET key is pressed to unlock the keyboard and PA1 is pressed, ISPF attempts to terminate the current function and redisplay the primary option menu. The attempt might not always be successful; for example, if there is an error in MVS allocation, the attempt fails. A failure might cause unpredictable results such as waits, loops, abends, or incorrect and unrelated error messages.

AUTOTYPE - Automatic Data Set Name and Member Name Completion

The AUTOTYPE function is not available on all ISPF panels. It works only on panels that are specifically written to understand it.

If you assign the value of AUTOTYPE to a function key, you can type a partial name into a library, member, or data set name field, then press the function key to have ISPF complete the name for you.

AUTOTYPE automatically searches the catalog or PDS directory to find names that match what you entered. You can even type a pattern to limit the names that AUTOTYPE will return. AUTOTYPE works only on panels that have been enabled to use the function. You can also enable your own applications to use AUTOTYPE (see "Enabling Applications to Use AUTOTYPE" on page 108).

If you are using a terminal emulator, you can assign an easily reachable key to the function key that invokes AUTOTYPE. For example, you can use a control key combination or any other key or combination that is within easy reach. You can also use the function key directly.

Within ISPF, AUTOTYPE is enabled for the following panels:

- Edit, Browse, and View (options 1 and 2, including recursive edit/browse/view, copy, replace and move panels).
- Library Utility panels (option 3.1)
- Data Set Utility panels (option 3.2, including Rename)
- Move/Copy (option 3.3)
- Data Set List entry panel (options 3.4)
- Reset ISPF Statistics (option 3.5)
- Hardcopy Utility (option 3.6)
- Download/Upload Data Set To/From Workstation (options 3.7.2)
- SuperC Compare (options 3.12 and 3.13 in all fields)
- SuperC Search (options 3.14 and 3.15, all fields)
- SCLM View and Edit (options 10.1 and 10.2)
- SCLM Library Utility (option 10.3.1)

- Sublibrary Management (option 10.3.2)
- SCLM Migration Utility (option 10.3.3)
- SCLM Delete Group Utility (option 10.3.9)
- SCLM Build and Promote (options 10.4 and 10.5)
- Preprocessed panel utility (ISPPREP)
- Dialog tag language compiler (ISPDTLC)

On panels that are not enabled for AUTOTYPE, pressing the AUTOTYPE key is the same as pressing ENTER. The variable ZVERB is set to the value 'AUTOTYPE'.

How to Use AUTOTYPE

1. Type a partial name (zero or more characters) into a **Library** field (project, group, type, or member) or the **Other Data Set Name** field.
2. Press the function key that has been set to AUTOTYPE. ISPF sets the field to the correct value.
3. If you immediately press the function key again, ISPF retrieves the next data set or member name. Up to 100 data set names and 700 member names can be retrieved.

Rules for Specifying the 'Other Data Set Name' Field

The prefix or pattern you specify is that which is to the left of the cursor. For example, if the field is 'CLIST(ABC)', with the cursor under the letter 'S', then the pattern used is 'CLI'. For more information, see "Cursor Position Sensitivity" on page 108.

- If the content of the **Data Set Name** field does not begin with a quote, your TSO prefix is added. If the field does begin with a quote, no prefix is added. Unquoted data set names are not processed if you do not have a TSO prefix (except for on the Data Set List Utility panel).
- The pattern can be any pattern similar to what you use in your data set list (except that you don't have to specify your TSP prefix as described above). Trailing wildcards are automatically added. For example, in a **Data Set Name** field, typing 'CHR' will result in a pattern of *prefix*.CHR*.** when searching the catalog.
- If you include a left parenthesis, followed optionally by a member name or pattern, the data set is assumed to be a PDS and the member name is returned. For example 'CLIST(XY' would search *prefix*.CLIST for members matching the pattern *XY**. A trailing * is always added to the member name to create a pattern.

Rules for Library Fields - Project, Group, Type, Member

- If the cursor is in the **Project** field, the other fields are not used as part of the data set name search and are erased.
- If the cursor is in a **Group** field, the project name and type name (if any) are added to create the search pattern. Each group name is used only once, even if there are many types in that group. As each group name is displayed, the first type name found for that project.group combination is also retrieved. The member name, if any, is not used and is erased.
- If the cursor is in the **Type** field, the project and first group name are used to create the pattern. The **Type** field is updated and the member name is erased.
- If the cursor is in the **Member** field, the project, first group, and type are used as the data set name. The second, third, and fourth groups are not used.

Cursor Position Sensitivity

The pattern or prefix used to search for names is only that which is to the left of the cursor. In this way you can refine your search simply by moving the cursor.

For example; suppose you have one hundred data sets called 'SYS1.A234.RGG.*' and you plan to use one named 'SYS1.A234.RGG.DBD0223.L422.FEB0299.TERRA'. You could type 'SYS1.A234.RGG' and press the AUTOTYPE key. That might return 'SYS1.A234.RGG.DBD0211.X331.AUG0599.FIRMA'. You can refine the next value returned by typing a '2' over the first '1' in 'DB0211' and then pressing the AUTOTYPE key again. This will use the new pattern and get you closer to the desired value.

Restrictions

AUTOTYPE only retrieves cataloged alias names. It will not retrieve generation data group or generation data set names. AUTOTYPE does not use the **Volume** field on any panel. It sets the **Volume** field associated with the current data set name field to blank.

AUTOTYPE does not use any ISPF name change exits or data set list retrieval exits.

AUTOTYPE retrieves a maximum or 100 data sets and 700 member names before cycling through the list from the beginning.

Enabling Applications to Use AUTOTYPE

You can enable applications to use AUTOTYPE by making some minor panel modifications as follows:

1. At the beginning of the)REINIT section, add the following lines. Make sure the subsequent line in the)REINIT section starts in column 1 so that it does not become part of the IF clause you have inserted.

```
IF (&ZNXTMSG='ISRT') .CSRPOS = &ZCSRP
                     .CURSOR = &ZCSRV
```

2. At the end of the)REINIT section add the following line in column 1.

```
REFRESH (*)
```

3. At the beginning of the)PROC section add the following lines. Make sure the subsequent line in the)PROC section starts in column 1 so that it does not become part of the IF clause you have inserted. If there is a line that says: `.RET = OFF` in the)PROC section, it should go before these lines.

```
&ZCSRV = .CURSOR
&ZCSRP = .CSRPOS
&ZNAMES='ZCSRV ZCSRP PRJ1 LIB1 LIB2 LIB3 LIB4 TYP1 MEM DSN ZCMD
PANEXIT ( (ZNAMES) , LOAD,ISRAUTOT)
IF (&ZNXTMSG='ISRT') EXIT
```

   Modify the line that assigns the variable &ZNAMES. This assignment contains a list of variable names on the panel. They must all be specified in order. Use an asterisk (*) for names that are not relevant for your panel.

The values in the &ZNAMES variable are:

1. The variable containing the Cursor field name
2. The variable containing the cursor offset
3. The name of the Project variable on the panel
4. The name of the first Group variable.
5. The name of the second Group variable

6. The name of the third Group variable
7. The name of the fourth Group variable
8. The name of the Type variable
9. The name of the Member variable
10. The name of the Other Data Set Name variable
11. The name of the command line variable (clears the command line)

The cursor and name variables (described here as ZCSRV, ZCSRP, and ZNAMES) can have any names you choose but they must match the names used in the)INIT section and the PANEXIT statement in the)PROC section.

If a name references a read-only field, add a dash to the end of the name. If you need to limit the size of the returned name, you can append the maximum length, after a period, to the name; for example, `ODSN.44`. You can disable member searches for a data set name field by adding a percent sign to the end of the field name; for example, `ODSN.44%` or `ODSN%`.

Panels defined in Dialog Tag Language (DTL) can be enabled for AUTOTYPE through DTL keywords. See the *ISPF Dialog Tag Language Guide and Reference* for more information.

Chapter 5. Libraries and Data Sets

An ISPF library is a cataloged partitioned data set or a partitioned data set extended (PDSE). The PDSE is a data set type introduced in the Data Facility Product Version 3.2 (DFP V3.2). See "Partitioned Data Set Extended (PDSE)" on page 135 for more information.

The ISPF library has a three-level name consisting of a project, group, and type. An optional library member name can also be included. A member consists of programming code, data, or text.

ISPF displays library names on line 1 of a data display, such as the member list shown in Figure 32 on page 119. Each library generally contains members with the same type of information.

Before you can create and use a new ISPF library or data set, you must allocate it using option A of the Data Set utility (option 3.2). The following section explains how to name the ISPF library or data set. See the section on the Data Set Utility (Option 3.2) in the *ISPF User's Guide Volume II* for step-by-step instructions on allocating data sets.

Naming ISPF Libraries and Data Sets

On data entry panels that require a library or other data set name, such as the Data Set Utility (option 3.2) and Edit Entry (option 2) panels, two groups of fields are provided: one for entering an ISPF library name and one for entering another partitioned or sequential data set name. The next two sections explain these two groups of fields.

ISPF Library Names

To name an ISPF library, you must specify at least a project, group, and type. For example:

```
Project  . . ISPFPROJ
Group  . . . TEST
Type . . . . PLI
```

Project The common identifier for all ISPF libraries belonging to the same programming project. This name must be your user ID unless you are using a specific project name that has been predefined in the MVS master catalog.

Group The identifier for a particular set of ISPF libraries, that is, the level of the libraries within the library hierarchy. For example, the group name of your private library could be PRIVATE or perhaps your first name, such as Joe in the example in Figure 30 on page 115.

Type The identifier for the type of information in the ISPF library, such as PL/I, SCRIPT, or PANELS.

Standard ISPF Naming Conventions

Each component of the library name can be up to 8 alphanumeric or national characters; the first one must be alphabetic. This conforms to standard TSO data set naming conventions. For convenience, any cataloged data set (sequential or partitioned) with a three-level name can be entered in the Project, Group, and Type

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fields, with one level of the name in each field. If a cataloged data set with four or more levels is to be entered, multiple levels of the name may be entered in each field, with each level being separated by a period.

If both a library and a data set name are specified on the same panel, the data set name takes priority. Therefore, to specify a library, leave the Data Set Name field blank.

When the library identification appears in a title line or message, the project name, group name, and type name are separated with periods. A member name, if applicable, is enclosed in parentheses. For example:

```
PROJECT.GROUP.TYPE(MEMBER)
```

On most data entry panels that allow a library name to be specified, a Member field is available:

```
Member  . . . PROJ1
```

Member

The name of an ISPF library or other partitioned data set member. Leaving this field blank or entering a pattern causes ISPF to display a member list. See "Displaying Member Lists" on page 117 for more information.

A *pattern* is a partial member name that uses either an * (asterisk) or % (percent sign) as place holders:

- A * symbol represents a string of characters
- A % symbol represents only 1 character

ISPF matches the pattern to any like member names in the specified data set.

The ISPF library's project, group, and type must always accompany the member name, if entered. If you try to edit a member that does not exist, ISPF provides an Edit display screen with a blank data area.

Member names entered in the Member field or those enclosed in parentheses and entered in the Data Set Name field must follow standard ISPF naming conventions.

If you have a partitioned data set with members whose names do not follow ISPF naming conventions, ISPF allows limited processing, as follows:

- View (option 1) allows any character string as a member name in either the Member or Data Set Name field and attempts to View or Browse the specified member.
- Edit (option 2) allows an *existing* member with a nonstandard member name to be edited. You cannot create a member with a nonstandard member name.

ISPF cannot process member names that begin with a blank or have embedded blanks which can cause unpredictable results. Also, ISPF cannot process member names that include special characters, such as an ampersand (&). CLIST processing in both Foreground (option 4) and Batch (option 5) can result in a run-time error.

Other Partitioned or Sequential Data Set Names

You can use the following field to specify any partitioned or sequential data set:

```
Other Partitioned or Sequential Data Set:
   Data Set Name . . .
```

Data Set Name

Any fully qualified data set name, such as:

```
Data Set Name . . . 'USERID.SYS1.ASM'
```

You can include either a TSO user prefix or user ID as the first-level qualifier of the data set name. If you omit the single quotes and if you have created a TSO user prefix, that prefix is automatically added to the beginning of the data set name. If you omit the single quotes and if you do not have a TSO user prefix, no prefix is added, and the name is used exactly as it appears.

If you include your user prefix or user ID, enclose the data set name with apostrophes. If you include the apostrophe at the beginning of the data set name but omit the one at the end, ISPF inserts it for you.

Note: ISPF does not support multivolume data sets or partitioned data sets with record format FBS or VBS.

For partitioned data sets, a member name enclosed in parentheses can follow the data set name. For example:

```
Data Set Name . . . 'SYS1.PROCLIB(ASMHC)'
```

If you include the parenthesis at the beginning of the member name but omit the one at the end, ISPF inserts it for you.

When you omit the member name and parentheses or use a pattern ISPF displays a member list. See “Displaying Member Lists” on page 117 for more information.

You can refer to generation data sets by using a signed or unsigned number in place of a member name in the Data Set Name field only. For example:

```
Data Set Name . . . 'gds.test(0)'
```

This example refers to the most recently allocated data set in the generation data group. Minus numbers refer to previously allocated data sets; positive refer to unallocated.

Note: For Edit, Browse, and View, a VSAM data set can be specified if the ISPF Configuration Table enables VSAM processing.

Volume Serials

Along with a data set name, you can optionally specify a volume serial. If you do, the system catalog is not used. For example:

```
Volume Serial . . . ______    (If not cataloged)
```

Volume Serial

A real DASD volume or a virtual volume residing on an IBM 3850 Mass Storage System. To access 3850 virtual volumes, you need MOUNT authority, which is acquired through the TSO ACCOUNT command or the RACF TSO AUTH CLASS command.

Library Concatenation

Whenever the first Group field is accompanied by three additional fields horizontally across the screen, you can enter a *library concatenation sequence*, which is a series of group names chained together. ISPF searches these groups in the sequence that you enter them.

You can concatenate libraries of the same type, but only libraries that belong to the same project. You will usually concatenate the lowest-level library ahead of the next higher-level library, and so on, in bottom-to-top order. Therefore, concatenation is usually most effective if this search sequence is the same as the library hierarchy.

For example, new library members or members undergoing changes generally reside in libraries used by program developers. A test library may contain members that have been unit tested and are ready for integration test. A master library might contain fully tested members that correspond to a previously released version of the program.

Concatenated libraries must have consistent record formats and logical record lengths. You can use concatenation with the following ISPF functions:
- Viewing
- Browsing
- Editing
- Selecting Library Utility (option 3.1) functions:
  - Print index or complete data set
  - Browse, delete, edit, print, rename, or view members
  - Compress data set.
- Copying data sets or members
- Compiling
- Assembling
- link-editing
- SCRIPT/VS processing.

Note: You can also use additional input libraries for compilations and assemblies.

Figure 30 on page 115 shows a sample three-level hierarchy consisting of a set of master libraries, a set of test libraries, and three sets of private development libraries identified by user ID. Using this hierarchy, a typical concatenation sequence for a project of ISPFPROJ, a type of DATA, and a member PGM1 is:

```
ISPF Library:
   Project . . . ISPFPROJ
   Group . . . . JOE      . . . TEST____ . . . MASTER__
   Type  . . . . DATA
   Member  . . . PGM1____
```

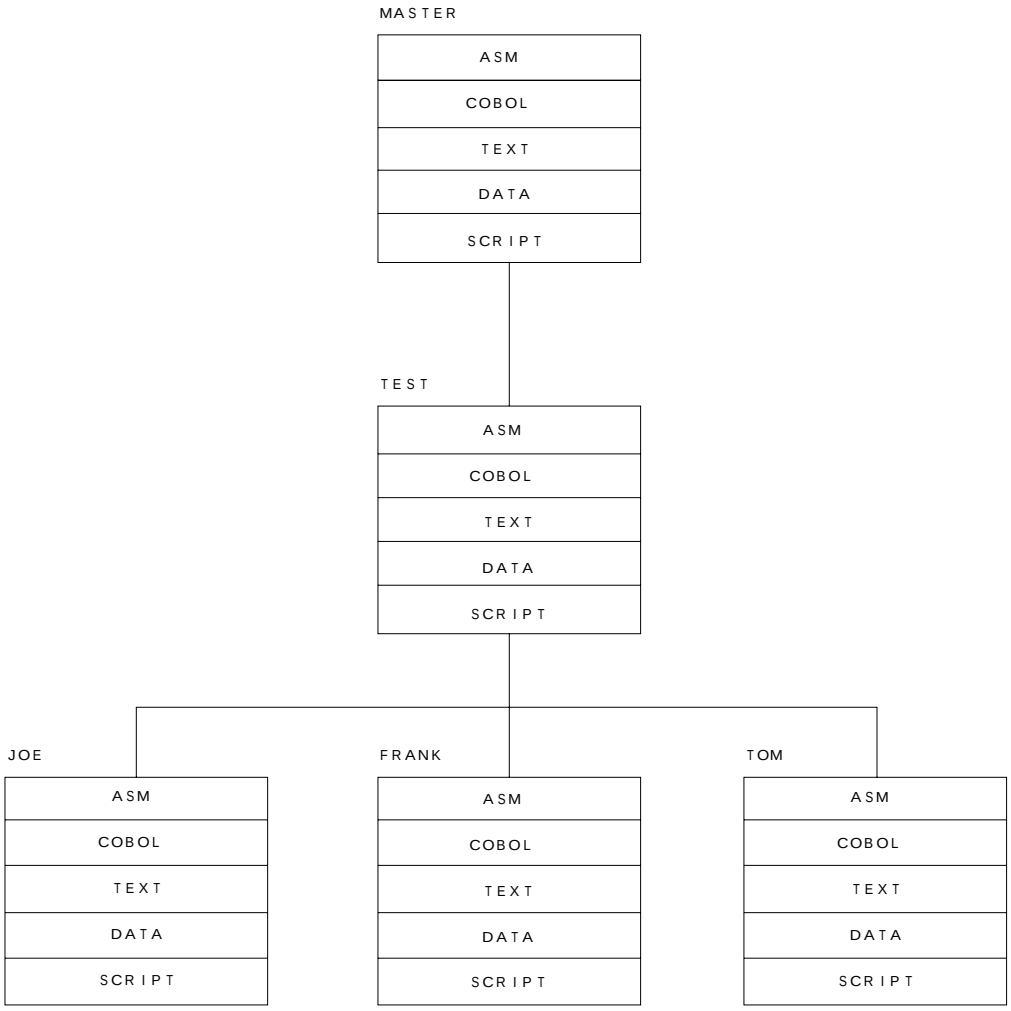

Figure 30. Hierarchy of ISPF Libraries

In this example, the search for member PGM1 goes through libraries:

```
ISPFPROJ.JOE.DATA
ISPFPROJ.TEST.DATA
ISPFPROJ.MASTER.DATA
```

Concatenation during Editing

Using concatenation during editing provides a way to copy members to your development library. Use the concatenation sequence to search the libraries for the member to edit. The edited member is saved in your development library, the first library in the concatenation sequence, while the unchanged version remains in the test or master library. When the new version is fully tested, you can use the Move/Copy utility (option 3.3) to:

- Move the new version to a higher-level library.

Concatenation during Language Processing

The purpose of concatenation during language processing is to:

- Help you include source segments in their proper order when using INCLUDE or COPY statements or when using SCRIPT imbed controls

- Allow debugging of new or changed programs without altering the contents of the test or master libraries.

The output from a compilation or assembly (an object module) or from a link-edit (a load module) is stored in the lowest-level OBJ or LOAD library, the first library in the concatenation sequence.

Using Member Selection Lists

A *member selection list*, also called a member list, is initially an alphabetic list of the members of an ISPF library or TSO partitioned data set. Table 5 provides a quick reference to the primary options that display member lists and their differences. In the Type of Selection column, "Single" means that ISPF processes only the line command that is the closest to the top of the list, ignoring all others. "Multiple" means that you can enter more than one line command simultaneously. The numbers in parentheses refer to notes following the table. See "Member Selection List Commands" on page 124 for more information about the line commands shown in the table.

Table 5. Member Selection List Differences

Primary Options	Type of Selection	Valid Line Commands	Prompt Field Available
View (1)	Single	S,V (4)	No
Browse (1)	Single	S,B (4)	No
Edit (2)	Single	S,E (4)	No
Library (3.1)	Multiple	B,C,D,E,G,M,P,R T,V,W	Yes
Move/Copy (3.3)	Multiple	B,S (1)	Yes
Data Set List (3.4)	Multiple	B,C,D,E,G,M,P,R T,V,W (2)	Yes
Reset (3.5)	Multiple	S	No
Convert (3.10)	Multiple	S	Yes
SuperC (3.12)	Multiple	S	No (3)
SuperCE (3.13)	Multiple	S	No (3)
Search-For (3.14)	Multiple	S	No
Foreground (4)	Single	S	No
Batch (5)	Single	S	No
Workplace (11)	Multiple	B,C,D,E,G,P MO,R,S,T,V,W	No

Notes:

1. For the Move/Copy utility, B (browse member) enables you to browse members of an ISPF library or another partitioned data set before moving or copying them without having to use browse on another panel. Then, use S (select) to select the member or members to move or copy. See "Line Commands for the Move/Copy Utility" on page 130 for more information.
2. When you select M (display member list) line command on a data set list, you can use B (browse member), D (delete member), E (edit member), P (print member), R (rename member), and V (view member). You can also enter TSO commands, CLISTs, and REXX EXECs.

   S (select) is valid also, but only when the B, CO, E, MO, RS, or V line commands are used on a data set list.

3. Instead of a Prompt field, this member list has an OLDMEM field, which you can use to enter the name of a member in the old data set. For more information about this field, see the section on SuperC Member Lists in the SuperC Utility (Option 3.12) chapter of the *ISPF User's Guide Volume II*.
4. For your convenience ISPF supports E as a select character from Edit member lists in addition to S and point-and-shoot selection. Similarly, V is supported from View member lists, and B is supported from Browse member lists.
5. When multiple members are selected from a member list that supports multiple selection and all members have been processed, the member list is scrolled such that the last member processed is positioned to the top of the member list display.

Displaying Member Lists

For each of the primary options listed in the preceding table, except Data Set List (option 3.4), you can display a member list by:

- Leaving the Member field blank for an ISPF library
- Omitting the member name from the name of another partitioned data set
- Entering a pattern as the member name.

  You can use a combination of asterisks and percent signs in the same pattern. However, the pattern, including the asterisks and percent signs, can contain no more than 8 characters. For example, entering the following pattern in the Member field:

  ```
  Member  . . . *prof___
  ```

  could display this member list:

  ```
  ISFPROF
  ISPPROF
  ISPSPROF
  ISRPROF
  LOCPROF
  SUPCPROF
  ```

When using the Data Set List utility (option 3.4), you can display a member list by:

- Entering the M (display member list) line command
- Entering the V (view), B (browse), or E (edit) line command and then using one of the methods described in the preceding list. This applies only if you are editing or browsing members of a partitioned data set.
- Entering the CO (copy) line command
- Entering the MO (move) line command
- Entering the RS (reset) line command.

On any member list, PF10 and PF11 toggle between two different views of the member list data.

Notes:

1. The column headers on a member list display (with the exception of Prompt) are point-and-shoot sort fields.
2. If you enter a slash in the line command field, the Member List Commands pop-up window shown in Figure 31 is displayed so that you can select the command you want to use.
3. The line command field is a point-and-shoot field. If you select the line command field beside a member name, the Member List Commands pop-up window shown in Figure 31 is displayed so that you can select the command you want to use.

4. Member list count fields show an accurate count when the number of members in a PDS or PDSE is less than 100 000. The row value will be truncated after member 99 999 and the total value will be truncated on display of the list if more than 99 999 members exist.

```
  Menu  Functions  Confirm  Utilities  Help
_ ┌──────────────────────────────────────────────┐ ──────────────────────
B │             Action for Member FILEMDB2       │     Row 00001 of 00047
  │                                              │  TTR     AC   AM   RM
/ │ Member Action                                │ 004F1B   01    31  ANY
_ │ __  1.  Edit              8.  Copy           │ 004F1B   01    31  ANY
_ │     2.  View              9.  Reset          │ 004F1B   01    31  ANY
_ │     3.  Browse            10. Open   Edit    │ 004F1B   01    31  ANY
_ │     4.  Delete            11. Submit         │ 004F1B   01    31  ANY
_ │     5.  Rename            12. TSO Cmd        │ 006E04   01    31  ANY
_ │     6.  Print             13. WS Cmd         │ 004F1B   01    31  ANY
_ │     7.  Move              14. Select BROWSE  │ 004F1B   01    31  ANY
_ │                                              │ 004F1B   01    31  ANY
_ │ Prompt Action . . ________  (For prompt field) │ 00000C   00    31  ANY
_ │                                              │ 001F15   01    31  ANY
_ │ Select a choice and press ENTER to continue  │ 001D05   01    31  ANY
_ │  F1=Help         F2=Split        F3=Exit     │ 006B05   01    31  ANY
_ │  F7=Backward     F8=Forward      F9=Swap     │ 001D0D   01    31  ANY
_ └──────────────────────────────────────────────┘ 006D0A   01    31  ANY
_
_________ FMNMODT                            0000F398  001E06   01    31  ANY
_________ FMNMODTR                           00000500  00201B   01    31  ANY
Command ===>                                                Scroll ===> PAGE
 F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
F10=Left   F11=Right  F12=Cancel
```

Figure 31. Member List Commands Pop-Up Window (ISRCMLEP)

Ending Member Lists

With two exceptions, you can end a member list by entering END (F15) or using = (the jump function) to go to another option. For the two exceptions, SuperC and Search-For member lists, enter RETURN (F16), CANCEL, or =. On these member lists, the END command processes your selections.

ISPF Member Statistics

On member lists, column headings appear in the national language. The information shown under the column headings contains the ISPF statistics generated for each member. You can print these statistics using option X (print index listing) of the Library utility (option 3.1) or option P (print data set list) of the Data Set List utility (option 3.4). You can also use the SAVE command to write a member list or data set list to the ISPF list data set or to a sequential data set. The statistics are displayed next to each member name.

