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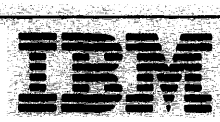
TSO Extensions (TSO/E) General Information



Seventh Edition (April 1986)

This is a major revision of, and obsoletes, GC28-1061-5. See the Summary of Amendments following the Contents for a summary of the changes made to this manual.

This edition applies to the TSO Extensions (TSO/E) Release 3 Licensed Program, Program Number 5665-285. Changes are made periodically to the information herein; before using this publication with the operation of IBM systems, consult the latest *IBM System/370 Bibliography*, GC20-0001, for the editions that are applicable and current.

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Preface

This publication describes the facilities of the TSO Extensions (TSO/E) program product (5665-285). It is intended for installation managers and system programmers who are considering installing TSO/E.

Depending on the feature ordered, TSO/E runs on one of the following operating systems:

1. MVS/System Product Version 1 (5740-XYN and 5740-XYS). Throughout the remainder of this publication that system is referred to as MVS/370.

   For more detailed information concerning MVS/370, refer to *MVS/System Product Version 1 General Information Manual*, GC28-1025.

2. MVS/System Product Version 2 (5665-291 and 5740-XC6) and MVS/Extended Architecture Data Facility Product (5665-284). Throughout the remainder of this publication that operating system is referred to as MVS/Extended Architecture (MVS/XA).

   For more detailed information concerning MVS/XA, refer to *MVS/System Product Version 2 General Information Manual*, GC28-1118.

This publication contains the following four chapters:

- Chapter 1, "Introduction" on page 3 explains the purpose and benefits of TSO/E.

- Chapter 2, "Description of TSO/E" on page 11 describes the facilities of TSO/E. The description includes the functions and enhancements in the current release, a consolidated description of the functions and enhancements in previous releases, and a summary of the contents of each of the previous releases.

- Chapter 3, "Planning for TSO/E Release 3" on page 51 contains advice for people who are preparing to install TSO/E.

- Chapter 4, "Documentation for TSO/E" on page 65 contains a description of the TSO Extensions library and gives ordering information for the manuals and microfiche that support each release of TSO/E.

Referenced Publications

In addition to the publications that support TSO Extensions, the following publications are referenced in this manual:

- *MVS/System Product Version 1 General Information Manual*, GC28-1025
- *MVS/System Product Version 2 General Information Manual*, GC28-1118
- *A Departmental Reporting System Users Guide*, SH20-2165
- *A Departmental Reporting System Systems Guide*, LY20-2415
- *A Departmental Reporting System II Business Graphics*, SH20-2658
- *The Financial Planning System - TSO Systems Guide*, LB21-2337
- *System Programming Library: JES2 User Modifications and Macros*, SC23-0067
- *MVS/Extended Architecture System Programming Library: JES2 User Modifications and Macros*, LC23-0069
- *System Programming Library: JES3 User Modifications and Macros*, LC28-1371
- *MVS/Extended Architecture System Programming Library: JES3 User Modifications and Macros*, LC28-1372
- *System Programming Library: JES2 Initialization and Tuning*, SC23-0046
- *MVS/Extended Architecture System Programming Library: JES2 Initialization and Tuning*, SC23-0065
- *MVS/Extended Architecture Operations: System Commands*, GC28-1206

Contents

Figures

Summary of Amendments

Summary of Amendments
for GC28-1061-6
for TSO Extensions Release 3

This revision of *TSO Extensions (TSO/E) General Information* describes TSO/E Release 3. It contains descriptions of the following additions for TSO/E Release 3. Unless otherwise indicated, the additions apply to both MVS/370 and MVS/XA.

- New services in the Information Center Facility
  - New conduit dialogs
  - Space management
  - Printer support for the Information Center Facility
  - Command table.
- Enhancements to the Information Center Facility
  - Names directory
  - Education services
  - Start-up and termination processing
  - Usability enhancements.
- Support for VM/PC Servers (MVS/XA only)
- ALLOCATE command enhancements (MVS/XA only)
  - Printer support for processing SYSOUT data sets
  - Acceptance of ATTRIB operands on ALLOCATE command during concatenation requests.
- Simplification of SYSGEN and IOGEN (MVS/XA only)
- CLIST additions and enhancements
  - New built-in CLIST functions and control variables
  - Accessing CLIST variables (MVS/XA only)
  - LISTDSI CLIST statement.
- TSO service facility enhancement (MVS/XA only)
- TRANSMIT/RECEIVE enhancements.

The manual is reorganized as follows:

- It contains an introduction.
- The new release is described first, followed by a consolidated description of the previous releases, and a list of the major items in each of the previous releases.
- The planning section describes the planning considerations for the new release only.
- The description of the TSO/E library has been moved from the Appendix to a new chapter that also includes the manual and microfiche order numbers for all releases that you can currently order.

Summary of Amendments
for GC28-1061-5
for TSO Extensions Release 2.1

This revision contains the following additions for TSO/E Release 2.1, which can be installed only on an MVS/XA system:

- Programming requirements
- Virtual storage requirements
- Module/macro lists
- Publications/microfiche information
- OPERATOR command enhancements.

Summary of Amendments
for GC28-1061-4
for TSO Extensions Release 2.1

The following additions have been made in this revision for TSO/E Release 2.1, which can be installed only on an MVS/XA system:

- Virtual storage constraint relief for:
  - LOGON processing
  - CLIST and I/O services
  - Session Manager processing
  - ALLOCATE command processing
  - Terminal monitor program processing
  - Miscellaneous TSO services.
- Logon extended region support
- HELP facility enhancements
- SEND command enhancements
- Session Manager enhancements.

Chapter 1. Introduction

The TSO Extensions (TSO/E) program product is the base for all TSO enhancements. It provides both MVS/370 and MVS/XA users with additional functions, improved usability, and better performance. In the MVS/XA environment, TSO/E also provides virtual storage constraint relief.

Users of TSO/E

TSO/E provides enhancements that are attractive to the entire range of users. The users include system programmers, application programmers, information center administrators, information center users, and others who access applications that run under TSO/E.

Highlights of TSO/E

TSO/E provides new functions and enhancements to existing functions. The major highlights are summarized here and described in more detail in Chapter 2, "Description of TSO/E" on page 11.

- The Information Center Facility

  The Information Center Facility is an important element in implementing an MVS-based information center (IC). An IC increases the productivity of users and the effectiveness of computers by providing easy-to-use computing tools, data access, education, and other assistance for users who have little or no data processing experience. The Information Center Facility eases the user into the data processing environment by providing a conversational, panel-driven interface. Many of the command-driven interactions between the user and the system are eliminated. In addition to end user services, the Information Center Facility provides panels that allow an administrator to maintain the facility.

- VM/PC servers

  The MVSSERV command processor in TSO/E Release 3 contains the VM/PC servers (spool, disk, and file). The VM/PC servers allow a VM/PC user on an IBM PC XT/370 or an IBM PC AT/370 to access services that run on an IBM System/370 host processor using MVS/XA. Without leaving the PC environment, the user requests the services by issuing VM/PC commands.

- The Session Manager

  The Session Manager is an interface to TSO. It saves the commands that you enter and the responses that you receive and allows you to redisplay or print them. You can correct or change a command that is displayed on the screen without having to retype the entire command. By allowing you to redisplay, change, and reuse your input, the Session Manager makes TSO easier to use.

  The Session Manager functions were previously available in TSO 3270 Extended Display Support - Session Manager (5740-XE2). The Session Manager program product is integrated into TSO/E. Therefore, TSO/E provides all of the Session Manager functions without requiring users to install the Session Manager separately.

- The TSO Command Package

  The TSO Command Package provides functions that help to improve productivity. The functions included are:

  - Support for running terminal sessions as batch jobs
  - Automatic saving of data
  - Accounting facility enhancements
  - Defaults for the user-attribute data set
  - Enhancements to several commands.

  The TSO Command Package functions were previously available in TSO Command Package (5740-XT6). Along with the Session Manager, the TSO Command Package program product is integrated into TSO/E. Therefore, TSO/E provides all of the Command Package functions without requiring users to install the Command Package separately.

- Data and notice handling

  TSO/E contains several enhancements that improve the manner in which data and notices are sent and received. For example, the Interactive Data Transmission Facility, which provides two commands, TRANSMIT and RECEIVE, lets users send data and messages to other users in a network.

  The LISTBC command is improved so that it requires fewer I/O operations to list the contents of the broadcast data set. The broadcast data set contains messages that either the system or another user sends using the SEND command. In addition, a recovery routine prevents broken mail chains that could occur when message handling is interrupted.

  Notices are also handled more efficiently during logon processing. TSO/E keeps a copy of notices in storage, thereby reducing the I/O operations needed to inform users of waiting messages when they logon.

- CLIST programming language

  The CLIST programming language, which is enhanced in TSO/E, is a high-level interpretive language that simplifies programming. CLIST performance is improved and built-in functions and control variables are added to make the language easier to use.

- Logon processing

  A number of enhancements have been made to logon processing. A full-screen logon menu makes the logon process easier by:

  - Saving user attributes from one session to the next.
  - Allowing program function keys to be used during logon.
  - Allowing users to enter commands during logon.
  - Explaining the error when incorrect information is specified.

  In addition to the full-screen enhancements, in MVS/XA, a user can request an expanded private area (region) during logon. The LOGON and ACCOUNT command processors have been updated to allow users to request private areas of up to 2,096,128 K bytes for each terminal session.

- Online help

  Terminal users can obtain online help for most TSO commands. Information Center Facility users can also obtain help for each panel and message. In addition, the HELP facility is enhanced to allow installations greater flexibility in adding help information.

- The TSO service facility

  The TSO service facility lets TSO/E users execute authorized or unauthorized programs, TSO commands, or CLISTs from an unauthorized environment, while maintaining system integrity.

- Virtual storage constraint relief

  TSO/E provides virtual storage constraint relief for the MVS/XA environment. Many modules and storage areas have been moved above 16 Mb, thereby increasing the amount of virtual storage available below 16 Mb.

  See "Virtual Storage Constraint Relief (VSCR)" on page 39 for details about the functions that are affected. "Virtual Storage Requirements" on page 60 provides information about the modules and storage areas that have been moved above 16 Mb.

- New or enhanced commands

  TSO/E provides or enhances these commands:

  - ACCOUNT
  - ALLOCATE
  - ATTRIB
  - EDIT
  - EXEC
  - FREE
  - HELP
  - LISTBC
  - LOGON
  - MVSSERV
  - OPERATOR
  - RECEIVE
  - SEND
  - SUBMIT
  - TEST
  - TRANSMIT.

Major Benefits of TSO/E

In addition to providing new functions, the benefits of TSO/E can be summarized as follows:

- Usability

  The Information Center improves TSO/E usability. It assists non-DP users by making it easier to use a variety of services. For example, education services provide panels that allow users to register for, take, audit, and produce online courses as well as read abstracts of courses. Users can also register for and read course abstracts for installation courses given in a classroom.

- Improved productivity

  TSO/E can also help improve end user and programmer productivity. The functions and enhancements available through the Information Center Facility, the TSO Command Package, the Session Manager, and the CLIST and command enhancements are intended for that purpose.

- Improved performance

  The performance of TSO is improved. For example, internal logic changes improve CLIST performance. Work areas for TSO service routines are obtained during logon processing rather than each time they are required, thereby improving performance. Message-handling performance has also been improved by decreasing the number of I/O operations needed to use the LISTBC command and to process notices during logon.

- Virtual storage constraint relief

  In the MVS/XA environment, TSO/E provides virtual storage constraint relief. Many TSO/E modules and storage areas are moved above 16 Mb in virtual storage, thereby freeing more virtual storage below 16 Mb for users' applications. In addition, whenever possible, new modules and storage areas are located above 16 Mb.

Chapter 2. Description of TSO/E

This chapter describes the functions contained in the new release of TSO/E (TSO/E Release 3), the functions contained in the previous releases (TSO/E Releases 1, 2, and 2.1) as a whole, and a summary of the contents of each of the previous releases. IBM no longer provides service for TSO/E Release 1.

TSO/E Release 3

This section describes the new and improved functions in TSO/E Release 3. Unless otherwise stated, the updates apply to both MVS/370 and MVS/XA systems.

TSO/E Release 3 contains the following:

- New services in the Information Center Facility
  - New conduit dialogs
  - Space management
  - Printer support for the Information Center Facility
  - Command table.
- Enhancements to the Information Center Facility
  - Names directory
  - Education services
  - Start-up and termination processing
  - Usability enhancements.
- Support for VM/PC servers (MVS/XA only)
- ALLOCATE command enhancements (MVS/XA only)
  - Printer support for processing SYSOUT data sets
  - Acceptance of ATTRIB operands on the ALLOCATE command during concatenation requests.
- Simplification of SYSGEN and IOGEN (MVS/XA only)
- CLIST additions and enhancements
  - New built-in CLIST functions and control variables
  - Accessing CLIST variables (MVS/XA only)
  - LISTDSI CLIST statement.
- TSO service facility enhancement (MVS/XA only)
- TRANSMIT/RECEIVE enhancements.

New Services in the Information Center Facility

The Information Center Facility contains several new services. They are printer support, conduits to additional products, space management, and a command table.

Users can access the conduits to the additional products by selecting the ANALYSIS and PROGRAM options on the user's primary selection panel. An administrator can access printer support by selecting the SYSDEF option on the administrator's primary panel. Figure 1 and Figure 2 on page 13 show the updated primary panels for the administrator and end user. The updates made to the primary panels are highlighted.

On the Information Center Facility administrator's primary panel:

- Option 5 is changed to SYSDEF to include the ISPF system defaults and the new printer defaults.
- The description of option 7 refers to education services to reflect the addition of two new course types, COMPUTER and CLASSROOM.

On the Information Center Facility user's primary panel:

- Option 3 is changed to OFFICE to let an installation supply a mail, document, or office service.
- Option 4 is changed to PROGRAM to provide access to IBM BASIC/MVS, APL2, VS APL, The Information Facility, and Application System.
- The description of option 7 refers to education services to reflect the addition of two new course types, COMPUTER and CLASSROOM.
- Option 8 is changed to PDF because that option now provides access only to ISPF/PDF, not to other program creation and execution services.

The other two new services, space management and the command table, provide internal support. The user cannot access those services through the primary panels. A description of each of the new services in the Information Center Facility follows the figures showing the primary panels. See "Information Center Facility" on page 23 for details about the Information Center Facility services provided in previous releases of TSO/E.

```
                        TSO/E INFORMATION CENTER FACILITY ADMINISTRATION
OPTION = = = > _

Welcome to the Information Center Facility.

Select the desired option. Type the highlighted character to the right of the
OPTION arrow, and press ENTER.

   1  NEWS          -Maintain system news
   2  NAMES         -Maintain the name/phone directory
   3  ENROLL        -Enroll users in the Information Center Facility
   4  USERTYPE      -Set defaults for the Information Center Facility user types
   5  SYSDEF        -Set system defaults
   6  ICFUSER       -Use Information Center Facility user services
   7  COURSES       -Maintain education services
   8  PDF           -Use ISPF/PDF services
   9  PROBLEM       -Use problem reporting services
   T  TUTORIAL      -Learn about Information Center Facility administration
   X  EXIT          -Exit from the Information Center Facility

To view PF key definitions, type KEYS on COMMAND or OPTION line of any panel.
```

Figure 1. Information Center Facility Administrator's Primary Panel

```
                        TSO/E INFORMATION CENTER FACILITY USER SERVICES
OPTION = = = > _

Welcome to the Information Center Facility.

Select the desired option. Type the highlighted character to the right of the
OPTION arrow, and press ENTER.

   1  NEWS          -Obtain system news
   2  NAMES         -Find a name/phone number
   3  OFFICE        -Use mail/document/other office services
   4  PROGRAM       -Use program creation/execution services
   5  ANALYSIS      -Perform data analysis/report creation/decision support
   6  CHART         -Create charts/graphs
   7  COURSES       -Use education services
   8  PDF           -Use ISPF/PDF
   9  PROBLEM       -Report problems
  10  UTILITY       -Use utility services
   T  TUTORIAL      -Learn about Information Center Facility services
   X  EXIT          -Exit from the Information Center Facility

To view PF key definitions, type KEYS on COMMAND or OPTION line of any panel.
```

Figure 2. Information Center Facility User's Primary Panel

New Conduit Dialogs

New interactive dialogs allow users to access the following products:

- VS APL - A general purpose program product for problem solving, data analysis, and applications.
- APL2 - Similar to VS APL; however, it contains more general data and data structures, additional functions, and more error and diagnostic facilities.
- Query Management Facility (QMF) - A data base function that allows users to query Data Base 2 (DB2) data bases and manipulate the information in them.
- IBM BASIC/MVS - A language that allows users to program applications and solve problems in an MVS environment.
- Info Center/1 - A decision-support system that enables the end user to enter, select, and organize data for analysis, reporting, planning, and graphics.
- The Information Facility (TIF) - Lets users build, update, query, and produce reports from data bases. It also lets them create applications for display terminals without writing programs.
- Application System - Provides facilities for data management, information retrieval, formal reporting, document preparation, and project control.

Space Management

The space management service monitors and compresses or re-allocates a data set as necessary without user intervention. Space management can also create a new data set at the user's request. The names directory and the GDDM conduit dialog use space management to manage data sets.

Application and system programmers can use the space management CLIST and panel to compress and re-allocate data sets as part of error recovery. They can also use space management to create data sets, to ask the user whether or not to create a new data set, and to notify users that a data set is being compressed, re-allocated, or created.

Printer Support for the Information Center Facility

Information Center Facility administrators can use a set of panels to define, change, and display information about available printers. The information can include output characteristics and fonts to be used with the printer. Application and system programmers can use two printer CLISTs in application programs to provide printer support to the users of the applications. One CLIST displays the printer definitions that the Information Center Facility administrator has provided. The other CLIST lets users print either a sequential data set or a member of a partitioned data set.

Command Table

The command table in the Information Center Facility lets installations add their own commands for use in the Information Center Facility. To use a command in the command table, a user simply types that command after the COMMAND or OPTION arrow on any panel in the Information Center Facility and presses the ENTER key.

As shipped, the command table contains two commands. These commands provide a fast way of accessing either the user's or the administrator's primary selection panel.

The commands and their functions are:

Command	Function
IC	Displays the user's primary panel.
ADMIN	Displays the administrator's primary panel.

Enhancements to the Information Center Facility

The names directory, education services, and start-up and termination processing were enhanced in the Information Center Facility. Several usability enhancements were also made to existing services. A description of these enhancements follows.

Names Directory

The existing names directory is expanded to contain additional information about each name in the directory. The directory can also contain groups. A group can contain names of individuals and names of other groups. Using a group name saves time because a user specifies the group name to represent frequently used combinations of names.

Another enhancement to the names directory allows users to maintain and use a private directory as well as the master directory that the administrator maintains. A user can view private directory entries, master directory entries, or a merged list that contains the names in both the master directory and the private directory. A user can also use the Information Center Facility to ask the administrator to make updates to the master directory.

Application programs can use the names directory interface to access data in the names directory. The TSO/E Release 3 revision of *TSO Extensions User's Guide* will explain how to use that interface.

Installations can provide a user exit to create and maintain a separate data base that contains information similar to the names directory, but in a different form. If an installation supplies this exit, the names function can invoke the exit every time it updates an entry in the names directory.

Education Services

Users can access two new course types, COMPUTER and CLASSROOM. A COMPUTER course is any course, other than an Interactive Instructional Presentation System (IIPS) course, that the user can access online. CLASSROOM refers to a course that is conducted in a classroom.

Education services now handles segmented Interactive Instructional Authoring System (IIAS) courses. When updating a course, an author can access a specific segment. Accessing a specific segment saves time because the author does not have to search from the beginning of the course file for the appropriate segment.

The administrator can also specify the maximum number of students in IIPS and CLASSROOM courses. When a registration request causes the number of students in a class to exceed the specified maximum, the administrator sees a panel on which to confirm the excess registration. The maximum serves as a warning only and does not limit registration.

Start-up and Termination Processing

An installation can easily tailor start-up and termination processing using the start-up CLIST. Through the use of parameters on the CLIST invocation statement, the start-up CLIST provides the following functions:

- Allows the installation to specify the name of the ISPF profile data set to be allocated for use in the Information Center Facility. The profile contains such information as the PF key definitions, user job card information, terminal type, the character to be used for padding, and the character to be used as a delimiter.
- If an ISPF profile does not exist, creates a new one using the ISPF defaults.
- If an old ISPF profile exists, copies it to create a new profile.
- Displays the primary panel specified.
- Specifies whether termination processing is to be done. Termination processing is done in an exit routine that the installation supplies.
- Sets the initialization parameters, thereby providing for easy maintenance of those parameters.

Usability Enhancements

There are several usability enhancements to existing functions:

- Date specification

  Installations can choose to use European, international, or U.S. date formats. The Information Center Facility also verifies each date that the user enters.

- News
  - Users are notified of added news when they enter the Information Center Facility. They can use the NEW command within the news service to see just that news.
  - Users can request to see news items dated on or after a specified date.
  - The administrator can specify begin and end dates to control the availability of a news item. Use of the begin and end dates replaces the DRAFT concept used in earlier releases of TSO/E.
- GDDM/PGF
  - When specifying a data set for use by the Interactive Chart Utility (ICU), Image Symbol Editor (ISE), or Vector Symbol Editor (VSE), the user can request a list of data sets and select a data set from it.
  - When invoking the ICU, the user can specify symbol data sets created by ISE or VSE. The user can also specify a graphic data format (GDF) file.
- USER TYPE definition
  - When an administrator asks to delete a user type, a verification panel is displayed. The verification panel allows administrators to check deletion requests before the user type is deleted.
  - The administrator can modify the user type name and description as well as the characteristics of the user type.

Support for VM/PC Servers

The VM/PC servers let a VM/PC user access services that run on the System/370 using MVS/XA. The MVSSERV command processor in TSO/E Release 3 contains the VM/PC servers (spool, disk, and file). The following sections describe how a VM/PC user accesses the VM/PC servers, the services that are available, and how to obtain information to diagnose problems.

Accessing the VM/PC Servers

To access the VM/PC servers, the user:

- Starts VM/PC on the PC.
- Switches to the Screen Select Menu.
- Selects the remote 3270 session.
- Logs onto TSO/E.
- Issues the MVSSERV command.
- Switches back to the Screen Select Menu.
- Selects the local 3270 session.

After selecting the local 3270 session, the user simply issues VM/PC commands to request the services. The PC user can remain in the PC environment and access MVS/XA services and resources.

Services Available to VM/PC Users

VM/PC users can do the following:

- Read, edit, and file MVS sequential and partitioned data sets from VM/PC.
- Spool local CMS files to a remote MVS/XA system for printing.
- Extend storage.
- Upload files and data to the remote MVS/XA system.
- Download files and data to the PC.

Diagnosing Problems in the VM/PC Servers

The diagnostic information for the VM/PC servers is located in the trace data set. By specifying parameters on the MVSSERV command, users can indicate whether they want all, some, or no diagnostic information in the trace data set.

The VM/PC servers provide their own recovery. In addition, the VM/PC servers provide recovery for the TSO commands.

ALLOCATE Command Enhancements

In MVS/XA, the ALLOCATE command is enhanced to provide:

- Printer support for processing SYSOUT data sets
- Acceptance of ATTRIB operands on the ALLOCATE command during concatenation requests.

Each of these enhancements is described in more detail in the following paragraphs.

Printer Support for Processing SYSOUT Data Sets

System and application programmers can use the ALLOCATE command to:

- Specify where and how a SYSOUT data set is to be printed by supplying only the names of output descriptors. The programmer does not need to know the JES name for the printer being used or need to supply other information related to the printer and the type of printing to be done. Using the OUTDES keyword of the ALLOCATE command, the programmer simply specifies the name of an installation-defined output descriptor. The installation can define the output descriptors in use at the installation in JCL OUTPUT statements in LOGON procedures. If a printer is unavailable, the installation can change the OUTPUT statement for that printer to refer to some other printer.
- Route a SYSOUT data set to another user or a printer on another system for processing. The programmer specifies the DEST keyword of the ALLOCATE command. Previously the programmer could only route the data set to a remote work station.
- Specify the universal character set to be used when printing a SYSOUT data set. The programmer provides the name of the character set on the UCS

keyword of the ALLOCATE command. Use of the UCS keyword lets the programmer specify different print fonts for different data sets.

- Specify an external writer (an installation-written program) instead of JES2 or JES3 to write a SYSOUT data set. The programmer specifies the name of the external writer on the WRITER keyword of the ALLOCATE command. Supplying an external writer lets an installation customize the way the output is written. See *System Commands* for information about external writers.

- Specify the name of the form on which the output from the SYSOUT data set is to be printed using the FORMS keyword of the ALLOCATE command. The FORMS keyword lets the user print different output on different forms.

Acceptance of ATTRIB Operands on the ALLOCATE Command during Concatenation Requests

Using ATTRIB operands on the ALLOCATE command during concatenation requests provides application and system programmers with greater flexibility in defining concatenated data sets. During concatenation requests, the ALLOCATE command can accept the following operands related to the ATTRIB command:

BFALN	BUFNO	EROPT	NCP
BFTEK	BUFOFF	INPUT	OPTCD
BLKSIZE	DEN	KEYLEN	OUTPUT
BUFL	DIAGNS	LIMCT	TRTCH
			USING

Examples of the benefits from using several of these operands follow:

- If a programmer specifies the ATTRIB operand BLKSIZE on an allocation concatenation request, the data set with the largest block size does not have to be first in the list.

- A programmer can provide data set attributes using the ATTRIB command and then refer to those attributes from one or more allocation concatenation requests by specifying the USING operand on the ALLOCATE command. The programmer does not have to repeat the attributes on each allocation concatenation request.

Simplification of SYSGEN and IOGEN

In MVS/XA, an installation does not have to do an IOGEN or a SYSGEN to change most TSO/E parameters formerly specified on the TSO, SCHEDULR, and EDIT macros. System programmers can assemble macros and execute background jobs that change the TSO-related parameters without a SYSGEN or IOGEN. SYS1.SAMPLIB contains samples of the macros and the JCL that a system programmer needs to run the background jobs. The TSO-related parameters are:

- LOGON limits, which limit the number of lines a user is allowed to enter before being cancelled and the number of seconds that are to elapse before a user sees the message "LOGON PROCEEDING."
- Broadcast limit, which indicates the number of records to be set aside for notices in the broadcast data set.
- EDIT defaults, which specify the physical characteristics and processing attributes of the data sets to be processed by the EDIT command.

CLIST Additions and Enhancements

The following additions and enhancements are made to CLISTs in this release of TSO/E:

- New built-in CLIST functions and control variables
- Accessing CLIST variables (MVS/XA only)
- LISTDSI CLIST statement

Each of these enhancements is described in more detail in the following paragraphs.

New Built-in CLIST Functions and Control Variables

The built-in functions and control variables added for use in CLISTs are:

Built-in Function	Function
&SYSINDEX	Returns the numeric character position of the beginning of a string of characters within another string of characters.
&SYSNSUB	Specifies the number of levels of symbolic substitution to be done in a given expression. &SYSNSUB lets the user override the rule of symbolic substitution regarding a variable name that contains double ampersands. Without &SYSNSUB, double ampersands indicate that the CLIST is to remove an ampersand and end symbolic substitution on the variable. Using &SYSNSUB, the CLIST treats the removal of the first ampersand as one level of symbolic substitution and continues substitution for the number of levels indicated by &SYSNSUB.

Control Variable	Function
&SYSHSM	Indicates whether or not the Hierarchical Storage Manager (HSM or DFHSM) is installed and active on the system. If HSM is installed and active, &SYSHSM returns the level of HSM in use or the word AVAILABLE, depending on the level of HSM in use. If HSM is not installed or is installed but not active, &SYSHSM returns a null value.
&SYSLRACF	If the Resource Access Control Facility (RACF) is installed on the system, &SYSLRACF returns the level of RACF installed. If RACF is not installed, &SYSLRACF returns a null value.
&SYSTSOE	Returns the version, release, and modification levels of TSO/E in use.

Accessing CLIST Variables

In MVS/XA, the internal algorithm used to search for CLIST variables is improved. This improvement helps speed up the search in many cases. Programs must use the CLIST variable access routine (IKJCT441) to access internal control blocks related to CLIST processing. See *TSO Extensions Guide to Writing a Terminal Monitor Program or a Command Processor* for information about that routine.

LISTDSI CLIST Statement

LISTDSI, a new statement, provides information about a data set's allocation and protection and, if the data set is partitioned, its directory. LISTDSI returns the data set information in CLIST variables. Subsequent CLISTs can use these variables in processing. See *CLISTs: Implementation and Reference* after general availability of TSO/E Release 3 for a description of those variables. Space management, a new function in the Information Center Facility, uses LISTDSI to find out whether or not a data set is running out of space.

TSO Service Facility Enhancement

In MVS/XA, the TSO service facility is enhanced to let programmers invoke CLISTs as well as programs and commands from an unauthorized environment. Previously, the TSO service facility restricted users to one TSO command or program per invocation. CLISTs can consist of many TSO commands and can invoke other CLISTs. Therefore, allowing the invocation of CLISTs increases the power and flexibility of the TSO service facility. See "TSO Service Facility" on page 38 for more information about the TSO service facility.