Figure 32 on page 119 shows an example of a member list with statistics and the 1-character line command field to the left of the member names.

```
  Menu  Functions  Confirm  Utilities  Help
 ------------------------------------------------------------------------------
 LIBRARY          USERID.EXEC                                Row 00001 of 00146
    Name     Prompt          Size    Created           Changed            ID
 _ ALLOCEXT                    5   2002/07/25   2002/07/25 16:28:48    USERID
 _ AMBLIST                     7   2001/01/04   2001/09/11 12:02:41    USERID
 _ AOPST                      10   2002/05/27   2002/05/27 10:38:15    USERID
 _ APCTOOLS                   20   2002/11/29   2003/01/21 09:59:50    USERID
 _ APCTOOLX                  193   2002/11/29   2003/01/21 10:16:42    USERID
 _ APCT2AZ                  2610   2002/11/29   2003/01/21 10:23:24    USERID
 _ APPLT1                      4   2002/05/22   2002/05/22 09:32:20    USERID
 _ APPLT2                      8   2002/05/22   2002/05/22 09:32:49    USERID
 _ APPLT3                      4   2002/05/22   2002/05/22 09:28:59    USERID
 _ ASMPROG1                    3   2002/01/23   2002/01/23 12:41:02    USERID
 _ BATCHCMP                    4   2002/02/21   2002/02/21 13:04:48    USERID
 _ CLEDIT                      3   2002/06/11   2002/06/11 09:31:02    USERID
 _ CMSED                      39   2002/12/06   2002/12/06 14:10:55    USERID
 _ COMP                       10   2002/10/09   2002/10/09 15:14:44    USERID
 _ CRZDIFF                    58   2002/11/18   2002/11/18 13:39:48    USERID
 _ CRZDISP                    14   2002/11/14   2002/11/14 15:02:03    USERID
 _ CRZLOAD                   105   2002/11/13   2002/11/18 14:30:48    USERID
 Command ===> ____________________________________________ Scroll ===> PAGE
  F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
 F10=Left   F11=Right  F12=Cancel
```

Figure 32. Member List Display (ISRUDMM)

If you want to see all of the statistics, you can scroll the screen either right or left by using PF keys 10 and 11. If you scroll right in this example, the screen looks like the one shown in Figure 33. Pressing either key repeatedly results in recycling of the screens.

```
  Menu  Functions  Confirm  Utilities  Help
 ------------------------------------------------------------------------------
 LIBRARY          USERID.EXEC                                Row 00001 of 00146
    Name     Prompt          Size     Init       Mod       VV MM          ID
 _ ALLOCEXT                    5        1         0       01.04        USERID
 _ AMBLIST                     7        7         0       01.08        USERID
 _ AOPST                      10       10         0       01.01        USERID
 _ APCTOOLS                   20       19         0       01.03        USERID
 _ APCTOOLX                  193      212         0       01.04        USERID
 _ APCT2AZ                  2610     2647         0       01.16        USERID
 _ APPLT1                      4        3         0       01.02        USERID
 _ APPLT2                      8        5         0       01.03        USERID
 _ APPLT3                      4        4         0       01.00        USERID
 _ ASMPROG1                    3        1         0       01.17        USERID
 _ BATCHCMP                    4        3         0       01.03        USERID
 _ CLEDIT                      3        2         0       01.01        USERID
 _ CMSED                      39       37         0       01.03        USERID
 _ COMP                       10       10         0       01.00        USERID
 _ CRZDIFF                    58       12         0       01.02        USERID
 _ CRZDISP                    14       14         0       01.01        USERID
 _ CRZLOAD                   105       57         0       01.15        USERID
 Command ===> ____________________________________________ Scroll ===> PAGE
  F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
 F10=Left   F11=Right  F12=Cancel
```

Figure 33. Member List Display cont. (ISRUDMM)

Member List Display Panel Action Bar

The Member List Display panel action bar choices function as follows:

Menu See the chapter on the Primary Option Menu in the *ISPF User's Guide Volume II* for information about the Menu pull-down.

Functions

The Functions pull-down offers the following choices:

1 **Save List**. Saves the member list into the list data set.

2 **Change Colors...** Displays the Member List Color Change Utility panel (Figure 34) to allow you to change one or more of the Member List Field Attributes and press Enter to see the effect immediately. Clearing a field or selecting the Defaults field restores defaults.

Note: You can also display this panel by typing `MLC` on the Command line and pressing Enter.

```
                      Member List Color Change Utility

 Change one or more of the Member List Field Attributes and press Enter
 to see the effect immediately.  Clearing a field restores defaults.

 Field:              Color:       Intens:      Hilite:        Defaults:
 Member Name . . . . BLUE   . . . LOW    . . . NONE          Blue
 Member Stats  . . . GREEN  . . . LOW    . . . NONE          Green
 Prompt field  . . . TURQ   . . . HIGH   . . . NONE          Turq

 _ Use ISPF Settings input field pad for member selection field

 -------------------------------- Example -----------------------------------

LIBRARY           ISR.V4R2M0.ISRPENU                        Row 00001 of 00003
   Name     Prompt         Size      Created          Changed           ID
_ ISRBRO01 /                231     1993/03/22    1995/05/31 08:53    HEATHER
_ ISREDM01 *Reset           207     1990/02/13    1994/01/25 13:14    EMILY
_ ISRUDLP  *Copied          123     1989/02/03    1994/01/25 13:14    X657188
  **End**

Command ===> ____________________________________________________________  Defaults
 F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
F12=Cancel
```

Figure 34. Member List Color Change Utility Panel (ISRMLCP)

3 **Initial Sort View...** Displays the Member List Sort Field View panel (Figure 35 on page 121) to enable you to select the member list field to be sorted on, before the display of an enhanced member list. Member Name is the default View. Some other sort views that you can choose are:

- RECFM=BLK sets the initial view for blocked (FB,VB,...) data set formats.
- RECFM=U sets the initial view for unformatted (Load,...) data set formats.
- Any of the following conditions result in a default sort view on member name.
  - Library field selected as initial sort view and member list is based on a single data set.
  - Created or Alias selected as initial sort view and extended command member list.

– A member name is given as input to member list action.

Note: You can also display this panel by typing `MLS` on the Command line and pressing Enter.

```
  Menu  Functions  Confirm  Utilities  Help
_ ┌──────────────────────────────────────┐ ──────────────────────────────────
  │  Enhanced Member List Initial Sort   │              Row 00001 of 00047
  │                                      │  Size      TTR     AC   AM   RM
_ │ RECFM=BLK          RECFM=U           │ 0133AC0   004F1B   01    31  ANY
_ │ 1  1.  Name        1  1.  Name       │ 0133AC0   004F1B   01    31  ANY
_ │    2.  Library        2.  Library    │ 0133AC0   004F1B   01    31  ANY
_ │    3.  VV             3.  Size       │ 0133AC0   004F1B   01    31  ANY
_ │    4.  MM             4.  TTR        │ 0133AC0   004F1B   01    31  ANY
_ │    5.  Created        5.  Alias      │ 0002A20   006E04   01    31  ANY
_ │    6.  Changed        6.  AC         │ 0133AC0   004F1B   01    31  ANY
_ │    7.  Size           7.  AM         │ 0133AC0   004F1B   01    31  ANY
_ │    8.  Initial        8.  RM         │ 0133AC0   004F1B   01    31  ANY
_ │    9.  MOD            9.  Attr       │ 002C4A8   00000C   00    31  ANY
_ │    10. Userid         10. SSI        │ 0000200   001F15   01    31  ANY
_ │                                      │ 0000BD0   001D05   01    31  ANY
_ │ Select an initial sort field view    │ 0010390   006B05   01    31  ANY
_ │ for Enhanced member lists.           │ 000BCF0   001D0D   01    31  ANY
_ │  F1=Help      F2=Split     F3=Exit   │ 0004D38   006D0A   01    31  ANY
_ │  F7=Backward  F8=Forward   F9=Swap   │ 000F398   001E06   01    31  ANY
_ └──────────────────────────────────────┘ 0000500   00201B   01    31  ANY
Command ===> MLS                                          Scroll ===> PAGE
 F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
F10=Left   F11=Right  F12=Cancel
```

Figure 35. Member List Sort Field View Panel (ISRMLIS)

Note: When using LLA in FREEZE mode, member lists might appear to be out of SORT order because ISPF uses direct reads of the data set directory for initial member list build and SORT, and uses BLDL for the displayed statistics.

Confirm

Select 1 or 2 to set delete confirmation ON or OFF.

Utilities

See the chapter on the Primary Option Menu in the *ISPF User's Guide Volume II* for details on the Utilities pull-down.

Help The Help pull-down offers the following choices:

1 Workplace General
2 Library/DSLIST General
3 Scrolling
4 Pattern matching
5 LOCATE command
6 SORT command
7 SAVE command
8 RESET command
9 SELECT command
10 MLC command (member list color)
11 MLS command (member list sort)
12 S line command
13 Statistics
14 Appendices
15 Index

Member List Display Panel Fields

ISPF generates statistics each time you edit a member, unless your edit profile is set to `STATS OFF`. The following fields identify the statistics in a member list:

Note: The column headers on a member list display (with the exception of Prompt) are point-and-shoot sort fields.

Name Name of the member.

Prompt
The Prompt field serves a variety of purposes. You can rename a member by typing the new name to the right of the member name. You can type a slash character (/) in the first position of the Prompt field so you can define additional behaviors for a given action.

Also, the Prompt field acts as a status field, showing information about the last action taken for a member. If you run an edit macro or TSO command against a member, the 7-character informational status that is returned in the dialog variable ZPROMPT at the completion of the service is shown in this field.

Lib Library number. The Lib field appears only if you specify a concatenated sequence of libraries. It shows the library that contains the member. In this example, if the member resides in the second library in the sequence, a `2` appears in the Lib field.

VV.MM
Version number and modification level. The version number is set to 1 and the modification level is set to 0 when the member is created. The modification level is the number of times this version has been modified. For example, `02.15` means version 2, modification 15.

If a member name is just an alternate name for another member, ALIAS appears in this field.

Created
Date this version was created. The format used depends on your national format. For example, `90/06/27` means June 27, 1990 to some, but so does `06/27/90` and `27/06/90` mean it for others.

Changed
Date and time this version was last modified; date is shown in the national format (see Created). Time is shown using a 24-hour format. For example, `17:20` means 5:20 p.m..

Size Current number of lines. The largest number this field can display is 65 535.

Init Number of lines when the member was first saved. The largest number this field can display is 65 535.

Mod Number of lines in the current member that have been added or changed. If the data is unnumbered, this number is zero. The largest number this field can display is 65 535.

ID The user ID of the person who created or last updated this version.

When you use View, Browse, and Edit, the current version and modification level are displayed in the title area, line 1, following the library and member name. You can change the version number, the user ID, or both, with the Reset ISPF Statistics utility (option 3.5) or with the LEVEL and VERSION Edit primary commands. Changing the version number updates most of the other statistics.

If you use the ISPF editor to delete all lines in a member of an ISPF library and then save the member, the statistics show that the member still exists but has a length of zero. To delete a member, including its statistics, use the Library utility (3.1).

Load Module Library Member Statistics

Figure 36 shows that the ISPF library statistics displayed in a member list have a different format for load module libraries. See "Member List Display Panel Action Bar" on page 119 for a description of the action bar choices on this panel.

```
  Menu  Functions  Confirm  Utilities  Help
 ------------------------------------------------------------------------
 LIBRARY          PDFTDEV.SVT.LOAD                          Row 00001 of 00480
    Name     Prompt         Alias-of      Size       TTR      AC    AM     RM
 _ FLM$CP                   FLMIO24     0000A938    01E70E    00     24     24
 _ FLM$CPI                              000000E8    01820C    00     31    ANY
 _ FLM$DE                   FLMIO24     0000A938    01E70E    00     24     24
 _ FLM$DT                   FLMIO24     0000A938    01E70E    00     24     24
 _ FLM$99                   FLMIO24     0000A938    01E70E    00     24     24
 _ FLMB                                 000A9970    01EF16    00     31    ANY
 _ FLMBCMD                  FLMDDL      00122360    029008    00     31    ANY
 _ FLMBD$                   FLMDDL      00122360    029008    00     31    ANY
 _ FLMCMD                   FLMS7C      000E62B8    02AE13    00     31    ANY
 _ FLMCNTGN                             0001E838    028C1D    00     31    ANY
 _ FLMCPCS                              00000150    01822A    00     31    ANY
 _ FLMCSLNK                 FLMIO24     0000A938    01E70E    00     24     24
 _ FLMCSPDB                             00001940    01E80A    00     31     24
 _ FLMCXCMD                 FLMIO24     0000A938    01E70E    00     24     24
 _ FLMCXCPD                 FLMIO24     0000A938    01E70E    00     24     24
 _ FLMCXCPM                 FLMIO24     0000A938    01E70E    00     24     24
 _ FLMCXCTN                 FLMIO24     0000A938    01E70E    00     24     24
 Command ===> ____________________________________________________ Scroll ===> PAGE
  F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
 F10=Left   F11=Right  F12=Cancel
```

Figure 36. Load Module Library Display (ISRUDMM)

If you want to see all of the statistics, you can scroll the screen either right or left by using PF keys 10 and 11. Pressing either key repeatedly results in recycling of the screens.

The fields on a member list display for a load module library are:

Note: The column headers on a member list display (with the exception of Prompt) are point-and-shoot sort fields.

Name Name of the member.

Prompt The Prompt field serves a variety of purposes. You can rename a member by typing the new name to the right of the member name. You can type a slash character (/) in the first position of the Prompt field so you can define additional behaviors for a given action. Also, the Prompt field acts as a status field, showing information about the last action taken for a member.

Lib Library number. The Lib field appears only if you specify a concatenated sequence of libraries. It shows the library that contains the member. In this example, the member resides in the second library in the sequence.

Size Size of the member in hexadecimal. The largest number this field can display is `'FFFFFFFF'X`.

TTR Relative block address.

Alias-of Name of the member for which this member is an alias. See following note.

AC Authorization code.

AM Addressing mode.

RM Residency mode.

Attributes The member's attributes:
- **NX** Not executable
- **DATA** Can be loaded only
- **OVLY** In overlay structure
- **RF** Refreshable
- **RN** Can be reentered
- **RU** Reusable
- **TEST** Module to be tested.

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Note: Question marks (?) are placed in the member list of a load module library for members that have load module directory fields that are not valid. For example, module 14, shown in Figure 36 on page 123, contains alias and authorization code information that is not valid.

Load module library lists displayed using the Data Set List utility (option 3.4) contain an extended line command field and do not display the created date.

Member Selection List Commands

If the member list is too large for the screen, you can see other parts of the list by using the UP and DOWN scroll commands. These commands are valid for all member list displays. However, because a member list display can be no wider than 80 characters, you cannot use the LEFT and RIGHT scroll commands. Refer to the *ISPF Dialog Developer's Guide and Reference* for more information about scroll commands.

The following *primary* commands are valid for all member list displays. You enter these commands on the Command line:
- `CONFIRM`
- `FIND`
- `LOCATE` *`string`*
- `SRCHFOR`
- `RESET`
- `RFIND`
- `SAVE [`*`list-id`*`]`
- `SELECT` *`pattern`* `[`*`lcmd`*`]`
- `SORT [`*`field1`*`[`*`field2`*`]]`
- `MLC`
- `MLS`
- `REFRESH`

The following *line* commands can be used with member lists. These are 1-character commands that are entered to the left of the member name. The option you are using determines:

- Whether you can enter more than one line command simultaneously
- Which line commands are valid
- Whether a Prompt or OLDMEM field is available.

Table 5 on page 116 provides a quick reference to the differences between member lists and the line commands available on each one. The line commands are:
- B (browse member)
- C (copy member)
- D (delete member)
- E (edit member)
- G (reset member)
- M (move member)
- P (print member)
- R (rename member)
- S (select member)
- T (TSO command)
- V (view member)
- W (WS command)
- = (repeat last command).

The S line command is available for all member list displays except the Library and Data Set List utilities. See "S Line Command" on page 128 for more information.

The B line command is available only for the Library, Move/Copy, and Data Set List utilities. The D, E, P, R, and V line commands are available only for the Library and Data Set List utilities.

Note: For the Data Set List utility, these line commands are valid only after you enter the M (display member list) line command. See "Library and Data Set List Utility Line Commands" on page 130 for information.

ISPF ignores any unprocessed member list commands when you leave a member list.

Primary Commands

Confirming a Delete Command: The CONFIRM primary command controls display of the Confirm Delete panel. Use the following format:

CONFIRM [ON | OFF]

You can use the following operands with the CONFIRM command:

ON Tells ISPF to display the Confirm Delete panel when you enter the D (delete data set) line command or TSO DELETE command. This is the default setting.

OFF Tells ISPF not to display the Confirm Delete panel.

For example, the following command would tell ISPF not to display the Confirm Delete panel:

```
CONFIRM OFF
```

Note: Confirm is forced on from the workplace member list with a default action of "D".

Find a Character String: To find a character string within the specified field use the FIND or the RFIND command. Only one of the fields on the member list can be specified at a time for the search. Use the following format:

FIND string field [NEXT]

[[ALL] [PREfix]

[[FIRST] [SUFfix]

[[LAST] [WORD]

[[PREV]

NAME is the default field. NEXT is the default operand. For example, the following command tells ISPF to find the last occurrence of the character string XLC in the NAME field.

```
FIND XLC NAME LAST
```

ISPF automatically scrolls to bring the line containing the character string to the top of the list.

Use the RFIND command to repeat the search without reentering the character string.

Locating a Data String: To find a data string, you can enter a LOCATE command in the Command field on any member list display. The format of the command is:

LOCATE *string*

where:

string A data string that is used to find an entry based on how the member list is sorted.

ISPF searches the field by which the member list was sorted for an entry equal to *string*. Either the entry, if found, or else the entry that immediately precedes the entry that you are searching for is scrolled to the top of the list.

For example, if the member list shown in Figure 36 on page 123 is sorted by name, the following command causes member MODULE12 to scroll to the top of the list:

```
LOCATE MODULE12
```

Removing Unwanted Line Commands and Messages: The RESET command removes unprocessed line commands and messages that show the result of line command processing. This command has no operands.

Writing a Member List to a Sequential Data Set: The SAVE primary command writes a member selection list to a sequential data set. The format of the SAVE command is:

SAVE [*list-id*] [**LONG**]

where:

list-id Optional. A user-specified qualifier of the sequential data set to which the member list is written.

LONG
Optional. LONG formats all dates in yyyy/mm/dd format for the member. Additionally, for PDS datasets not containing load libraries, the untranslated member name is written after the member name.

ISPF names the data set:

```
prefix.userid.list-id.MEMBERS
```

prefix Your data set prefix, as specified in your TSO user profile. If you have no prefix set, or if your prefix is the same as your user ID, the prefix is omitted and the data set name is userid.list-id.MEMBERS.

userid Your TSO user ID.

The data set is created if it does not exist, or written over if it exists and has compatible attributes.

ISPF writes the member list in the current sort order and as it appears on the display, except for the column headings, line command fields, and anything you have typed on the display.

If you omit the list ID, ISPF writes the member selection list in the current sort order, including column headings, to the ISPF list data set. Processing is the same as using option X of the Library utility (primary option 3.1), except that data set information is not printed.

Selecting a Member: You can use the SELECT, or S, command as either a primary command or a line command.

SELECT Primary Command: The SELECT primary command allows you to select one or more members in a member list, whether they are displayed or not. When you enter it on a member list displayed using the Edit option, this command even creates a member if you specify the complete member name of a member that does not exist.

The SELECT command optionally provides a quick method of calling the same line command for one or more members. The format of the SELECT command is:

SELECT { *pattern* | * }[*lcmd*]

where:

pattern
Either a complete member name or a partial member name that contains one or more asterisks (*), percent signs (%), or both as place holders. See "Displaying Member Lists" on page 117 for more information about using patterns.

* An asterisk, which means you want to select all members in a member list.

lcmd
One of the following optional line commands: S (select), B (browse), V (view), D (delete), E (edit), or P (print). On a member list that has an expanded line command field, such as one generated by the M (member list) line command in the Data Set List utility (option 3.4), you can also enter a TSO command, CLIST, or REXX EXEC. If you do not enter a line command, S is the default.

The member list shown in Figure 32 on page 119 contains members INT and INTTOOL. The following command selects these members for printing:

```
SELECT INT* P
```

S Line Command: You can enter the S line command at the beginning of a line, ahead of one or more member names. For example, in Figure 36 on page 123, you could select member MODULE9 by moving the cursor to the left of the member name, typing S, and pressing Enter.

Note: On member lists displayed with the View, Browse, Edit, Foreground, and Batch options, ISPF processes only the first S entered, ignoring all others.

With the Move/Copy utility and the Convert utility, you can rename members by entering new member names in the Prompt field to the right of the member name.

Sorting a Member List: The SORT primary command arranges a member list according to the fields you specify. The sort sequence, ascending or descending, is determined by the fields you choose and is maintained between member list displays.

The format of this command is:

SORT [*field1*[*field2* **]]**

where:

field1 The primary field by which the member list is sorted.

field2 The secondary field by which the member list is sorted.

Table 6 and Table 7 show:
- Valid values for *field1* and *field2*
- The sort sequence used for each field
- A description of each field name.

Note: When National Language Support is enabled, the field names listed in Table 6 and Table 7 on page 129 may be displayed in the national language. If they are then the SORT command will expect *field1* or *field2* to be entered in the national language, or the standard abbreviation to be used.

Table 6. Sort Fields for Source Libraries

Field	Sequence	Description
Name	Ascending	Member name
Lib	Ascending	Library in concatenation sequence
VV	Ascending	ISPF version number
MM	Ascending	ISPF modification level
Created	Descending	Creation date
Changed	Descending	Date and time last changed
Size	Descending	Current number of records
Init	Descending	Initial number of records
Mod	Descending	Number of modified records
ID	Ascending	Last user
Prompt	Descending	Prompt field

Table 7. Sort Fields for Load Libraries

Field	Sequence	Description
Name	Ascending	Member name
Lib	Ascending	Library in concatenation sequence
Size	Descending	Load module size
TTR	Ascending	TTRN of beginning of load module
Alias-Of	Ascending	Member this is an alias of
AC	Ascending	Authorization code
AM	Descending [2]	Addressing mode
RM	Descending [2]	Residency mode
Attributes	Descending	Load module attributes
SSI	Ascending	System Status Index
Prompt	Descending	Prompt field

For example, to sort a member list by size and then by track record, you could enter:

```
SORT SIZE TTR
```

Searching for Members: Use the SRCHFOR primary command to search the members in the member list for one or more strings of data using the SuperC Utility (see Option 3.14). You may limit the search to excluded or non-excluded members, and control whether migrated members are recalled and searched or not. Use the following format:

```
SRCHFOR string
```

The string parameter is optional and if specified is used to prefill the first search string on the subsequent MEMLIST Srchfor Options panel.

WORD, SUFFIX, and PREFIX are available operands for search string specification. Note that the search strings are case sensitive and must match exactly as specified. Consider the 'Any case' process option if you want to disregard case.

You can use the C (continuation) operand to specify that both the current and previous string must be found on the same line to constitute a match. Otherwise, lines with either string are treated as matching.

Table 8. Examples of search strings

Example Search strings:	Explanation:
`===> ABC` `===> EFG`	Either string ABC or EFG may be found in the search members.
`===> ABC WORD` `===> EFG C`	The two strings (ABC and EFG) must be found on the same line. ABC must be a complete word, while EFG (a continuation definition) can be part of any word.
`===> ABcD prefix`	The string (ABcD) is detected if the case of each letter matches and it is a prefix of a word.
`===> X'7b00'`	The hex string is specified as the search string. The listing must be browsed with 'HEX ON'.

2. For the AM and RM columns, the value ANY is considered to be the largest value and will therefore sort to the top of the list.

Table 8. Examples of search strings (continued)

`===> 'AB C''D'`	The string (AB C'D) is specified.

To start the search, press the Enter key from the MEMLIST Srchfor Options panel. To cancel the request and return to the Member List, enter END or CANCEL.

Output is in the listing DSN you specify and in the MESSAGE field in the DSLIST. Sort on this field to consolidate results.

Changing Member List Field Attributes: The MLC command enables you to change one or more of the member list field attributes and to see the change immediately. Clearing a field restores the field's default setting. Use the Defaults point-and-shoot field to restore **all** field attributes to ISPF default settings.

You can also change the member selection field to use the ISPF Settings input field padding character instead of the member list field default padding character. The member list default padding character for single command selection lists is a period (.), and for multiple command selection lists it is an underscore (_).

Changing the Default Sort Order for Member Lists: The MLS command enables you to change the default sort order for all ISPF member lists. You can specify separate sort orders for Load and non-Load data sets. These sort orders apply only to ISPF Enhanced Member lists.

Refreshing the Member Lists: The REFRESH command refreshes the member list, adding new members, adding renamed members under their new names, and deleting members that have been removed from the list. It also resets the line command field and prompt field on the member list. Unprocessed line commands and input or messages in the prompt fields are erased by the Refresh command.

Line Commands

Line Commands for the Move/Copy Utility: On member list displays for the Move/Copy utility (option 3.3), you can enter the following line commands at the beginning of a line, ahead of one or more member names.

B Browse the member
S Select the member.

The B (browse) line command allows you to browse a member or members to determine whether you really want to move or copy them. You can enter the B line command beside as many members as you want to. The first member that has a B line command beside it is browsed when you press Enter. When you finish browsing each member, the member list is redisplayed along with the unprocessed line commands. Press Enter again to browse the next member.

Once you have decided which members to move or copy, use the S (select) line command to select those members.

Library and Data Set List Utility Line Commands: On member list displays for the Library utility (option 3.1) and the Data Set List utility (option 3.4), you can enter the following line commands at the beginning of a line, ahead of one or more member names.

B Browse the member
C Copy the member
D Delete the member

E Edit the member
G Reset the member
J Submit the member
M Move the member
P Print the member
R Rename the member
T TSO command
V View the member
W WS command

Note: Member lists displayed with the M line command have a 9-character line command field to accommodate TSO commands, CLISTs, and REXX EXECs. For more information, see the sections titled "M-Display Member List" and "TSO Commands, CLISTs, and REXX EXECs" in the Data Set List Utility (Option 3.4) chapter of the *ISPF User's Guide Volume II*.

When you use the R line command, enter the new member name in the Prompt field to the right of the member name.

When you press Enter, each member preceded by a line command is processed unless:

- The V (view), B (browse), or E (edit) line command is followed by another line command. When you return to the member list after Viewing, Browsing, or Editing a member, you must press Enter again to call any remaining line commands.
- You enter a line command for a member that was deleted. The names of deleted members are not removed from the member list until it is updated. Remove the line command that precedes the deleted member, and press Enter again. See "Updating a Member List" on page 132 for more information.
- You enter an R (rename) line command, but do not put a new name in the Prompt field. Enter a new member name, and press Enter again.

You can then do one of the following:
- Enter additional primary or line commands
- Scroll, if necessary, to bring additional members into view
- Enter the END command to return to the previous panel.

Figure 37 and Figure 38 on page 132 show before and after examples that print members TEST and TEST1, delete member TEST8, and rename member TEST4 to OLDTEST.

```
  Menu  Functions  Confirm  Utilities  Help
 ------------------------------------------------------------------------
 LIBRARY          USERID.TEST.SOURCE                      Row 00001 of 00009
    Name     Prompt          Size    Created          Changed            ID
 P TEST                        1   2003/02/03   2003/02/03 17:04:14    USERID
 P TEST1                       1   2003/02/03   2003/02/03 17:04:14    USERID
 _ TEST2                       1   2003/02/03   2003/02/03 17:04:23    USERID
 _ TEST3                       1   2003/02/03   2003/02/03 17:04:14    USERID
 R TEST4    OLDTEST            1   2003/02/03   2003/02/03 17:04:14    USERID
 _ TEAST5                      1   2003/02/03   2003/02/03 17:04:14    USERID
 _ TEST6                       1   2003/02/03   2003/02/03 17:04:14    USERID
 _ TEST7                       1   2003/02/03   2003/02/03 17:04:14    USERID
 D TEST8                       1   2003/02/03   2003/02/03 17:04:14    USERID
   **End**
 Command ===> ____________________________________________ Scroll ===> PAGE
  F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
 F10=Left   F11=Right  F12=Cancel
```

Figure 37. Library Utility before Print, Rename, and Delete (ISRUDMM)

```
  Menu  Functions  Confirm  Utilities  Help
 ------------------------------------------------------------------------
 LIBRARY          USERID.TEST.SOURCE                      Row 00001 of 00009
    Name     Prompt          Size    Created          Changed            ID
 _ TEST     *Printed          1   2003/02/03   2003/02/03 17:04:14    USERID
 _ TEST1    *Printed          1   2003/02/03   2003/02/03 17:04:14    USERID
 _ TEST2                      1   2003/02/03   2003/02/03 17:04:23    USERID
 _ TEST3                      1   2003/02/03   2003/02/03 17:04:14    USERID
 _ TEST4    *Renamed
 _ TEST5                      1   2003/02/03   2003/02/03 17:04:14    USERID
 _ TEST6                      1   2003/02/03   2003/02/03 17:04:14    USERID
 _ TEST7                      1   2003/02/03   2003/02/03 17:04:14    USERID
 _ TEST8    *Deleted
   **End**
 Command ===> ____________________________________________ Scroll ===> PAGE
  F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
 F10=Left   F11=Right  F12=Cancel
```

Figure 38. Library Utility after Print, Rename, and Delete (ISRUDMM)

Updating a Member List

When the member list is displayed again following completion of a function or command, it does not include:

- For View, Browse, and Edit:
  - New members created by recursive Edit calls

  - New members created using the CREATE command in EDIT do not display in an Enhanced Member List display, but do display when using the traditional member list processing.
  - Members created by another user
  - In split-screen mode, members created on another logical screen.
- For Library, Move/Copy, Data Set List, and Convert:
  - New names of members that have been renamed
  - Fewer member names when members are deleted (Library and Data Set List) or moved (Move/Copy).