TRANSMIT/RECEIVE Enhancements

The TRANSMIT and RECEIVE commands contain the following enhancements:

- The RECEIVE command processor allows users to receive Professional Office System (PROFS) (5664-176) notes. The RECEIVE command processor recognizes the header information in PROFS notes and processes them in the same way as information sent using the MESSAGE operand of the TRANSMIT command.
- The date stamp for data sent using the TRANSMIT command includes seconds for more accurate timing.

- The length of a line of data that can be sent in line mode using the LINE operand of the TRANSMIT command is increased from 72 to 80 characters. This increase allows an application to use a single TRANSMIT command to send an 80-character line of a screen display.

- When a user issues the RECEIVE command with the INDSNAME or INDDNAME operands, the sender no longer gets an acknowledgement. However, the sender does get an acknowledgement for the original RECEIVE command with the COPY operand. Reducing the number of acknowledgements avoids unnecessary messages for the sender.

- Several terminal messages for the TRANSMIT and RECEIVE commands are rewritten to improve their clarity.

Previous Releases of TSO/E

This section describes the functions that already exist in TSO/E. The contents of each of the earlier releases of TSO/E is summarized at the end of this chapter. The information is presented in the following order:

- Information Center Facility
- Session Manager
- Command Package
- Interactive Data Transmission Facility (TRANSMIT and RECEIVE commands)
- Mail-handling enhancements (LISTBC command)
- CLIST enhancements
- Logon enhancements
- Assistance to users
- TSO service facility
- Service routines
- Virtual storage constraint relief
- Enhancements to commands.

Information Center Facility

The Information Center Facility is a set of panel-driven functions that provide easy access to and usage of system services for the end user who has little or no knowledge of data processing. These panels assist the user in accessing the services in the facility as well as creating the environments required for a number of program products. By accessing program products through the Information Center Facility, users can generate reports, modify and manipulate data, perform business-related analyses, make spontaneous inquiries of the system, and perform other tasks that require the use of computing systems. Installations can customize the Information Center Facility by adding additional products or deleting references to products they do not have. In addition, the Information Center Facility also provides online tutorials and help panels for the user and Information Center Facility administrator.

The Information Center Facility is based on the Interactive System Productivity Facility (ISPF) dialog manager services.

The Information Center Facility provides the following functions:

- ***User Enrollment***

  User enrollment assists the Information Center Facility administrator in enrolling users. Data entry panels are used to collect information about each user and to customize profiles. The facility adds the user to the names directory, identifies the user to TSO and the Resource Access Control Facility (RACF) (if installed), creates a catalog alias, and creates the user's ISPF profile using the default Information Center Facility/ISPF profile. The facility automatically issues the required underlying commands.

- ***News***

  The news service allows the Information Center Facility administrator to maintain and distribute online information (news) to all Information Center Facility users. The administrator can add, update, and delete news items that all users can read.

- ***Names Directory***

  The names directory allows the Information Center Facility administrator to maintain an online names directory. The directory contains the names of all people enrolled in the Information Center Facility as well as other names the administrator has added. In addition, each entry can contain a person's phone number, user ID, address, title, and other information. The administrator can add, update, and delete names from this directory, which all users can read.

  See "Enhancements to the Information Center Facility" on page 15 for the changes to the names directory for TSO/E Release 3.

- ***Conduit Dialogs***

  Each conduit dialog provides an interactive process for the user to access the associated licensed program product installed at an installation. These dialogs mask the underlying system operations required to access the products. Using the program products, users can generate reports, modify and manipulate data, perform business-related analyses, make spontaneous inquiries of the system, and perform other tasks that require the use of computing systems.

  For a list of the products supported by the Information Center Facility, see "Programming Requirements" on page 58.

- ***Education Services***

  Education services let users take a course, audit a course, produce a course, view a course abstract, and request registration in a course. The Information Center Facility administrator can provide abstracts for the courses, register students, keep a record of course registration, and modify the administrator's defaults to indicate which courses are actually available at an installation.

To access and write an IIPS course, the system programmer must install both the Interactive Instructional Presentation System (IIPS) (5668-012) and the Interactive Instructional Authoring System (IIAS) (5668-011). If neither of these is installed, descriptions of IIPS courses can still be viewed. In TSO/E Release 3, services associated with COMPUTER and CLASSROOM courses are also available without IIPS and IIAS. See "Enhancements to the Information Center Facility" on page 15 for the changes to the education services for TSO/E Release 3.

- ***Tutorials and Help Information***

  The end user's and administrator's tutorials provide an online description of how to use the basics of the Information Center Facility. End users and administrators can access specific topics of interest or view the full tutorial sequentially.

  Most of the panels in the Information Center Facility have associated help panels. Help panels provide additional information about a panel and assist the user in making decisions.

Figure 1 and Figure 2 on page 13 show the primary panels for the administrator and end user. The updated panels show the services and exits to functions that are generally available in information centers. The administrator can access the user's primary panel by selecting the ICFUSER option on the administrator's primary panel.

Session Manager

The Session Manager is an interface to line mode TSO that provides full-screen display support for line-oriented commands, programs, and CLISTs. It makes TSO easier to use and takes advantage of many of the features of a display terminal.

The major functions of the Session Manager are:

- Saves all line-oriented input and output in data streams. Under the Session Manager, the display terminal screen acts as a focal point for I/O, enabling you to edit and reuse previous input and output with a minimal number of keystrokes. This data can easily be reentered as input, saved in a data set, or printed.

- Enhances the usability of TSO TEST and other interactive debugging tools.

- Enables you to access, compare, and manipulate the data needed to do your work directly on the screen. You no longer have to rely on physical documents and listings that are often outdated, time-consuming to obtain, and cumbersome to work with. PF keys can be used to locate data quickly and to move efficiently through data streams.

- Allows an installation to tailor the layout of the display screen and the terminal environment to the requirements of its users. Sophisticated users can also tailor the screen layout and PF key definitions to suit their own needs by using Session Manager commands. These commands can easily be put in a CLIST, enabling all users to tailor the environment for themselves.

Regardless of whether or not you have the Interactive System Productivity Facility (ISPF) installed, the Session Manager provides full-screen display support for line-oriented commands, programs, and CLISTs. Existing applications do not have to be rewritten to use this support. Logging on under the Session Manager does not affect the features of ISPF (editing, library management, and menus).

Other than the journaling of line-oriented output, the Session Manager functions are not available while full-screen programs like ISPF are in control. However, the Session Manager enhances the usability of these programs by making it possible to modify line-oriented applications to simulate the full-screen environments from which they are invoked. Users need be familiar only with those environments.

IBM supplies a default screen and PF key environment that meets many users' needs. Installations can use the Session Manager commands to change the default environment. These commands allow you to control the format and content of your screen, as well as the definitions of PF keys. Since these commands can be imbedded in any program running under the Session Manager, you can use them to design screen layouts and define PF keys for your applications.

The Session Manager includes a stream for Session Manager commands. This stream can be of great assistance when saving, changing, and restoring environments.

The Default Environment

TSO/E provides a default Session Manager environment. The Session Manager automatically adapts the screen image to the terminal screen size used. This adaptability is achieved through enhancements to the Session Manager commands that are available to all users.

The IBM-supplied Session Manager default screen is divided into five major areas called **windows**. These windows can be used to enter, look at, and change the work on the screen. Figure 3 shows the default display screen.

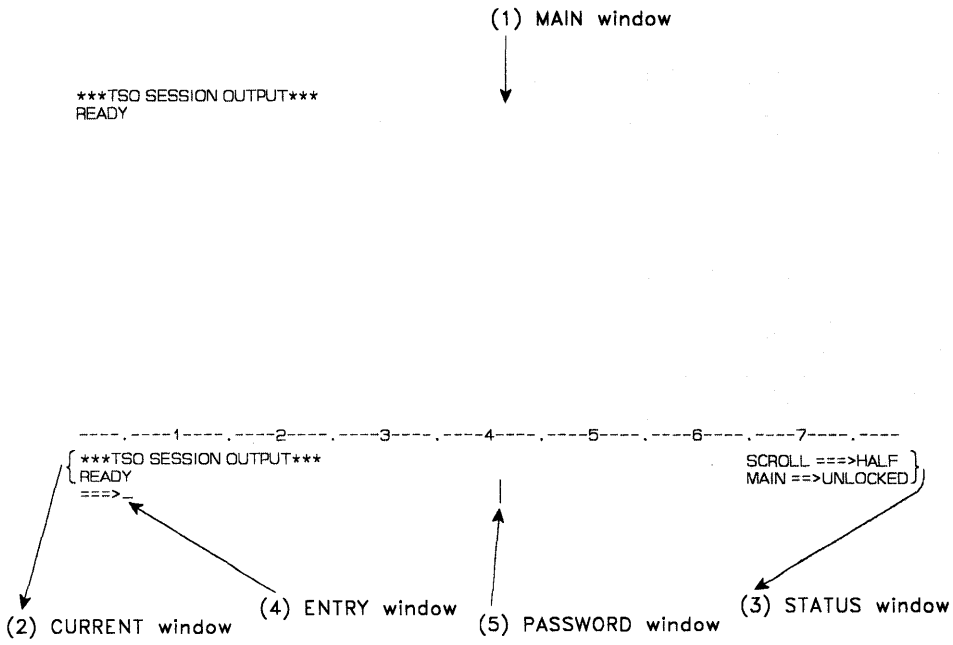

Figure 3. Session Manager Display Screen

The following list describes each window:

Windows	Definition
(1) MAIN	The large portion of the display screen above the numbered line is the MAIN window. This window displays a certain number of lines in the stream of data containing TSO input and output. If you wish to submit one or more of these lines as input to TSO, type over any character on a line and press the ENTER key.
(2) CURRENT	Just below the numbered line is the CURRENT window. When you first log on, this window displays the last two lines of output generated. A PF key lets you alternate the contents of this window between the last two lines of input entered and the last two lines of output generated.
(3) STATUS	The STATUS windows for the MAIN window are located in the lower right hand corner of the display screen. The top window shows the scroll amount (labelled SCROLL= = = >HALF) and the bottom window indicates whether the MAIN window is locked or unlocked. The top of the MAIN window contains older data in the stream. Once enough data has been generated to fill the MAIN window, the older data begins to be pushed out of the top of the window. You can use PF keys to scroll forward, backward, left, and right in the stream. This action locks the window in place over the desired section of the stream. The keyboard remains unlocked so that you can edit lines in the window.
(4) ENTRY	The ENTRY window begins right after the arrow near the bottom of your display screen and continues to the vertical bar on the last line of the screen. This area is where you normally type in TSO commands.
(5) PASSWORD	The window after the vertical bar is the PASSWORD window and can be used to type in passwords for your data sets. The information you type in the PASSWORD window does not appear on the display screen or in your session journal. The Session Manager also uses the PASSWORD window to display any error messages to you.

Terminal Key Definitions

The default terminal key definitions are designed to help you work with the default screen layout. In addition to the scrolling PF keys, a PF key locates occurrences of character strings in your data.

Session Manager Defaults Module

In MVS/XA, the Session Manager defaults module, ADFDFLTX, located in SYS1.SAMPLIB, is modified to contain a prologue, documentation of key areas, and more meaningful labels. The defaults module provides a default Session Manager environment for installations that do not specify one. It also serves as a model for installations that want to customize the Session Manager screen layout.

The prologue provides the information that system programmers require to change the default environment for the installation. The additional comments and labels also help system programmers understand the process. This enhancement was made available in TSO/E Release 2.1 for MVS/XA systems and in TSO/E Release 3 for MVS/370 systems.

TSO/E Enhancements to the Session Manager

The TSO/E Session Manager supersedes the TSO Session Manager (5740-XE2). The TSO/E Session Manager includes all of the functions of the TSO Session Manager as well as a number of important usability improvements. Major enhancements include:

- 3278 Model 5 support

  The Session Manager supports wide screens (27 rows x 132 columns).

- 3290 Information Panel support

- Dynamic adjustment to screen size used

  The Session Manager supports relative addressing when calculating a window's position on the screen. This enhancement eliminates the need for separate default environments for different screen sizes.

- Enhanced IBM-supplied default environment

  The MAIN window behaves more like a native TSO screen, giving the user more control over automatic scrolling of output.

  The FIND program function key remembers the last character string searched so that the search can be repeated.

- Improved interface with full-screen programs

  The Session Manager saves all line-mode output generated during the session, even if it does not have control of the screen. For example, if the user enters a TSO command in option 6 of Interactive System Productivity Facility/Program Development Facility and elects not to view the output via

the Session Manager, the output is saved in the session journal for later viewing.

- Documentation improvements.

  The documentation for the Session Manager is improved to extend its usability to all users. Chapter 4, "Documentation for TSO/E" on page 65 contains a list of the Session Manager manuals.

Command Package

The Command Package is integrated into TSO/E. It includes:

- Support for running terminal sessions as batch jobs
- Automatic saving of data
- Accounting facilities enhancements
- Defaults for the user attribute data set
- ATTRIB and FREE subcommands
- ALL keyword for the FREE command and subcommand
- Eight-character station ID.

Running Terminal Sessions as Batch Jobs

You can run a terminal session as a batch job. You might do this when it is impractical for you to enter commands from a terminal, as when your job has a long run time or produces large amounts of printed output.

Instead of waiting at a terminal for your job to run, you can use the terminal to prepare a job containing the commands and data you would have entered at the terminal. Then use the SUBMIT command to run the job. In this case, you are using the facilities of TSO exactly as if you had submitted the commands individually at the terminal.

For your job, you need these job control language (JCL) statements:

- A JOB statement to identify your job
- An EXEC statement with the name of the TSO terminal monitor program
- Special DD statements to indicate that your input data contains executable TSO commands, and to indicate what you want done with your output.

You also need commands (such as LOGON and EDIT) that you would have entered at the terminal to run your job. You need the commands in the sequence you would have entered them.

If you create a data set and use the SUBMIT command, TSO provides a JOB card for you. You need to provide only the commands you want executed.

Using the SUBMIT Command: You can use the SUBMIT command without first creating a control data set that contains the job stream to be submitted. You can do this in one of the following ways:

- Enter a SUBMIT * command and then enter the job stream from the terminal.
- Put your JCL into a CLIST along with a SUBMIT * command and then invoke that CLIST.

The SUBMIT command has two additional operands:

- END(nn) where nn denotes the characters you use to end job streams containing blank lines (without the END operand, the first blank or null line ends your job stream).
- PAUSE stops processing after the last line of your job stream is read, so you can decide whether or not to continue with submission.

Automatic Saving of Data

When you are doing text editing, TSO can save your data automatically in a work file so you won't have to remember to type SAVE. Should you finish editing without incident, TSO deletes the work file. Should a problem develop, TSO makes the work file available to you the next time you log on. You tell TSO how often to save your data, in terms of number of changes or number of lines you enter.

Accounting Facilities Enhancements

You can use a type 32 system management facilities (SMF) record for a total count of each TSO command and all subcommands of the EDIT, ACCOUNT, OUTPUT, and OPERATOR commands, by command and subcommand type.

Defaults for the User Attribute Data Set

Each entry in the user attribute data set (SYS1.UADS) has these defaults:

- A MSGCLASS default for submitted jobs where HOLD or NOHOLD is specified on the SUBMIT command
- A job class default for jobs submitted without a JOB statement
- A SYSOUT class default for job output where no SYSOUT class is specified on the ALLOCATE command.

ATTRIBUTE and FREE Subcommands

The EDIT command has ATTRIB and FREE subcommands identical to the ATTRIB and FREE commands.

ALL Keyword for the FREE Command and Subcommand

Both the FREE command and the FREE subcommand of the EDIT command have an ALL keyword you can use to free all dynamically allocated data sets.

Eight-Character Station ID

You can use an eight-character station ID with the DEST keyword of the ALLOCATE, FREE, and OUTPUT commands.

Interactive Data Transmission Facility

The Interactive Data Transmission Facility provides two commands, TRANSMIT and RECEIVE, to simplify the process of sending data and messages among nodes in a network. You need know only the name of the receiving node and the user ID of the person to whom you are sending the data.

The Interactive Data Transmission Facility can be used to implement a simple electronic note system between users. Users can enter messages in full-screen mode and have them sent to other users in a network.

A typical transmission sequence follows:

- When a sender enters the TRANSMIT command, TSO gets the data (a message, data set, or both) to be sent, converts the data to transmittable format, and writes it to a class B SYSOUT PUNCH file.
- The job entry subsystem (JES) routes the data to the receiver's node.
- When the data arrives at the receiver's node, JES sends a message to the receiver indicating data arrival.
- The receiver uses the RECEIVE command and is given the name of the sender and the name of the sending node. Then, the message, if any, and/or the data set name is displayed.

  If a data set was sent, the receiver is prompted for the name of a data set for the data. TSO restores the data to its original format and places it in the named data set.

In MVS/370, if you have MVS/370 Data Facility Product (5665-295) and either Programmed Cryptographic Facility (5740-XY5) or Cryptographic Unit Support (5740-XY6) installed, TSO uses the Access Method Services REPRO command to encrypt data sets before transmitting them. In an MVS/XA environment, the same function is obtained when you install the MVS/Extended Architecture Data Facility Product (DFP) (5665-284). You can choose private key management or system key management. With private key management, both the sender and receiver must enter an encryption key. With system key management, TSO selects a key and enciphers the data.

You can choose to substitute "nicknames" for node/user ID identifiers, and thereby simplify what a sender has to do to transmit data. First you build a *names data set* that TSO uses to translate "nicknames" into node names and user IDs. In the names data set, you can put text you want inserted at the beginning

or end of data being transmitted, the name of a file containing another names data set to be used for "nickname" translation, and the name of a data set into which you want to log information about your transmission activity.

A number of user exits give installation management a means of monitoring transmission activity or altering the way TSO performs some operations. Information from the PARM keyword of the TRANSMIT and RECEIVE commands is passed to all exit routines of the TRANSMIT and RECEIVE command processor routines.

- For *authorization checking*, there are two exits (a transmission start-up exit and a receive data set pre-processing exit) for controlling who can transmit and/or receive data, and who can use a particular network path. Also, with the receive exit, you can identify persons to receive messages not directed to their own user IDs.

- For *unsupported data set types*, use the two exits mentioned above in combination with a third, the receive data set post-processing exit. Supported data set types are format F (fixed), V (variable) and U (undefined) length, in sequential or partitioned data sets. Unsupported data set types are ISAM and VSAM data sets, or data sets with user labels or keys.

- For *accounting*, use the transmission termination exit and the receive data set post-processing exit. At each of these, information is available about volume and direction of data traffic.

- For *local encryption and decryption support*, use transmission encryption and receive decryption exits.

The individual exits are:

- Transmission start-up exit: taken after the TRANSMIT command is scanned and an addressee list has been built

- Transmission encryption exit: taken just before the Access Method Services REPRO command is invoked to encipher a data set

- Transmission termination exit: taken after all processing of the TRANSMIT command is complete

- Receive initialization exit: taken after the RECEIVE command processor parses the RECEIVE command, but before it takes any other action

- Receive data set pre-processing exit: taken just before the prompt to the receiver asking where the data is to be stored

- Receive data set decryption exit: taken just before the Access Method Services REPRO command is invoked to decipher the data set

- Receive notification exit: taken when a sender is to be notified that transmitted data was received

- Receive data set post-processing exit: taken after all processing for a data set (except for deletion) is complete

- Receive termination exit: taken after all processing of the RECEIVE command is complete.

Mail-Handling Enhancements (LISTBC Command)

The enhancements to the LISTBC command processor improve the performance and reliability of mail-handling. The LISTBC command lets users obtain a listing of the SYS1.BRODCAST data set. The SEND command with the SAVE or LOGON parameter causes messages to be stored in the mail section of that data set.

Mail-Handling Performance

To improve mail-handling performance, the LISTBC command processor maintains a field that points directly to the user ID's mail chain. Fewer I/O operations are required because no sequential search for a matching user ID is necessary.

Fewer I/O operations are performed when you use the LISTBC command to list the contents of the SYS1.BRODCAST data set. The LISTBC command processor reads the mail directory directly instead of sequentially searching it.

Channel, control unit, and device busy times are reduced when a new record is added to the SYS1.BRODCAST data set. The LISTBC command processor remembers the first free record or a record preceding the first free record, so no sequential search of the entire data set is necessary.

Mail-Chain Recovery

To prevent broken mail chains, a recovery routine rewrites the mail header in the SYS1.BRODCAST data set and saves pointers to the mail chain whenever message handling is interrupted.

Notice-Handling during Logon

The processing of notices during logon is improved to require significantly fewer I/O operations. This reduction is achieved by keeping an in-storage copy of the broadcast notices.

CLIST Enhancements

The CLIST programming language provides powerful functions that enable you to perform tasks more efficiently. Like other high level interpretive languages, CLISTs are easy to write and test. The CLIST language provides an extensive set of arithmetic and logical operations and extensive string-handling capabilities. Also, commonly-repeated TSO command sequences can be put in a CLIST data set and executed by entering one command. Entire applications can be written in the CLIST language.

CLIST Performance

A number of internal logic changes have significantly improved CLIST performance:

- CLIST processing maintains direct pointers to variables it commonly references.
- The external variable access service is centralized.
- Translation of CLIST lines is improved.
- Work areas are obtained during logon processing for TSO service routines.
- Improved access to CLIST data sets.

External Variable Access

Any application can invoke the CLIST variable access routine (IKJCT441) to examine and manipulate CLIST variables. Callers can be in any addressing mode.

Use this service to:

- Find the value of a variable.
- Set the value of a variable, as well as create the variable if it does not exist.
- List all of the currently active CLIST variables. This function is useful when testing CLISTs.

Command Output Management

A control variable is available that enables a CLIST to intercept and save command output in CLIST variables. The CLIST can then reference the output produced by programs it invokes and interpret, reformat, or modify it. With Interactive System Productivity Facility (ISPF) installed, the reformatted output can then be displayed in a full-screen environment.

Text Processing Support

When you write text processing CLISTs, you can use the CAPS/NOCAPS/ASIS operand on the CONTROL statement to indicate whether the CLIST is to translate input strings to uppercase characters or process them as they are.

Built-in functions enable you to translate individual character strings to uppercase or lowercase.

These functions give you precise control over a CLIST's input and output.

National Character Support

National characters (@,$,#) are allowed in a symbolic variable name. Symbolic variable names are preceded by an ampersand. The first character can be a national character, a letter, or an underscore (_).

Note: The system recognizes the following hexadecimal representations of the U.S. national characters: @ as X'7C', $ as X'5B', and # as X'7B'. In countries other than the U.S., the U.S. national characters represented on terminal keyboards might generate a different hexadecimal representation and cause an error. For example, in some countries the $ character may generate a X'4A'.

Built-in Functions and Control Variables

CLISTs extend application possibilities by allowing for variable substitution. Meaningful naming conventions make maintenance and debugging easier. Built-in functions and control variables enable you to obtain, interpret, and manipulate data that would otherwise be unavailable or impractical to access. Additional IBM-defined built-in functions and control variables available for use in CLISTs are:

Built-in Function	**Function**
&SYSDSN(dsname)	Indicates whether the specified data set or member exists.
&SYSCAPS(string)	Returns the input string translated to uppercase characters. This statement is useful for text processing CLISTs.
&SYSLC(string)	If used with the CONTROL operand NOCAPS or ASIS, returns the input string in lowercase characters. This statement is useful for text processing CLISTs.
Control Variable	**Function**
&SYSISPF	Indicates whether the Interactive System Productivity Facility (ISPF) dialog manager services are available to the CLIST.
&SYSWTERM	Returns the width of the screen. This statement is useful when invoking dialogs for display terminals.
&SYSLTERM	Returns the number of lines available on the screen. This statement is useful when invoking dialogs for display terminals.
&SYSOUTTRAP	Indicates the number of lines of command output to be integrated and saved.
&SYSOUTLINE	Indicates the number of lines of command output actually saved.
&SYSRACF	Indicates whether the Resource Access Control Facility (RACF) is installed and available. &SYSRACF returns the word AVAILABLE when RACF is installed and available.
&SYSSDATE	Returns the year, month, and day in the form: *year/month/day*.
&SYSJDATE	Returns the Julian date in the form: *year.days*.
&SYSSTIME	Returns the time of day in the form: *hours:minutes*.
&SYSCPU	Returns the number of CPU seconds used during the session in the form: *seconds.hundredths of seconds*. This statement is useful for measuring performance of applications or for reporting session duration to the user.

&SYSSRV	Returns the number of system resources manager (SRM) service units used during the session. This statement is useful for measuring performance of applications or for reporting session duration to the user.

See "New Built-in CLIST Functions and Control Variables" on page 20 for the built-in CLIST functions added in TSO/E Release 3.

Logon Enhancements

Full- screen logon enhancements are available for 327X terminals with 24 x 80 or larger screen sizes. Another enhancement to logon processing is logon extended region support for MVS/XA systems.

Full-Screen Logon

The full-screen logon menu provides the following functions:

- Saving of user attributes across sessions
- Program function key assignments for logon processing
- Command entry during logon
- Logon error assistance.

The full-screen logon menu is optional. Using the logon pre-prompt exit, the installation can suppress display of the menu.

Saving of User Attributes Across Sessions: If you log on with a user ID that matches one in the user attribute data set, you are:

- Shown a menu of attributes saved from your last session. (You can use these again without reentering them, or you can change individual attributes.)

- Prompted for your password.

Key Use During Logon: You can use these keys during logon:

- PA1 causes an attention interruption.
- PA2 displays the original logon menu (minus current changes).
- PF1 and PF13 signify help.
- PF3 and PF15 cause logoff during display of the logon menu.

Command Entry During Logon: You can enter a single TSO command (up to 80 characters long) via the logon panel. The command is executed following any command in the PARM field of the EXEC statement of the logon procedure. (The command you enter is saved across sessions, so you won't have to reenter it the next time you log on.)

Logon Error Assistance: If you make a syntax error during logon, the following happens:

- An alarm sounds (if your terminal has one).

- A message appears on the menu.

- Asterisks appear next to incorrect entries, and incorrect entries are highlighted.
- The cursor moves to the first incorrect entry.

Logon Extended Region Support

For MVS/XA systems, the LOGON and ACCOUNT command processors were modified to let users request a private area (region) of up to 2,096,128 K bytes for each TSO terminal session. A user can specify the new region size in the SIZE parameter on the LOGON command or in the SIZE field of the full-screen logon panel. A system programmer can control the region size using the SIZE and MAXSIZE parameters on the ADD (for new user IDs) or CHANGE (for existing user IDs) subcommands of ACCOUNT.

Assistance to Users

TSO/E provides online help to terminal users and HELP facility enhancements.

Online Help to Terminal Users

Users can get online help for commands when they type a "?" in response to a prompt. This additional information is available for all keyword operands on all commands except the TEST command. It is also available for positional operands of the ATTRIB, CALL, CANCEL, EDIT, EXEC, HELP, OUTPUT, RUN, and SEND commands. The additional information is not available for any subcommands.

HELP Facility Enhancements

In MVS/XA, the HELP command processor is modified to allow members of the help data set to include for display additional information contained in another member of a help data set. This enhancement allows installations to tailor help information easily.

The include control character is useful when users know that they have to add help information at a specific point, but do not yet know what that information is. It is also useful when repeating the same information. For example, when a parameter is repeated on several commands, the help information for that parameter also repeats. Using the include control character lets users supply that information once and then include it wherever it is needed. If that information has to be changed, it needs to be changed in only one place.

The additional information is incorporated by using the include control character followed by a member name:

```
)I membername
```

The include control character, which can appear anywhere within a help data set member, causes the information in the specified member to be imbedded and displayed to users at that point. Note that the include character is ignored if the member is not found or if the member is empty.

TSO Service Facility

The TSO service facility allows a TSO/E user to invoke an authorized command or program from an unauthorized environment. In TSO/E Release 3, the TSO service facility is enhanced to allow users to invoke a CLIST from an unauthorized environment. The invoked program or command processor can then be processed as it would if invoked from an authorized environment. Any unauthorized program or command processor that uses the TSO service facility can ignore the consideration of authorized or unauthorized environments and programs. However, an authorized program or command processor can use the TSO service facility to invoke only authorized programs or command processors.

The TSO service facility can be invoked in both foreground and background TSO sessions. For example, an application program written in a high level language such as PL/1, COBOL, FORTRAN, PASCAL, or assembler can use the TSO service facility. The program can use the interface to accomplish dynamic allocation of data sets via the ALLOCATE command and, after completing file processing, issue the RACF PERMIT command to ensure correct data set security.

Invoking the TSO Service Routine (IKJEFTSR)

You can invoke the TSO service routine, IKJEFTSR, by that name or by its alias, TSOLNK. You must follow the rules of the application programming language that you are using. If the program language allows a maximum of six characters, you must use TSOLNK.

Service Routines

The service routine support for MVS/XA is comprised of the following:

- TSO/E supports invocation (by the CALL command) of programs that execute in 31-bit mode whether they are loaded above or below 16 megabytes. TSO/E also supports user-written command processors that are coded to execute in 31-bit mode and reside either above or below 16 megabytes.

- The GETLINE, PUTLINE, PUTGET, and STACK service routines allow a program executing in 31-bit mode to issue one of the macros (same name as the service routine) without having to switch to 24-bit mode. The service routine always return control in the addressing mode of the caller.

- The following service routines can be invoked by programs executing in 31-bit mode. In addition, they process data in virtual storage above 16 megabytes.

  - Parse service routine
  - TSO message issuing services
  - DAIRFAIL
  - GNRLFAIL/VSAMFAIL
  - Command scan.