To display an up-to-date list, return to the previous panel, leave the member name blank or enter a pattern. See "Displaying Member Lists" on page 117 for more information about displaying member lists.

To set your system to display a traditional member list when using the E, V, or B commands (Edit, View, Browse) specifically, see the section on DSLIST Settings in the *ISPF User's Guide Volume II*. This can be found in the Utilities (Option 3) chapter, in the section on Data Set List Utility Options.

Member List Positioning

After selected members have been processed, the member list is redisplayed and positioned based on the members selected and the setting of the Scroll Member List option.

When the Scroll Member List option is selected:

- If a single member is selected, the member list is redisplayed with the selected member scrolled to the top of the display. However, if the CANCEL command is used to exit the selected member, the member list is not scrolled.
- If multiple members are selected and some selections are contained in the last screen displayed before the Enter key was pressed, the first selected member on that screen is scrolled to the top of the display.
- If multiple members are selected and none of the selections are contained in the last screen displayed before the Enter key was pressed, the first selected member in the member list is scrolled to the top of the display.

When the Scroll Member List option is not selected:

- If only single selections are allowed and the selection is contained in the last screen displayed before the Enter key was pressed, the member list is not scrolled. The cursor is positioned in front of the selected member.
- If only single selections are allowed and the selection is not contained in the last screen displayed before the Enter key was pressed, the member list is redisplayed showing the last screen containing the selected member. The cursor is positioned in front of the selected member.
- If multiple selections are allowed and the last selected member is contained in the last screen displayed before the Enter key was pressed, the member list is not scrolled. The cursor is positioned in front of the last selected member.
- If multiple selections are allowed and the last selection is not contained in the last screen displayed before the Enter key was pressed, the member list is redisplayed with the last selected member scrolled to the top. The cursor is positioned in front of the last selected member.

Data Set Passwords

A Data Set Password field is included on library and data set entry panels:

```
Data Set Password  . .          (If password protected)
```

The Data Set Password field contains the password for OS password-protected data sets. By assigning more than one password to the same data set, you can give some users read-only access while giving others read/write access.

Nondisplay input fields are used so that the passwords do not appear on the screen. When you specify a concatenated sequence of libraries, the password applies to all data sets in the sequence.

If you replace a long password with a shorter password, blank out the remaining spaces of the Data Set Password field.

You can use ISPF with either the TSO/VS2 Programming Control Facility (PCF) or the Resource Access Control Facility (RACF®). PCF and RACF provide extensive facilities for data set security. However, when using either PCF or RACF, do not enter a password on the ISPF panels, because both facilities rely on your TSO user ID and logon password to identify you and check for proper authorization.

Format Definitions

A Format Name field is included on the View Entry Panel and on the Edit Entry Panel:

```
Format Name  . . . _______
```

The Format Name field contains the name of a format definition, which is used to view, browse, or edit a formatted data set. A *formatted* data set contains records that consist of subfields. The locations and lengths of these subfields are fixed throughout the data set. The formatted data set support in View, Browse, and Edit is particularly useful for data that contains double-byte character (DBCS) data but does not contain shift-out (SO) and shift-in (SI) characters.

The format name can consist of up to eight alphanumeric characters; the first one must be alphabetic.

A format definition can include Extended Binary Coded Decimal Interchange Code (EBCDIC) fields, DBCS fields, and mixed fields. If the specified format includes a mixed field definition, the Mixed Mode field is ignored, even if you select it. See "Mixed Mode" on page 135 for information. For information about defining formats for formatted data sets, see the section on the Format Specifications Utility (Option 3.11) in the *ISPF User's Guide Volume II*. The Format Specifications utility is provided to support the IBM 5550 terminal that uses DBCS.

When formatted data is displayed, an attribute character that does not reside in the data set and is not stored in the data set precedes each field. Therefore, the column position on the display is different from the column position in the data set.

The allowable maximum length is decreased two bytes per field definition from the standard View, Browse, and Edit allowable maximum length.

Mixed Mode

A Mixed Mode field is included on the View Entry Panel and on the Edit Entry Panel:

```
_ Mixed Mode
```

The Mixed Mode field specifies whether you want to view, browse, or edit unformatted mixed data that contains both EBCDIC (single-byte) and DBCS (double-byte) characters. Use a slash to select mixed mode. If your terminal does not support DBCS, the value in this field is ignored.

DBCS strings are enclosed with SO (`X'0E'`) and SI (`X'0F'`) characters in unformatted mixed data. The SO character precedes the DBCS character string and the SI character follows the string.

If the view, browse, or edit line contains mixed data that are not valid, ISPF assumes the line can contain only EBCDIC characters. Examples of mixed data that are not valid include:

- Unpaired SO and SI characters
- Incorrect DBCS characters between SO and SI characters
- An odd number of bytes between SO and SI characters.

If you call View, Browse, or Edit from the Library utility (option 3.1) or the Data Set List utility (option 3.4), ISPF assumes that you want to use mixed mode.

If you want to view, browse, or edit DBCS data as EBCDIC data, you must do so in non-mixed mode. You can do this by operating from a terminal that does not support DBCS or by deselecting the Mixed Mode field.

In non-mixed mode, SO and SI characters are not treated as special characters; instead, they are treated as characters that cannot be displayed. Thus, you can view, browse, or edit the data in the conventional way.

You can also view, browse, or edit DBCS data in hexadecimal format, just as you would EBCDIC data. For information about specifying hexadecimal display, see the section titled HEX-Displaying Data in Hexadecimal Format in the View (Option 1) chapter of the *ISPF User's Guide Volume II*.

Note: Do not edit a record in hexadecimal format when a DBCS string encroaches on the display boundary.

DBCS data that is not valid is not supported. If DBCS fields or DBCS strings in a mixed field contain any bytes with hexadecimal code ranging from `X'00'` to `X'3F'`, you may get unwanted results.

Partitioned Data Set Extended (PDSE)

The partitioned data set extended (PDSE) is a storage management subsystem formatted data set. Externally, the PDSE is very similar to a PDS. Internally, the PDSE contains a new directory structure, member format, and record format. A PDSE is indistinguishable from a PDS through most interfaces used to access a PDS directory or member. All ISPF functions support the PDSE.

You can concatenate a PDSE library with a PDS library if they have consistent record formats and logical record lengths. All functions in the Library Utility (option 3.1) support PDSEs with the exception of the compress function.

Packed Data Sets

The *packed* data set format allows you to use direct access storage devices (DASD) more efficiently. In this format, ISPF replaces any repeating characters with a sequence showing how many times the character is repeated. Before you can properly use data stored in this format as input to processing programs, such as compilers, you must first tell ISPF to unpack and expand the data.

The two requirements for using packed data sets are:

- To store data in packed format:
  - Enter the PACK ON Edit primary command while editing a data set or PDS member.
  - Select the Pack Option field (under To Data Set Options:) when copying or moving members using the Move/Copy utility (option 3.3).
- To unpack and expand packed data for processing, select the Source Data Packed field on the Foreground Selection panel or the Batch Selection panel. You must select this field if any of the input data, including that referred to in COPY or INCLUDE statements, is in packed format.

List and Log Data Sets

ISPF helps you get hardcopy listings of source modules, and maintains a log of significant user activities. These items are kept in data sets called the list data set and the log data set, respectively.

When needed, the two data sets are allocated automatically. They are temporary data sets named:

```
prefix.userid.SPFn.LIST
prefix.userid.SPFLOGn.LIST
```

prefix The data set prefix in your TSO profile. Used only if it is different from your user ID.

userid Your user ID.

n A number from 0 to 9.

If you have specified in your TSO profile a data set prefix that differs from your user ID, the data set names begin with your data set prefix, followed by your user ID. Once generated, these data sets remain open throughout your ISPF session. However, even though they are open, you can still process them by using the ISPF LIST and LOG commands.

List Data Set

The list data set is used for temporary storage for data to be printed at a later time. This data includes, for example, data written as a result of:

- Using the LIST service
- Issuing the PRINT, PRINT-HI, PRINTL, or PRINTLHI commands (but not PRINTG)
- Using Option 3 utilities.

To avoid generating an ISPF list data set, do not request any print functions.

Log Data Set

The log data set is used to capture data that can be useful for such things as diagnosing problems. This data includes, for example, data written as a result of:

- Using the LOG service
- Test and trace data such as:
  - ISPF TRACE mode data
  - Dialog Test option 7.7 dialog trace data.

Use the Log/List pull-down from the ISPF Settings panel action bar to prevent generating the ISPF log data set. However, if you use the Dialog Test option (7), allow generating the log data set because Dialog Test writes trace data to the log when you request it. Also, if Dialog Test finds an unexpected condition, problem data and error messages are written to the log.

Processing the Log and List Data Sets

You can process the log and list data sets either:

- During an ISPF session, using the LOG and LIST commands
- At the end of a session.

ISPF processes (prints, keeps, deletes) only data sets that it has allocated. Any attempt to process a log or list data set that has been preallocated by the user results in an appropriate ISPF message. Any references to ISPF processing of log or list data sets refer to data sets that ISPF has allocated. Users can supply routines to process preallocated data sets after ISPF has terminated.

How to Specify Log and List Data Set Processing Options

The log and list data set processing options can be specified through any of the following:

- Use of the LOG and LIST commands during an ISPF session.
- Use of the Log/List pull-down on the ISPF Settings panel for setting default options.
- The ISPF termination panel, which can display when you exit from ISPF. See "Log and List Data Set Processing at the End of a Session" on page 139 to find out under what conditions ISPF will display this panel.

Processing the Log and List Data Sets During an ISPF Session

The LOG and LIST commands allow you to process the log and list data sets, respectively, at any time during an ISPF session. The log and list data sets must have been allocated. You control the data set processing by specifying on the LOG or LIST command one of the three keyword options: PRINT, DELETE, or KEEP.

If you issue the LOG or LIST command with no parameter specified, ISPF displays a panel that allows you to select the data set processing options. The panels for the LOG and LIST commands are shown in Figure 39 on page 138 and Figure 40 on page 138, respectively.

```
                      Specify Disposition of Log Data Set

  Log Data Set (USERID.SPFLOG2.LIST) Disposition:
    Process Option . . . .  _ 1. Print data set and delete
                              2. Delete data set without printing
                              3. Keep existing data set and
                                 continue with new data set
    Batch SYSOUT class . . ________________
    Local printer ID or
    writer-name  . . . . . ___________________
    Local SYSOUT class . . ________________

  Press ENTER key to process the log data set.
  Enter END command to exit without processing the log data set.

Job statement information:  (Required for system printer)
 ===> ______________________________________________________________________
 ===> ______________________________________________________________________
 ===> ______________________________________________________________________
 ===> ______________________________________________________________________

Command ===> ________________________________________________________________
 F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
F12=Cancel
```

Figure 39. Log Data Set Defaults Panel (ISPLLP01)

```
                      Specify Disposition of List Data Set

  List Data Set (USERID.SPF1.LIST) Disposition:
    Process Option . . . .  _ 1. Print data set and delete
                              2. Delete data set without printing
                              3. Keep existing data set and
                                 continue with new data set
    Batch SYSOUT class . . ________________
    Local printer ID or
    writer-name  . . . . . ___________________
    Local SYSOUT class . . ________________

  Press ENTER key to process the list data set.
  Enter END command to exit without processing the list data set.

Job statement information:  (Required for system printer)
 ===> ______________________________________________________________________
 ===> ______________________________________________________________________
 ===> ______________________________________________________________________
 ===> ______________________________________________________________________

Command ===> ________________________________________________________________
 F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
F12=Cancel
```

Figure 40. List Data Set Defaults Panel (ISPLLP02)

With the appropriate panel displayed, type in the process option of your choice. If you specify Print data set and delete, you must also specify a Batch SYSOUT class, or local printer ID or writer name. After you have typed in all information that you wish to specify, press Enter to pass the input to ISPF. ISPF takes the specified action for the data set and then returns you to the panel from which you issued the LOG or LIST command. ISPF issues a message indicating whether the action requested was successful.

If you issue the END command from the Log or List Data Set Defaults panel, ISPF returns you to the panel from which you issued the LOG or LIST command without processing the data set.

ISPF initializes the Log or List Data Set Defaults panel fields with the default values specified with the Log/List pull-down on the ISPF Settings panel. If a default disposition of Keep data set has been specified, ISPF translates the value to Keep data set and allocate new data set before displaying the panel. If you modify the process option field, the new value is used to process the data set; however, it is not saved in the system profile. All other fields modified on the panel are saved in the system profile and become the default values the next time the data set is processed.

If you issue the LOG or LIST command with the PRINT, DELETE, or KEEP option, ISPF does not display a panel. Specifying PRINT, DELETE, or KEEP on the command causes data set processing equivalent to specifying Print data set and delete, Delete data set, and Keep data set and allocate new data set, respectively, on the Log or List Data Set Defaults panel.

Two system variables, ZLOGNAME and ZLSTNAME, contain the fully qualified names of the log and list data sets, respectively. If either data set is not allocated or has not been used in the session, the corresponding system variable value is blank.

Note: The values of ZLOGNAME and ZLSTNAME are set to blank immediately after the log and list data sets have been processed because the data sets are freed by the LOG/LIST command processing. A new data set will not be allocated until it is written to. If you intend to use the log or list data set name for your processing, be sure to retrieve it before issuing the LOG or LIST command.

The system variables are summarized in *ISPF Dialog Developer's Guide and Reference*.

Conditions for Using the LOG and LIST Commands

You can issue the LOG or LIST command from any command line except when any of the following applies:

- The command panel for the related log or list data set is active in any logical screen.
- The ISPF termination panel is active.
- The data set to be processed is not allocated or was preallocated.
- Dialog Test option 7.5 (Browse ISPF log) is active, and you are attempting to process the log data set.

An attempt to issue the LOG or LIST command in violation of any of these conditions results in ISPF issuing an appropriate message.

Log and List Data Set Processing at the End of a Session

Figure 41 shows the panel that ISPF displays at the end of a session if one of the following is true:

- The initial dialog began with the display of a menu, and the dialog is ended with the END command issued from that menu.
- The initial dialog began with the performance of a function, and the function ends with a return code of 0.
- The log and list data set processing defaults have not been specified, or the default values are not valid.

If the application ends with a nonzero return code, the termination panel is not displayed.

If the termination panel does not display for one of these reasons, the log and list data sets are processed using the default options.

```
                 Specify Disposition of Log and List Data Sets
                                                                More:     +
Log Data Set (USERID.SPFLOG2.LIST) Disposition:
Process Option . . . . _  1. Print data set and delete
                          2. Delete data set without printing
                          3. Keep data set - Same
                             (allocate same data set in next session)
                          4. Keep data set - New
                             (allocate new data set in next session)
Batch SYSOUT class . . ________________
Local printer ID or
writer-name  . . . . . ________________
Local SYSOUT class . . ________________

List Data Set (USERID.SPF1.LIST) Disposition:
Process Option . . . . _  1. Print data set and delete
                          2. Delete data set without printing
                          3. Keep data set - Same
                             (allocate same data set in next session)
                          4. Keep data set - New
                             (allocate new data set in next session)
Command ===> ____________________________________________________________
 F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
F12=Cancel
```

Figure 41. Specify Disposition of Log and List Data Sets Panel (ISPPFT03)

The valid process options shown in Figure 41 are described below.

Data Set Processing Options

For each term defined below, the first value shown is the processing option that you can specify on the Log/List pull-down from the ISPF Settings panel, on the Specify Disposition of Log and List Data Sets panel, or on the Log or List Data Set Defaults panel. The value in parentheses is the corresponding LOG or LIST command parameter.

1. Print data set and delete (PRINT)

Print the data set, then delete it. You must specify a Batch SYSOUT class or local printer ID or writer name.

- If the Batch SYSOUT class is specified, ISPF submits a background job to print and deletes the data set or sets.
- If a local printer ID or writer name is specified, ISPF uses the TSO PRINTDS command to route the data set to the specified printer or external writer program and then deletes the data set.

Note: If you have selected Edit PRINTDS Command on the ISPF Settings panel (option 0), ISPF displays the Local Print Command Edit panel to allow you to intercept and edit the PRINTDS command before it processes. See “Editing the PRINTDS Command” on page 141 for additional information.

ISPF uses file tailoring services to print data on a system printer. Therefore, if this option is specified during an ISPF session, along with a Batch SYSOUT

class, file tailoring must not be active on the logical screen from which the LOG or LIST command is issued. If an FTOPEN or FTINCL has been issued without a subsequent FTCLOSE, ISPF issues an appropriate message.

2. Delete data set without printing (DELETE)
Delete the data set.

3. Keep data set - Same
Not applicable to LOG or LIST command. Close and free the data set. Allocate the same data set the next session.

4. Keep data set - New (KEEP)
Close and free the data set. Allocate a different data set for the next session or the next time log or list information is generated in this session.

Editing the PRINTDS Command

If you have selected Edit PRINTDS Command on the ISPF Settings panel (option 0) and you specify a local printer ID or writer name on either the Log and List Data Set Termination Options panel or the Hardcopy Utility panel, ISPF displays the Local Print Command Edit panel shown in Figure 42 to allow you to edit the PRINTDS command before it processes.

```
                           Local Print Command Edit

Select function to perform and press Enter to exit and print.
End or Cancel will exit without printing.

Local Print Command Options:
   Function to perform  . . . 1  1. Exit and issue PRINTDS command
                                 2. Exit without printing

PRINTDS Header:
 . . : PRINTDS DATASET('USERID.SPFLOG3.LIST') DEST(PRINTER1) CCHAR


Configuration table PRINTDS operands:
 . . . NONUM
____________________________________________________________________________
____________________________________________________________________________

User PRINTDS operands:
 . . . ______________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
_________________________
 F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
F12=Cancel
```

Figure 42. Local Print Command Edit Panel (ISPCHPLP)

The fields on this panel function as follows:

Function to perform
Specify the print function you want ISPF to perform:

1 Exit ISPF and issue the PRINTDS command (as edited below)

2 Exit ISPF without printing.

Note: If you arrive at this panel from ISPF termination processing, you will continue with termination and exit the product after your print request is issued or cancelled.

PRINTDS Header
This field cannot be edited. It contains the PRINTDS command, the data set name, the printer ID or writer name, and the CCHAR operand, if appropriate.

Configuration table PRINTDS operands
These operands operate at a system level and can be altered only in the ISPF Configuration table.

User PRINTDS operands
Enter additional operands (for example, COPIES or FORMS). These operands can be edited and are saved in the application command table.

If you enter CANCEL (or select Cancel), the PRINTDS command is not issued. If you enter END or RETURN or use a jump function, the PRINTDS command is issued and you receive a completion message.

Foreground and Batch Output Listings

The following additional listing data sets are allocated as needed for foreground or batch processing:

```
prefix.userid.list-id.LIST
prefix.userid.list-id.LINKLIST
prefix.userid.list-id.TERM
prefix.userid.list-id.TESTLIST
```

prefix The data set prefix in your TSO profile. Use it only if you have one and it is different from your user ID.

userid Your user ID.

list-id The name specified in the List ID field on the foreground or batch data entry panel. This name is required for sequential data sets. However, for partitioned data sets, the member name becomes the default *list-id* if the List ID field is blank.

The particular data set names you use depend on the foreground or batch processing option chosen.

For batch processing, the output can either be directed to a list data set or printed as part of the batch job. When batch processing is finished, you can browse the list data set, and then use the Hardcopy utility (option 3.6) to print it. Using this utility, show whether you want to keep the data set or delete it after printing. ISPF does not delete these data sets when you end ISPF.

For the foreground option, the output listing is directed to a list data set and automatically displayed for browsing. When you end the browse function, ISPF displays a selection panel that allows you to choose whether to print, keep, or delete the list data set. Again, ISPF does not delete this data set when you end ISPF.

Other Temporary Data Sets

If you are using virtual I/O (VIO), you can allocate space for temporary data sets, and then VIO assigns them system-generated names. Otherwise, ISPF allocates temporary control and listing data sets, as needed, for its own internal use. You are usually not aware of their existence. They are assigned the following names:

```
prefix.user-id.SPFTEMPn.CNTL
prefix.user-id.SPFTEMPn.LIST
prefix.user-id.appl-idzzzz.BACKUP
prefix.user-id.appl-idzzzz.BACKUPI
prefix.user-id.SPFxxx.OUTLIST
```

prefix The data set prefix in your TSO profile. It is used only if you have one and it is different from your user ID.

userid Your user ID.

n A number from 1–4, depending on which logical screen is active.

appl-id The application ID.

zzzz A number from 0001–0008, or higher if customized, controlled by the edit recovery table (*appl-id* EDRT for the EDREC service and *appl-id* EIRT for the EDIREC service) and the number of concurrent edit calls that are active.

xxx A number generated by ISPF, which has a range of 100–999.

These data sets are deleted:
- By edit recovery when the data sets are no longer needed
- When you specifically request that they be deleted.
- By Move/Copy when no IEBCOPY errors are encountered.

Job Statement Information

ISPF allows you to submit Batch jobs for printing and language processing. However, before submitting a Batch job, you must supply job statement information. For this purpose, four lines are provided on each job submission panel.

You can use the lines that contain `//*`:
- As continuation lines by removing the asterisk (*)
- To enter other JCL statements, such as JOBLIB DD.

If you do not need these lines, you can blank them out. Blank lines are not submitted to the job stream.

Running a Sample ISPF Session

This section provides an example of an ISPF session. For new users, it is a quick introduction to ISPF. For users with previous ISPF experience, it is a quick review. It can also be used to demonstrate that ISPF has been properly installed and is operational.

The scenario requires the installation of a data set named SYS1.SAMPLIB. This data set is included on the ISPF basic distribution tape and should contain the following four members:

ISRASM Sample assembler source
ISRCOBOL Sample COBOL source
ISRFORT Sample FORTRAN source
ISRPLI Sample PL/I source.

During this scenario, member ISRASM is copied from SYS1.SAMPLIB to a user data set. The other three members are not used.

Running a Sample ISPF Session

For this scenario, the TSO Assembler Prompter, program number 5734-CP2, is installed and available. If the Assembler Prompter is not available at your installation, skip steps 35 through 48.

Action	Result
1. Log on to TSO.	A READY message appears on your screen.
2. Type `ISPF` (or the appropriate alias) and press Enter.	The ISPF Primary Option Menu appears.
3. On the Option line, type `3` to select the Utilities option. Then press Enter.	The Utility Selection Panel appears.
4. On the Option line, type `2` to select the Data Set utility. Then press Enter.	The Data Set Utility panel appears.

5. On the Option line, type `A` to allocate a new data set. Specify an ISPF library by typing the following information, but substitute your first name in the Group field:
`Project  . . your_user_id`
`Group  . . . name`
`Type . . . . ASM`
 	
Now press Enter.
	The Allocate New Data Set panel appears. Note: The Project name must be defined as a valid high-level identifier on your installation. Generally, user-ids are defined as such. If this is not true for your installation, contact your system programmer for information about what project names are valid for your system.

6. Type the following information:
Note: Leave ALL fields blank except the following.
`Space units . . . . . TRKS`
`Primary quantity. . . . 2`
`Secondary quantity. . . 1`
`Directory blocks. . . . 1`
`Record format . . . . . FB`
`Record length . . . . . 80`
`Block size  . . . . . 3120`
 	
Now press Enter.
	Data set your_user_id.*name*.ASM is allocated on scratch volume. The Data Set Utility panel reappears.

7. Select option A again and specify the following ISPF library, again substituting your first name in the Group field:
`Project  . . your_user_id`
`Group  . . . name`
`Type . . . . OBJ`
 	
Press Enter.
	The Allocate New Data Set panel reappears.

8. Leave everything the same. Just press Enter.	Data set your_user_id.*name*.OBJ is allocated. The Data Set Utility panel reappears.
9. Press F3.	The Utility Selection Panel reappears.
10. Press F3 again.	The ISPF Primary Option Menu reappears.
11. Type `3.3` to select the Move/Copy utility, bypassing the Utility Selection Menu. Press Enter.	The Move/Copy Utility panel appears.
12. Now you will copy a data set. On the Option line, type `C` to select `Copy data set or member(s)`. Then, under From Other Partitioned or Sequential Data Set:, enter the following data set name: `Data Set Name . . . 'SYS1.SAMPLIB(ISRASM)'` Press Enter.	A panel titled COPY FROM SYS1.SAMPLIB(ISRASM) is displayed.

Action	Result

13. Under To ISPF Library:, type the following values:
`Project  . . your_user_id`
`Group  . . . name`
`Type . . . . ASM`
 	
Press Enter.
	Member ISRASM is copied from data set SYS1.SAMPLIB to ISPF library your_user_id.*name*.ASM. Then, the Move/Copy Utility panel reappears.

14. Press F3.	The ISPF Primary Option Menu appears.
15. Now you will browse member ISRASM. On the Option line, type 1 to select View and press Enter.	The View Entry Panel appears. Select Browse Mode.

16. Type the following under ISPF LIBRARY:
`Project  . . your_user_id`
`Group  . . . name`
`Type . . . . ASM`
 	
Note: Leave the Member field blank.
 	
Press Enter.
	A member list is displayed, showing ISRASM as the only member in the your_user_id.*name*.ASM library.

17. Move the cursor to the left of ISRASM. Then type `S` to select ISRASM and press Enter.	A panel titled BROWSE your_user_id.*name*.ASM (ISRASM) appears. This is the first page of member ISRASM.
18. Press F8 to scroll ahead one page.	The second page of ISRASM appears.
19. Press F7 to scroll backward one page.	The first page of ISRASM reappears.
20. Type `FIND COMMENT` on the Command line and press Enter.	The cursor moves to the first occurrence of the character string `COMMENT` and the string is intensified. Also, the message `CHARS 'COMMENT' FOUND` is displayed in the upper-right corner of the screen.
21. To find the next occurrence of `COMMENT`, press F5, the RFIND command.	The cursor moves to the second occurrence of `COMMENT` and once again the string is intensified.
22. Press F3.	The member list reappears.
23. Press F3 again.	The View Entry Panel reappears.
24. Press F3 one more time.	The ISPF Primary Option Menu appears.
25. Now you will edit member ISRASM. On the Option line, type `2` to select Edit and press Enter.	The Edit Entry Panel appears.
26. Type `ISRASM` in the Member field and press Enter.	A panel titled EDIT your_user_id.*name*.ASM(ISRASM) appears. This is the first page of member ISRASM.
27. On the Command line, type `FIND COMMENT` and press Enter to find the line containing the character string `COMMENT`.	The cursor moves to the first occurrence of the character string and the line number is intensified.
28. Delete `COMMENT` by pressing the Erase EOF key.	`COMMENT` is erased. Any characters to the right of `COMMENT` are erased, also.
29. Press F5 to find the next occurrence of `COMMENT`.	The cursor moves to the second occurrence of `COMMENT` and the line number is intensified.
30. Move the cursor to the sequence number of the line below `COMMENT`, then move the cursor up one line. Repeat the `COMMENT` line by typing `R` over the first digit of the line number and pressing Enter.	The line is repeated.
31. On the Command line, type `AUTOLIST ON`, and press Enter.	Sets autolist mode on for automatic source listings.
32. Try out more Edit commands if you like, but remember: this program will be assembled later.	HAVE FUN!