- If a program executing under TSO or TSO TEST abnormally terminates in a cross memory environment, the TMP's ESTAI exit displays, in addition to the normal error message(s), information describing the cross memory environment at the time of the abend.

- The TMP invokes TSO TEST in 31-bit mode.

- For each subcommand of OPERATOR issued by a TSO user, message IKJ000I is now directed to hardcopy only.

- If a command processor or program has the attribute AMODE=ANY, the TSO terminal monitor program (TMP) gives it control in 31-bit addressing mode.

Improved Storage Management for TSO Service Routines

Work areas are obtained for TSO service routines during logon processing so that the service routines do not have to obtain their own storage each time they require dynamic areas. This improves service routine performance.

Acceptance of Double-Byte Character Set Data

In MVS/XA only, command scan and parse accept double-byte character set (DBCS) strings in addition to EBCDIC character strings. Double-byte characters can appear in comments and the following types of user strings:

- Self-delimiting string
- Quoted string
- Parenthesized string
- Value string
- Quoted character constant
- Quoted character string.

See "Parse Service Routine" on page 55 for planning considerations regarding the acceptance of double-byte character set data.

Virtual Storage Constraint Relief (VSCR)

Virtual storage constraint relief is provided for MVS/XA systems. To provide this relief, most of the modules that perform the following TSO functions were moved above 16 Mb in virtual storage:

- LOGON processing
- CLIST and I/O services
- Session Manager processing
- ALLOCATE command processing
- Terminal monitor program processing
- Miscellaneous services.

Some of the storage obtained for these functions is also moved above 16 Mb in virtual storage. The movement of the modules and storage areas increases the amount of virtual storage available below 16 Mb. A brief description of how virtual storage constraint relief is accomplished for specific TSO functions follows.

LOGON Virtual Storage Constraint Relief

All LOGON modules are moved above 16 Mb except for the LOGON UADS I/O routine (IKJEFLIO), the LOGON 31-bit initialization routine (IKJEFLA), the LOGON address table (IKJEFTBL), the LOGON defaults module (IKJEFLP0), and the VTAM modules that perform VTIOC processing. The installation pre-prompt exit (IKJEFLD), which resides in load module IKJEFLA, remains below 16 Mb. All LOGON dynamic storage remains below 16 Mb.

CLIST and I/O Services Virtual Storage Constraint Relief

Most of the CLIST and I/O services modules are moved above 16 Mb in virtual storage. The I/O related portion of several modules and most dynamic storage for CLIST and I/O services are not moved and still reside in virtual storage below 16 megabytes.

The GETLINE, PUTLINE, PUTGET, and STACK service routines are modified so that they can now process data in virtual storage above as well as below 16 Mb. The list service descriptor (LSD), which is passed to the STACK service routine, is the only data area that continues to reside below 16 Mb. Routines that execute in 31-bit addressing mode must pass valid 31-bit addresses to these service routines.

Session Manager Virtual Storage Constraint Relief

All Session Manager modules, except for the following, reside in the extended link pack area (ELPA) above 16 Mb:

- Session Manager SVC intercept routines
- Linkage assistance routines
- Modules relating to the Session Manager TSO commands: SMCOPY, SMFIND, and SMPUT.

In addition, all of the modules that reside in the ELPA also obtain dynamic storage above 16 Mb. Also, all Session Manager control blocks and streams reside above 16 Mb.

ALLOCATE Virtual Storage Constraint Relief

All existing ALLOCATE modules, except the ALLOCATE subsystem interface routine (IKJEFD38), are moved above 16 Mb in virtual storage. However, the get directory size routine (IKJEFD40) resides in storage below 16 Mb. In addition, all dynamic storage for the ALLOCATE modules is obtained below 16 Mb.

Terminal Monitor Program Virtual Storage Constraint Relief

Most of the terminal monitor program (TMP) modules were moved above 16 Mb in virtual storage. Also, storage that is used exclusively by the TMP is obtained from above 16 Mb.

However, the TSO control tables (IKJEFTE2, IKJEFTE8, and IKJEFTNS), which are referenced by applications that might be executing in 24-bit addressing mode, reside below 16 Mb. The linkage assist routine (IKJEFTSL) for VSAM I/O also resides below 16 Mb.

Miscellaneous Services Virtual Storage Constraint Relief

Virtual storage constraint relief for the TSO service routines consists of the following:

- Several services are moved above 16 Mb in virtual storage. They are:
  - Command scan
  - TSO message issuing services
  - Parse service routine.

  These services use a common linkage assist routine (IKJTSLAR) to ensure that each service is invoked in 31-bit addressing mode. IKJTSLAR resides below 16 Mb.

- Dynamic storage for command scan and the TSO message issuing service is obtained above 16 Mb. Storage obtained by the parse service routine remains below 16 Mb. In particular, the parse work area (IKJEFPWA) and the parse description list (PDL) reside below 16 Mb.

Enhancements to Commands

The following pages describe the enhancements to these commands or refer to where that information is given.

- ACCOUNT
- ALLOCATE
- EDIT
- FREE
- HELP
- LISTBC
- LOGON
- OPERATOR
- RECEIVE
- SEND
- SUBMIT
- TEST
- TRANSMIT.

ACCOUNT

See "Logon Extended Region Support" on page 37 for information about the enhancements to the ACCOUNT command.

ALLOCATE

The ALLOCATE command enhancements include:

- Simplified allocation
- Formatting and organizing output
- RACF protection
- Concatenating more partitioned data sets.

Simplified Allocation: To allocate new non-VSAM data sets, you do not have to use the ATTRIB command to describe the data sets. An expanded ALLOCATE command offers the LIKE keyword for identifying an existing data set you want the new one to look like. You can standardize your TSO data set types by creating model data sets. Then, when a certain type of data set is needed, you can use the LIKE keyword to indicate the appropriate model data set.

Also, the ALLOCATE command accepts keywords from the ATTRIB command, so you can define a new data set's attributes directly on the ALLOCATE command. Or, you can use the LIKE keyword with attribute keywords; these override the corresponding attributes of your existing data set.

Formatting and Organizing Output: A number of keywords are available on the ALLOCATE command to format and organize listings of your output data sets.

COPIES You can use the COPIES keyword of the ALLOCATE command to get multiple printed copies of your output data sets.

FCB The FCB keyword of the ALLOCATE command defines the forms control buffer (FCB) for printing of your output data sets.

The following 3800 keywords give you flexibility in formatting and organizing 3800 output listings without requiring you to submit a background job or to know JCL. These keywords apply to a 3800 model 1 or a 3800 model 3 operating in model 1 compatibility mode. When you use these keywords, you avoid the cost of running a job, as well as copying the data from a held data set to an output data set.

CHARS When printing data sets on the 3800 Printing Subsystem, you can use the CHARS keyword to specify up to four character arrangement tables. These tables are used to reference 3800 character sets.

MODIFY The MODIFY keyword lets you take advantage of the copy modification feature of the 3800 printer. This feature allows you to print predefined data such as legends and column headings on pages of a data set.

FLASH You can also use the FLASH keyword to print a predefined form, grid, or legend on pages of a data set as it is being processed by the 3800 printer. FLASH can also specify the number of copies on which the predefined image is to be printed. While you might use FLASH to specify a form for all pages of a document, MODIFY could be used in conjunction with it to tailor individual pages to different addressees.

COPIES For 3800 listings only, you can use the COPIES keyword to tailor the number of copies of each page you want printed at a given time in the printing process. For example, you can request that three copies of each page be printed first, then four copies and so on.

BURST The BURST keyword indicates whether or not your 3800 listing is to be burst when printed.

OPTCD(J) J is a subfield on the OPTCD keyword of ALLOCATE and ATTRIB. J indicates that the character after the carriage control character is the table reference character for that line. The table reference character tells job entry subsystem (JES) which character arrangement table to select when printing the line.

The following ANSI keywords are also available for use with ANSI-tapes.

LRECL(nnnnnK) The "K" multiplier for the LRECL operand on the ALLOCATE and ATTRIB commands supports ANSI extended logical records (spanned record format). Spanned records were extended to accommodate a logical record size of 16 Mb (from its 32K restriction). This support is only available to the QSAM "locate mode" user for ANSI-label tapes.

ACCODE(code) The ALLOCATE command must have an ANSI file accessibility code operand. The ANSI accessibility code for a data set must be in the range from A to Z. This parameter can only be used with ANSI tape data sets.

RACF Protection: You can use the PROTECT keyword of the ALLOCATE command to get RACF protection for tape volumes or DASD data sets.

Concatenating More Partitioned Data Sets: You can concatenate up to 123 partitioned data sets (the same number as for sequential data sets). In previous releases, the maximum was 16.

EDIT

The EDIT command has ATTRIB and FREE subcommands identical to the ATTRIB and FREE commands. Also, the FREE subcommand of EDIT contains the ALL keyword that you can use to free all dynamically allocated data sets.

FREE

The FREE command contains the ALL keyword that you can use to free all dynamically allocated data sets.

HELP

See "HELP Facility Enhancements" on page 37 for information about the enhancements to the HELP facility.

LISTBC

See "Mail-Handling Enhancements (LISTBC Command)" on page 33 for information about the enhancements to the LISTBC command.

LOGON

See "Logon Enhancements" on page 36 for information about the enhancements to logon processing.

OPERATOR

In an MVS/XA environment, the MPF operand of the DISPLAY subcommand of OPERATOR displays all available information about message suppression and color and highlighting. M and C, two new operands of MPF, are now available to limit the information displayed. Using these operands of MPF, you can display either the message suppression information or the color and highlighting information.

RECEIVE

See "Interactive Data Transmission Facility" on page 31 for information about the RECEIVE command.

SEND

In MVS/XA, the SEND command processor is modified to eliminate unnecessary system delays caused when inserting mail messages into the broadcast data set, SYS1.BRODCAST.

Mail is saved in the broadcast data set when:

- A user issues a SEND command with the SAVE or LOGON keywords.
- A user specifies the NOTIFY keyword on a batch JCL JOB statement.

To save a mail message, the SEND command processor enqueues on the directory record for the user who is to receive the message. Changing the processing to enqueue only on the directory record to be updated and not on each directory record reduces system delays.

This enhancement relieves a condition called send flooding, which occurs when mail messages are queued faster than they are processed.

SUBMIT

See "Using the SUBMIT Command" on page 30 for information about the enhancements to the SUBMIT command.

TEST

The TEST command is not supported in a TSO MVS/XA environment unless TSO/E for MVS/XA is installed.

The TEST command support for TSO/E for MVS/XA is comprised of the following:

- **31-bit addresses**: An additional indirection symbol (?) is introduced to allow indirect addresses to be treated as 31-bit addresses. The ? indicates a 31-bit address. The following TEST subcommands process addresses above 16 Mb regardless of the current addressing mode of the program being tested:

Assignment Function	LISTDEB
AT	LISTPSW
COPY	LISTTCB
EQUATE	OFF
FREEMAIN	QUALIFY
LIST	WHERE
LISTDCB	

  Additionally, users can specify the ? symbol on those subcommands to refer to data pointed to by 31-bit addresses in a register or in virtual storage.

  The % symbol is always interpreted as meaning the address is a 24-bit address.

- **Breakpoints**: The AT subcommand supports breakpoints for all new instructions (op codes) except the following cross memory instructions:

PC	- Program Call
PT	- Program Transfer
SAC	- Set Address Space Control
SSAR	- Set Secondary ASID

- **Addressing mode**: The AMODE keyword is added to the CALL, GO, and RUN subcommands. AMODE changes the current addressing mode of the tested program before the specified subcommand restarts execution.

- **Program testing**: When a program is loaded for testing, the RMODE/AMODE characteristics of that program determine both where it is to be loaded in virtual storage (above or below 16 megabytes) and in which addressing mode (24-bit or 31-bit) it is to be entered. (The addressing mode at time of entry or at any breakpoint can be overridden using the AMODE operand on the CALL, GO, or RUN subcommand.)

- **Allocation of a data set in the link list**: If a program being tested loads modules from a data set in the link list concatenation, TEST is able to access symbols in those modules, provided the modules were both assembled and link edited with the TEST option. TEST can also process CSECT names (qualified addresses and deferred breakpoints) in modules loaded from a data set in the link list concatenation.

- **GETMAIN subcommand**: The LOC operand is added to GETMAIN to allow storage to be acquired either above or below 16 megabytes.

- **LIST subcommand**: The LIST subcommand with the specification of the assembler instruction data type displays all the new op codes (including all cross memory op codes).

- **WHERE subcommand**: A single specification of the WHERE subcommand without an address now displays the address of the next executable

instruction and the related load modules and CSECT names plus the hexadecimal offset within the CSECT.

TRANSMIT

See "Interactive Data Transmission Facility" on page 31 for information about the TRANSMIT command.

Summary of Releases

The new functions or services introduced in previous releases of TSO/E are listed below. Each subsequent release of TSO/E includes the functions and services of the previous releases of TSO/E.

TSO Extensions Release 2.1

For MVS/XA only, TSO/E Release 2.1 provides the following enhancements:

- Virtual storage constraint relief for:
  - LOGON processing
  - CLIST and I/O services
  - Session Manager processing
  - ALLOCATE command processing
  - Terminal monitor program processing
  - Miscellaneous TSO services.
- Logon extended region support
- HELP facility enhancements
- SEND command enhancements
- Session Manager enhancements
- OPERATOR command enhancements.

PTF UZ90426 to TSO Extensions Release 2.1 lets command scan and parse accept double-byte character set data.

TSO Extensions Release 2

For MVS/370 and MVS/XA, TSO/E Release 2 provides the following enhancements:

- Information Center Facility
- CLIST enhancements
- TSO service facility
- Session Manager support and enhancements
- ALLOCATE command enhancements
- Enhancements to the handling of notices
- Improved storage management for TSO service routines
- Improved command processor and program support.

TSO/E Release 2 contains all of the enhancements for TSO/E Release 1. For MVS/370, TSO/E Release 1 provided the following enhancements:

- Interactive Data Transmission Facility
- Logon enhancements
- ALLOCATE and ATTRIB command enhancements
- Improved assistance to terminal users
- Enhancements to the handling of mail.
- Performance enhancements.

Additionally, TSO/E Release 1 for MVS/370 contained all functions of the TSO Command Package (5740-XT6), including:

- Support for running terminal sessions as batch jobs
- Automatic saving of data
- Accounting facilities enhancements
- Defaults for the user attribute data set
- ATTRIB and FREE subcommands
- ALL keyword for the FREE command and subcommand
- Eight-character station ID.

TSO/E Release 1 for MVS/XA contained all the facilities of TSO/E for MVS/370 and the TSO Command Package (5740-XT6), in addition to enhancements in the following major areas:

- TEST command facilities
- Service routine facilities.

Chapter 3. Planning for TSO/E Release 3

This chapter covers general considerations; machine, programming, and virtual storage requirements; and the new and changed modules, macros, and CLISTs for TSO/E Release 3.