Action	Result
33. Press F3.	Member ISRASM is saved in data set your_user_id.*name*.ASM and a listing of the member is placed in the ISPF list data set. The Edit Entry Panel appears.
34. Press F3 again.	The ISPF Primary Option Menu appears.
35. Now you will assemble the program. On the Option line, type `4` and press Enter to select the Foreground option.	The Foreground Selection Panel appears.
36. On the Option line, type `1` and press Enter to select `Assembler`.	The Foreground Assembler panel appears.

37. Type the following values:
`Project . . .your_user_id`
`Group . . . .name`
`Type  . . . .ASM`
`Member  . . .ISRASM`
`List ID . . .ASMTEST1`
`Assembler Options:`
`  ===> TEST,RENT`
 	
Press Enter.
	The Assembler Prompter is called. Terminal output is written at the bottom of a blank screen. When *** is displayed, press Enter to continue.
	Note: The assembly may take a few minutes.
	
	The assembly listing is displayed in Browse mode.

38. Browse the listing using the scroll commands. Then press F3.	The Foreground Print Options panel appears.
39. On the Option line, type `K` to select `Keep data set (without printing)` and press Enter.	The assembled program is saved in the list data set and the Foreground Assembler panel reappears.
40. Press F3.	The Foreground Selection Panel reappears.
41. Press F3 again.	The ISPF Primary Option Menu appears.
42. On the Option line, type `5` to select the Batch option and press Enter.	The Batch Selection Panel appears.
43. On the Option line, type `1` to select `Assembler`, enter job statement information as required by your installation, and press Enter.	The Batch Assembler panel appears.

44. Type the following values:
`Project . . . your_user_id`
`Group . . . . name`
`Type  . . . . ASM`
`Member  . . . ISRASM`
`List ID  . . . . . ASMTEST2`
`Assembler options:`
`  Term  . . . TERM  (TERM or NOTERM)`
`  Other . . . OBJ,NODECK,LIST`
 	
Press Enter.
	JCL for assembling ISRASM is generated. The Batch Selection Panel reappears. The message "Job step generated" appears in the upper right corner of the panel.

45. Press F3.	The job is submitted. The job name is displayed at the bottom of the screen. When *** is displayed, press Enter. The ISPF Primary Option Menu appears.
46. On the Option line, type `6` to select the Command option. Press Enter.	The ISPF Command Shell panel appears.
47. Type the following command: `===> STATUS` Press Enter.	The status of your job appears. When *** is displayed, press Enter. The ISPF Command Shell panel is displayed again with the previous command still showing.
48. Press F3.	The ISPF Primary Option Menu reappears.

Action	Result
49. Move the cursor to Help on the action bar. Press Enter. On the resulting pop-up window, select **18**.	The beginning of the ISPF tutorial appears. Follow the directions to learn more about ISPF. When you have finished, press F3 to return to the ISPF Primary Option Menu.

If you have followed this scenario, you should have an Assembler listing in a data set named either *prefix*.*userid*.ASMTEST1.LIST or *userid*.ASMTEST1.LIST. Also, when the job that you submitted has finished, you will have another listing in a data set named either *prefix*.*userid*.ASMTEST2.LIST or *userid*.ASMTEST2.LIST. Try the Browse option to review the listings and try experimenting with other ISPF options. When you have finished, return to the ISPF Primary Option Menu.

Action	Result
50. With the ISPF Primary Option Menu on the screen, press F3.	The ISPF Specify Disposition of Log and List Data Sets panel appears.
51. Select the process option to print and delete both the log and list data sets, and fill in the job statement information as required by your installation. Press Enter.	Data sets will be printed, then deleted through batch jobs submitted by ISPF. The job name is displayed at the bottom of the screen.
52. You are now out of ISPF. To leave TSO, type `LOGOFF` and press Enter.	This is the end of this usage scenario.

Chapter 6. Getting Ready to Run on MVS

This chapter helps you prepare to use ISPF data-element libraries. ISPF data elements include such things as panels and messages. Libraries to be accessed during processing of a dialog must be defined to ISPF. This chapter describes the kinds of data-element libraries required when ISPF is active. It also describes and provides examples of how to define library data sets to ISPF, both before starting a session, and dynamically during a session.

Setting Up ISPF Libraries

To set up libraries for developing and testing dialogs, follow these steps:

1. Set up the panel, message, skeleton, table, and program libraries for the application. Allocate new partitioned data sets.
2. Create a CLIST or REXX command procedure that contains the necessary ALLOCATE statements to allocate the libraries. Concatenate the application libraries ahead of the libraries required by ISPF, as described in "Library Concatenation" on page 114.

   Note: You can use the LIBDEF service to dynamically allocate libraries instead of allocating them before invoking ISPF. For more information see the *ISPF Services Guide*.
3. Create the panels, messages, and skeletons by editing directly into the application libraries.
4. Create the dialog functions and ensure that the load modules are in libraries accessible to ISPF.

   Functions coded as program modules *must* be link-edited. When a function is link-edited, the ISPLINK subroutine must be included (explicitly or by automatic call) in the load module. ISPLINK is distributed in load module format and can be placed in a system library for automatic call during link-edit.
5. Invoke the application. To do this, add an ISPSTART command to the command procedure created in step 2. The ISPSTART command should start the application using the appropriate PANEL, CMD, or PGM parameter. Users can start the application by using this command procedure or by selecting the application from the master menu or another menu.

Allocating Required ISPF Libraries

The libraries described in Table 9 are partitioned data sets required for operation of ISPF in the MVS/TSO environment:

Table 9. Required Partitioned Data Sets

DDNAME	Description	RECFM	LRECL	BLKSIZE
ISPPLIB	Panel Library	FB	80	3120
ISPMLIB	Message Library	FB	80	3120
ISPSLIB	Skeleton Library	FB	80	3120
ISPTLIB	Table Input Library	FB	80	3120
ISPPROF	User Profile Library	FB	80	(see note)
SYSPROC	Command Procedures Lib	FB	80	3120

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Note: The block size can be established by the application. It must be a multiple of 80.

The panel, message, skeleton, and table input libraries are distributed with ISPF. As distributed, the libraries have the characteristics listed above. These libraries can be reblocked by the installation to a larger block size. In addition, the panel, message, and skeleton libraries can be copied into a variable record format. The maximum length records supported are 160 for panels, 80 for messages, and 255 for skeletons. If data sets having unequal record lengths are to be concatenated, the record format must be variable. If you have preprocessed any panels in the panel library, they must be reprocessed using the ISPPREP utility after changing the panel library's record size or record format. Preprocessed panels will not function correctly if copied directly to a data set with a different record size or format.

Table 10 contains the LRECL limits which are enforced during ISPF initialization:

Table 10. LRECL Limits during ISPF Initialization

DDNAME	Description	RECFM	Minimum LRECL	Maximum LRECL
ISPPLIB	Panel Library	FB VB	80 84	160 164
ISPMLIB	Message Library	FB VB	80 84	80 84
ISPSLIB	Skeleton Library	FB VB	80 84	255 259

The VB libraries require the LRECL to contain 4 extra bytes for the record descriptor word.

Note: Use of the BUFNO parameter on allocation of ISPF libraries is not supported.

Problems can occur when using file tailoring services together with other services (EDIT, COPY, ...) that result in modifying the data set members in the ISPSLIB concatenation. ISPSLIB is the input skeleton library, and it is assumed to be a static library. FTINCL obtains existing DCB/DEB information based on the last OPEN done against ISPSLIB by ISPF.

It is recommended that applications that use file tailoring and that also modify members of ISPSLIB use the LIBDEF service for ISPSLIB to point to the application's skeleton library. Additionally, the application should check for any changes to the data set information (DCB/DEB) before invoking file tailoring services. If there has been a change, then the application should issue a `NULL` LIBDEF for ISPSLIB and then re-issue the original LIBDEF for ISPSLIB. This forces the ISPSLIB library to close and then re-open.

ISPF assumes that ISPSLIB is a static library. When you make allocations, consider limiting the possibility of extents by allocating the skeleton with the largest optimal block size.

There is a separate profile library for each end user. Its contents are dynamically generated and updated while ISPF is running. There is also a unique profile library for each national language version.

The recommended data set names for these libraries are shown below. Check with your ISPF system administrator to determine if these are the actual data set names used at your installation.

DDNAME	DSNAME
ISPPLIB	ISP.SISPP*xxx*
ISPMLIB	ISP.SISPM*xxx*
ISPSLIB	ISP.SISPS*xxx* ISP.SISPSLIB
ISPTLIB	ISP.SISPT*xxx*
ISPPROF	User-selected. Unique for each national language used.
SYSPROC	ISP.SISPEXEC ISP.SISPCLIB

xxx is a placeholder that represents the specific language you are using:

xxx	**Language**
ENU	US English
DES	Swiss German
DEU	German
JPN	Japanese
ENP	Uppercase English.

You should concatenate application libraries for panels, messages, skeletons, and tables ahead of the corresponding ISPF libraries using the DDNAMEs shown above. The application libraries must have the same data set characteristics as the required libraries, as described above. For example, assume that application XYZ uses the following partitioned data sets for panels, messages, skeletons, and tables:

```
XYZ.PANELS
XYZ.MSGS
XYZ.SKELS
XYZ.TABLES
```

You would issue the following allocations:

```
//ISPPLIB  DD DSN=XYZ.PANELS,DISP=SHR
//         DD DSN=ISP.SISPPxxx,DISP=SHR

//ISPMLIB  DD DSN=XYZ.MSGS,DISP=SHR
//         DD DSN=ISP.SISPMxxx,DISP=SHR

//ISPSLIB  DD DSN=XYZ.SKELS,DISP=SHR
//         DD DSN=ISP.SISPSxxx,DISP=SHR
//         DD DSN=ISP.SISPSLIB,DISP=SHR

//ISPTLIB  DD DSN=XYZ.TABLES,DISP=SHR
//         DD DSN=ISP.SISPTENU,DISP=SHR

//ISPPROF  DD DSN=USERAA.ISPF.PROFILE,DISP=OLD

//SYSPROC  DD DSN=ISP.SISPEXEC,DISP=SHR
//         DD DSN=ISP.SISPCLIB,DISP=SHR
```

These allocations must be performed before you start ISPF. They can be done in the user's TSO LOGON procedure by using DD statements, as shown above, or in a CLIST or REXX command procedure by using the corresponding TSO ALLOCATE commands.

Allocating Optional Table and File Tailoring ISPF Libraries

The data sets described in Table 11 are optional. You must allocate them only if an application uses table or file-tailoring services.

Table 11. Table and File-Tailoring Data Sets

DDNAME	Description	RECFM	LRECL	BLKSIZE
ISPTABL	Table Output Library	FB	80	(See note)
ISPFILE	File-Tailoring Output	FB/VB	255 max.	

Note: The block size can be established by the application. It must be a multiple of 80.

The table output library must be a partitioned data set. The ISPTABL DDNAME that defines the table *output* library can specify the same data set as the table *input* library, DDNAME ISPTLIB. The output and input data sets must be the same if the updated version of a table is to be reprocessed by the same dialog that updated it.

You must allocate the table output library to DDNAME ISPTABL before using table services. ISPF includes ENQ logic to prevent simultaneous updates. ISPTABL must *not* specify a concatenated sequence of data sets.

The dialog can dynamically allocate ISPTABL, and can free it upon completion of its use. ISPTABL should be allocated with DISP=SHR, even though it specifies an output data set. The TSO Programming Control Facility II (PCF) cannot protect the table output library from unauthorized updating if the library is allocated DISP=SHR. The library can be either protected by RAC or allocated with DISP=OLD and protected by PCF.

File-tailoring output can be written to a temporary sequential data set provided by ISPF. The temporary data set is allocated automatically, so there is no need for the dialog to allocate a data set. The fully qualified name of the temporary data set is available in system variable ZTEMPF. The DDNAME is available in ZTEMPN. This temporary data set always uses 80-character fixed-length records.

If the temporary data set is not used, file-tailoring output can be written to either a partitioned or a sequential data set. Both fixed-length and variable-length records are permitted. The maximum logical record length is 255 bytes. A data set must be allocated to DDNAME ISPFILE before starting file-tailoring services. The dialog can dynamically allocate the output library, and can free it upon completion. For a sequential data set, ISPFILE must be allocated with DISP=OLD. For a partitioned data set, it can be allocated with DISP=SHR but cannot be protected by the Program Control Facility II (PCF) unless it is allocated with DISP=OLD. ISPFILE must not specify a concatenated sequence of data sets.

Allocating Optional Image ISPF Library

The data set described in Table 12 is not a required ISPF library. You must allocate it only if an application in GUI mode uses images.

Table 12. Image Data Set

DDNAME	Description	RECFM	LRECL	BLKSIZE
ISPILIB	Image Input Library	FB	80	(See note)

Note: The block size can be established by the application. It must be a multiple of 80.

If you plan to use ISPF's image support, you must allocate the image input data set to ddname ISPILIB before using the images. You can accomplish this by allocating the image input data set before you invoke ISPF. Image files in Graphic Interchange Format (GIF) should reside in this input data set. This data set must be a partitioned data set. It can be allocated with DISP=SHR.

Note: The LIBDEF service does *not* result in the allocation of ISPILIB.

ISPF ships sample image files in the sample library SISPSAMP. The ISPF panel ISR@PRIM uses three of the sample image files: ISPFGIFL, ISPFGIFS, and ISPEXIT. You can copy the sample image files to your own image input data set allocated to ddname ISPILIB.

Allocating CLIST, REXX, and Program Libraries

Dialog functions that are coded as CLIST or REXX command procedures can be in a procedure library that has been allocated to DDNAME SYSPROC prior to starting ISPF. A REXX command procedure can also be allocated to the SYSEXEC DDNAME. The SYSEXEC DDNAME is described in *TSO/E Version 2 REXX User's Guide*.

You must link-edit dialog functions that have been coded as programs. The load module can reside in a step library, a system link library (such as SYS1.LINKLIB), or the link pack area. Alternatively, it can be in a partitioned data set (RECFM=U) allocated to DDNAME ISPLLIB(DISP=SHR). This library (the ISPF Link Library) can be used for testing new dialogs that contain program-coded functions. If used, it must be allocated prior to starting ISPF. ISPLLIB can specify a concatenated sequence of partitioned data sets.

ISPLLIB is used as a task library when fetching load modules. It is searched before the system link libraries and the link pack area. If ISPF product modules are kept in a step library and a task library (ISPLLIB) is used, the data sets containing the ISPF product modules should be included in the ISPLLIB concatenation sequence as well as the step library concatenation. If a program is to be used in split-screen mode it should be linked as reentrant or nonreusable.

The exception to this search order is the SISPSASC library. Modules in it are not searched for using the ISPLLIB task library. SISPSASC must be in STEPLIB or LNKLST if you are using the ISPF C/S feature. For more information about SISPSASC, refer to *ISPF Planning and Customizing*.

Allocating DBCS Libraries

DBCS users can use alternate message, panel, and skeleton libraries. To do so, the DBCS versions of the libraries must have been allocated using these DDNAMEs:

ISPMALT Alternate message library

ISPPALT Alternate panel library

ISPSALT Alternate skeleton library.

You can allocate these libraries when you allocate the distributed ISPF libraries. If the alternate libraries are allocated and the terminal has DBCS capability, ISPF uses the alternate libraries. If either of these two conditions is not satisfied, ISPF uses the distributed libraries.

Selecting the National Language for ISPF Sessions

An ISPF session can be run in any installation-supported national language. Before starting ISPF with the ISPSTART command, a user must perform the necessary allocations. For example, command procedure ISPFE might be issued for an English session or ISPFG for a German session.

The same set of DDNAMEs (ISPPLIB, ISPMLIB, ISPSLIB, ISPTLIB, and ISPPROF) must be allocated regardless of the command procedure used. At logon time, the necessary allocations for the national language at an installation can be performed by a CLIST or REXX logon procedure.

The language in which a session runs reflects the value (not always the full language name) in the read-only system variable ZLANG, which is available to dialogs running under ISPF. The default value for session languages is specified when ISPF is installed, and is discussed in *ISPF Planning and Customizing*. You can override the default session language with an alternate language keyword on the ISPSTART command. See the *ISPF Dialog Developer's Guide and Reference* for the exact syntax to use.

By specifying a default session language, the installation can ensure that both ISPF initialization messages and the normal session messages are in the default language. Even if you override the session default language with an alternate language using an ISPSTART language keyword, some of the first initialization messages, issued before the command scan, are in the default session language. However, any messages issued after processing of the ISPSTART parameters are in the language specified by the keyword.

If the terminal does not support DBCS, and the default language (or the alternate language selected by the language keyword) requires DBCS, ISPF uses English as the session language.

In cases where the session language requires DBCS, certain messages are always issued in English. These messages are:
- ISPF Main task abend.
- ISPF Subtask abend.
- The following required module for the selected language could not be loaded.
- ISPF command not allowed. You are already under ISPF.
- Invalid environment; TSO/E version 2.1 or later required.

Part 2. Appendixes

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Appendix A. Installing the Client/Server Component

The Client/Server component of ISPF takes the form of an application called the ISPF Workstation Agent (WSA). The WSA runs on your local workstation and maintains a connection between the workstation and the ISPF host. The WSA provides:

- The ability to display the ISPF panels using the display function of your workstation operating system (known as *running in GUI mode*).
- The ability to edit host data on your workstation and workstation data on the host (known as *distributed editing*).

The WSA installation file is supplied with ISPF and must be downloaded from the host to the local workstation and then installed and initialized before these functions are available.

Installation Considerations for the Client/Server component

This section provides information on the following topics that you need to be aware of before you install the WSA component on your workstation:

- Assumptions
- Required hardware and software
- Configuration parameters

Assumptions

The Workstation Agent assumes that you have already established either:

- An APPC connection between your workstation and the host, and your workstation is running under OS/2;

OR

- A TCP/IP connection between your workstation and the host, and your workstation is running under one of the following supported operating systems:
  - IBM OS/2
  - Microsoft Windows 2000
  - AIX
  - HP-UX
  - Solaris (SUN).

All necessary APPC or TCP/IP communications software must be initialized fully before starting the WSA. The WSA does not attempt to initialize the communications protocol again after it receives the first initialization error.

for information about installation and customization of the APPC or TCP/IP software used on your workstation, consult the documentation supplied by your software vendor. Additional information can be found in Appendix B, “Configuring Communications for the ISPF Client/Server,” on page 169.

The WSA installation file is downloaded using the ISPF C/S Component Install Utility. This utility provides three ways of obtaining the file:

1. Using File Transfer Protocol (FTP): This option assumes that you have a TCP/IP connection (not APPC), that the TCP/IP on your workstation supports the File Transfer Protocol (FTP) and that FTP is operational at your workstation. An operational FTP requires that:

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- FTP be configured and started on the workstation.
- The workstation FTP server (FTPD), or "Daemon," be active.
- The users have the authority to transfer files. Users are authorized through entries in the FTP Daemon access protection file. See "Configuration Parameters" for additional information.

2. Using an existing WSA connection to get a new or updated version: This option assumes that you have already downloaded and installed a previous version of the WSA and is suitable for use by those with TCP/IP or APPC connections.
3. Using a manual method: If your workstation does not support FTP, or you do not have an established connection, it is assumed that you have a means of transferring the ISPF C/S workstation programs down from the host files to the workstation. Although the ISPF C/S Install Utility does not provide an automated download procedure for all users, it does provide information that can assist in the download process.

Required Hardware and Software

For the hardware and software requirements for ISPF, refer to *z/OS Planning for Installation*, document number GA22–7504.

Configuration Parameters

Before you run the ISPF C/S Install Utility, gather the following installation-unique parameters:

IP Address The TCP/IP address, Internet address, workstation ID, or Internet address alias. Required for download options 1 (FTP) or 2 (existing WSA connection).

Note: for information about how to obtain your IP Address, see "TCP/IP Requirements Detail" on page 169.

User ID This is the FTP user name that must have write access to the directory where the workstation ISPF Workstation Agent code is to be installed. Required for download option 1 (FTP) only.

Note: The user authorization is granted through an entry in the FTP Daemon access protection file. If you do not have an entry in this file, you will need to create one. Refer to the TCP/IP documentation for details on creating a user entry in the FTPD Access Protection file.

Password Password for the FTP User ID specified. Required for download option 1 (FTP) only.

Directory The workstation directory where you want the utility to install the programmable workstation programs. The user must have write access to this directory. Required for all download options.

Downloading the Workstation Agent

This section provides a step-by-step method for downloading and installing the Workstation Agent for the first time. For additional information about the ISPF panels used in the process, see the 'Download Data Set to Workstation Utility (Option 3.7)' section of the *ISPF User's Guide Volume II*.

1. From the Primary Option Menu panel, enter `3.7` (Utilities/Download Data Set to Workstation).

2. On the Download Data Set to Workstation panel, enter option **1** (ISPF C/S Download ISPF C/S component).
3. On the Client/Server Component Download panel, choose your download method.
   - **1**. FTP (requires workstation FTP server).

     Download using FTP. ISPF invokes the host FTP client to connect with the FTP server on your workstation and transfer the WSA installation program.
   - **2**. ISPF C/S (requires workstation connection).

     Download using ISPF Client/Server. If you already have a workstation agent installed on your workstation, you can use the built-in file transfer services to download a new WSA installation program. This process is described in detail in the 'Download Data Set to Workstation Utility (Option 3.7)' section of the *ISPF User's Guide Volume II*.
   - **3**. Manual.

     ISPF tells you the name of the file you need to copy. You can copy it with any method you prefer as long as you maintain the data integrity of the WSA installation program. For example, you could use the File Transfer facility in your terminal emulator software. The file must be downloaded as "binary".
4. Specify the type of workstation environment in which you want to use the WSA.

   You must indicate which workstation operating system you want the WSA to run in, by typing the appropriate number in the Workstation Type entry field.
5. In the "Directory to copy file to:" field, specify a directory on your workstation where you want to store the WSA installation program. You can specify a full path name or a relative directory, or leave this field blank. If you leave it blank, the download is made to your home directory (in the case of FTP downloads) or the current directory (in the case of client/server downloads). If you specify a relative directory (one that does not start with a drive letter or slash character) the directory is relative to the FTP home directory or the client/server current directory.
6. You can download into an existing directory, or you can have ISPF create the directory you specify on the panel. If you want ISPF to create the directory on your workstation before copying the WSA installation program, select the *Create directory to which the file is to be copied* field.
7. By default, the *Data set to copy file from:* entry field displays the name of the host data set that contains the WSA installation program. This field value varies depending on the naming convention that was used when ISPF was installed. If the WSA installation program has been moved or copied elsewhere, you can change the name of this data set.
8. Press Enter. The remaining steps will differ according to the download method selected.

File Transfer Protocol (FTP) Download

When you select choice 1 **FTP (requires workstation FTP server)** under *Download methods* on the ISPF Client/Server Component Download panel, ISPF displays the ISPF Client/Server Installation Notice panel shown in Figure 43 on page 160.

```
—                    Client/Server Installation Notice
I
   For successful FTP download of the client server component:
1
2  o   There must be TCP/IP connectivity between the z/OS host and the
       workstation.

   o   An FTP server must be running on the workstation.

   If either of these conditions does not exist, you must choose another
   method to download the installation program.

   ENTER to continue, END or CANCEL to return to the previous screen.


   Command ===> _____________________________________________________
    F1=Help     F2=Split    F3=Exit     F9=Swap    F12=Cancel


Option ===> 1
 F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
F10=Actions  F12=Cancel
```

Figure 43. ISPF Client/Server Installation Notice (ISPWSD02)

This panel is a reminder to you that certain conditions must be present for you to use the FTP download method. Aside from the two specific conditions mentioned on the panel, you must also ensure that:

- the path specified in step 5 on page 159 has write access (review your TRUSERS file);
- you have read access to the MVS data base where the ISPF Client/Server Component is stored; and
- the directory where you want to copy the component exists, OR you have selected the *Create directory* option on the previous panel.

To complete the download:

1. Press Enter. ISPF displays the panel shown in Figure 44 on page 161.

```
                    Client/Server Component Download

Enter the following information to download the ISPF Client/Server
Component via FTP:


IP Address or Host Name of workstation:
_______________________________________________________________
User to login: (Case sensitive)
_________________________________
Password for login: (Case sensitive)


Enter "/" to select option
/  Browse FTP output only if an error occurs.




Command ===> _______________________________________________________
 F1=Help       F2=Split      F3=Exit       F7=Backward   F8=Forward
 F9=Swap      F12=Cancel
```

Figure 44. Second Client/Server Component Download Panel (ISPWSD04)

2. Complete the fields on this panel with the appropriate information:

   IP Address or Host Name to OPEN
   The dotted IP address or name of the workstation ID to which you want to copy the ISPF Workstation Agent installation program.

   User to login
   The file transfer protocol (FTP) user name. This name must have write access to the directory where the ISPF Workstation Agent code will be installed and is case sensitive.

   Password for login
   The password for the user ID you want to use at the FTP server. You can leave this field blank if the user id is "anonymous", but be aware that most FTP servers expect a password, even if only an e-mail address.

   Browse FTP output only if an error occurs
   You can choose to display FTP output only if something wrong happens. Enter "/" in this field to have the option active. If you do not choose this option, ISPF displays *all* output from the FTP transfer.

3. Press Enter to process this panel.

   If you chose not to override the ISPF default concerning display of FTP output, your screen will now show that output. Press Enter to proceed to the next download panel.

   If you chose to browse the FTP output only if an error occurs, and there is an error, the error information is displayed. If no error occurred, you proceed to the next download panel.

   After a successful FTP download, the following panel appears on your screen, telling you to complete the installation from your workstation.

```
The ISPF Client/Server Component workstation install program has been
copied to workstation:



in directory:

   C:\TEMP

Run the ISPFINST program to complete the install on your workstation
in the directory specified. The program is a self extracting
executable that will result in additional files being generated on
your workstation.




Command ===> _____________________________________________________
 F1=HELP       F2=           F3=END        F4=DATASETS   F5=FIND
 F6=CHANGE     F9=SWAP      F10=LEFT      F11=RIGHT     F12=SUBMIT
```

Figure 45. ISPF Client/Server Component Install Program Panel (ISPWSD07)

Manual Download

When you select choice 3 **Manual** under *Download methods* on the ISPF Client/Server Component Download panel, you are choosing to use your own preferred download method. ISPF displays a panel of instructions necessary for you to do this, as shown in Figure 46.

```
ISPWSD05       Client/Server Component Download

In order to install the ISPF Client/Server Component
workstation code you will need to download (Binary) from the
MVS data set where the ISPF Client/Server Component install
executable resides to a directory on your workstation.
Complete the install by running the install program on your
workstation. The program is a self extracting executable and
will result in files being generated on your workstation.



Copy member . : ISPGUINX

From data set : 'ISP.SISPGUI'

To file . . . : ispfinst.exe


Command ===> _____________________________________________________
 F1=Help         F2=Split        F3=Exit         F7=Backward
 F8=Forward      F9=Swap        F12=Cancel
```

Figure 46. Client/Server Component Download Panel (ISPWSD05)

The non-editable fields on this panel are:

Copy member
The name of the data set member that contains the appropriate installation executable for the selected workstation type.

From data set
The name of the MVS data set in which the installation members reside.

To file The name of the file to be created on the selected workstation type.

Running the Installation Program

After you have downloaded the Workstation Agent Installation program, resume the installation by running the program called ISPFINST.EXE (ispfinst on UNIX platforms). This is a self-extracting executable program that generates additional necessary files on your workstation. Follow this procedure:

1. Go to a command line.
2. Change to the directory to which you downloaded the ISPF C/S workstation code. (For AIX, Solaris, and HP UX, use the **chmod** command to give the file execute permission).
3. Enter ISPFINST.
4. A dialog box called Workstation Agent Install Program is displayed.

Figure 47. Workstation Agent Install Program

A Base Install Directory and a national language (such as English) are displayed in this box. Be sure this is the Base Install Directory and the national language that you want to use for the installation of ISPFINST. If the directory is incorrect, type in the correct directory name. If the language is incorrect, scroll down the list of languages and pick the one that is correct.

5. Press Enter or select the Install push button.
6. WSA.EXE, along with several other files, is created in the Base Install Directory that you specified. (For AIX and HP UX, the executable file, called **wsa**, is created.
7. A final dialog box will appear, instructing you to be sure that the name of the Base Install Directory is in your libpath (or for AIX and HP UX, the PATH environment variable). Select OK to close the dialog box.

8. If the Workstation Agent Install Program dialog box still appears on your screen, select Quit to remove it from your display.

The Workstation Agent Window

The Workstation Agent (WSA) window is displayed when you have prepared your workstation to make a connection to the host, by downloading and executing the workstation portion of the Client/Server software.

Figure 48. The Workstation Agent window

The functions available from the Options pull-down menu on the Workstation Agent window are:

Information
Displays the ISPF WSA Information dialog window. The Information dialog shows you the number of active sessions. Each active session represents a connection between the ISPF Client/Server workstation agent and an ISPF host. The dialog also indicates which communications interfaces (such as TCP/IP or APPC) have been initialized on the workstation, and the TCP/IP Port Number, or APPC Transaction Program (TP) Name. Additionally, the WINSOCK Path, if required, is shown in this dialog. The WINSOCK Path is applicable to Windows environments only.

Enable TCP/IP
This selection toggles between active and inactive when you click it. The change does not take affect until you restart the Workstation agent.

Enable APPC
This selection toggles between active and inactive when you click it. The change does not take affect until you restart the Workstation agent.

Set TCP/IP Port
Displays the ISPF Client/Server Configuration dialog. The Configuration dialog enables you to change the TCP/IP port number. From a TCP/IP perspective, the port number represents the ISPF Client/Server Workstation Agent. If a port number is not specified in the Configuration dialog, the default ISPF Client/Server port number is used.

If you specify a port number, the change takes effect after the ISPF Client/Server Workstation Agent is closed and restarted. The change remains in effect for subsequent invocations of the ISPF Client/Server Workstation Agent. If you later decide to change back to the ISPF Client/Server default port number, delete the port number in the Configuration dialog and restart the ISPF Client/Server Workstation Agent.

If you change the port number, you must also change the port number specified in the ISPF GUI initialization.

Set SNA TP Name
Displays the ISPF Client/Server Configuration dialog. The Configuration dialog enables you to change the SNA Transaction Program name. From an SNA APPC perspective, the TP name represents the ISPF Client/Server Workstation Agent.

If specified, the name is used to construct the names of the two transaction programs required to support an ISPF Client/Server connection. The ISPF Client/Server function appends different single letters to the supplied name to form the actual names of the two APPC transaction programs. The letter S is appended to the name selected to indicate the *send* conversation TP name used on the workstation and host. The letter R is appended to the name to indicate the *receive* conversation TP name.

This option is available if your workstation operating system is OS/2 or Windows APPC. For all other operating systems this option is disabled.

If a TP name is not specified in the Configuration dialog, the default ISPF Client/Server TP name is used. If you specify a TP name, the change takes effect after the ISPF Workstation Agent is closed and restarted. The change remains in effect for subsequent invocations of the ISPF Workstation Agent. If you later decide to change back to the ISPF Client/Server default TP name, delete the TP name in the Configuration dialog and restart the ISPF Workstation Agent.

If you change the TP name, you must also change the TP name specified in the ISPF GUI initialization.

Set WINSOCK Path

This option enables you to specify an explicit path to the socket DLL used by the active TCP/IP subsystem in a Microsoft Windows workstation environment. The specification of an explicit path overrides the default DLL search order for Windows.

For example, if the desired DLL is located in directory D:\TCPDOS\BIN then the path would be specified as follows:

```
D:\TCPDOS\BIN
```

The setting takes effect after the ISPF Client/Server workstation agent is closed and restarted. The setting remains in effect for subsequent invocations of the ISPF workstation agent.

This option is only available in a Microsoft Windows environment. For other operating systems this option is disabled.

Set Font

This option enables you to specify the font of your connection through the Workstation Agent window. When you choose “Set font” from the Options pull-down, the Font dialog window appears. Choose from one of the available fonts and sizes that appear in the list. The list of fonts shows the fonts that are registered with your operating system. The change takes place after you re-start the agent, and affects all text in the interface windows except the menu bar and title bar text.

Because the layout of the data in a workstation panel is based on row and column positions, you should use a non-proportional (that is, fixed width or monospaced) font. Using a non-proportional font ensures that the data within the panels lines up correctly. If you use a proportional font, data within columns might not align correctly.

Note: If you are using an AIX platform, you can change the font of the Workstation Agent by entering the following in your .Xdefaults file:

```
DtProcess*dtFont: <font name>
```

For example:

```
DtProcess*dtFont: fixed
```

gives you a fixed font for the Workstation Agent application. However, this setting is overridden when you use the Set Font option on the Workstation Agent window.

System Register
This option enables you to bypass the Workstation Agent connection panel when you make a client/server connection. Choosing this function on the Options pull-down on the Workstation Agent window displays the System Register panel.

The System Register Panel

Figure 49 shows the System Register panel, which is displayed when you select System Register from the Options pull-down on the Workstation Agent panel. The main panel is divided into four parts.

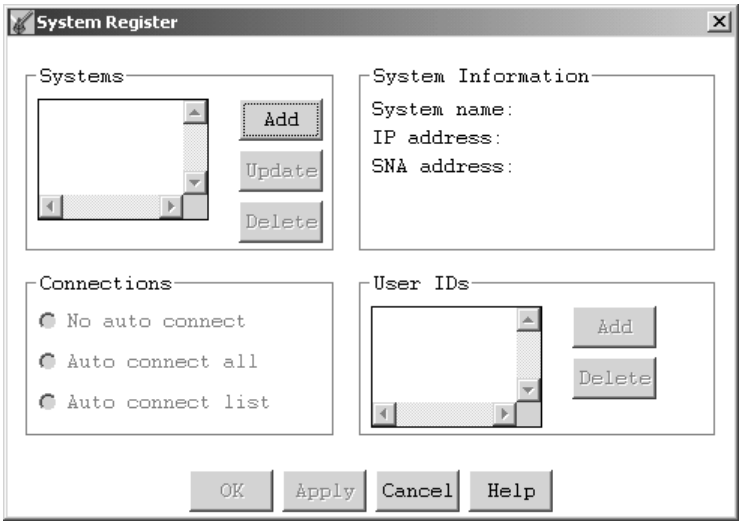

Figure 49. System Register Panel

The Systems section of the panel is where you name the system you want to connect from. Click the **Add** pushbutton to add a new entry to the systems list. A pop-up dialog box like the one shown in Figure 50 appears.

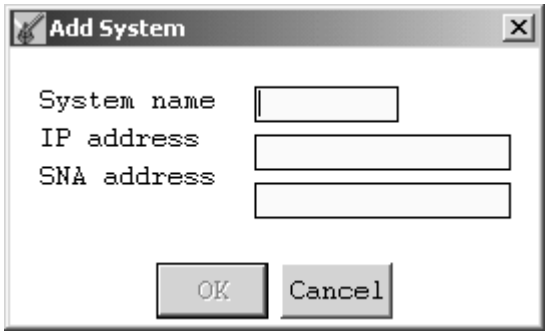

Figure 50. Add System Pop-up Dialog

There are entry fields for the system name and an IP or SNA address. If you do not know the system address, you can get it from the WSA connection panel. Until

you set up the system register to bypass that panel, it will show you the address of the system that you are connecting from. Simply make your client/server connection, and before accepting the connection, note the address of the system.

After filling in the appropriate information, click **OK**. After you finish your session with the System Register panel, this system will be available to the users you select without it being necessary for them to see the Workstation Agent connection panel.

You can update or delete system information in the same area of this panel. To update a system, first highlight it in the list by clicking on it. Then click the **Update** pushbutton. A Change System pop-up dialog box, similar to the Add System window, appears on your screen with the system name and its IP or SNA address already filled in. Modify the information, then click **OK**.

To delete a system from the System Register files, first highlight the desired system in the list by clicking on it. Then, click the **Delete** pushbutton. The system and any user IDs associated with it in the System Register files are deleted.

The Connections part of the panel enables you to define how to set the connections that you want to make. The Connections choices are:

No Auto Connect
: Selecting this choice means that no one connecting to the Workstation Agent can bypass the WSA connection panel for the specified system. In other words, everyone connecting to the WSA must use the connection panel to accept the connection from that system before continuing.

Auto Connect All
: Everyone connecting to the WSA from the specified system will bypass the connection panel.

Auto Connect List
: Selecting this choice activates the User IDs section of the System Register panel. When you make this selection, you must enter the ID of at least one user you want to be able to bypass the WSA connection panel when connecting from the specified system. Enter user IDs by clicking on the **Add** button in the User IDs section of the panel. A pop-up dialog like the one shown here is displayed.

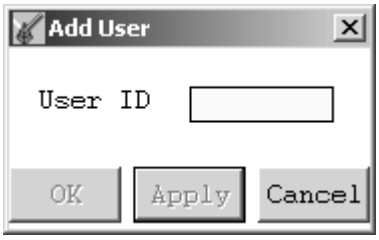

Figure 51. Add User Pop-up Dialog

Enter the user ID of each user you want to automatically connect from the highlighted system. If you are entering only one user ID at this time, click **OK** to update the list and return to the System Register panel. If you are entering a list of IDs, click **Apply** after each entry, then click **OK** after the last one. As you enter IDs, they are added to the list appearing in this section of the System Register panel.

To delete IDs from the list, highlight the line in the list, then click on the **Delete** button located next to the list.

The System Information section of the System Register panel shows the name of the system highlighted in the Systems section of the panel, and its IP or SNA address. This is the system that you are currently working with on the System Register panel. You cannot change the information in the System Information section.

When you are finished working with the System Register panel, you can dismiss it by clicking the **OK** button at the bottom of the panel. During long sessions where you are making many entries, it is recommended that you occasionally click **Apply** to save your entries.

Appendix B. Configuring Communications for the ISPF Client/Server

Either a TCP/IP or an SNA APPC connection must be enabled to support ISPF Client/Server (C/S) communication between an MVS host and a workstation. The following sections describe what must be configured at the host and at a workstation for both TCP/IP and SNA APPC connections. Configuration of 3270 terminal type connections that support user logon to MVS TSO is not described here. A configuration fast path is provided at the beginning of the discussion of each type of connection.

Although a few elements of ISPF C/S configuration must be coordinated between a workstation and the MVS host, ISPF users will generally be more concerned with workstation requirements. MVS system or network support personnel will generally be more concerned with MVS host requirements.

Note: All necessary TCP/IP or APPC communications software must be initialized fully before starting the ISPF Workstation Agent component. The WSA does not attempt to initialize the communications protocol again after it receives the first initialization error.

Configuring TCP/IP connections

The following table provides a fast path for configuring TCP/IP communications to support ISPF C/S.

TCP/IP Requirements Fast Path

Workstation	MVS host
A numeric internet address must be defined for TCP/IP on the workstation (such as, 9.67.224.96).	The numeric internet address defined for TCP/IP on the workstation must be specified on the ISPSTART command or from the GUI settings panel to invoke ISPF WSA.
No workstation requirement matching this host requirement →	It must be possible for ISPF to locate the TCP/IP configuration data set containing the TCP/IP started task name. Keywords SAS/C_TCPIP_DATA_VALUE and SAS/C_TCPIP_PREFIX_VALUE in the ISPF Configuration Table Keyword File can be used to determine the appropriate data set.

TCP/IP Requirements Detail

An internet address is the 32-bit address assigned to a TCP/IP host and usually represented in dotted decimal form. For example: `9.67.224.96`. The address identifies both a physical network within the internet and an individual host within that network.

A TCP/IP host can be an MVS system or an OS/2, Windows, or UNIX workstation. To configure ISPF C/S communications you need to know the dotted decimal internet address associated with the workstation on which the ISPF WSA graphical user interface is to be displayed. In many enterprises the workstation internet address is obtained from a network administrator and assigned to the

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workstation during installation and customization of the TCP/IP workstation software. For information about installing and customizing the TCP/IP software used on your workstation, consult the documentation supplied by your TCP/IP software vendor. If you have already installed TCP/IP on your workstation and you do not know your TCP/IP internet address, but you do know your TCP/IP workstation host name (such as JSMITH, ACCT23), you can determine the internet address as follows:

If you have this TCP/IP workstation software	do this on the workstation
• IBM TCP/IP for OS/2	Select the Command Prompts folder after selecting the OS/2 System icon. Select OS/2 Window from the folder and at the displayed OS/2 command prompt enter the command **host** <hostname>. The numeric internet address of the workstation host identified by <hostname> should appear in the reply.
• Windows TCP/IP	From an MS/DOS command prompt enter **ipconfig** (or **winipcfg** in some systems). The numeric internet address of the workstation should display in the IP Configuration panel.
• AIX TCP/IP	From the AIX command prompt enter the command **host** <hostname>. The numeric internet address of the workstation identified by <hostname> should appear in the reply.
• HP-UX TCP/IP	From the HP-UX command prompt enter the command **ping** <hostname>. The numeric internet address should appear in the output of the command. Use <Ctrl-c> to end the command.
• Solaris TCP/IP	From the command prompt enter the command **ping -s** <hostname>. The numeric internet address of the workstation identified by <hostname> should appear in the reply.

UNIX users might need to specify a unique port on the workstation to be used for communication, in addition to the internet address. This is necessary because multiple ISPF WSA components can run on any one UNIX workstation at the same time. The port is specified by appending `:<port#>` to the end of the internet address. By default, all of the TCP/IP protocols are defined in the /etc/services file. This file can be viewed so you can choose a port that is not currently reserved by another application. Ports 0 through 1024 are reserved for system use. The port number must also be specified in the ISPF WSA graphical user interface. Do this through the Options pull-down menu, Set TCP/IP Port choice. The port number specified on the host must be the same as the port entered in the ISPF WSA graphical user interface.

The ISPF C/S component uses the C-socket interface for TCP/IP communications. C-sockets are enabled by the SAS/C runtime support code distributed with ISPF. The SAS/C runtime library supports z/OS Communications Server: IP as well as other common socket implementations.

Determining the TCP/IP sockets started task : procedure name

With the enablement of SAS/C socket support the TCP/IP started task procedure name for TCP/IP sockets is determined by reading the TCP/IP configuration data set. The default name for this data set is TCPIP.TCPIP.DATA.

The SAS/C runtime code locates the configuration data set by testing for data set access as determined by the elements of the following search order:

1. =TCPIP_DATA=style:any.dataset.name.or.ddname

   =TCPIP_DATA is a SAS/C environment variable. The parameter SAS/C_TCPIP_DATA_VALUE in the ISPF Configuration table can be used to set the value of this variable. The value DEFAULT indicates that no value is set by ISPF.

   Options for setting the value are:

   - DDN:ddname - indicates that SAS/C will search for the data set identified by "ddname". If the SAS/C style prefix is omitted the style prefix value is assumed to be "DDN:". For example,

     ```
     SAS/C_TCPIP_DATA_VALUE=DDN:MYTCPDD
     SAS/C_TCPIP_DATA_VALUE=MYTCPDD
     ```

     (if the TSO logon procedure contains this JCL statement:

     ```
     //MYTCPDD DD DSN=MYTCPIP.CONFIG ...
     ```

     SAS/C will search for the data set MYTCPIP.CONFIG)
   - TSO:dataset - indicates that SAS/C will search for the data set "userid.dataset" where userid is the TSO userid. For example,

     ```
     SAS/C_TCPIP_DATA_VALUE=TSO:MYTCPIP.CONFIG
     ```

     (if the TSO userid is SMITHJ, SAS/C will search for the data set SMITHJ.MYTCPIP.CONFIG)
   - DSN:dataset - indicates that SAS/C will search for the data set "dataset".

     ```
     SAS/C_TCPIP_DATA_VALUE=DSN:MYTCPIP.CONFIG
     ```

     (SAS/C will search for the data set MYTCPIP.CONFIG)
2. //SYSTCPD DD or TSO ALLOC F(SYSTCPD)

   //SYSTCPD DD or TSO ALLOC FI(SYSTCPD) indicates that SAS/C will search for the data set associated with the ddname "//SYSTCPD". For example,

   ```
   //SYSTCPD DD DSN=TCPIP.TCPIP.DATA ...
   ```

   (if the TSO logon procedure contains the `//SYSTCPD DD JCL` statement, then SAS/C will search for the data set TCPIP.TCPIP.DATA)
3. userid.TCPIP.DATA

   userid.TCPIP.DATA indicates that SAS/C will search for the data set identified by concatenating the TSO userid to the character string ".TCPIP.DATA". If the prefix value set in the user's TSO profile differs from the TSO userid the prefix value will be used instead of the TSO userid. Some examples follow:

   ```
   SMITHJ.TCPIP.DATA
   ```

   (if the TSO userid is "SMITHJ" SAS/C will search for the data set SMITHJ.TCPIP.DATA)

   ```
   JONESB.TCPIP.DATA
   ```

   (if the TSO userid is "SMITHJ" and the TSO prefix is set to "JONESB", SAS/C will search for the data set JONESB.TCPIP.DATA)
4. SYS1.TCPPARMS(TCPDATA)

   SYS1.TCPPARMS(TCPDATA) indicates SAS/C will search for the data set SYS1.TCPPARMS and the member TCPDATA.
5. =TCPIP_PREFIX=prefix

=TCPIP_PREFIX is a SAS/C environment variable. The parameter SAS/C_TCPIP_PREFIX_VALUE in the ISPF Configuration table can be used to set the value of the variable. The value "DEFAULT" indicates that no value will be set by ISPF. If a string other than "DEFAULT" is specified for SAS/C_TCPIP_PREFIX_VALUE, SAS/C will concatenate the string to the characters ".TCPIP.DATA".

```
SAS/C_TCPIP_PREFIX_VALUE=TCPIP
```

(SAS/C will search for the data set TCPIP.TCPIP.DATA)

6. zap_prefix.TCPIP.DATA

   zap_prefix.TCPIP.DATA - indicates that SAS/C will search for the data set identified by concatenating the SAS/C runtime internal prefix string to the string ".TCPIP.DATA". The default value for the prefix string is "TCPIP" which implies the data set name TCPIP.TCPIP.DATA. Information on applying a zap to change the prefix to a string other than "TCPIP" is available with SAS/C compiler documentation if the SAS/C compiler is installed on your MVS system. If you simply use the SAS/C runtime support supplied with ISPF you should control the search for the TCPIP.DATA set by using one of the other search options.

The elements in the search order list are examined one by one. The search ends when an element in the list enables a data set to be located. That data set is considered to be the TCP/IP configuration data set. The content of the data set is not validated. If the selected data set does not contain valid configuration data for the installed TCP/IP subsystem, TCP/IP socket calls made from the ISPF Client/Server component to the SAS/C runtime might fail and an ISPF Client/Server connection to a workstation might not be possible for TCP/IP.

Search order specification for the TCPIP.DATA data set is currently not required for the ISPF interface to z/OS Communications Server: IP sockets.

Selecting the z/OS Communications Server: IP socket implementation

If you want to use the z/OS Communications Server: IP socket implementation, set the ISPF Configuration table keyword USE_MVS_OPEN_EDITION_SOCKETS to YES. The default value NO indicates that the common TCP/IP socket implementation will be used.

Changing ISPF defaults

The ISPF Configuration table must be modified if the value of either of the ISPF defaults keywords is to be changed to a value other than the default value shipped by ISPF. For information about customizing the ISPF Configuration table, see *ISPF Planning and Customizing*.

TCP/IP additional tips

The ISPF Workstation Agent is not linked with the application programming interface (API) modules provided by any specific communications software vendor. The default behavior for accessing a TCP/IP subsystem in IBM OS/2 environments is for the ISPF WSA to try to locate tcpipdll.dll which contains the IBM TCP/IP API modules. If that dynamic link library can be located, then no attempt is made to locate any other TCP/IP dynamic link library.

If the IBM TCP/IP library cannot be located then the workstation agent will try to locate rcb43.dll which contains the Novell TCP/IP API modules. If neither dynamic

link library can be located or if the TCP/IP API modules cannot be loaded successfully from a selected library then TCP/IP communication will be inoperative.

The default behavior for accessing a TCP/IP subsystem in Microsoft Windows environments is for the ISPF WSA to try to locate WINSOCK.DLL. In the Microsoft Windows environment, many different vendors supply a winsock.dll so it is critical that the first winsock.dll located by the ISPF WSA contains the TCP/IP API modules actually used by the active TCP/IP subsystem on the workstation. The difficulty of managing multiple winsock.dll files in a given workstation environment is compounded by the fact that the search order used by Windows to locate a dynamic link library is not constrained by a CONFIG.SYS LIBPATH statement as it is in OS/2 environments. The Windows search order is as follows:

1. current directory
2. WINDOWS directory
3. WINDOWS\SYSTEM directory
4. directory containing the executable file for the current task
5. directories listed in the PATH environment variable
6. list of directories mapped in a network

If the dynamic link library cannot be located or if the TCP/IP API modules cannot be loaded successfully from the selected library then TCP/IP communication will be inoperative.

You can specify an explicit path to the socket DLL used by the active TCP/IP subsystem in a Microsoft Windows workstation environment. Specifying an explicit path overrides the default DLL search order for Windows. The directory defined by the explicit path is searched for WINSOCK.DLL. The explicit path to the TCP/IP socket DLL is specified by using the Set WINSOCK Path function available from the Options pull-down found on the Client/Server Agent Window (see "The Workstation Agent Window" on page 164). This function is useful in environments such as those using LAN operating systems, in which the directories containing software from several TCP/IP vendors can be accessed by a workstation.

The Client/Server feature of ISPF (ISPF WSA) takes advantage of the TCP/IP *keepalive* socket option to enable ISPF on the host to detect an abnormal end to a session with the ISPF Workstation Agent on the workstation. Abnormal endings include such events as powering off or rebooting the workstation before closing the session with the ISPF WSA agent. The behavior of the keepalive facility differs for each workstation platform and TCP/IP product supported by ISPF:

Workstation Platform	Keepalive behavior
OS/2	Reboot (CTRL-ALT-DELETE), power off, and Workplace Shell shutdown are detected.
Windows	Reboot (CTRL-ALT-DELETE), power off, and Program Manager close are detected.
AIX	Reboot, power off, and shutdown of an AIX host are detected. Reboot (CTRL-ALT-BACKSPACE) of an X-station client is detected, but power off of an X-station client is detected only when the X-station is powered on again.
HP-UX	Reboot, power off, and shutdown of an HP-UX host are detected.

Solaris Reboot, power off, and shutdown of a Solaris host are detected.

If no transmissions have been received over a socket connection to the workstation during the specified timer interval, TCP/IP sends a keepalive packet to the workstation. If there is no response on the socket connection or if the socket connection has been reset, an error is returned and the ISPF C/S session ends on MVS.

The keepalive timer value for z/OS Communications Server: IP is controlled by the KEEPALIVEOPTIONS statement in the TCP/IP configuration data set. The INTERVAL parameter specifies the number of minutes that TCP/IP waits after the last transmission from the workstation before sending a keepalive packet. The SENDGARBAGE parameter specifies whether the packet contains any data. ISPF C/S was tested with the INTERVAL value set to 1 and the SENDGARBAGE value set to `TRUE`.

Enabling the z/OS Communications Server: IP socket implementation

The TCP/IP started task must be active in order to use ISPF Client/Server with the z/OS UNIX System Services (z/OS UNIX) socket implementation. Failure to start z/OS UNIX will result in a SAS/C runtime message such as the following when an ISPF Client/Server session is started from MVS:

```
LSCX902 **** WARNING **** ERRNO = EMVSNOTUP
  Generated in   SOCKET called from line   9512 of @@671470(NF6),
  offset 00020A
  C++ name: DtTCPCLIENT::BeginOperation
  socket failed because the OpenEdition kernel is not running,
  reason code 0000004E.
```

The TSO/ISPF userid must be authorized to use z/OS UNIX services if the z/OS UNIX socket implementation is selected. Failure to obtain proper authorization will result in an MVS abend code ″EC6″ when an ISPF Client/Server connection is attempted. The ″EC6″ abend code indicates a failure of the z/OS Communications Server: IP interface. Authorization status for basic z/OS UNIX services can be determined by entering the **OMVS** command from the TSO READY prompt. The following example indicates that the TSO user is not authorized to use z/OS UNIX services:

```
 READY
omvs
 FSUM2057I No session was started.  This TSO/E user ID does not have
access to OpenMVS.+
 READY
```

It is not necessary to run the z/OS UNIX shell to use the z/OS UNIX socket implementation with ISPF.

Understanding SAS/C socket TCP/IP error codes

ISPF continues to return a TCP/IP error code in the ″network data″ portion of ISPF messages indicating a TCP/IP communication failure. The TCP/IP error codes returned for failing socket calls are not defined in the z/OS Communications Server documentation. Instead, the error codes are those used by the SAS/C socket implementation. The codes are found in the SAS/C file errno.h. Refer to *ISPF Messages and Codes* for more information.

Configuring APPC connections

The following table provides a fast path for configuring APPC communications to support ISPF C/S.

APPC Requirements Fast Path

Workstation	MVS host
A fully-qualified network name must be defined for an SNA-independent LU type 6.2 on the workstation (for example, USIBMNR.NRI41G00).	The fully-qualified network name defined for an SNA-independent LU type 6.2 on the workstation must be included in an MVS VTAM® definition for the workstation node and must be specified on the ISPSTART command or from the GUI settings panel to invoke ISPF WSA.
No workstation requirement matching this host requirement →	Either a NOSCHED LU defined with the BASE option or a LU defined with the BASE and SCHED(ASCH) options in the MVS parmlib member APPCPM*xx* is required to support outbound conversation requests from ISPF to the workstation.
No workstation requirement matching this host requirement →	A VTAM application LU must be defined such that the label of the APPL definition statement and its ACBNAME parameter value match the ACBNAME of the APPC LU defined in MVS parmlib member APPCPM*xx*.
The mode #INTER must be defined on the workstation.	The mode #INTER must be defined as an entry in a MVS VTAM mode table associated with the VTAM definition of the workstation node.
No workstation requirement matching this host requirement →	The SYS1.CSSLIB data set containing the APPC callable system services modules must be accessible by ISPF.