General Planning Consideration for TSO Extensions

The general planning considerations are grouped under the following headings:

- MVS/XA
- JES2 and JES3
- Interactive Data Transmission Facility
- Information Center Facility
- Installation exits
- User attribute data set (SYS1.UADS)
- Broadcast data set
- Parse service routine
- CLIST processing
- System generation
- Commands.

MVS/XA

The following planning considerations apply to MVS/XA:

- MVS/XA contains no TSO TEST command. TEST command support is available only with TSO/E for MVS/XA installed.

- Routines that execute in 31-bit addressing mode must pass valid 31-bit addresses to these service routines: PUTLINE, PUTGET, GETLINE, and STACK. If the address is below 16 Mb, the high-order byte of that address must be zero.

JES2 and JES3

The following planning considerations for the TRANSMIT and RECEIVE commands apply to JES2 and JES3:

- JES2 and JES3 are unaware that data sets being routed among nodes in a network are enroute to TSO terminals. Thus, no checking for valid user IDs is performed during transmission. It is recommended that you periodically check for transmissions to user IDs that are not valid. If you have JES2, you can use the $D F command to list all data sets in transit. You get a separate line for each external writer name (target user ID). You can then delete or reroute unwanted files with a special form of the RECEIVE command containing an appropriate external writer name. If you have JES3, you can check for invalid transmissions by writing a user exit routine. Refer to *JES3 User Modifications and Macros* for additional information about the exit routine.

- If you are using either of the JES2 initialization statements, &TSU NOOUTPUT or TSUCLASS OUTPUT=NO, the TRANSMIT command does not work. The SYSOUT data resulting from the use of the TRANSMIT command is deleted. Refer to *JES2 Initialization and Tuning* for information about the JES2 initialization statements.

- If you are using the JES2 initialization statement, ESTPUN, to limit punch-card output, the limit cannot be altered for TSO sessions. Therefore, if you do not wish to use the exit to control output limits, set the value of ESTPUN high to avoid abends when you use the TRANSMIT command.

- An installation must provide the appropriate JES2 or JES3 exit to notify a person that transmitted data has arrived. The JES2 exit is exit 13 and the JES3 exit is IATUX42. Refer to *JES2 User Modifications and Macros* and *JES3 User Modifications and Macros* for information about the JES2 and JES 3 exits.

Interactive Data Transmission Facility

The following planning considerations relate to the Interactive Data Transmission Facility:

- If your installation has installed a previous release of TSO/E and modified member INMINOPT of SYS1.SAMPLIB, you must save a copy of that member before installing a later release. Installation of TSO/E replaces that member of SYS1.SAMPLIB. INMINOPT is a sample job stream that can be used to install the installation defaults for the TRANSMIT and RECEIVE commands.

- The TRANSMIT and RECEIVE commands have installation defaults that you must code, assemble, and link edit into the TRANSMIT and RECEIVE libraries. See *SPL: TSO Extensions Command and Macro Reference Volume 3* for the format and syntax of the macros that you can use to define the defaults.

- The Interactive Data Transmission Facility uses class B SYSOUT PUNCH to route transmissions.

- Before users can issue the RECEIVE command in the background, the system programmer must define their user IDs to either RACF or a functionally equivalent program.

Information Center Facility

The following planning considerations apply to the Information Center Facility:

- Installations that installed the Information Center Facility for TSO/E Release 2 need to convert the tables used in the Information Center Facility names, news, education, and user type services before using those services in TSO/E Release 3. Conversion of tables creates new tables with different names. Variables have been added, updated, or deleted to create the new tables. If your installation installed and activated the Information Center Facility in TSO/E Release 2, some of the original tables may be deleted. The *Program Directory* for TSO/E Release 3 describes those tables.

  IBM supplies CLISTs to perform the necessary conversion of the Information Center Facility tables. The *Program Directory* describes how to run the CLISTs.

- Each entry in the names directory contains a directory ID that identifies the entry. The conversion CLIST for names assigns a value to each directory ID in the names directory. Installations may want to change those values to something that is meaningful for them. At general availability of TSO/E Release 3, *SPL: TSO Extensions User Exits and Modifications Volume 2* will describe the names table containing the directory ID variable.

- The education conversion CLIST copies the course abstracts that an installation provided prior to Release 3. It also identifies all course names that are longer than 40 characters because in TSO/E Release 3, course names are limited to 40 characters. Installations that added course abstracts or renamed courses that IBM shipped in TSO/E Release 2 need to rename the courses whose names are longer than 40 characters. If a course that IBM shipped in Release 2 has its original name and that name is longer than 40 characters, the conversion CLIST shortens the name.

- Before users can use printer support, the Information Center Facility administrator must identify the available printers and create printer definitions for them. The printer definitions contain information such as the output characteristics of the data to be printed and the location of the printer. If a printer is not accessible directly via TSO, the installation must also provide a print routine and the administrator must identify that routine when providing information about the printer.

- Installations can tailor start-up and termination procedures by specifying parameters on the CLISTs used by the logon procedure. The Information Center Facility ships a sample logon procedure for administrators and users. Each logon procedure executes a CLIST that allocates an ISPF profile. The default ISPF profile is userid.ISPF.PROFILE. The CLIST for administrators is ICQICFA and the CLIST for users is ICQICF.

- When using education services in the Information Center Facility, a user cannot have a user ID of EQ. The system programmer must provide a new user ID for any user of education services with that ID.

Installation Exits

The following considerations apply to installation exits:

- TSO/E deletes or replaces the following installation exit routines. If you have installed user versions of these routines, you must save and reinstall the user versions after installing TSO/E. The exit routines are:
  - SUBMIT exit routine (IKJEFF10)
  - OUTPUT/STATUS/CANCEL exit routine (IKJEFF53)
  - Session Manager exit routines (ADFEXIT1, ADFEXIT2, ADFEXIT3)
  - TMP CSECTs (IKJEFTE2, IKJEFTE8, IKJEFTNS), which are located in load module IKJTABLS (for MVS/XA only)
  - Interactive Data Transmission Facility exit (INMXPARM). See "Interactive Data Transmission Facility" on page 52 for more information about planning considerations for the Interactive Data Transmission Facility.
- The SUBMIT exit routine (IKJEF10) and the OUTPUT/STATUS/CANCEL exit routine (IKJEF53) receive control in key 8 rather than key 1. If necessary, these user-written exit routines can change to a different key after they receive control, but must return to key 8 upon completion.
- If you have a LOGON pre-prompt exit routine, and the exit routine requests that the UADS not be opened (as for verifying the user ID, account number, etc.), you have to make a small change in your exit routine to get the I/O reduction for the LISTBC command. Set the CTLNUADE bit so the logon program can open the UADS and retrieve the address of the mail directory.
- For installations using RACF, the system no longer stores the users' passwords in the terminal status block (TSB). These installations may have to do one of the following:
  - Change any installation exit or routine that makes use of the users' passwords stored in the TSB.
  - Force the system to store the users' passwords in the TSB. To do this, the installation overrides the default set in the LOGON pre-prompt exit routine. If an installation does not override the default, the system no longer stores passwords for RACF users in the TSB.

  Installations that change the default and store users' passwords in the TSB, which is fetch-protected storage, risk exposing the passwords in dumps that display protected storage. The installation should take appropriate action to protect these dumps.

User Attribute Data Set (SYS1.UADS)

The following considerations apply to the user attribute data set:

- To accommodate additional logon information, the size of the user attribute data set (SYS1.UADS) is expanded to 172 bytes per user ID in TSO/E Release 1. However, the attributes of SYS1.UADS were not changed. If you have not done so, you have to reformat the UADS (with the UADSREFM program) to use the logon improvements. If you do not reformat the UADS, the logon information is not saved across TSO sessions and users receive the default values.
- If you are to take advantage of the reduction in I/O operations for the LISTBC command, a user attribute data set (SYS1.UADS) must exist.

Broadcast Data Set

The following considerations apply to the broadcast data set:

- To get reduced channel, control unit, and device busy time when you write a new record to the SYS1.BRODCAST data set, you must put a free search record in the SYS1.BRODCAST data set. Do this by using the SYNC subcommand of ACCOUNT to reformat the SYS1.BRODCAST data set to include a free search record. See *SPL: TSO Extensions Command and Macro Reference Volume 3* for information about the ACCOUNT command.
- The in-storage list of broadcast notices resides in the common service area (CSA). In TSO/E for MVS/XA, the list resides in the extended CSA.
- When the broadcast data set is shared among different releases of TSO/E or TSO, use a TSO/E Release 2 or later system to add notices. Using Release 2 or a later system ensures that all TSO/E systems have a current in-storage list of notices.

Parse Service Routine

For MVS/XA systems only, command scan and parse recognize the characters X'0E' and X'0F' as delimiters of double-byte character set data. Parse treats data enclosed by those delimiters as lowercase data.

Command processors that use parse to scan input data that contains X'0E' followed by X'0F' as input must change those characters when they do not delimit double-byte character set data.

CLIST Processing

For MVS/XA only, programs that access internal control blocks related to CLIST processing must use the CLIST variable access routine. See *TSO Extensions Guide to Writing a Terminal Monitor Program or a Command Processor* for information about that routine.

System Generation

Installations that modified the TSO-related parameters using the TSO, EDIT, or SCHEDULR SYSGEN macros prior to TSO/E Release 3 will have their changes overlaid by the IBM-supplied defaults for the TSO/E Release 3 equivalent parameters. Installations that want to change the IBM defaults can do so after system generation. System programmers can use the sample macros and JCL in SYS1.SAMPLIB to run background jobs to change the defaults.

Commands

TSO/E planning considerations apply to these commands:

- ALLOCATE
- ATTRIB
- FREE.

ALLOCATE

To let users specify the OUTDES keyword of the ALLOCATE command to describe where and how a SYSOUT data set is to be printed, the installation must define output descriptors for the printers to be used. The system programmer can include the // OUTPUT JCL statements defining the descriptors in the LOGON procedure.

ATTRIB

Although many operands of the ATTRIB command are now repeated on the ALLOCATE command (eliminating the need for the ATTRIB command), the ATTRIB command remains available for use. Your CLISTs that contain ATTRIB commands perform in the same way that they did before this change.

FREE

You can no longer abbreviate the ATTRLIST operand as A because the ALL operand is allowed on the FREE command. Check all CLISTs that use the ATTRLIST operand. If the ATTRLIST operand was abbreviated as A, change it to AT.

Machine Requirements

TSO/E for MVS/370 is designed to be used on IBM processors supported by MVS/System Product Version 1 (5740-XYN or 5740-XYS).

TSO/E for MVS/XA is designed to be used on IBM processors supported by MVS/System Product Version 2 (5740-XC6 or 5665-291) and MVS/XA Data Facility Product (5665-284).

The Information Center Facility does not directly support any particular hardware products. The hardware required for the Information Center Facility is the same as that for the prerequisite programming products: MVS, TSO/E, and ISPF. The required hardware includes System/370 model 43XX, 303X, 308X, or 309X processors. Because the Information Center Facility interacts with end users via ISPF dialogs, these processors need to have interactive terminals installed.

TSO/E operates on any terminal currently supported by MVS TSO. The full-screen logon, the Interactive Data Transmission Facility, the Session Manager, and the Information Center Facility support:

- IBM 3270 Information Display System Terminals
  - 3275 Models 2 and 12
  - 3276 Models 2, 3, 4, 12, 13, and 14
  - 3277 Model 2
  - 3278 Models 2, 3, 4, and 5
  - 3279 Models 2A, 2B, 2X, 3A, 3B, 3X, S2A, S2B, and S3G (base color mode).
- IBM 3178 Display Terminal Models C1, C2, C3, and C4
- IBM 3179 Display Terminal Model 1
- IBM 3180 Display Terminal Models 100 and 101
- IBM 3290 Information Panel
- IBM Personal Computer (configured for 3278/79 support)
- Any other IBM terminal that functions in compatibility mode with the terminals listed above.

Note: A minimum screen size of 24 by 80 is required.

The VM/PC servers (spool, disk, and file) available with the MVSSERV command processor require the IBM Personal Computer Models XT/370 or AT/370 with an IBM 3278/79 Device Emulation Adapter.

Programming Requirements

The programming requirements for TSO/E Release 3 follow.

- TSO/E requires one of the following:
  - MVS/System Product Version 1 Release 3.2 or later.
  - MVS/System Product Version 2 Release 1.2 and MVS/XA Data Facility Product Version 2 (5665-XA2), or MVS/XA Data Facility Product Version 1 Release 1.2 (5665-284), or later releases.

  To use specific functions and devices, MVS/System Product Version 1 requires either MVS/370 Data Facility Product (5665-295) or OS/VS2 Data Facility Device Support (5740-AM7). See *MVS/System Product Version 1 General Information Manual* for information about these requirements.

- In TSO/E Release 3, the Information Center Facility requires:
  - Interactive System Productivity Facility (ISPF) Version 2 Release 1 (5665-319) or later
  - ISPF/Program Development Facility Version 2 Release 1 (5665-317) or later.

- If Interactive System Productivity Facility (ISPF) Version 1 is installed, PTF UZ45181 must also be installed to ensure correct manipulation of CLIST variables.

- The Information Center Facility supports the following IBM licensed programs:

  APL and APL-based associated products:

  - APL2 (5668-899): A Programming Language 2
  - VS/APL (5748-AP1): Virtual Storage/A Programming Language
  - APLDI-II (5796-PNJ): APL Data Interface II
  - ADRS-II (5796-PLN): A Departmental Reporting System II
  - FPS (5798-CXP): Financial Planning System-TSO

    When using the Information Center Facility, you can access the FPS routines through ADRS-II or Info Center/1. Note that IBM no longer provides service for FPS. Consult the following publications for information about installing the FPS routines or ADRS-II with the BG feature and the FPS routines under ADRS-II:

    — *A Departmental Reporting System Users Guide*

- *A Departmental Reporting System Systems Guide*
- *A Departmental Reporting System II Business Graphics*
- *The Financial Planning System - TSO Systems Guide.*

- Info Center/1 (5668-897)

Other associated products:

- GDDM (5748-XXH): Graphical Data Display Manager
  PGF (5748-XXH/02): Presentations Graphics Feature To use the graphic data format (GDF) file, GDDM Release 4 is required.

- IIPS/IIAS: Interactive Instructional Presentation System (5668-012)
  Interactive Instructional Authoring System (5668-011)

- QMF (5668-972): Query Management Facility

- IBM BASIC/MVS (5665-948)

- TIF (5665-339): The Information Facility

- AS (5767-001): Application System

- RACF 1.7 (5740-XXH): Resource Access Control Facility, which is required for space management to use RACF modelling. Except for that function, space management works without RACF 1.7.

Each product to be used with the Information Center Facility has to be ordered separately in addition to TSO/E. However, these products do not have to be installed in order for the Information Center Facility to operate.