APPC Requirements Detail

A fully-qualified SNA network name is an identifier up to 17 bytes in length assigned to a SNA logical unit (LU) and represented as two symbols, each up to 8 bytes in length, separated by a period. For example:

```
USIBMNR.NRI41G00
```

The symbol preceding the period specifies the name of an SNA network and the symbol following the period specifies the name of an LU within that network. For ISPF C/S communications you need to know the fully-qualified network name of an independent SNA LU type 6.2 associated with the workstation on which the ISPF WSA graphical user interface is to be displayed. The LU type 6.2 is required by the SNA communications software to support APPC connections to the workstation. for information about installation and customization of the SNA APPC software used on your workstation consult the documentation supplied by your software vendor. If you have already installed SNA APPC communications software on your workstation and you do not know the fully-qualified network name of an independent SNA LU type 6.2 you can identify a candidate name as follows:

If you have this SNA APPC workstation software	do this on the workstation
• OS/2 Access Feature of IBM Communications Server for OS/2 Warp, Version 4	Select the Command Prompts folder after selecting the OS/2 System icon. Select OS/2 Window from the folder and at the OS/2 command prompt enter the command **pmdsplay**. Select Display from the Display Active Configuration menu followed by the General SNA option on the pull-down menu. From the list box select Logical unit 6.2 to display a list of independent SNA type 6.2 logical units, each with its associated fully-qualified network name.
• IBM APPC Networking Services for Windows 1.00.02 (base product with CSD #2).	From the "IBM APPC Networking Services" program group select the icon for the Configure program item. Select the **Step 1** pushbutton from the Networking Services Configuration window. The fully-qualified local LU name for APPC communications will appear in the General Configuration window.

The fully-qualified name of the independent LU selected for the ISPF WSA connection on the workstation must also be identified to VTAM on the MVS system on which the ISPF C/S host agent will be invoked. The workstation independent LU can be identified to VTAM by one of the following methods:

- by dynamic definition by VTAM during session establishment
- by CDRSC definition statements
- by standard LU definition statements with LOCADDR=0 coded

The *VTAM Network Implementation Guide* and the *VTAM Resource Definition Reference* provide details on each method.

An LU definition must also be associated with the ISPF C/S agent on the MVS host to enable the connection to an ISPF WSA agent on a workstation. This LU must be made available to ISPF C/S by an APPC/MVS definition of a *base* LU to handle outbound connection requests from MVS to the workstation. The LU can be defined in one of two ways in the APPCPM*xx* member of the MVS parmlib data set by using a LUADD statement that includes one of the following combinations of parameters:

- the NOSCHED and BASE parameters
- the SCHED(ASCH) and BASE parameters

If neither LU option is defined outbound session requests from the ISPF C/S agent on the MVS host will be rejected.

A VTAM application LU must be defined in VTAMLST to match the definition in APPCPM*xx*. Both the label of the APPL statement and the ACBNAME= parameter value must be identical to the value specified for the ACBNAME parameter on the LUADD statement for the APPC/MVS LU defined in MVS parmlib member APPCPM*xx*.

A logical connection called a *session* must exist between the LU associated with the ISPF C/S agent on the MVS host and the LU associated with the ISPF WSA agent on the workstation to support APPC communication. To establish a session the LU on the MVS host must send a set of session control parameters called a *bind* to the LU on the workstation. The parameters are selected based on a *mode* definition. The ISPF C/S agent on MVS uses the #INTER definition, which is located in the IBM-supplied default VTAM mode table ISTINCLM. The #INTER mode definition

is also included among the default definitions supplied by the supported APPC communications software for workstations.

The VTAM node definition for the independent LU used by APPC Networking services for Windows cannot be the same VTAM node definition used for your native or emulated 3270 terminal support. A single node definition cannot be shared by APPC Networking Services for Windows and your 3270 terminal support. Likewise, if you are using a 3270 emulator on the Windows system on which you intend to use APPC Networking Services for Windows you must ensure that different local SNA service access point (SAP) addresses are used by the 3270 emulator and by APPC Networking Services for Windows.

To change the local SAP address for APPC Networking Services for Windows, select the icon for the Configure program item from the IBM APPC Networking Services program group. Select the **Step 2** pushbutton from the Networking Services Configuration window, then select Advanced from the LAN Configuration window. The local SAP can be changed on the Advanced LAN Configuration window.

APPC additional tips

To activate APPC Networking Services for Windows and Personal Communications/3270 in any order in that environment it was necessary to increase the values of the MINSAP and MINLINK parameters for the IEEE 802.2 protocol driver for NDIS in the CONFIG.SYS file as follows:

```
DEVICEHIGH = C:\LSP\DXME0MOD.SYS N ,,,2,2
```

where C:\LSP specifies the LAN Support Program directory in which the IEEE 802.2 protocol driver (DXME0MOD.SYS) was installed.

The final two positional parameters specify the minimum service access point and minimum link station values required to support activation of an independent LU 6.2 for APPC Networking Services for Windows and activation of a dependent LU 2 for Personal Communications/3270. If additional LUs are required, for example to support additional dependent LU 2 connections, the minimum service access point and minimum link station values might need to be increased.

Configuration of network support for SNA APPC communications is somewhat more complex than configuration for TCP/IP owing largely to the transition that SNA has made from an essentially static hierarchical networking model to a dynamic peer-to-peer networking model. Recognizing the difficulty that this transition presents to customers trying to configure APPC application support and APPN network support, networking specialists at IBM have produced the *Multi-platform APPC Configuration Guide* (GG24-4485). This guide is a valuable aid for anyone who wants to understand how to configure APPC and APPN communications in any of the environments in which the ISPF C/S capability can be enabled. It is available from the IBM Redbooks site: www.redbooks.ibm.com.

One way to simplify APPC configuration is to use the fully-qualified network name of the SNA *control point* defined for your workstation as the independent SNA LU type 6.2 that will support ISPF C/S connections. The control point for your workstation represents various subsystem functions associated with your communications software. The fully-qualified network name for the control point can be used not only to identify that set of subsystem capabilities but also to support applications such as the ISPF workstation agent that use an independent SNA LU type 6.2. If you do not know, or cannot remember, the fully-qualified

name associated with your workstation control point you can determine the name as follows:

If you have this SNA APPC workstation software	do this on the workstation
• OS/2 Access Feature of IBM Communications Server for OS/2 Warp, Version 4	Select the Command Prompts folder after selecting the OS/2 System icon. Select OS/2 Window from the folder and at the displayed OS/2 command prompt enter the command **pmdsplay**. Select Display from the Display Active Configuration menu followed by the General SNA option on the pull-down menu. From the displayed list box select Global SNA and an information window will be displayed. Together, the `Network name` and `Control point (CP) name` constitute the fully-qualified control point name associated with your workstation.
• IBM APPC Networking Services for Windows 1.00.02 (base product with CSD #2).	From the "IBM APPC Networking Services" program group select the icon for the Configure program item. Select the **Step 1** pushbutton from the Networking Services Configuration window. The fully-qualified local LU name for APPC communications will appear in the General Configuration window.

Appendix C. Listing Formats

This appendix describes and displays the kinds of listings you can produce using ISPF. The sample listings shown on the following pages are for illustration purposes only. They are not intended to be exact replicas, because printouts of ISPF listings vary according to the kind of printer you are using.

Source and Index Listings

If autolist mode is on, the ISPF editor automatically generates a source listing when you finish editing. You can also get source listings and index listings by using the following utility options:

Library (3.1)	P - Print member
Move/Copy (3.3)	
	CP - Copy and print
	MP - Move and print
Data Set List (3.4)	
	P - Print data set list
	PV - Print VTOC entries
Hardcopy (3.6)	
	PK - Print and keep data set
	PD - Print and delete data set
Outlist (3.8)	P - Print job output

Source Listings

Figure 52 on page 180 shows a sample source listing.

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```
PROJECT:  ISPFDEMO                    MEMBER:   COINS                    DATE:  86/07/30
GROUP:    MYLIB                       LEVEL:   01.04                     TIME:  17:22
TYPE:     PLI                         USERID:   USERID                   PAGE   01 OF 01

START                                                                                  MOD
 COL  ------+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8                FLAGS

  2     COINS                                                                  00010001      *
  4        PROCRDURE OPTIONS  (MAIN):                                          00020000
  6           DECLARE                                                          00030000
  8              COUNT                                                         00040000
  8              HALVES                                                        00050000
  8              QUARTERS                                                      00060003      *
  8              DIMES                                                         00070000
  8              NICKELS                                                       00080004      **
  8              SYSPRINT                                                      00090000
  6           DO HALVES = 100 TO 0 BY -50;                                     00100000
  8              DO QUARTERS = (100 - HALVES) TO 0 BY -25;                     00110000
 10                 DO DIMES = ((100 - HALVES - QUARTERS)/10)*10 TO 0 BY -10;  00120000
 12                    NICKELS = 100 - HALVES - QUARTERS - DIMES;              00130000
 12                    PUT FILE (SYSPRINT) DATA (COUNT, HALVES, QUARTERS, DIMES, NICKELS);  00140000
 12                    COUNT = COUNT + 1;                                      00150000
 10                 END;                                                       00160000
  8              END;                                                          00170000
  6           END;                                                             00180000
  4        END COINS;                                                          00190001      *
```

Figure 52. Sample Source Listing

Information at the top of the page includes project, group, type, and member name, current version and modification level, user ID, date and time that the listing was produced, and page number.

A column-positioning line is printed following the heading and preceding the actual data. The *start column* is printed to the left of each line, indicating the position of the first character in each line that is not a blank.

For ISPF library members with statistics, asterisks are either printed or not printed to the right of each line according to the setting of the modification flag, as follows:

- If the modification flag (columns 79-80) in the line is 00, no asterisks are printed.
- If the modification flag is nonzero but differs from the current modification level of the member, a single asterisk (*) is printed.
- If the modification flag is nonzero and has the same value as the current modification level of the member, two asterisks (**) are printed.

The asterisks allow you to scan the listing quickly for lines that were added or changed since the version was created (*) and for lines that were added or changed during the last update (**).

Index Listings

ISPF provides index listings at your request through the X (Print index listing) option of the Library utility (3.1), or the X or PX options of the Data Set List utility (3.4).

Index Listings for Source Libraries

Figure 53 on page 181 shows a sample index listing for an ISPF library.

```
                                                                                                                  DATE:  87/12/03
PROJECT:  ISPFDEMO                                                                                                TIME:  15:44
GROUP:    MYLIB                                                                                                   PAGE   001
TYPE:     PANELS

GENERAL DATA:                          GENERAL DATA:                          CURRENT  ALLOCATION:
     MANAGEMENT CLASS:        MI             RECORD FORMAT:          FB        7,172,640  KILOBYTES
     STORAGE CLASS:           31             RECORD LENGTH:          80                1  EXTENT
     DATA CLASS:              DI             BLOCK SIZE:          6,610               35  DIRECTORY BLOCKS
     VOLUME SERIAL:       D00163             1ST EXTENT SIZE:     7,162,640
     DEVICE TYPE:           3380             SECONDARY QUAN:      7,168,000      CURRENT  UTILIZATION:
     ORGANIZATION:            PO                                                    2,235  KILOBYTES
     CREATION DATE:     1986/08/22                                                      2  EXTENT
     EXPIRATION DATE:   ***NONE***                                                     10  DIRECTORY BLOCKS
                                                                                        8  MEMBERS

MEMBER      TTR      VERS.MOD  CREATION      DATE AND TIME        CURRENT    INITIAL    MODIFIED    USER
 NAME      (HEX)      LEVEL     DATE       LAST MODIFIED         NO. LINES  NO. LINES  NO. LINES   ID

ISRUADCS  000025     21.46   1981/06/10  1987/11/19  09:42:53      37         23         0       USERID
ISRUAIPS  000103     21.23   1984/12/07  1987/12/01  11:06:02      48         33         0       USERID
ISRUAISO  000105     21.56   1981/06/10  1987/12/01  11:06:11      48         48         0       USERID
ISRUAISX  000107     21.44   1981/06/10  1987/12/01  11:06:26      50         50         0       USERID
ISR01734  000027     21.06   1981/06/26  1987/11/30  13:46:31      27         25         0       USERID
ISR01735  000101     21.06   1981/06/26  1987/11/30  13:49:02      26         25         0       USERID
ISR01739  000029     21.09   1981/06/26  1987/11/30  13:49:55      27         25         0       USERID
MIKIE     000109     01.92   1997/01/24  1987/12/01  12:48:37      42         41         0       USERID

  MAXIMUMS:                   21.56   1987/01/24  1987/12/01  12:48:00      50         50         0

  TOTALS:                                                               305        270        0

  END OF MEMBER LIST
```

Figure 53. Sample Index Listing - Managed Source Library

The sample index listing shown here is for a source library that is managed by the Storage Management Subsystem.

Note: This index listing format is available only when Data Facility Product (DFP) Version 3 Release 1 is installed and available, and when Storage Management Subsystem is active.

The heading information includes:
- Project, group (library), and type
- Date and time the listing was produced
- Page number.

This is followed by general information about the data set, including current space allocation and utilization. The only differences between this index listing and one for a non-managed source library are the following:
- Management, storage, and data classes are shown under the GENERAL DATA heading.
- The 1st extent size, secondary quantity, current allocation, and current utilization sizes can be shown in bytes, kilobytes, or megabytes, in addition to tracks, blocks, or cylinders.

The 1st extent quantity, secondary quantity, current allocation, and current utilization sizes are shown in tracks for data sets that are allocated in bytes, kilobytes, or megabytes on a non-managed volume. Following this, the member name and statistics are printed for each member in the data set, arranged in alphabetical order. For sequential data sets, the index listing contains only the general information.

Index Listings for Load Libraries

An index listing for an OBJ library is similar to an index listing for a source library, except that no statistics are maintained. A sample index listing for a LOAD library that is managed by the Storage Management Subsystem is shown in Figure 54.

Note: This index listing format is available only when Data Facility Product (DFP) Version 3 Release 1 is installed and available, and when Storage Management Subsystem is active. See *ISPF User's Guide* for more information.

Here, the module attributes are printed to the right of each member name.

```
                                                                                                  DATE:  99/03/15
DATA SET:    ISPF.TEMP.LOAD                                                                       TIME:  10:47
                                                                                                  PAGE   001
GENERAL DATA:
     MANAGEMENT CLASS:   STANDARD     GENERAL DATA:                    U            CURRENT
     STORAGE CLASS:          BASE        RECORD FORMAT:               0                608
     DATA CLASS:          **NONE**       RECORD LENGTH:           6,144                  2
     VOLUME SERIAL:        PRM905        BLOCK SIZE:                280                 30
     DEVICE TYPE:            3390        1ST EXTENT SIZE:           325
     ORGANIZATION:             PO        SECONDARY QUAN:                    C
     DATA SET NAME TYPE:      PDS
     CREATION DATE:     1999/03/15
     EXPIRATION DATE:   ***NONE***

MEMBER
  NAME

ISPCIP
ISPSUBS
ISPVCALL
ISPVSTG
ISPVVD
ISRLALIN
ISRLCFCL
ISRLESS
ISRLLDFI
ISRLUACT
ISRPLEX
ISRSEPRM
ISRSFM
ISRSSM
ISRSUBS
ISRUDA
ISRUDL          ISRUDA
ISRUOLP

   TOTALS:

  END OF MEMBER LIST

------

MODULE ATTRIBUTE CODES:
      NX        NOT EXECUTABLE
      DL        DATA ONLY, NOT LOADABLE
      OV        IN OVERLAY STRUCTURE
      RF        REFRESHABLE
      RN        REENTERABLE
      RU        REUSABLE
      TS        MODULE CONTAINS TEST INFORMATION
      SC        SCATTER LOAD
```

The only differences between this index listing and one for a non-managed LOAD library are the following:

- Management, storage, and data classes are shown under the GENERAL DATA heading.
- The 1st extent size, secondary quantity, current allocation, and current utilization sizes can be shown in bytes, kilobytes, or megabytes, in addition to tracks, blocks, or cylinders.

As in the source library index listing, the 1st extent quantity, secondary quantity, current allocation, and current utilization sizes are shown in tracks for data sets that are allocated in bytes, kilobytes, or megabytes on a non-managed volume.

ISPF Log Listings

Figure 55 shows a sample ISPF log listing. The log contains a message for each significant user action, such as saving edited data, moving members from one data set to another, or submitting a batch job.

```
TIME                 * * * ISPF TRANSACTION LOG * *                                    USERID:  USERID    DATE:  86/06/29    PAGE:  1

17:11          START OF ISPF SESSION LOG #64 ----------------------------------------------------------------------------------------
17:12              UTILITY  -  ALLOCATE        -  ISPFDEMO.NEWLIB.PLI ALLOCATED ON VOLUME WORK 97
17:13              UTILITY  -  MOVE/COPY       -  ISPFDEMO.MYLIB.PLI (ACCOUNT) COPIED
17:13                                                   TO ISPFDEMO.NEWLIB.PLI (ACCTXX)
17:13              UTILITY  -  MOVE/COPY       -  ISPFDEMO.MYLIB.PLI (ACCT1) COPIED
17:13                                                   TO ISPFDEMO.NEWLIB.PLI (ACCTYY)
17:13              UTILITY  -  MOVE COPY       -  ISPFDEMO. MYLIB.PLI (ACCT2) COPIED
17:13                                                   TO ISPFDEMO.NEWLIB.PLI (ACCTZZ)
17:13              UTILITY  -  MOVE COPY       -  ISPFDEMO.MYLIB.PLI (COINS) COPIED
17:13                                                   TO ISPFDEMO.NEWLIB.PLI (COINS)
17:14              EDIT     -  SAVE            -  ISPFDEMO.NEWLIB.PLI (COINS) - MEMBER SAVED
17:15              EDIT     -  CREATE          -  ISPFDEMO.NEWLIB.PLI (ACCTNEW) - MEMBER CREATED
17:15              EDIT     -  SAVE            -  ISPFDEMO.NEWLIB.PLI (ACCTXX) - MEMBER SAVED
17:15              EDIT     -  SAVE            -  ISPFDEMO.NEWLIB.PLI (ACCTYY) - MEMBER SAVED
17:16              EDIT     -  SAVE            -  ISPFDEMO.NEWLIB.PLI (ACCTZZ) - MEMBER SAVED
17:17              UTILITY  -  DELETE          -  ISPFDEMO.NEWLIB.PLI (ACCTZZ)  DELETED
17:17              TSO      -  COMMAND         -  LISTC
17:17              UTILITY  -  ALLOCATE        -  ISPFDEMO.NEWLIB.OBJ ALLOCATED ON VOLUME WORK98
17:19              JOB      -  USER8           -  PLI OPT COMPILE - - TO ISPFDEMO.NEWLIB.OBJ (COINS)
17:19              JOB      -  USER8           -  SUBMITTED
17:20          END OF ISPF SESSION LOG #64----------------------------------------------------------------------------------------
```

Figure 55. Sample ISPF Log Listing

Member List Listings

This section shows samples of member list listings created by the SAVE command. With this command, you can create listings for both source and load libraries.

The following sample listings show the format used when you do not specify a list ID.

Member List Listings for Source Libraries

Figure 56 on page 184 shows a sample member list listing for a source library. These listings contain the relative block address of each member, shown in hexadecimal format, and other characteristics when available.

DATA SET: ISPF.PRIVATE.PLS

DATE: 99/03/15
TIME: 10:53
PAGE 001

MEMBER NAME	TTR (HEX)	VERS.MOD LEVEL	CREATION DATE	DATE AND TIME LAST MODIFIED		CURRENT NO. LINES	INITIAL NO. LINES	MODIFIED NO. LINES	USER ID
$FORMAT	006A01	01.00	1997/06/03	1997/06/03	10:36:39	3376	3376	0	PDFTOOL
ACCTEX2	005E05	01.00	1997/10/09	1997/10/09	13:06:00	46	43	3	P020136
ALLMEMS	002B03	01.00	1997/10/09	1997/10/09	13:06:00	117	112	20	P020136
ALLMEM2	001C06	01.00	1997/10/09	1997/10/09	13:06:00	135	135	0	P020136
APAR3	005501	01.00	1997/10/09	1997/10/09	13:06:00	250	251	0	P020136
BINDER	003501	01.06	1994/02/17	1994/02/17	15:20:38	74	46	44	P020136
CALLER	001B01	01.04	1992/01/30	1992/01/30	12:41:18	165	164	7	TSTLMF4
EXPDATE1	013208	01.00	1998/11/10	2005/05/05	12:12:00	1	1	0	PDFTOOL
ISRCNFIG	009F01								
END OF MEMBER LIST									

Figure 56. Sample Member List Listing for a Source Library

Member List Listings for Load Libraries

Figure 57 shows a sample member list listing for a source library. These listings contain the size of each load module, shown in hexadecimal format, and other characteristics when available.

DATA SET: ISPF.TEMP.LOAD

DATE: 99/03/15
TIME: 10:52
PAGE 001

MEMBER NAME	ALIAS OF	SSI	SIZE (HEX)	SIZE (DEC)	ENTRY POINT	TTR (HEX)	AUTH CODE	AMODE	RMODE	MODULE ----ATTRIBUTES----
ISPCIP	ISPSUBS	D2799050	000D6C00	879,616	0008B420	000020	00	31	ANY	RN RU
ISPSUBS		D2799050	000D6C00	879,616	00000000	000020	00	31	ANY	RN RU
ISPVCALL		D5C99036	00009EB0	40,624	00000000	001C0B	00	31	24	RN RU
ISPVSTG		DF499019	00000C90	3,216	00000000	001D09	00	31	24	RN RU
ISPVVD		DF499019	00000CB0	3,248	00000000	001D11	00	31	24	RN RU
ISRLALIN		D5D99036	0000A4D8	42,200	00000000	001D19	00	31	ANY	RN RU
ISRLCFCL		D2199057	0001B4C8	111,816	00000000	001E13	00	31	ANY	RN RU
ISRLESS		C4898300	00000F30	3,888	00000000	002112	00	31	ANY	RN RU
ISRLLDFI		D5D99036	00006F88	28,552	00000000	002119	00	31	ANY	RN RU
ISRLUACT		D5D99036	00002C00	11,264	00000000	002210	00	31	ANY	RN RU
ISRPLEX		D5D99036	0000E6C8	59,080	00000000	002303	00	31	ANY	RN RU
ISRSEPRM		D5D99036	00012B68	76,648	00000000	00240C	00	31	ANY	RN RU
ISRSFM		D5D99036	000087C0	34,752	00000000	00261B	00	31	ANY	RN RU
ISRSUBS		D5D99036	00009A70	39,536	00000000	002804	00	31	ANY	RN RU
ISRUDA		B4299057	000C9148	823,624	00000000	00290C	00	31	ANY	RN RU
ISRUDL	ISUDA	B4499057	000380D8	229,592	00000000	00160F	00	31	ANY	RN RU
ISRUOLP		B4499057	000380D8	229,592	0001FAD0	00160F	00	31	ANY	RN RU
END OF MEMBER LIST		D5C99036	00002680	9,856	00000000	003E04	00	31	ANY	RN RU

Figure 57. Sample Member List Listing for a Load Library

Formats for Member List Listings

The following is the format used by the SAVE command to create a member list listing for a source library. The members of a source library have formatted records (RECFM≠U).

Table 13. Format of Source Library Member List Listing

Starting Column	Length in Characters	Description
4	8	Member name
19	6	Relative block address in hexadecimal format
25	2	Version number
28	2	Modification level
31	8	Creation date
40	8	Date last modified
49	5	Time last modified
55	5	Current number of lines
61	5	Initial number of lines
67	5	Number of modified lines
73	7	User ID

The following is the format used by the SAVE command to create a member list listing for a load library. The members of a load library have unformatted records (RECFM=U).

Table 14. Format of Load Library Member List Listing

Starting Column	Length in Characters	Description
4	8	Member name
24	6	Load module size in hexadecimal format
33	6	Load module relative block address in hexadecimal format
40	8	Alias
49	2	Authorization code
53	3	Addressing mode
56	3	Residency mode
61	18	Load module attributes

Data Set List Listings

The sample listing in Figure 58 on page 186 shows the format used when you do not specify a data set list ID.

Format for Data Set List Listings

Table 15 shows the format of the data set list written by the SAVE command when a data set list ID is specified.

Table 15. Format of Data Set List Listing

Starting Column	Length in Characters	Description
1	44	Data set name
46	7	Volume and volume indicator
53	4	Data set organization
58	5	Data set record format
64	5	Data set logical record length
70	5	Data set block size
76	6	Data set size

Appendix D. APL and TEXT Character Conversion

You can use APL keyboards for all models of 3270 terminals, and TEXT keyboards for 3278 and 3279 terminals with ISPF. Figure 59 and Figure 60 on page 188 show that the 2-byte transmission codes for APL and TEXT characters are converted by ISPF into 1-byte codes for internal storage.

3278 only; character is not valid on 3277

National use character. Graphics shown are for U.S. Keyboards; graphics differ in other countries.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20																
30																
40	sp	A	B	C	D	E	F	G	H	I	¢	.	<	(	+	|
50	&	J	K	L	M	N	O	P	Q	R	!	$	*	)	;	¬
60	_	/	S	T	U	V	W	X	Y	Z	¦	,	%	_	>	?
70		^	¨						v	`	:	#	@	'	=	"
80	~	a	b	c	d	e	f	g	h	i	↑	↓	≤	⌈	⌊	→
90	□	j	k	l	m	n	o	p	q	r	⊃	⊂		o		←
A0	¯	~	s	t	u	v	w	x	y	z	∩	∪	⊥	[	≥	∘
B0	α	∈	ι	ρ	ω		×	\	÷		∇	∆	⊤	]	≠	|
C0	{	A	B	C	D	E	F	G	H	I	⍲	⍱		⌽		⍉
D0	}	J	K	L	M	N	O	P	Q	R	⌶	!	⍧	⍋	⍎	⍕
E0	\		S	T	U	V	W	X	Y	Z	≠	⍲		⊖	⍞	⍒
F0	0	1	2	3	4	5	6	7	8	9		⍱	⍋	⍟	⍎	

Figure 59. Internal Character Representations for APL Keyboards

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3278 only; character is not valid on 3277

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20																
30																
40	sp										¢	.	<	(	+	|
50	&	1	2	3						↓	!	$	*	)	;	¬
60	—	/									¦	,	%	_	>	?
70	n	o								\	:	#	@	'	=	"
80		a	b	c	d	e	f	g	h	i	↑	{	≤	(	+	+
90	□	j	k	l	m	n	o	p	q	r		}	⌑	)	±	■
A0	‾	~	s	t	u	v	w	x	y	z	⊛	⌊	⌈	[	≥	•
B0	0	1	2	3	4	5	6	7	8	9	▽	⌋	⌉	]	≠	—
C0	{	A	B	C	D	E	F	G	H	I	△	⊥	⊤	∨	≠	⊼
D0	}	J	K	L	M	N	O	P	Q	R	⌹	⌅	§	¶	←	→
E0	\	\	S	T	U	V	W	X	Y	Z	⍒	⊢	⊣	⍋	⍱	∧
F0		1	2	3	4	5	6	7	8	9	|	⌊	⍉	⍈	⌈	

Figure 60. Internal Character Representations for Text Keyboards

Appendix E. Abbreviations for Commands and Other Values

The following list includes the commands, field values, keywords/operands, and scroll amounts that can be abbreviated, followed by the allowable abbreviations. To improve readability, you should avoid using abbreviations in edit macros.

Command Abbreviations

BACK	B		
BROWSE	BRO		
CANCEL	CAN		
COLUMNS	COLS	COL	
CONFIRM	CON	C	
DISPLAY	DISPL	DISP	DIS
FIND	F		
INDEX	I		
LOCATE	LOC	L	
RESUME	RES		
SELECT	SEL	S	
SHOWCMD	SHOW		
SKIP	S		
TOP	T		
UP	U		

Field Value Abbreviations

%USED	%		
AFTER	AFT	A	
ALIAS-OF	ALIAS		
ATTRIBUTES	ATTR		
BEFORE	BEF	B	
BLOCK	BLKS		
BOTTOM	BOT	B	
CHANGED	CHA	CHG	C
CREATED	CRE		
CYLINDER	CYLS		
DEVICE	DEV		
EXPIRES	EXP		
GET	G		
MESSAGE	MES		
NO	N		
PUT	P		
REFERRED	REF		
TOP	T	0	
TRACK	TRKS		
VOLUME	VOL		
YES	Y		

Keyword/Operand, Scroll Amount, and Programming Language Abbreviations

CHANGE	CHA	CHG	C
CHARS	CHAR		
COBOL	COB		
DISPLAY	DISPL	DIS	

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ERROR	ERR	
LABELS	LABEL	LAB
PREFIX	PRE	
SPECIAL	SPE	
STANDARD	STD	
SUFFIX	SUF	
VERTICAL	VERT	
VOLUME	VOL	

Scroll Amount Abbreviations

CUR	CSR	C
DATA	D	
HALF	H	
MAX	M	
PAGE	P	

Programming Language Abbreviations

ASSEMBLER	ASSEMBLE	ASSEM	ASM
COBOL	COB		
FORTRAN	FORT	FOR	FTN
PASCAL	PAS		
PLI	PLIOPT	PL1	
SCRIPT	SCR	TEXT	

Appendix F. Allocation Data Sets

ISPF issues ALLOC commands based on the ISPF libraries, data set names, list IDs, options, and additional input libraries you enter on the Foreground Assembler H and Foreground VS COBOL II Compile panels. All allocations are done before Assembler H and the VS COBOL II compiler are called.

Because Assembler H and VS COBOL II do not provide a language prompter, ISPF allocates the required data sets for you. The following sections describe the data sets ISPF allocates when you use Assembler H or the VS COBOL II compiler.

SYSIN Data Set

The SYSIN data set is the main input into Assembler H and VS COBOL II. It contains the ISPF libraries or other partitioned or sequential data sets that you enter on the Foreground Assembler H and VS COBOL II Compile panels. This data set is used to find the member that contains the program to be assembled or compiled. For a PDS, the ALLOC command would be:

```
ALLOC FI(SYSIN) DA('proj.lib.type(mem)')
```

For a sequential data set, the ALLOC command would be:

```
ALLOC FI(SYSIN) DA('proj.lib.type')
```

In both commands, `lib` is the library in which the member or data set was found.

SYSLIB Data Set

The SYSLIB data set contains the ISPF library concatenation sequence used to resolve any copy statements specified in your program. It contains the ISPF libraries or other partitioned or sequential data sets and the additional input libraries you specify on the Foreground Assembler H and VS COBOL II Compile panels. For example:

```
ALLOC FI(SYSLIB) DA('SYS1.MACLIB','proj.lib1.type',...,
       'proj.lib4.type','additional lib1','additional lib2')
```

SYSPRINT Data Set

The SYSPRINT data set contains the generated output listing. The entry in the List ID field determines the destination of the output listing. If you enter a name in the List ID field, the output listing is stored in a sequential data set:

```
ALLOC FI(SYSPRINT) DA('prefix.listid.LIST')
```

where `listid` is the name entered in the List ID field. However, if you leave the List ID field blank, ISPF uses the name of the member being assembled or compiled instead of the list ID:

```
ALLOC FI(SYSPRINT) DA('prefix.member.LIST')
```

If you enter an asterisk (*) in the List ID field, ISPF displays the output listing at your terminal, using the following command:

```
ALLOC FI(SYSPRINT) DA(*)
```

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See the **List Data Sets** section of the ***Foreground (Option 4)*** chapter of the *ISPF User's Guide Volume II* for more information.

SYSTERM Data Set

The SYSTERM data set contains a summary of the information in the listing data set (SYSPRINT). It is displayed at the terminal if the TERM option is used:

```
ALLOC FI(SYSTERM) DA(*)
```

SYSLIN Data Set

The SYSLIN data set must be preallocated before running Foreground (option 4) or Batch (option 5). The SYSLIN data set contains the object module. This object module will be the input when you link-edit. For a PDS, the ALLOC command would be:

```
ALLOC FI(SYSLIN) DA('proj.lib1.OBJ(mem)')
```

For a sequential data set, the ALLOC command would be:

```
ALLOC FI(SYSLIN) DA('proj.lib1.OBJ')
```

SYSPUNCH Data Set

The SYSPUNCH data set is the same as the SYSLIN data set. ISPF does not use this data set. The DUMMY parameter on the ALLOC statement means it should not be used:

```
ALLOC FI(SYSPUNCH) DUMMY
```

SYSUT1 Data Set

The SYSUT1 data set is a temporary utility data set used during processing. It is deleted after it is used.

For Assembler H, the format is:

```
ALLOC FI(SYSUT1) UNIT(SYSDA) NEW DELETE
```

For VS COBOL II, the format is:

```
ALLOC FI(SYSUT1) UNIT(SYSDA) NEW DELETE SPACE(1,1) CYLINDER
```

SYSUT2—SYSUT7 Data Sets

The SYSUT2, SYSUT3, ..., SYSUT7 data sets are temporary utility data sets used by VS COBOL II only during processing. They are deleted after they are used:

```
ALLOC FI(SYSUT2) UNIT(SYSDA) NEW DELETE SPACE(1,1) CYLINDER
ALLOC FI(SYSUT3) UNIT(SYSDA) NEW DELETE SPACE(1,1) CYLINDER
ALLOC FI(SYSUT4) UNIT(SYSDA) NEW DELETE SPACE(1,1) CYLINDER
ALLOC FI(SYSUT5) UNIT(SYSDA) NEW DELETE SPACE(1,1) CYLINDER
ALLOC FI(SYSUT6) UNIT(SYSDA) NEW DELETE SPACE(1,1) CYLINDER
ALLOC FI(SYSUT7) UNIT(SYSDA) NEW DELETE SPACE(1,1) CYLINDER
```

Note: SYSUT6 and SYSUT7 are required only if VS COBOL II Version 1, Release 3 is being used.

Appendix G. ISRDDN Diagnostic Utility

ISRDDN is a utility that assists IBM support in evaluating and solving problems. It provides a list of allocated DD names, a list of system ENQs, a list of data sets causing system ENQ contention, and a means of viewing storage within a TSO user's address space. ISRDDN also provides some facilities for gathering information about your system environment.

You can start ISRDDN by issuing the commands TSO ISRDDN or DDLIST from any ISPF command line.

The allocated DD name list shows you all of the DD names allocated to your TSO session. From the list you can perform functions such as Edit or Compress against individual data sets, DD names, or sets of DD names. You can also perform actions against the entire list of displayed DD names.

The ENQ list, available by typing ENQ on the allocation list command line, shows you ENQs on your system. You can limit the size of the list by specifying the QNAME, RNAME, job, user or address space name, and system name.

The ENQ contention list, available by typing CON on the allocation list command line, shows you ENQ contentions on your system for data sets (QNAME SYSDSN).

You can Browse storage using the BROWSE primary command from the allocation list. You can only browse storage which an unauthorized program can see (private and common).

ISRDDN can be used to manipulate the data sets that are allocated, but it also provides the ability to answer questions like:

- Where did a module the user has loaded come from?
- What data sets contain a specific member?
- Are the I/O errors and ABENDs the user is getting due to mixed record format allocations?
- Who is currently allocated to "SYS1.BRODCAST"?
- What member names or LPA load modules are duplicated in the user's current allocations?
- How many members are in the allocated libraries and which libraries are empty?
- Is the user running ISPF out of LPA or from STEPLIB?

To invoke the ISRDDN program, type **TSO ISRDDN** on any ISPF command line.

The Current Data Set Allocations List

When you start ISRDDN, the Current Data Set Allocations list displays, as shown in Figure 61 on page 194.

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```
                         Current Data Set Allocations           Row 1 of 197

 Volume   Disposition Act DDname   Data Set Name   Actions: B E V M F C I Q
 D$SY01   SHR,KEEP   > _  ALLOCPDS SYS2.SYSPLEXD.ALLOCLIB
 D$IS02   SHR,KEEP   > _  ASMLANGX PDFTDEV.COMMON.WDBLANGX
 D1SY01   SHR,KEEP   > _  HASPINDX SYS2.ISD1.HASPINDX
 D$IS04   SHR,KEEP   > _  ISPILIB  PDFTDEV.STG.GIF
 D$IS03   SHR,KEEP   > _           PDFTDEV.INT.GIF
 D$IS03   SHR,KEEP   > _           PDFTDEV.FVT.GIF
 D$IS04   SHR,KEEP   > _           PDFTDEV.SVT.GIF
 D$PP02   SHR,KEEP   > _  ISPLLIB  WDB.WDBDEV.LOAD
 D$IS04   SHR,KEEP   > _           PDFTDEV.USERID.LOAD
 D$IS03   SHR,KEEP   > _           PDFTOOL.COMMON.LOAD
 D$IS04   SHR,KEEP   > _           PDFTDEV.STG.LOAD
 D$IS02   SHR,KEEP   > _           PDFTDEV.INT.LOAD
 D$IS02   SHR,KEEP   > _           PDFTDEV.FVT.LOAD
 D$IS04   SHR,KEEP   > _           PDFTDEV.SVT.LOAD
 D$IS03   SHR,KEEP   > _           PDFTOOL.FLM@SCAN.LOAD
 D$IS05   SHR,KEEP   > _           ISPFTEST.LOAD
 $$SR40   SHR,KEEP   > _           SYS1.DFQLLIB
 $$SR40   SHR,KEEP   > _           SYS1.DGTLLIB
Command ===> ____________________________________________________ Scroll ===> PAGE
 F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
F10=Left   F11=Right  F12=Cancel
```

Figure 61. Current Data Set Allocations List panel

On the right side of the display is a list of DD names and their associated data sets. The list of data sets can also contain indicators of DUMMY allocations, subsystem files, or allocations to the terminal. The DD name is shown in white, unless the first data set in the concatenation is scrolled off the top of the screen. If the first data set in a concatenation is not on the screen, the DD name is shown in yellow.

In the center of the display is a column of 1-character input fields, preceded by greater-than signs (>). These input fields are used for line commands such as **E** for Edit or **I** for Information.

The left side of the display contains columns of information about individual data sets. When you scroll right or left, the left side of the screen changes. Initially, the left side of the screen contains the volume name and disposition. If the disposition is red, there are other jobs waiting to use this data set as shown. You can use the **Q** line command to see what jobs are waiting. You can view the VTOC information for a volume by placing the cursor on the volume name and pressing the Enter key.

ISRDDN automatically checks for mixed concatenations when it is started. If you have concatenations of mixed data set types or formats, you are shown a message to that effect when you press the Enter key or scroll the first time. ISRDDN also checks for mixed concatenations when you use the RESET command.

If you scroll right once, you see the attributes of each data set, as shown in Figure 62 on page 195.

```
                          Current Data Set Allocations           Row 1 of 197

Blksz Lrecl RCFM Org  Act DDname   Data Set Name   Actions: B E V M F C I Q
27920    80 FB   PO  > _  ALLOCPDS SYS2.SYSPLEXD.ALLOCLIB
27998  1017 VB   PO  > _  ASMLANGX PDFTDEV.COMMON.WDBLANGX
 4096  4096 F    PS  > _  HASPINDX SYS2.ISD1.HASPINDX
27920    80 FB   LIB > _  ISPILIB  PDFTDEV.STG.GIF
27920    80 FB   LIB > _           PDFTDEV.INT.GIF
27920    80 FB   LIB > _           PDFTDEV.FVT.GIF
27920    80 FB   PO  > _           PDFTDEV.SVT.GIF
 6144    ** U    PO  > _  ISPLLIB  WDB.WDBDEV.LOAD
 6144    ** U    PO  > _           PDFTDEV.USERID.LOAD
 6144    ** U    PO  > _           PDFTOOL.COMMON.LOAD
 6144    ** U    LIB > _           PDFTDEV.STG.LOAD
 6144    ** U    LIB > _           PDFTDEV.INT.LOAD
 6144    ** U    LIB > _           PDFTDEV.FVT.LOAD
 6144    ** U    PO  > _           PDFTDEV.SVT.LOAD
 6144    ** U    PO  > _           PDFTOOL.FLM@SCAN.LOAD
 6144    ** U    LIB > _           ISPFTEST.LOAD
32760    ** U    PO  > _           SYS1.DFQLLIB
32760    ** U    PO  > _           SYS1.DGTLLIB
Command ===> ____________________________________________ Scroll ===> PAGE
 F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
F10=Left   F11=Right  F12=Cancel
```

Figure 62. Data Set Attributes in ISRDDN

For some types of allocations, such as subsystem allocations, you might see different information. If you have mixed concatenations, a message with this information appears when you press the Enter key or scroll the first time. You can suppress this message for future innovations of ISRDDN by using the CHECK OFF command.

If you scroll right a second time, you see information that includes whether the DD name is open and if so, by how many active DCBs, as shown in Figure 63 on page 196.

```
                         Current Data Set Allocations           Row 1 of 197

Open     SMS ENQWait  Act DDname   Data Set Name   Actions: B E V M F C I Q
                     > _  ALLOCPDS SYS2.SYSPLEXD.ALLOCLIB
         SMS         > _  ASMLANGX PDFTDEV.COMMON.WDBLANGX
                     > _  HASPINDX SYS2.ISD1.HASPINDX
         SMS         > _  ISPILIB  PDFTDEV.STG.GIF
         SMS         > _           PDFTDEV.INT.GIF
         SMS         > _           PDFTDEV.FVT.GIF
         SMS         > _           PDFTDEV.SVT.GIF
Open(2)              > _  ISPLLIB  WDB.WDBDEV.LOAD
Open(2)  SMS         > _           PDFTDEV.USERID.LOAD
Open(2)  SMS         > _           PDFTOOL.COMMON.LOAD
Open(2)  SMS         > _           PDFTDEV.STG.LOAD
Open(2)  SMS         > _           PDFTDEV.INT.LOAD
Open(2)  SMS         > _           PDFTDEV.FVT.LOAD
Open(2)  SMS         > _           PDFTDEV.SVT.LOAD
Open(2)  SMS         > _           PDFTOOL.FLM@SCAN.LOAD
Open(2)  SMS         > _           ISPFTEST.LOAD
Open(2)              > _           SYS1.DFQLLIB
Open(2)              > _           SYS1.DGTLLIB
Command ===> ____________________________________________________ Scroll ===> PAGE
 F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
F10=Left   F11=Right  F12=Cancel
```

Figure 63. Additional DD Information

You also see the indicator ***SMS*** if the data set is SMS-managed, and information about jobs waiting on the resource. For JES files you might see additional information such as the class and the writer name.

Some primary commands, MEMBER and COUNT, for example, put messages in a fourth status screen (Figure 64.

```
                         Current Data Set Allocations           Row 1 of 197

 Message             Act DDname   Data Set Name   Actions: B E V M F C I Q
Members: 10         > _  ALLOCPDS SYS2.SYSPLEXD.ALLOCLIB
Members: 0          > _  ASMLANGX PDFTDEV.COMMON.WDBLANGX
                    > _  HASPINDX SYS2.ISD1.HASPINDX
Members: 0          > _  ISPILIB  PDFTDEV.STG.GIF
Members: 0          > _           PDFTDEV.INT.GIF
Members: 0          > _           PDFTDEV.FVT.GIF
Members: 26         > _           PDFTDEV.SVT.GIF
Members: 2          > _  ISPLLIB  WDB.WDBDEV.LOAD
Members: 1          > _           PDFTDEV.USERID.LOAD
Members: 138        > _           PDFTOOL.COMMON.LOAD
Members: 5          > _           PDFTDEV.STG.LOAD
Members: 0          > _           PDFTDEV.INT.LOAD
Members: 0          > _           PDFTDEV.FVT.LOAD
Members: 480        > _           PDFTDEV.SVT.LOAD
Members: 1          > _           PDFTOOL.FLM@SCAN.LOAD
Members: 5          > _           ISPFTEST.LOAD
Members: 13         > _           SYS1.DFQLLIB
Members: 568        > _           SYS1.DGTLLIB
Command ===> ____________________________________________________ Scroll ===> PAGE
 F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
F10=Left   F11=Right  F12=Cancel
```

Figure 64. Additional DD Information

If messages exist and you scroll right again, you see the messages. The message screen is only shown if messages exist. If messages do *not* exist, a third scroll to the right returns you to the initial screen.

Using Commands on the Displayed List

The Current Data Set Allocations list supports both primary commands and line commands. The *displayed list* is the list of DD names that you can see by scrolling up and down. You can use primary commands to limit what is displayed in the list. Many of the primary commands work only on the contents of the displayed list.

ISRDDN can also create pseudo-DD names that show useful data set names. For example, the **LPA** command adds two pseudo-DD names, LINKLIST and LPALIB, which contain lists of the current link list and LPA libraries.

Allocation List Primary Commands

Primary commands are used to limit the contents of the displayed list, to add pseudo-DD names, to operate on all the contents of the displayed list and to invoke other ISRDDN options.

All primary commands can be invoked with their minimum unique names. For example, MEMBER can be abbreviated as M, while CLIST can be abbreviated as CL. The allocation list primary commands follow.

You can specify an initial primary command when you start ISRDDN. For example, if you enter `DDLISTB 10.???` on an ISPF command line, you will immediately browse the storage containing the TCB control block. When you exit the Browse screen, you are not returned to the DD allocation list. This feature is useful for calling ISRDDN from within a program when, for example, you want to limit the list to specific dd names, view ENQs, save the current allocations, or browse storage.

Only (O) and Exclude (EX, X)

ONLY and EXCLUDE are used to limit the DD names in the displayed list. They take one operand—a whole or partial DD name. For example, the command **O PLI** causes the list to contain only DD names that contain the string ″PLI″, such as STE**PLI**B and ISP**PLI**B.

The ONLY and EXCLUDE commands are useful when you want to limit the DD names or pseudo-DD names that are operated on by commands like MEMBER and DUPLICATES. They are also helpful in reducing the size of the displayed list for easier viewing.

Find (F) and Locate (L)

FIND and LOCATE search the list for a string. LOCATE looks only at DD names and always locates the first matching DD name. FIND looks at everything currently in the displayed list and finds the next occurrance of the string following the current cursor position. You can repeat a FIND opeartion by pressing the RFIND key.

When a string is found by FIND, the string is highlighted and the cursor is placed on the string. When a string is found by LOCATE, the string is highlighted and the cursor is placed in the line command area next to the located DD name.

Reset (R)

The RESET command rebuilds the list. In most screen formats the list is automatically rebuilt when you press Enter. However, if you have used the COUNT command or the MEMBER command and have messages showing in the list, you might need to use the RESET command to refresh the list.

Short (S) and Long (LON)

The SHORT and LONG commands alter the format of the list. The SHORT command places the DD name of a concatenation next to the first data set (as shown in Figure 61 on page 194). The LONG command formats the list with DD names of concatenations placed on a separate line before the data set names (as shown in Figure 65).

```
                          Current Data Set Allocations           Row 1 of 206

 Volume   Disposition Act DDname   Data Set Name   Actions: B E V M F C I Q
 D$SY01   SHR,KEEP   > _  ALLOCPDS SYS2.SYSPLEXD.ALLOCLIB
 D$IS02   SHR,KEEP   > _  ASMLANGX PDFTDEV.COMMON.WDBLANGX
 D1SY01   SHR,KEEP   > _  HASPINDX SYS2.ISD1.HASPINDX
                     > _  ISPILIB
 D$IS04   SHR,KEEP   > _           PDFTDEV.STG.GIF
 D$IS03   SHR,KEEP   > _           PDFTDEV.INT.GIF
 D$IS03   SHR,KEEP   > _           PDFTDEV.FVT.GIF
 D$IS04   SHR,KEEP   > _           PDFTDEV.SVT.GIF
                     > _  ISPLLIB
 D$PP02   SHR,KEEP   > _           WDB.WDBDEV.LOAD
 D$IS04   SHR,KEEP   > _           PDFTDEV.USERID.LOAD
 D$IS03   SHR,KEEP   > _           PDFTOOL.COMMON.LOAD
 D$IS04   SHR,KEEP   > _           PDFTDEV.STG.LOAD
 D$IS02   SHR,KEEP   > _           PDFTDEV.INT.LOAD
 D$IS02   SHR,KEEP   > _           PDFTDEV.FVT.LOAD
 D$IS04   SHR,KEEP   > _           PDFTDEV.SVT.LOAD
 D$IS03   SHR,KEEP   > _           PDFTOOL.FLM@SCAN.LOAD
 D$IS05   SHR,KEEP   > _           ISPFTEST.LOAD
Command ===>                                                Scroll ===> PAGE
 F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
F10=Left   F11=Right  F12=Cancel
```

Figure 65. Current Data Set Allocations List in LONG Format

The SHORT format shows more information on one screen. Use the LONG format when you want to use line commands that operate on whole concatenations, such as **E** and **V**, on only the first data set in a concatenation.

Member (M)

The MEMBER command is a very useful command in ISRDDN. MEMBER searches the displayed list (or just DD names containing a given string) for a member whose name matches a pattern. For example, the command **M ISRSUBS** searches the data sets in the displayed list, the job pack area, and the link pack directory for members named ISRSUBS. Data sets that contain the member are flagged with a message on the left side of the list, as shown in Figure 66 on page 199.

```
                          Current Data Set Allocation        Member was found

  Message             Act DDname   Data Set Name   Actions: B E V M F C I Q
                     > _  ALLOCPDS SYS2.SYSPLEXD.ALLOCLIB
                     > _  ASMLANGX PDFTDEV.COMMON.WDBLANGX
                     > _  HASPINDX SYS2.ISD1.HASPINDX
                     > _  ISPILIB  PDFTDEV.STG.GIF
                     > _           PDFTDEV.INT.GIF
                     > _           PDFTDEV.FVT.GIF
                     > _           PDFTDEV.SVT.GIF
                     > _  ISPLLIB  WDB.WDBDEV.LOAD
                     > _           PDFTDEV.USERID.LOAD
                     > _           PDFTOOL.COMMON.LOAD
 Member: ISRSUBS     > _           PDFTDEV.STG.LOAD
                     > _           PDFTDEV.INT.LOAD
                     > _           PDFTDEV.FVT.LOAD
 Member: ISRSUBS     > _           PDFTDEV.SVT.LOAD
                     > _           PDFTOOL.FLM@SCAN.LOAD
                     > _           ISPFTEST.LOAD
                     > _           SYS1.DFQLLIB
                     > _           SYS1.DGTLLIB
Command ===> ____________________________________________ Scroll ===> PAGE
 F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
F10=Left   F11=Right  F12=Cancel
```

Figure 66. Results of the MEMBER Command

If the name is the name of a loaded module in the job pack area or LPA, you also see a panel similar to the one in Figure 69 on page 202.

When a member name is used on the MEMBER command (such as, M ISRSUBS) and an E, V, or B line command is used next to a data set in which that member is found, ONLY that member is Edited, Viewed, or Browsed. When the M line command is used, the member list is shown with the selected member at the top of the list.

When a member name pattern is used on the member command (such as, M ISR*), the E, V, B, and M line commands display member lists with members that match the given pattern.

Use the MEMBER command in situations when you do not know from where a member is coming or when you suspect that you might be accessing the wrong copy of a member. For example, if you are developing ISPF panels and you do not see your version of the panel being displayed, you can issue the MEMBER command to search for other copies of the panel.

Usually the MEMBER command operates on the entire displayed list. You can add a second operand that is a partial DD name. For example, the command **M ISRSUBS PL** searches only DD names with the string PL in it such as IS**PL**LIB or STE**PL**IB. This avoids having to use the ONLY command to limit the search.

Clist (CL) or Save (SA)

The CLIST command creates a CLIST that contains TSO ALLOCATE statements to reproduce the allocations in the displayed list. The CLIST name is 'userid.ISRDDN.CLIST' or 'prefix.userid.ISRDDN.CLIST'. You can use the command name SAVE instead of CLIST.

Use this command when you want to change allocations for testing purposes. For example, to add a panel library to your ISPPLIB concatenation:

- Enter ISRDDN
- Type **O ISPPLIB** to limit the displayed list to DD name ISPPLIB
- Type CLIST to create and edit the ISRDDN.CLIST data set
- Change the ALLOCATE statement to add your data set
- Exit ISPF
- Execute the CLIST (that is, EX ISRDDN)

Like the MEMBER command, you can add a whole or partial DD name to limit the number of DD names that are included in the generated CLIST. For example, to create a CLIST that only contains allocation statements for DD names containing the string ISP, type **CLIST ISP** or **SAVE ISP**.

Check (CH)

The CHECK command turns on or off automatic checking for mixed concatenations. CHECK or CHECK ON enables automatic checking, and CHECK OFF disables it. When checking for mixed concatenations is enabled, ISRDDN checks for concatenations with mixed record formats, mixed fixed record lengths, and mixed data set organizations. Because there are times when these concatenations are intended, you might want to turn off the warning generated by ISRDDN.

Count (C)

The COUNT command displays the number of members in a partitioned data set. The number of members is shown in the message area on the left side of the list.

COUNT can be used to find out if you have empty data sets in your concatenations. For example, if you want to find out if all members of an SCLM-controlled library system were successfully promoted, you can edit the hierarchy, invoke ISRDDN, and use the COUNT command to verify that all of the expected libraries in the concatenation are empty.

Like the MEMBER command, you can add a whole or partial DD name to limit the number of DD names that are searched.

Duplicates (DUP)

The DUPLICATES command searches all of the partitioned data sets in the displayed list and the LPA and displays a list of duplicate names. From the duplicates list, you can use the E (edit), B (browse), and V (view) line commands to view the PDS member or LPA storage. Use the DUPLICATES command to see where you might have potential conflicts with old or modified versions of load modules, REXX or CLIST programs, ISPF panels, or other PDS members.

For module names found in the Link Pack directory, the address of the module and its size are shown on the left side of the screen. If the name is an alias of a different module, the real name (major name) is shown instead of the size.