- The VM/PC servers (spool, disk, and file) available using the MVSSERV command require:

  - ACF/VTAM Version 2 or later on the host
  - VM/PC Version 1.1 on the IBM Personal Computer XT/370 or AT/370 or VM/PC Version 2 or later on the IBM Personal Computer AT/370.

  The external functions provided in the VM/PC servers are similar to some of the functions provided in the program offering, TSO Host Server for the IBM PC XT/370 (5798-DTL). MVS/XA installations with TSO/E Release 3 should reevaluate their requirements for that program offering.

- In MVS/370 if data encryption is to be used, you must install the MVS/370 Data Facility Product (5665-295) and either Programmed Cryptographic Facility (5740-XY5) or Cryptographic Unit Support (5740-XY6).

- For MVS/370 systems, you must install MVS/370 Data Facility Product (5665-295) to use the ANSI keywords, LRECL(nnnnnk) and ACCODE(code), of the ALLOCATE command.

- If an IBM 3284, 3286, 3287, 3288, or 3289 Printer is to be used for Information Center Facility output, the JES/328X Print Facility Version 1 (5785-BAB) or some appropriate product must be installed on the system.

Virtual Storage Requirements

The following lists the increase in virtual storage requirements for each release of TSO/E.

TSO/E Release 1

For MVS/370 and MVS/XA:

PLPA Approximately 40K bytes.

Private Area The TRANSMIT and RECEIVE commands can be used within a TSO user region size of approximately 128K bytes.

The requirements for the SUBMIT * function depend upon the size of the submitted job stream.

The other functions of the product result in a small increase in virtual storage requirements and also can be used within a TSO user region size of approximately 128K bytes.

In addition, for MVS/XA:

ELPA Approximately 16K bytes.

Private Area The requirements for the TEST command depend upon the size of the program being tested.

TSO/E Release 2

The following lists the increase in virtual storage requirements when going from TSO/E Release 1 to TSO/E Release 2:

For MVS/370 and MVS/XA:

PLPA Approximately 45K bytes.

Private Area Use of the Session Manager requires additional virtual storage for the Session Manager streams and functions.

Use of the Information Center Facility requires a small increase over the virtual storage requirements of its prerequisite product, the Interactive System Productivity Facility (ISPF).

In addition for MVS/XA:

EPLPA Less than 4K bytes.

TSO/E Release 2.1

The following lists the changes in virtual storage requirements when going from TSO/E Release 2 in an MVS/XA environment to TSO/E Release 2.1:

PLPA	A decrease of approximately 200K bytes below the 16-megabyte line.
EPLPA	An increase of approximately 405K bytes above the 16-megabyte line.
Private Area	Most of the storage for Session Manager streams and functions is obtained above the 16-megabyte line.

TSO/E Release 3

The changes in virtual storage requirements for TSO/E Release 3 will be included at general availability of TSO/E Release 3.

New Macros, Modules, and CLISTs

The names of the new macros, modules, and CLISTs for TSO/E Release 3 will be included at general availability of TSO/E Release 3.

Chapter 4. Documentation for TSO/E

This chapter describes the documentation that users need for TSO/E. It contains a description of the TSO/E library and ordering information for the documentation of TSO/E Releases 1, 2, and 2.1. Ordering information for TSO/E Release 3 documentation will be included at general availability of TSO/E Release 3.

Note: IBM no longer provides service for TSO/E Release 1. The functions in TSO/E Release 1 were incorporated into later releases of TSO/E.

The TSO Extensions Library

The manuals in the TSO/E library are described below. These are your primary information sources about TSO/E. Frequently, the text of a TSO/E manual directs readers to other, non-TSO, manuals for related information. The Preface of each TSO/E manual has a list of all such manuals, with their order numbers.

All TSO/E manuals have a Reader's Comment Form. Use this form to make comments about the book, as well as about any online information. Feedback always reaches the writers responsible for the manuals.

The books in the library are grouped in the following categories:

- Introductory information
- Programming
- System programming
- Interactive Data Transmission Facility
- Session Manager
- Information Center Facility
- Messages
- Diagnostic - Logic.

Introductory Information

This category contains the introductory manual for TSO/E:

- *TSO Extensions General Information*

  This manual describes the facilities of the TSO Extensions (TSO/E) licensed program. It is intended for installation managers and system programmers who are considering installing TSO/E. The book is revised when a new release is announced and again when that release is generally available.

Programming

This category includes any manual that contains programming information needed by an application programmer. The following manuals are in this category:

- *TSO Extensions User's Guide*

  This manual describes activities you would typically perform with TSO/E and the commands you would use. Examples illustrate how to perform many of the activities. It includes information about entering and manipulating data and executing programs from the terminal. In addition, this manual describes how to transmit and receive data and messages using the TRANSMIT and RECEIVE commands. Starting with TSO/E Release 2, *TSO Extensions User's Guide* replaces the *TSO Terminal User's Guide* and the *Interactive Data Transmission Facility User's Guide* and includes both MVS/370 and MVS/XA information.

- *TSO Extensions Command Language Reference*

  This manual describes individual TSO commands. Commands are arranged alphabetically, and subcommand descriptions appear with the commands. All parameters are explained. It includes both MVS/370 and MVS/XA information.

- *TSO Extensions Command Language Reference Summary*

  This pocket-size manual has summaries of frequently-used TSO commands. Included is information about CLISTs, with brief discussions of expressions and control variables. This manual is intended for persons already familiar with TSO commands. It includes both MVS/370 and MVS/XA information.

- *TSO Extensions Guide to Writing a Terminal Monitor Program or a Command Processor*

  This manual describes how to write terminal monitor programs and command processors. First, there are descriptions of what terminal monitor programs and command processors should accomplish. These are followed by descriptions of macro instructions and service routines that simplify program preparation. It includes both MVS/370 and MVS/XA information.

- *TSO Extensions CLISTs: Implementation and Reference*

  This manual is intended for programmers who design and code CLISTs for installation-dependent applications. It describes the types of functions that can be performed using CLISTs and contains numerous examples. It includes both MVS/370 and MVS/XA information.

System Programming

This category includes any manual that contains programming information needed by a system programmer. The following three manuals are in this category. The three manuals include information for both MVS/370 and MVS/XA. Starting with TSO/E Release 2, they replace *System Programming Library: TSO.*

- *System Programming Library: TSO Extensions Installation and Planning Volume 1*

  This manual provides system programmers with information about how to plan the installation of TSO/E.

- *System Programming Library: TSO Extensions User Exits and Modifications Volume 2*

  This manual describes how to modify TSO/E. It includes information about IBM-supplied exit routines and requirements for writing your own.

- *System Programming Library: TSO Extensions Command and Macro Reference Volume 3*

  This manual provides syntactical definitions of TSO commands and macro instructions.

Interactive Data Transmission Facility

This category contains the logic manual for the Interactive Data Transmission Facility. Starting with TSO/E Release 2, the information in *Interactive Data Transmission Facility User's Guide* has been put into *TSO Extensions User's Guide.*

- *Interactive Data Transmission Facility Logic*

  This manual describes the internal logic of the TRANSMIT and RECEIVE command processors and is intended for people who maintain or modify these command processors. It includes both MVS/370 and MVS/XA information.

Session Manager

This category contains the manuals that describe the Session Manager.

- *TSO Extensions Session Manager Terminal User's Guide*

  This manual describes how to use the default Session Manager environment. It is intended for users who are unfamiliar with the Session Manager and how it works. The manual contains explanations and exercises illustrating how to use the program function (PF) keys and the different areas of the screen. It includes both MVS/370 and MVS/XA information.

- *TSO Extensions Session Manager Program Reference*

  This manual describes the Session Manager default environment, how you can change it to suit your particular needs, and the syntax and functions of the Session Manager commands. It is intended for users who are already familiar with how the Session Manager works and want to use the commands to change the screen layout, PF keys, or other attributes related to the Session Manager environment. It includes both MVS/370 and MVS/XA information.

- *TSO Extensions Session Manager Logic Manual*

  This manual describes the functions and logic of the internal operations, program structure, control flow, data flow, and data areas of the Session Manager. It also provides some diagnostic aids. It is intended for system programmers who need to modify the Session Manager. This manual contains information for the MVS/370 environment only.

- *TSO Extensions Session Manager Logic, MVS/Extended Architecture*

  This manual applies to the MVS/XA environment and contains the same information as the previous manual.

Information Center Facility

This category contains the manuals that describe the Information Center Facility.

- *TSO Extensions Guide to Getting Started With the Information Center Facility*

  This manual describes how to begin using the Information Center Facility. It also describes the services available through the Information Center Facility. Examples illustrate how to use a display terminal, the PF keys, and the Information Center Facility panels. It includes both MVS/370 and MVS/XA information.

- *TSO Extensions Information Center Facility Administrator's Guide*

  This manual describes the administrative tasks required to maintain Information Center Facility services at an installation. It includes both MVS/370 and MVS/XA information.

This category also includes the online information that describes the Information Center Facility.

- Users' tutorial

  This tutorial consists of a series of panels that explain how to use the Information Center Facility. The tutorial also provides an overview of the services available through the Information Center Facility.

- Administrators' tutorial

  This tutorial provides an overview of the tasks that an administrator performs to maintain the Information Center Facility.

- Help information

  All functional panels in the Information Center Facility have help panels associated with them. Starting in TSO/E Release 3, the messages for the Information Center Facility also have help panels associated with them. The functional panels are the panels that let users do work, such as type data in fields, select an item from a list of items, or choose a service. The help panels associated with a functional panel explain the purpose of the functional panel and tell how to use the functional panel. A help panel for a message explains the message and provides information about how to proceed.

Messages

This category contains the message book for TSO:

- *TSO Messages*

  This manual describes the messages for TSO and all releases of TSO/E. Intended primarily for debugging, it is not needed for normal program operation. Messages are arranged by message identifier, and each message has a description of why the message was issued. It also lists the modules in which the conditions were detected and the modules that contain the messages. This manual includes both MVS/370 and MVS/XA information.

Diagnostic - Logic

The following manuals describe the internal logic and organization of TSO/E. They are intended for people who maintain or modify TSO/E.

- *OS/VS2 TSO Command Processor Logic Volume I: ACCOUNT*

  This manual describes the ACCOUNT command processor and applies to the MVS/370 environment.

- *TSO Extensions Command Processor Logic Volume I: ACCOUNT MVS/Extended Architecture*

  This manual describes the ACCOUNT command processor and applies to the MVS/XA environment. Starting in TSO/E Release 2.1, it replaces *OS/VS2 TSO Command Processor Logic Volume 1: ACCOUNT* and the supplement for MVS/ System Product Version 2.

- *OS/VS2 TSO Command Processor Logic Volume II: EDIT*

  This manual describes the EDIT command processor and applies to TSO/E in the MVS/370 environment when the TSO/E supplement is installed.

- *MVS/XA TSO Extensions TSO Command Processor Logic Volume II: EDIT*

  This manual describes the EDIT command processor and applies to the MVS/XA environment. Starting in TSO/E Release 2.1, it replaces *OS/VS2 TSO Command Processor Logic Volume II: EDIT* and the supplements for MVS/System Product Version 2 and TSO Extensions.

- *OS/VS2 TSO Command Processor Logic Volume III: TEST*

  This manual describes the TEST command processor and applies to the MVS/370 environment.

- *MVS/XA TSO Extensions TSO Command Processor Logic Volume III: TEST*

  This manual describes the TEST command processor and applies to the MVS/XA environment.

- *TSO Extensions Command Processor Logic Volume IV*

  This manual describes all of the major TSO command processors except ACCOUNT, EDIT, and TEST. It includes both MVS/370 and MVS/XA information and replaces *OS/VS2 TSO Command Processor Logic Volume IV* and the supplements for MVS/System Product Versions 1 and 2 and TSO Extensions Release 1 and 2.

- *TSO Extensions Command Processor Logic Volume IV MVS/Extended Architecture*

  This manual describes all of the major TSO command processors except ACCOUNT, EDIT, and TEST. It applies to TSO/E Release 2.1 in an MVS/XA environment.

- *OS/VS2 Terminal Monitor Program and Service Routines Logic*

  This manual describes the logic of the terminal monitor program and the TSO service routines. With the supplement for TSO/E and MVS/System Product Version 1, it applies to TSO/E in an MVS/370 environment.

- *TSO Extensions Terminal Monitor Program and Service Routines Logic MVS/Extended Architecture*

  This manual describes the logic of the terminal monitor program and the TSO service routines and applies to the MVS/XA environment. Starting in TSO/E Release 2, it replaces *OS/VS2 Terminal Monitor Program and Service Routines Logic* and the supplements for TSO/E and MVS/System Product Version 2.

Publications and Microfiche Ordering Information

This section lists the TSO publications and microfiche that have been updated for releases of TSO/E that are currently available. The most recent releases are listed first. Figure 4 shows the format of the lists.

Title (1)	Order Numbers (2)			
	Base (3)	Prerequisite/ Service (4)	Release 2 (5)	Service (6)
TSO Terminal Messages	*******	None	GC28-1310-2	None
TSO Extensions Terminal Monitor Program and Service Routines Logic	*******	None	LT68-1308 formerly LY28-1308-0	None
SPL: TSO Extensions User Exits and Modifications Volume 2	*******	None	ST28-1380 formerly SC28-1380-0	SN28-1041 SN28-0975

Figure 4. Example of a TSO/E Publications or Microfiche List

The list identifies the updated manuals and microfiche by:

(1) Title of the manual or microfiche.

(2) All the pertinent order numbers for this title for the release of TSO/E specified. If the manual has to be ordered using a temporary order number, this table lists both the temporary order number and the former order number. The order numbers include:

(3) The base order number to which you must apply any subsequent TNL or supplement order numbers. Asterisks (**********) in this column indicate that there is a new base order number. For the new base order number, see (5) in Figure 4.

(4) The prerequisite or service TNLs or supplements that you must apply. If there is an update to the manual for the release, these TNLs or supplements are considered prerequisites; otherwise, they are considered service to the base. None in this column indicates that you do not need any prerequisites for the release or service to the base.

(5) The TNL, supplement, base order number that contains the information for the release of TSO/E specified. None in this column indicates that this manual or microfiche was not updated for the release of TSO/E specified.

(6) The service TNL or supplement order numbers that you must apply after the release is available. None in this column indicates that there are no service updates for this release of the manual.

Some examples of how to use the information in Figure 4 are:

- For the TSO/E Release 2 level of *TSO Terminal Messages*, you need only GC28-1310-2. The asterisks in the Base column indicate that this is a new base order number. None in the Prerequisite/Service and Service columns means that you do not need any prerequisite or service TNLs or supplements.

- For the TSO/E Release 2 level of *TSO Extensions Terminal Monitor Program and Service Routines Logic*, you need LT68-1308. That manual was formerly available under the order number, LY28-1308-0. None in the Prerequisite/Service and Service columns means that you do not need any prerequisite or service TNLs or supplements.