The duplicates list is shown in Figure 67 on page 201. Like the MEMBER command, you can add a whole or partial DD name to limit the number of DD

names that are searched. For example, to search only DD names that contain the string LLIB, enter **DUP LLIB**.

```
                          Duplicate members list                  Row 1 of 562

Address  Siz/Maj  DDname   Act Member   Data set name    Actions: B, E, V
                  ISPLLIB  > _ FLM$CP   PDFTDEV.SVT.LOAD
00D8A5F8 FLMIO24  --LPA--- > _

                  ISPLLIB  > _ FLM$CPI  PDFTDEV.SVT.LOAD
04668F20 000000E0 --LPA--- > _

                  ISPLLIB  > _ FLM$DE   PDFTDEV.SVT.LOAD
00D8B218 FLMIO24  --LPA--- > _

                  ISPLLIB  > _ FLM$DT   PDFTDEV.SVT.LOAD
00D8B9D8 FLMIO24  --LPA--- > _

                  ISPLLIB  > _ FLM$99   PDFTDEV.SVT.LOAD
00D88DF8 FLMIO24  --LPA--- > _

                  ISPLLIB  > _ FLM@SCAN PDFTOOL.COMMON.LOAD
                  ISPLLIB  > _          PDFTOOL.FLM@SCAN.LOAD

Command ===> ____________________________________________ Scroll ===> PAGE
 F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
F10=Left   F11=Right  F12=Cancel
```

Figure 67. The Duplicates List Display

Apf, Linklist (LI), Parmlib, and Lpa (LP)

The APF, LINKLIST, PARMLIB, and LPA commands add and remove pseudo-DD names that show the defined APF libraries, link list libraries, PARMLIB libraries, and LPA libraries respectively. These pseudo-DD names are shown as if they are allocated DD names, but no actual allocation to the libraries is made. You can use most of the primary and line commands with these names, just as you would with real DD names.

In the confirmation panel, you can type **YES** to process the libraries, or **SKIP** to process the libraries and avoid the confirmation panel in the future. Dynamic LPA, Link lists, PARMLIB, and APF lists are all supported.

The LINKLIST and LPA commands add both the LINKLIST and LPALIB pseudo-DD names. To delete any pseudo-DD name, enter the appropriate command a second time. For example, to add APF libraries to the list, use the APF commmand. To remove the APF libraries from the list, enter the APF command a second time.

Select (S) and Load (L)

The SELECT command searches the job pack area (JPA) and link pack area (LPA) to see if a module is loaded. If the module is found, you see the CSVQUERY Results panel shown in Figure 69 on page 202.

```
                                                                    197
                          CSVQUERY Results
                                                        More:     +   Q
Module ISRSUBS  was found to be already loaded. Note that
invocations of this program name may pick up another copy from
STEPLIB or a LIBDEF'ed data set or from a tasklib such as ISPLLIB.
Tab to a box and press enter to view the module in storage.
   +-------------------------+         +-------------------------+
   | Job pack area resident  |         | PLPA resident           |
   | Resident above 16 Meg   |         | Resident above 16 Meg   |
   | Loaded by program fetch |         | Module address:05437000 |
   |  from ISPLLIB   (Lib 4) |         | Module size:   000D03C0 |
   | PDFTDEV.STG.LOAD        |         | Reentrant               |
   | Module address:15EC6000 |         | Serially reusable       |
   | Module size:   000D3000 |         | Not loadable only       |
   | Reentrant               |         | AMODE 31                |
   | Serially reusable       |         | Authorized library      |
   | Not loadable only       |         | Not Authorized program  |
   | AMODE 31                |         +-------------------------+
   | Not Authorized program  |
   +-------------------------+
C  Command ===>                                                      PAGE
    F1=Help    F2=Split   F3=Exit    F9=Swap   F12=Cancel
F
```

Figure 69. The CSVQUERY Results Panel

The information shown in the CSVQUERY Results panel is mostly derived by issuing a CSVQUERY macro. The data set name from which the module was loaded is shown if it can be determined. However, because of the way this information is gathered, the data set name can be incorrect if the original DD name from which the data set was loaded has been reallocated since the module was loaded.

On the CSVQUERY Results panel, you can use the TAB key to place the cursor inside the boxes describing the load module. If you then press Enter, you can browse the load module in storage.

The SELECT command is useful in situations where you need to know where a loaded program came from, for example, when you think you might be running mixed levels of ISPF or of an application under ISPF.

If a module is not loaded but you want to see its attibutes, you can use the LOAD command instead of the SELECT command. LOAD uses the current tasklib such as ISPLLIB, but you should verify that the loaded module came from the source you were expecting it to come from. LOAD automatically browses the load module storage.

Custom (CU)

The CUSTOM command shows several settings about your ISPF installation. It shows the values that used to be set in the ISPDFLTS CSECT but are now in the ISPF Configuration table, and it shows the values configurerd in module ISPTCM. This command is helpful when you are having trouble with the way certain programs are invoked. For more information about ISPTCM, refer to *ISPF Planning and Customizing*.

MList (ML)

The MLIST command displays the eyecatchers for some of the ISPF CSECTs contained in modules ISPSUBS and ISRSUBS. This command can sometimes be used to verify that you are running with a particular level of maintenance because the eyecatchers in most ISPF modules contain a release number or a PTF level.

Browse (B)

ISRDDN provides a method of browsing storage using ISPF BROWSE. The storage can be browsed as unformatted data, as minimally formatted data, or as a side-by-side hexadecimal and EBCDIC dump format. ISRDDN also enables you to automatically chain lists, view arrays, and view the data pointed to by control blocks that are mainly lists of pointers (such as CVT).

The BROWSE primary command accepts a storage address, module name, or TSO TEST address locator string. Some examples invoking BROWSE are:

B ISRSUBS	Browse the already loaded module named ISRSUBS.
B 10.	Browse storage at hexadecimal location 10. In order to distinguish hexadecimal addresses from module names, absolute addresses must end with a period.
B 0.+21c?+b4?+108?+8	Browse storage based on a TSO TEST style string. In this case, the control block called the Protected Step Control Block or PSCB is shown.
B ISRSUBS+60?	Browse the address pointed to by the 4 bytes at offset hexadecimal 60 into module ISRSUBS.
B ? or B +0?	When executed from within the storage browser, this command uses the address 0 bytes from the beginning of the displayed storage as a pointer and starts a new browse session to show that storage.

Enq (E)

You can view ENQs on the system using the ENQ command. A display similar to the one shown in Figure 70 on page 204 appears. You can reduce the size of the list by specifying a QNAME, RNAME, address space name, and a system name. All entries are treated as prefixes, so you might not need to specify complete names.

```
                          System ENQ Status                      Row 1 of 183

       Scroll LEFT or RIGHT to see type or system name.

Major name prefix . . . SYSDSN    (SYSDSN, SPFEDIT, etc)
Minor name prefix . . .                                            (dsn etc)
Address id prefix . . . USERID    (Job name, User id, etc)
System prefix . . . . .           (System name)
  Major      Minor                                                 Job Name
 ┌──────────┬──────────────────────────────────────────────────────┬──────────┐
 │ SYSDSN   │ AOP.SAOPEXEC                                         │ USERID   │
 │ SYSDSN   │ AOP.SAOPMENU                                         │ USERID   │
 │ SYSDSN   │ AOP.SAOPPENU                                         │ USERID   │
 │ SYSDSN   │ AZZ.V1R1.SAZZCLIB                                    │ USERID   │
 │ SYSDSN   │ AZZ.V1R1.SAZZMENU                                    │ USERID   │
 │ SYSDSN   │ AZZ.V1R1.SAZZPENU                                    │ USERID   │
 │ SYSDSN   │ AZZ.V1R1.SAZZSENU                                    │ USERID   │
 │ SYSDSN   │ BZZ.SBZZCLIB                                         │ USERID   │
 │ SYSDSN   │ BZZ.SBZZMENU                                         │ USERID   │
 │ SYSDSN   │ BZZ.SBZZPENU                                         │ USERID   │
 │ SYSDSN   │ BZZ.SBZZSENU                                         │ USERID   │
Command ===> ____________________________________________ Scroll ===> PAGE
 F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
F10=Left   F11=Right  F12=Cancel
```

Figure 70. The System ENQ Status List Panel

The Major column shows the QNAME. The Minor field shows the RNAME and if the RNAME is 8 bytes or less, it shows the hexadecimal representation of the RNAME next to the EBCDIC representation.

In the System ENQ Status list, the Job Name field is color-coded to indicate the type of ENQ that the address space holds or is waiting for. Green indicates a shared ENQ. Red indicates an exclusive ENQ.

If an address space does not hold the ENQ but is waiting for it, the job name is shown highlighted in reverse video.

On narrow screens, you can scroll right or left for more information. By scrolling left and right you see the system name and ENQ options (SYS (system), SYSS (systems), STEP, G (global), and R (reserve)). On wide screens you see all of the information on one screen without scrolling left or right.

On the System ENQ Status display, press END to return to the Current Data Set Allocations list, or enter CON to view the System ENQ Contention display. You can also use the ALL command to view all ENQs or use the RESET command to see only the data set ENQs (QNAME SYSDSN) for your TSO user id.

Con (C)

You can view ENQ contention on the system by using the CON command. When ENQ contention exists, you see a screen similar to the one in Figure 70, but without the input fields. When no contention exists, a message displays instead of the list.

Allocation List Line Commands

Allocation list line commands are entered next to a DD name or data set. By default the allocation list is in *short* format. This means that for concatenations, the DD name is next to the first data set name in the concatenation.

When a line command is entered next to a DD name, the command is intended to work on the DD allocation rather than the data set name on that line. For example, an **E** command next to the DD name that refers to a concatenation edits the whole concatenation. If you want to edit just the first data set in a concatenation, use the LONG command to place the list in *long* format. In long format, the DD name for a concatenation is on a separate line so that you can place line commands next to the first data set name in the concatenation.

The Edit, Browse, View, and Member list commands are sensitive to the results of the MEMBER primary command. When the MEMBER primary command searches the displayed list for a member or members matching a name pattern, the member or pattern is shown in the list. Placing an E, B, V, or M next to a name in which the member or pattern was found displays either a member list with member names matching the pattern or the specific found member.

E - Edit

The E line command edits a data set or concatenation. It can be used on any data set or any DD name allocated to a data set (real or VIO). You might want to use the E line command for editing temporary files such as JCL that was created by file tailoring and written to the ISPCTLn DD name.

B - Browse

The B line command browses a data set or concatenation. It can be used on any data set or any DD name allocated to a data set (real or VIO). You can use the B line command for browsing allocated files. For example, the compress option in the PDF utilities, option 3.1, creates a listing data set that is sometimes allocated to the ISPCTL1. When you press the HELP key after compressing a data set in option 3.1, you might see that the listing was saved in a temporary data set. The B line command in ISRDDN is an easy way to browse that data set.

V - View

Use the V line command to view a data set or concatenation. This is similar to E (Edit) but there is no SAVE command. Use this when you want to view a data set and modify it for easier viewing without risking changes to the data set.

M - Member list

The M command displays an enhanced member list for a data set or concatenation. This gives you greater flexibility in working with allocated data sets. You might use this command when you have several different operations to perform on members.

F - Free

Use the FREE command to free an allocation. The Free command must be specified next to a DD name. F commands next to data sets in a concatenation with an F next to the DD name are ignored because those data sets are removed from the list before the F commands are processed.

The F command uses SVC 99 (dynamic allocation) to free the DD name. However, if SVC 99 cannot free the data set, ISRDDN invokes TSO's FREE command. The TSO FREE command might write a message to the screen with information on why

the free failed. This command is useful when you need to free allocations such as those left by prematurely terminated or poorly behaved programs.

C or Z - Compress

Use the COMPRESS command to compress partitioned data sets. The COMPRESS command can be used with data sets that are allocated as shared and can be used next to data set names or DD names.

I - Information

The I command attempts to invoke the PDF data set information utility to display information about a data set. It can be used next to any real data set name. VIO data sets are not supported. This command can provide information such as the number of allocated directory blocks or a data set's SMS management class, or other information that is not shown by scrolling the Current Data Set Allocations list left or right.

Q - Query ENQs

The Q command shows all SYSDSN and SPFEDIT ENQs that exist for a data set. This command is useful when you want to see what other users or jobs are using a data set you have allocated. Using the Q command provides the same information as using the ENQ primary command and selecting an RNAME of the data set name.

T - Test Directory

The T line command reads the directory of a PDS directly, and performs a BLDL command on each member to see if the BLDL service returns accurate information for the directory. The results are displayed in a separate Browse session. The T command can be used to debug problems such as I/O errors or the need to refresh LLA or other directory caching systems.

K- VTOC Information

The K line command displays VTOC information for the first volume on which the data set resides. The information returned is the same as in the Data Set List utility (option 3.4, command V). You can also view VTOC information by placing the cursor on the volume name and pressing Enter. If the data set is not on a physical volume, the K command does not provide any information.

Browsing Storage

You can use the BROWSE command within ISRDDN to view the contents of storage within your address space. When you are browsing storage, you can use any of the standard ISPF Browse primary commands. In addition, there are several primary commands you can use to format and move around in the storage list.

If you are not using one of the special display formats (CHAIN, ARRAY, or ARRAYP), you can scroll UP even when the "Top of Data" line is displayed so that you can see what data exists before your requested storage location. After you scroll up once, you can scroll up or down to the limits of the contiguous addressable storage.

BROWSE

When the BROWSE command is invoked within an existing browse session, a new browse session is started. The END command returns you to the previous Browse session. To end all of the sessions and return to the Current Data Set Allocations list, use the CANCEL command.

Browse can also be used with point and shoot. Place the cursor over an address within the display and press Enter. A new browse session is started to view the storage pointed to by the cursor. If the cursor is not on a valid, accessible address, an error message displays.

RAW

Display storage data as unformatted text. Storage is shown on the screen without any formatting. The data on a line is the data that immediately follows the data on the previous line. Because the FIND command is actually searching the screen image and not storage itself, it is best to search storage while in the RAW display format. Note that even in unformatted displays, if your search string would span lines, FIND does not locate the string. To avoid this, search for the string in RAW format, then enter the command **B +20** to find the string again. This shifts the display by 32 bytes (hexadecimal 20) and the line breaks occur in different places.

DATA

Display the storage as an unformatted string of data with offsets shown on the left side of the screen. Use this format to give you a better context of the storage you are browsing.

FORMAT

Display the storage in both hexadecimal and EBCDIC, the way you might see the format in a data dump (see Figure 71 on page 208). On wide screens such as a 3278 Mod 5, the format includes 16 bytes per line (8 sets of 4 bytes). On narrower screens, the format contains 8 bytes per line (4 sets of 4 bytes). FORMAT is the default format that appears whenever a storage browse session is started.

```
 BROWSE    ISPSUBS JPA Start:15D8C890 Size:000E5770   Line 00000000 Col 001 080
******************************** Top of Data *********************************
      +0 (15D8C890)   C9E2D7E3 E2C3F040 000003BC 15E03450  * ISPTSC0 ...≪.\.& *
     +10 (15D8C8A0)   15DCE850 15DB0C48 15E1EDB0 15DE49A0  * .³Y&.¹.þ.¸Ê^.·±Á *
     +20 (15D8C8B0)   15DE7BF8 15E21780 15E00E48 15E71848  * .·#8.S.Ï.\.þ.X.þ *
     +30 (15D8C8C0)   15E1E1A0 15DCEA40 15E1F400 15E1FEE0  * .¸¸Á.³. .¸4..¸┌\ *
     +40 (15D8C8D0)   15E0D540 15E0E148 15E20038 15E6BE98  * .\N .\¸þ.S...W┤q *
     +50 (15D8C8E0)   15E106D0 15E202B8 15E0E950 15DDD380  * .¸.}.S.¢.\Z&.¨LÏ *
     +60 (15D8C8F0)   15D8DC30 15E0F7C0 15E10308 15E0F1A0  * .Q³..\7{.¸...\1Á *
     +70 (15D8C900)   15E1EB98 15E20700 15DBA490 15E0B518  * .¸Èq.S...¹u..\º. *
     +80 (15D8C910)   15E6D018 15DA8AC0 15DA5D58 15E20AE0  * .W}...½{..)ý.S.\ *
     +90 (15D8C920)   15E25D20 15DA9A30 15E6D3D0 15E6DB98  * .S)...¬..WL}.W¹q *
     +A0 (15D8C930)   15E212C0 15E21540 15DFFB08 15E6F128  * .S.{.S. .....W1. *
     +B0 (15D8C940)   15DAE7D8 15E083C8 15DB0428 15E0EFB0  * ..XQ.\cH.¹...\ı^ *
     +C0 (15D8C950)   15E0F628 15E0F290 15E0AB60 15E209D8  * .\6..\2..\┐-.S.Q *
     +D0 (15D8C960)   15E224F0 15DFDBE0 15E0D050 15DCD0B0  * .S.0..¹\.\}&.³}^ *
     +E0 (15D8C970)   15DCD3D0 15DCD190 15E23A80 15E6F480  * .³L}.³J..S.Ï.W4Ï *
     +F0 (15D8C980)   15E23B58 15E24BE8 15D8D630 15E24E40  * .S.ý.S.Y.QO..S+  *
    +100 (15D8C990)   15D8CC50 15E252A8 15E25468 15E25B20  * .Q÷&.SÛy.SÞÃ.S$. *
    +110 (15D8C9A0)   15E29E30 15E6FDA8 15E2B778 15E0D358  * .Sã..W┘y.S...\Lý *
    +120 (15D8C9B0)   15E70AC8 15DCEB10 15E2B998 15DFF458  * .X.H.³È..S¥q..4ý *
 Command ===> ___________________________________________ Scroll ===> PAGE
  F1=HELP      F2=          F3=END       F4=DATASETS  F5=FIND      F6=CHANGE
  F9=SWAP     F10=LEFT     F11=RIGHT    F12=SUBMIT
```

Figure 71. Storage Viewed in FORMAT Mode

WIDE and NARROW

The WIDE and NARROW commands switch the display between wide and narrow formats regardless of the type of terminal you are using. If the screen is too narrow to handle the wide format, you must scroll right and left to see all of the data.

REFRESH (REF)

Use the REFRESH command to scroll the display back to the +0 offset. REFRESH is useful if you have scrolled up past the initial ″Top of Data″ line and want to return to your original referenced storage location.

REFRESH is not available in CHAIN, ARRAY, or ARRAYP formatted displays.

CHAIN

When you are viewing a linked list, you can use the CHAIN command to view more than one link at a time. The syntax for CHAIN is

```
CHAIN [offset [length]]
```

The *offset* is a hexadecimal offset of the 4–byte pointer to the next link. The *length* is a hexadecimal minimum length to show for each link. The default for offset is zero. The default for length is whatever fits on one line in the current display format. The chain is considered terminated when a pointer of zero is found, a pointer to the first node is found, or a pointer to unavailable storage is found. Entering the CHAIN command a second time turns the CHAIN formatting off.

For example, to see the current ASCB chain, enter ISRDDN and type

```
B 10.??+C?
CHAIN 4 20
```

You see a screen similar to Figure 72.

```
 BROWSE    STORAGE  Start:00F90100                    Line 00000001 Col 001 080
      +0 (00F90100)   C1E2C3C2 00F92B80 00F90280 00000000  * ASCB.9.Ï.9.Ï.... *
     +10 (00F90110)   008FD788 00029982 00000000 00000000  * ..Ph..rb........ *

     +30 (00F92B80)   C1E2C3C2 00F98500 00F90100 00000000  * ASCB.9e..9...... *
     +40 (00F92B90)   008FD880 000005B4 00000000 00000000  * ..QÏ...®........ *

     +60 (00F98500)   C1E2C3C2 00F90700 00F92B80 00000000  * ASCB.9...9.Ï.... *
     +70 (00F98510)   008FD598 0000E527 00000000 00000000  * ..Nq..V......... *

     +90 (00F90700)   C1E2C3C2 00F90580 00F98500 00000000  * ASCB.9.Ï.9e..... *
     +A0 (00F90710)   008FD690 00009130 00000000 00000000  * ..O...j......... *

     +C0 (00F90580)   C1E2C3C2 00000000 00F90700 00000000  * ASCB.....9...... *
     +D0 (00F90590)   008FD788 00007EC0 00000000 00000000  * ..Ph..={........ *

******************************** Bottom of Data ********************************




 Command ===> ____________________________________________ Scroll ===> PAGE
  F1=HELP      F2=          F3=END       F4=DATASETS  F5=FIND      F6=CHANGE
  F9=SWAP     F10=LEFT     F11=RIGHT    F12=SUBMIT
```

Figure 72. CHAIN Storage Format

In the CHAIN format display, the offsets on the left are the offsets within a particular link followed by the actual address of the start of the line.

ARRAY

When you are viewing that is an array, you can show the array elements as separate blocks of storage. The syntax for ARRAY is

`ARRAY [dimension [length]]`

The *dimension* is the number of array elements in decimal. The *length* is the length of each element in hexadecimal. The default for length is 4.

For example, the static link list table is an array. Assuming that each element is 45 bytes (hexadecimal 2D) and that you want the first 30 entries, enter ISRDDN and type:

```
B 10.?+4DC?+8
ARRAY 30 2D
```

You see a screen similar to Figure 73 on page 210.

```
BROWSE    STORAGE  Start:00F3E6C0                   Line 00000001 Col 001 080
     +1 (00F3E6C0)   0CE2E8E2 F14BD3C9 D5D2D3C9 C2404040  * .SYS1.LINKLIB    *
        (00F3E6D0)   40404040 40404040 40404040 40404040  *                  *
        (00F3E6E0)   40404040 40404040 40404040 40        *                  *

     +2 (00F3E6ED)   0BE2E8E2 F14BD4C9 C7D3C9C2 40404040  * .SYS1.MIGLIB     *
        (00F3E6FD)   40404040 40404040 40404040 40404040  *                  *
        (00F3E70D)   40404040 40404040 40404040 40        *                  *

     +3 (00F3E71A)   0BE2E8E2 F14BC3E2 E2D3C9C2 40404040  * .SYS1.CSSLIB     *
        (00F3E72A)   40404040 40404040 40404040 40404040  *                  *
        (00F3E73A)   40404040 40404040 40404040 40        *                  *

     +4 (00F3E747)   11E2E8E2 E74BC9E2 C4F14BD3 C9D5D2D3  * .SYSX.ISD1.LINKL *
        (00F3E757)   C9C24040 40404040 40404040 40404040  * IB               *
        (00F3E767)   40404040 40404040 40404040 40        *                  *

     +5 (00F3E774)   15E2E8E2 E74BE2E8 E2D7D3C5 E7C44BD3  * .SYSX.SYSPLEXD.L *
        (00F3E784)   C9D5D2D3 C9C24040 40404040 40404040  * INKLIB           *
        (00F3E794)   40404040 40404040 40404040 40        *                  *

Command ===> ____________________________________________ Scroll ===> PAGE
 F1=HELP      F2=          F3=END       F4=DATASETS  F5=FIND      F6=CHANGE
 F9=SWAP     F10=LEFT     F11=RIGHT    F12=SUBMIT
```

Figure 73. ARRAY Storage Format

In the ARRAY format display, the offsets on the left are the array element number followed by the address of the displayed line.

ARRAYP

Many control blocks are mainly list of pointers. For example, the Communications Vector Table (CVT) is an MVS control block that points to many other control blocks. The ARRAYP command shows the data pointed to by the pointers in a control block. Use the ARRAYP command when you are looking for the offset of a pointer to a particular storage location. The syntax for ARRAYP is

```
ARRAYP [dim [length]]
```

The *dim* is the decimal number of pointers in the array. The *length* is a hexadecimal length of each element pointed to by the pointer. The default for length is whatever fits on one line in the current display format.

For example, to see what is pointed to by the elements of CVT, enter ISRDDN and type

```
B 10.?
ARRAYP
```

You see a screen similar to Figure 74 on page 211.

In the ARRAYP format display, the offsets on the left are the offsets within the array of pointers followed by the pointer itself. This is followed by the data to which the pointer refers.

```
BROWSE    STORAGE  Start:00FC6CB8                   Line 00000001 Col 001 080
     +0 (00000218)   00889E88 00889E88 00FC4D80 00F90100  * .hãh.hãh..(Ï.9.. *
     +4 (00FDEFC4)   0DA01211 A7240008 10114111 00001111  * .Á..x.....á..... *
     +8 (00FC6C34)   00000000 00000000 00000000 00000000  * ................ *
     +C (00FC72A0)   C1E4E2C3 C2010000 00FCA440 40404040  * AUSCB.....u      *
    +10 (00000000)   000A0000 000130E1 00000000 00000000  * .......¸........ *
    +14 (00FEB70C)   00FEB63C 00FEB63C 00FEB63C 00FEB63C  * .┌Â..┌Â..┌Â..┌Â. *
    +18 (00FE7096)   58F00224 58F0F06C 58F0F070 58F0F004  * ý0..ý00%ý00°ý00. *
    +1C (00FDA0E8)   47F0F028 47F0F034 47F0F020 47F0F018  * Õ00.Õ00.Õ00.Õ00. *
    +20 (00FD9F1C)   47F0F028 47F0F0E6 47F0F020 47F0F018  * Õ00.Õ00WÕ00.Õ00. *
    +24 (0181B7F8)   D3D3C3C2 04820000 00000000 00F8BB00  * LLCB.b.......8]. *
    +28 (0126F150)   47F0F01C 16C3E2E5 D3D3E3D9 D440F0F2  * Õ00..CSVLLTRM 02 *
    +2C (00FD8C50)   05F047F0 F00600E6 05A04AF0 F00407FF  * .0Õ00..W.Áó00... *
    +30 (00F29C70)   0088FF8E FA0E0000 00000000 00E4C3C2  * .h.▪│........UCB *
    +34 (00FDC2F0)   0DF058F0 F2020BEF 00FDC34C 00FDC360  * .0ý02..ı.┘C<.┘C- *
    +38 (0103034F)   0C4104A0 045000E1 08961060 7E584000  * .á.Á.&.¸.o.-=ý . *
    +3C (00FC72C8)   15C7A300 D4E2C5D9 15CD6B40 000000FF  * .Gt.MSER.═, .... *
    +40 (00F16000)   02000000 52000000 00000000 1000263C  * ....Û........... *
    +44 (00FEDE78)   47F0F008 41EE0002 1FCC43CE 00009110  * Õ00.áË...÷õ¾..j. *
    +48 (00FDEFE8)   0DF04111 00000BE0 58F0F00E 0BEF0000  * .0á....\ý00..ı.. *
    +4C (00000000)   000A0000 000130E1 00000000 00000000  * .......¸........ *
Command ===> ___________________________________________ Scroll ===> PAGE
 F1=HELP      F2=          F3=END       F4=DATASETS  F5=FIND      F6=CHANGE
 F9=SWAP     F10=LEFT     F11=RIGHT    F12=SUBMIT
```

Figure 74. ARRAYP Storage Format

Defining Named Storage Locations

If you browse the same storage locations or control blocks frequently, you might want to set up a file that names those storage locations so that you can use a name in the BROWSE command.

To enable the BROWSE command to use a named reference to storage, you must allocate a sequential file to the DD name ISRDDN. Within that file each line is either a comment or a named storage location. Comments start with a semi-colon (;).

Location definitions have a name as the first word, followed by a TSO TEST style locator string. Anything after the locator string is ignored. The TSO TEST locator string can use another defined name as a starting point. If the locator string cannot be resolved because of syntax or other errors, the line is ignored.

For example, if you allocate a sequential file like the one shown in Figure 75 to DD name ISRDDN, you could then browse your User Profile Table, which stores your TSO PROFILE settings, by typing **B UPT** on the command line.

```
CVT        10.?          Communications Vector Table
PSCB       JSCB+108?     TSO Protected Step Control Block
JSCB       TCB+B4?       Job/Step Control Block
TCB        CVT??         Task Control Block
UPT        PSCB+34?      User Profile Table
```

Figure 75. Sample ISRDDN Named Storage File

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