- For the TSO/E Release 2 level of *SPL: TSO Extensions User Exits and Modifications Volume 2*, you need ST28-1380. That manual was formerly available under the order number, SC28-1380-0. You also need the service TNLs, SN28-1041 and SN28-0975, to ST28-1380 or SC28-1380-0. None in the Prerequisite/Service column means there are no prerequisites for the manual.

TSO/E Release 2.1 Publications

The information in this section applies to TSO/E Release 2.1.

MVS/XA

Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 2.1**	**Service**
Introductory Information				
TSO Extensions General Information	*******	None	GC28-1061-5 or later	None
Programming				
TSO Extensions User's Guide (Not updated for Release 2.1)	SC28-1333-1	None	None	None
TSO Extensions Command Language Reference (Not updated for Release 2.1)	SC28-1307-1	None	None	None
TSO Extensions Command Language Reference Summary (Not updated for Release 2.1)	GX23-0015-0	None	None	None
TSO Extensions Guide to Writing a Terminal Monitor Program or a Command Processor	*******	None	SC28-1136-3	None
TSO Extensions CLISTs: Implementation and Reference (Not updated for Release 2.1)	SC28-1304-1	None	None	None
System Programming Library				
SPL: TSO Extensions Installation and Planning Volume 1	*******	None	SC28-1379-1	None
SPL: TSO Extensions User Exits and Modifications Volume 2	*******	None	SC28-1380-1	None
SPL: TSO Extensions Command and Macro Reference Volume 3	SC28-1381-0	None	SN28-0996	None

TSO/E Release 2.1 Publications (continued)
MVS/XA (continued)

Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 2.1**	**Service**
Interactive Data Transmission Facility				
TSO Extensions Interactive Data Transmission Facility Logic (Not updated for Release 2.1)	LY28-1105-1	LN28-0820	None	None
Session Manager				
TSO Extensions Session Manager Terminal User's Guide (Not updated for Release 2.1)	SC28-1305-0	None	None	None
TSO Extensions Session Manager Program Reference (Not updated for Release 2.1)	SC28-1306-0	None	None	None
TSO Extensions Session Manager Logic Manual	*******	None	LY28-1502-0	None
Information Center Facility				
TSO Extensions Guide to Getting Started With the Information Center Facility (Not updated for Release 2.1)	GC28-1334-0	None	None	None
TSO Extensions Information Center Facility Administrator's Guide (Not updated for Release 2.1)	GC28-1332-0	None	None	None
Messages - Codes				
TSO Terminal Messages	*******	None	GC28-1310-2	None
MVS/XA Message Library: System Codes	GC28-1157-3	None	None	None

TSO/E Release 2.1 Publications (continued)
MVS/XA (continued)

Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 2.1**	**Service**
Diagnostics - Logic				
TSO Extensions Command Processor Logic Vol. I: ACCOUNT	*******	None	LY28-1503-0	None
TSO Extensions Command Processor Logic Vol. II: EDIT (No new information for Release 2.1)	*******	None	LY28-1504-0	None
TSO Extensions Command Processor Logic Vol. III: TEST (Not updated for Release 2.1)	LY28-1137-0	LN28-0818	None	None
TSO Extensions Command Processor Logic Vol. IV	*******	None	LY28-1506-0	LN28-1033
TSO Extensions Terminal Monitor Program and Service Routines Logic	*******	None	LY28-1308-1	LN28-1034
Diagnostics - Reference				
MVS/XA Debugging Handbook Vol. 5	LT00-1630	None	LN28-1001	None

TSO/E Release 2.1 Microfiche

MVS/XA Only

Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 2.1**	**Service**
Data Areas	(for JES2) LYB8-1191-0 (for JES3) LYB8-1195-0	None	LDB3-0276-3	None
Macro Usage Table	(for JES2) LYB8-1193-0 (for JES3) LYB8-1197-0	None	LDB3-0278-3	None
Symbol Usage Table	(for JES2) LYB8-1192-0 (for JES3) LYB8-1196-0	None	LDB3-0277-3	None

TSO/E Release 2 Publications

The information in this section applies to TSO/E Release 2.

MVS/370

Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 2**	**Service**
Introductory Information				
TSO Extensions General Information	*******	None	GC28-1061-3 or later	None
Programming				
TSO Extensions User's Guide	*******	None	SC28-1333-1	None
TSO Extensions Command Language Reference	*******	None	SC28-1307-1	None
TSO Extensions Command Language Reference Summary	*******	None	GX23-0015-0	None
TSO Extensions Guide to Writing a Terminal Monitor Program or a Command Processor	*******	None	SQ28-1136 formerly SC28-1136-1	None
TSO Extensions CLISTs: Implementation and Reference	*******	None	SC28-1304-1	None
System Programming Library				
SPL: TSO Extensions Installation and Planning Volume 1	*******	None	ST28-1379 formerly SC28-1379-0	None
SPL: TSO Extensions User Exits and Modifications Volume 2	*******	None	ST28-1380 formerly SC28-1380-0	SN28-1041 SN28-0975
SPL: TSO Extensions Command and Macro Reference Volume 3	*******	None	SC28-1381-0	None
Interactive Data Transmission Facility				
TSO Extensions Interactive Data Transmission Facility Logic (Not updated for Release 2)	LY28-1105-1	LN28-0820	None	None

TSO/E Release 2 Publications (continued)
MVS/370 (continued)

Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 2**	**Service**
Session Manager				
TSO Extensions Session Manager Terminal User's Guide	*******	None	SC28-1305-0	None
TSO Extensions Session Manager Program Reference	*******	None	SC28-1306-0	None
TSO Extensions Session Manager Logic Manual	*******	None	LY28-1312-0	None
Information Center Facility				
TSO Extensions Guide to Getting Started With the Information Center Facility	*******	None	GC28-1334-0	None
TSO Extensions Information Center Facility Administrator's Guide	*******	None	GC28-1332-0	None
Messages - Codes				
TSO Terminal Messages	*******	None	GC28-1310-2	None
Diagnostics - Logic				
TSO Command Processor Logic Vol. I: ACCOUNT (Not updated for Release 2)	SY28-0651-2	None	None	None
TSO Command Processor Logic Vol. II: EDIT (Not updated for Release 2)	SY33-8548-3	LD23-0246-0	None	None
TSO Command Processor Logic Vol. III: TEST (Not updated for Release 2)	SY35-0004-2	None	None	None
TSO Extensions Command Processor Logic Vol. IV	*******	None	LY28-1553-1	None
TSO Terminal Monitor Program and Service Routines Logic	SY28-0650-4	None	LD23-0258-1	None

TSO/E Release 2 Publications (continued)
MVS/370 (continued)

Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 2**	**Service**
Diagnostics - Reference				
Debugging Handbook Vol. 1	*******	None	GC28-1047-1	GN28-0993 GN28-0939 GN28-1048
Debugging Handbook Vol. 2	*******	None	GC28-1048-2	None

TSO/E Release 2 Publications (continued)
MVS/XA

Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 2**	**Service**
Introductory Information				
TSO Extensions General Information	*******	None	GC28-1061-3 or later	None
Programming				
TSO Extensions User's Guide	*******	None	SC28-1333-1	None
TSO Extensions Command Language Reference	*******	None	SC28-1307-1	None
TSO Extensions Command Language Reference Summary	*******	None	GX23-0015-0	None
TSO Extensions Guide to Writing a Terminal Monitor Program or a Command Processor	*******	None	SQ28-1136-0 formerly SC28-1136-1	None
TSO Extensions CLISTs: Implementation and Reference	*******	None	SC28-1304-1	None
System Programming Library				
SPL: TSO Extensions Installation and Planning Volume 1	*******	None	ST28-1379 formerly SC28-1379-0	None
SPL: TSO Extensions User Exits and Modifications Volume 2	*******	None	ST28-1380 formerly SC28-1380-0	SN28-1041 SN28-0975
SPL: TSO Extensions Command and Macro Reference Volume 3	*******	None	SC28-1381-0	None
Interactive Data Transmission Facility				
TSO Extensions Interactive Data Transmission Facility Logic (Not updated for Release 2)	LY28-1105-1	LN28-0820	None	None

TSO/E Release 2 Publications (continued)
MVS/XA (continued)

Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 2**	**Service**
Session Manager				
TSO Extensions Session Manager Terminal User's Guide	*******	None	SC28-1305-0	None
TSO Extensions Session Manager Program Reference	*******	None	SC28-1306-0	None
TSO Extensions Session Manager Logic Manual	*******	None	LY28-1312-0	None
Information Center Facility				
TSO Extensions Guide to Getting Started With the Information Center Facility	*******	None	GC28-1334-0	None
TSO Extensions Information Center Facility Administrator's Guide	*******	None	GC28-1332-0	None
Messages - Codes				
TSO Terminal Messages	*******	None	GC28-1310-2	None
Diagnostics - Logic				
TSO Command Processor Logic Vol. I: ACCOUNT (Not updated for Release 2)	SY28-0651-2	LD23-0270-0	None	None
TSO Command Processor Logic Vol. II: EDIT (Not updated for Release 2)	SY33-8548-3	LD23-0271-0 LD23-0272-1	None	None
TSO Command Processor Logic Vol. III: TEST (Not updated for Release 2)	LY28-1137-0	LN28-0818	None	None
TSO Extensions Command Processor Logic Vol. IV	*******	None	LY28-1553-1	None
TSO Extensions Terminal Monitor Program and Service Routines Logic	*******	None	LT68-1308 formerly LY28-1308-0	None

TSO/E Release 2 Publications (continued)
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Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 2**	**Service**
Diagnostics - Reference				
Debugging Handbook Vol. 1	*******	None	LT00-1626	None
Debugging Handbook Vol. 2	*******	None	LT00-1627	None

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Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 2**	**Service**
Data Areas	LYB8-1119-0	None	LNB8-0985	None
Macro Usage Table	LYB8-1120-0	None	LNB8-0986	None
Symbol Usage Table	LYB8-1121-0	None	LNB8-0987	None

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Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 2**	**Service**
Data Areas	(for JES2) LYB8-1191-0 (for JES3) LYB8-1195-0	None	LDB3-0276-2	None
Macro Usage Table	(for JES2) LYB8-1193-0 (for JES3) LYB8-1197-0	None	LDB3-0278-2	None
Symbol Usage Table	(for JES2) LYB8-1192-0 (for JES3) LYB8-1196-0	None	LDB3-0277-2	None

TSO/E Release 1 Publications

The information in this section applies to TSO/E Release 1.

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Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 1**	**Service**
Introductory Information				
TSO Extensions General Information	*******	None	GC28-1061-1 or later	None
Programming				
TSO Terminal User's Guide	GC28-0645-4	GN28-4753	SD23-0241-0	SN28-1037
TSO Command Language Reference	GC28-0646-4	GN28-4699 GN28-4754 GD23-0228-0 GN28-4924	SD23-0242-0	SN28-1042
TSO Guide to Writing a Terminal Monitor Program or a Command Processor	GC28-0648-4*	GD23-0240-0	SD23-0245-0	SN28-1032
System Programming Library				
SPL: TSO	GC28-0629-3	GD28-0227-0 GN28-2971	SD23-0244-0	None
Interactive Data Transmission Facility				
TSO Extensions Interactive Data Transmission Facility User's Guide	*******	None	SC28-1104-1	None
TSO Extensions Interactive Data Transmission Facility Logic	******	None	LY28-1105-1	LN28-0820
Messages - Codes				
TSO Terminal Messages	*******	None	GC28-1310-2	None
VS2 System Codes	*******	None	GC38-1008-10	GN28-5086
Diagnostics - Logic				
TSO Command Processor Logic Vol. I: ACCOUNT	SY28-0651-2	None	None	None
TSO Command Processor Logic Vol. II: EDIT	SY33-8548-3	None	LD23-0246-0	None

* GC28-0648-4 is a minor revision of GC28-0648-3 incorporating TNLs GN28-2998, GN28-4688, and GN28-4749.

TSO/E Release 1 Publications (continued)
MVS/370 (continued)

Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 1**	**Service**
TSO Command Processor Logic Vol. III: TEST	SY35-0004-2	None	None	None
TSO Command Processor Logic Vol. IV	*******	None	LT68-1553 formerly LY28-1553-0	None
TSO Terminal Monitor Program and Service Routines Logic	SY28-0650-4	None	LD23-0248-1	None
Diagnostics - Reference				
Debugging Handbook Vol. 2	GQ28-1048 formerly GC28-1048-1	None	GD23-0250-0	None
Debugging Handbook Vol. 3	GQ28-1049 formerly GC28-1049-1	None	GD23-0251-0	None

TSO/E Release 1 Publications (continued)
MVS/XA

Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 1**	**Service**
Introductory Information				
TSO Extensions General Information	*******	None	GC28-1061-0 or later	None
Programming				
TSO Terminal User's Guide	GC28-1274-0	None	SD23-0263-1	SN28-1038
TSO Command Language Reference	********		SC28-1134-0	SN28-0816 SN28-1029
TSO Guide to Writing a Terminal Monitor Program or a Command Processor	*********	None	ST28-1136 formerly SC28-1136-0	SN28-0817
System Programming Library				
SPL: TSO	GC28-1173-0	GN28-0882	SD23-0267-1	SN28-0883
Interactive Data Transmission Facility				
TSO Extensions Interactive Data Transmission Facility User's Guide	*******	None	SC28-1104-1	SN28-0819
TSO Extensions Interactive Data Transmission Facility Logic	*******	None	LY28-1105-1	LN28-0820
Messages - Codes				
TSO Terminal Messages	*******	None	GC28-1310-2	None
Diagnostics - Logic				
TSO Command Processor Logic Vol. I: ACCOUNT	SY28-0651-2	LD23-0270-0	None	None
TSO Command Processor Logic Vol. II: EDIT	SY33-8548-3	LD23-0271-0	LD23-0272-1	None
TSO Command Processor Logic Vol. III: TEST	*********	None	LY28-1137-0	LN28-0818
TSO Command Processor Logic Vol. IV	*******	None	LT68-1553 formerly LY28-1553-0	None
TSO Terminal Monitor Program and Service Routines Logic	*******	None	LY28-1555-0	None

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Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 1**	**Service**
Data Areas	*****	None	LYB8-1119-0	None
Macro Usage Table	****	None	LYB8-1120-0	None
Symbol Usage Table	*****	None	LYB8-1121-0	None

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Title	Order Numbers			
	Base	**Prerequisite/ Service**	**Release 1**	**Service**
Data Areas	(for JES2) LYB8-1191-0 (for JES3) LYB8-1195-0	None	LDB3-0276-1	None
Macro Usage Table	(for JES2) LYB8-1193-0 (for JES3) LYB8-1197-0	None	LDB3-0278-1	None
Symbol Usage Table	(for JES2) LYB8-1192-0 (for JES3) LYB8-1196-0	None	LDB3-0277-1	None

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TSO Extensions (TSO/E)
General Information

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